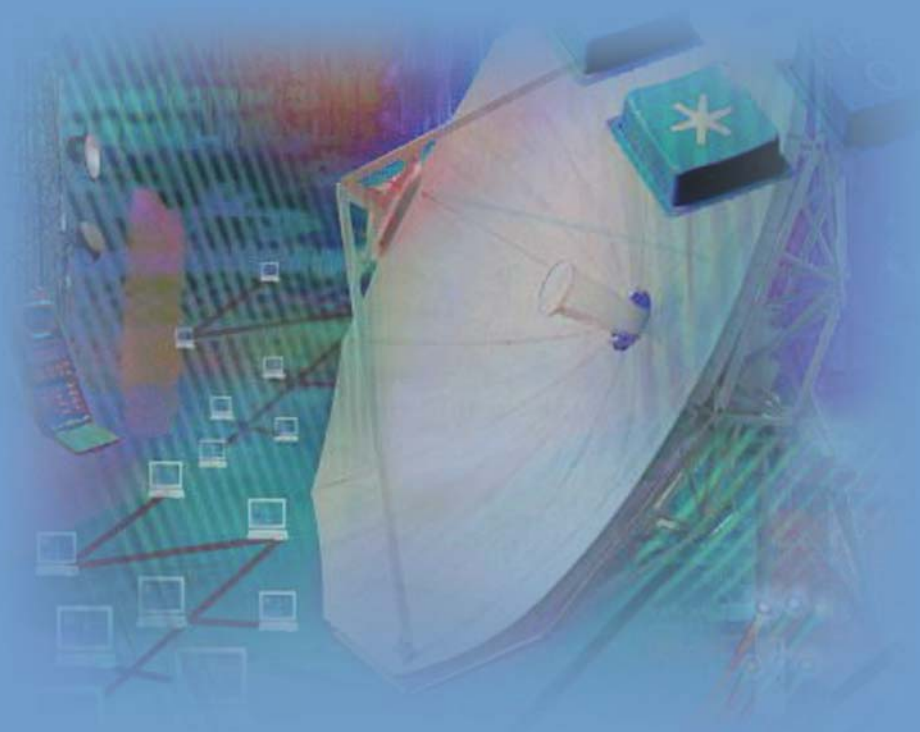


Profiles of Institutions

*for Scientific Exchange and
Training in the South*



4th Edition 2007

Published by

TWAS, the academy of sciences for the developing world
in collaboration with

COMSATS, Commission on Science and Technology for
Sustainable Development in the South

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Foreword

TWAS, the Academy of Sciences for the Developing World, in Trieste, Italy, and COMSATS, the Commission on Science and Technology for Sustainable Development in the South, in Islamabad, Pakistan, are delighted to present the fourth edition of Profiles of Institutions for Scientific Exchange and Training in the South.

The three previous editions – detailing the accomplishments and capabilities of leading research centres, institutes and universities in the developing world – have proven to be valuable sources of information, especially in efforts to promote South-South and South-North cooperation in science. We trust that this volume will be equally useful. In addition to the profiles, we have included several tables and indexes that group the institutions. The tables and indexes are intended to help users quickly access aggregate statistical information related to specific fields, regions and institutions in Least Developed Countries (LDCs).

This fourth edition of Profiles of Institutions for Scientific Exchange and Training in the South contains a total of 485 institutions in 65 countries, including 28 countries categorized as scientifically lagging according to an index developed by TWAS.

About 85 percent of the institutions in the current issue were also included in volume three. Information about these institutions has been updated. Fifteen percent of the institutions are new entries. All of the information has been assembled with the help of administrators, researchers and staff at the institutions.

We strongly believe that volumes like Profiles of Institutions for Scientific Exchange and Training in the South not only help to showcase the growing capacity of scientific institutions in the developing country, but also help to promote it. In fact, the information presented in those volumes has and can be used to encourage the creation of scientific networks and joint research projects, which are often the keys to successful research in the today's world of science.

TWAS will celebrate its 25th anniversary in 2008. COMSATS will celebrate its 15th anniversary in 2009. Much progress has been made in building scientific capacity in the developing world over the past few decades. It is now reasonable to conclude that many of the leading scientific institutions in the South pursue research agendas that are comparable in quality and impact to the research agendas pursued by their counterparts in the North. Yet, it is also reasonable to conclude that scientific institutions of superior excellence in the

developing world remain small in number and are often confined to just a few developing countries that are emerging as scientific powers.

Such trends, which are encouraging and disappointing at the same time, raise new challenges for those seeking to promote scientific capacity building in the developing world: Most importantly, what measures should be taken to close the growing gap in scientific capacity within the South?

Indeed nearly 30 percent of institutions listed in this volume are located in Brazil, China and India. This simple breakdown of information strongly suggests that a South-South divide in scientific excellence may be continuing to unfold even as the North-South seems to be narrowing.

The growing gap in scientific capabilities in the developing world, which has become a topic of intense discussion in scientific meetings and books in both the South and North, should not be viewed solely with trepidation. This trend also promises hope. But such hope can only be fulfilled if the developing world's best universities and pre-eminent centres of scientific excellence open their doors to others and welcome greater South-South cooperation in science. Only then will the growing gap in scientific capacity within the South turn into asset that can reap enormous benefits across the developing world in the future.

We believe that the information contained in Profiles of Institutions for Scientific Exchange and Training in the South can help advance the cause of South-South cooperation (and South-North cooperation in science as well). Previous volumes have been consulted to help build the scientific network for the TWAS-UNESCO (United Nations Educational, Scientific and Cultural Organization Associateship programme). This programme allows talented scientists from the developing world to visit centres of excellence in the South for extended periods to enhance research activities and forge valuable partnerships with colleagues who share similar interest. The centres of excellence serving as the cornerstones of this initiative were first identified in previous editions of Profiles of Institutions for Scientific Exchange and Training in the South.

Under a project funded by the United Nations Development Programme's Special Unit for South-South Cooperation (UNDP-SSC), TWAS has also turned to the Profiles of Institutions for Scientific Exchange and Training in the South to bring together scientific institutions throughout the developing world to share experiences in the application of science and technology to address critical societal problems. Over the past three years, workshops have been held on risk management in small island nations, knowledge sharing for sustainable development, and applications of science and technology to address urban challenges in the developing world.

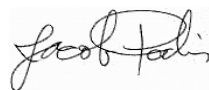
The examples cited above indicate how earlier volumes of Profiles of Institutions for Scientific Exchange and Training in the South have helped to

facilitate science-and technology-based projects by providing information to help forge institutional links. It is our fond hope that this volume will serve a similar purpose.

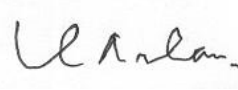
TWAS and COMSATS are most grateful to all those who have contributed to the realization of this latest edition of Profiles of Institutions for Scientific Exchange and Training in the South.

Collecting the information has been a challenging, time-consuming task, requiring continuous follow-up emails and phone calls to ensure that the information was as current and complete as possible. We extend a special thanks to the many researchers and staff at scientific institutions throughout the developing world who spent countless hours collecting the information that has made this volume possible. A careful review process, led by TWAS's secretary general, Dorairajan Balasubramanian, was instituted to guarantee that only institutions demonstrating scientific excellence were selected. We would like to express our gratitude to him for his efforts. We would also like to extend a special thanks to Ms. Sheila Khawaja, TWAS, and Mr. Tajammul Hussain, Mr. Irfan Hayee, Mr. Imran Chaudhry and Ms. Sadia Nawaz, COMSATS, for the administrative and publishing assistance they provided in bringing this volume to fruition.

We sincerely hope that the fourth edition of Profiles of Institutions for Scientific Exchange and Training in the South proves worthy of our efforts. Our ultimate satisfaction will be derived from knowing that policy makers and staff, institutional presidents and directors, and individual scientists and researchers all find the volume to be a valuable resource both in advancing their own research agendas and in providing valuable knowledge for science-based sustainable development in the South.



Prof. Jacob Palis
President
TWAS, the academy of sciences
for the developing world
Trieste, Italy



Dr. Hameed Ahmed Khan
Executive Director
COMSATS, Commission on Science
and Technology for Sustainable
Development in the South
Islamabad, Pakistan

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Reference Index of Centres with Research Fields

Index table by name of centre with page reference

Centres (in alphabetical order)

A

	Agri	Bio	Chem	Earth	Engg	Env	math	Med	Phys	Soc	Page #
Academia Sinica, China							x		x		103
Academia Sinica — Institute of Atomic and Molecular Sciences (IAMS), China			x						x		104
Academia Sinica — Institute of Earth Sciences (IES), China				x							104
Academia Sinica — Institute of Molecular Biology, China		x									105
Academy of Sciences of Uzbekistan — Heat Physics Department, Uzbekistan			x		x	x			x		447
Academy of Sciences of Uzbekistan — S. Yu. Yusunov Institute of Chemistry of Plant Substances, Uzbekistan	x	x	x		x						449
Addis Ababa University (AAU) — Department of Physics, Ethiopia									x		167
Addis Ababa University (AAU) — Institute of Pathobiology, Ethiopia		x						x			167
African Regional Centre for Technology (ARCT), Senegal	x					x					379
Aga Khan University (AKU), Pakistan		x									347
Ain Shams University — Institute of Environmental Studies and Research, Egypt	x	x	x			x					159

Centres (in alphabetical order)

	Agri	Bio	Chem	Earth	Engg	Env	math	Med	Phys	Soc	Page #
American University of Beirut — Faculty of Agricultural and Food Sciences, Lebanon	x					x					275
Arab Center for the Studies of Arid Zones and Dry Lands (ACSAD), Syria	x	x		x							412
Arid Zone Research Centre, Pakistan	x										348
Asia Network for Sustainable Agriculture and Bioresources (ANSAB), Nepal	x	x				x					328
Asian Disaster Preparedness Center (ADPC), Thailand				x		x				x	420
Asian Institute of Medicine Science and Technology (AIMST) — School of Medicine, Malaysia								x			283
Asian Institute of Medicine, Science and Technology (AIMST) — Department of Biotechnology, Malaysia		x									283
Asian Institute of Technology (AIT), Thailand				x		x					420
Atomic Energy Commission of Syria (AECS), Syria	x	x	x			x	x				413
B											
Banaras Hindu University — Department of Zoology, India		x									178
Banaras Hindu University — Faculty of Science — Department of Physics, India									x		179

Centres (in alphabetical order)

	Agri	Bio	Chem	Earth	Engg	Env	math	Med	Phys	Soc	Page #
Bangladesh Council of Scientific and Industrial Research (BCSIR), Bangladesh	x	x	x			x			x		35
Bangladesh Institute of Research and Rehabilitation in Diabetes, Endocrine and Metabolic Disorders (BIRDEM), Bangladesh		x	x								36
Bangladesh National Scientific and Technical Documentation Centre (BANSDOC), Bangladesh	x	x	x	x	x	x	x		x		39
Bangladesh University of Engineering and Technology (BUET), Bangladesh			x	x	x	x	x		x		40
Bhabha Atomic Research Centre (BARC), India	x	x	x	x	x	x	x		x		180
Bose Institute, India	x	x									182

C

Cairo University — Faculty of Science — Entomology Department, Egypt		x				x					159
Caribbean Epidemiology Centre (CAREC), Trinidad & Tobago		x						x			426
Caribbean Industrial Research Institute (CARIRI), Trinidad & Tobago			x			x					426
Central Glass and Ceramic Research Institute (CG&CRI), India								x			183
Central Metallurgical Research and Development Institute (CMRDI), Egypt					x						160

Centres (in alphabetical order)	Agri	Bio	Chem	Earth	Engg	Env	math	Med	Phys	Soc	Page #
Centre de Biotechnologie de Sfax (CBS), Tunisia		x				x		x			428
Centre de Biotechnologie de Borj Cédria (CBBC), Tunisia	x	x			x	x					429
Centre de Recherche Océanographique de Dakar, Thiaroye (CRODT), Senegal		x	x	x		x					379
Centre de Recherches et Technologies de l'Eau, Tunisia	x	x	x	x	x	x					430
Centre for Development of Advanced Computing (C-DAC), India					x						184
Centre for Health and Population Research [formerly Intl. Centre for Diarrhoeal Diseases Research (ICDDR), Bangladesh], Bangladesh		x				x					41
Centre for Research and Development of Nuclear Techniques (CRDNT), Indonesia		x							x		244
Centre International des Technologies de l'Environnement (CITET), Tunisia						x					430
Centre National d'Application des Recherches Pharmaceutiques (CNARP), Madagascar		x	x			x					277
Centre National de la Recherche Scientifique et Technologique (CNRST), Burkina Faso	x	x	x	x	x	x					87
Centre National de Recherche Agronomique (CNRA), Cote d'Ivoire	x		x			x					145
Centre National de Recherches Appliquées au Développement Rural, Madagascar	x					x					278

Centres (in alphabetical order)

	Agri	Bio	Chem	Earth	Engg	Env	math	Med	Phys	Soc	Page #
Centre National de Recherches Industrielles et Technologique (CNRIT), Madagascar	x		x	x		x			x		278
Centre National de Recherches sur l'Environnement (CNRE), Madagascar	x	x		x		x					279
Centre National de Semences Forestieres (CNSF), Burkina Faso	x	x				x	x				88
Centre National pour la Recherche Scientifique et Technique (CNRST), Morocco		x		x		x	x		x		323
Centre Regional AGRHYMET, Niger	x	x		x		x					332
Centre Regional pour l'Eau Potable et l'Assainissement (CREPA), Burkina Faso					x	x					89
Centre Suisse de Recherche Scientifique en Cote d'Ivoire (CSRS), Cote d'Ivoire	x	x				x					146
Centro Brasileiro de Pesquisas Físicas (CBPF), Brazil		x	x						x		48
Centro de Bioplasmas (Plant Biotechnology Centre), Cuba	x	x				x					150
Centro de Estudios Científicos (CECS), Chile		x		x		x			x		96
Centro de Investigación Agrícola Tropical (CIAT), Bolivia	x										44
Centro de Investigación Científica de Yucatán (CICY), Mexico	x	x				x					298

Centres (in alphabetical order)

	Agri	Bio	Chem	Earth	Engg	Env	math	Med	Phys	Soc	Page #
Centro de Investigación Científicas y Educación Superior de Ensenada (CICESE), Mexico		x		x	x	x			x		299
Centro de Investigación en Matemáticas A.C. (CIMAT), Mexico							x				300
Centro de Investigación y de Estudios Avanzados (CINVESTAV-IPN) — Departamento de Física, Mexico							x		x		300
Centro de Investigación y Desarrollo en Ciencias Aplicadas 'Dr. Jorge J. Ronco' (CINDECA), Argentina			x								1
Centro de Investigaciones en Láseres y Aplicaciones (CEILAP), Argentina									x		2
Centro de Investigaciones Opticas (CIOp), Argentina									x		3
Centro de Pesquisas de Energia Elétrica (CEPEL), Brazil					x						49
Centro de Pesquisas e Desenvolvimento Leopoldo A. Miguez de Mello (CENPES), Brazil				x		x					50
Centro de Previsão de Tempo e Estudos Climáticos (CPTEC), Brazil	x			x		x					51
Centro del Agua del Tropico Humedo para America Latina y el Caribe (CATHALAC), Panama	x	x		x	x	x					365
Chennai Mathematical Institute, India							x				185
Childrens Medical Center — Immunology, Asthma and Allergy Research Institute (IAARI), Iran, Islamic Rep.								x			249

Centres (in alphabetical order)

	Agri	Bio	Chem	Earth	Engg	Env	math	Med	Phys	Soc	Page #
China Agricultural University — State Key Laboratory of Agrobiotechnology (SKLAB), China	x										106
Chinese Academy of Medical Sciences (CAMS) — Institute of Medicinal Plant Development (IMPLAD), China	x	x	x					x			107
Chinese Academy of Sciences (CAS) — Academy of Mathematics and Systems Science (AMSS), China							x				108
Chinese Academy of Sciences (CAS) — Beijing Institute of Genomics (BIG), China		x									108
Chinese Academy of Sciences (CAS) — Beijing Laboratory of Electron Microscopy (BLEM), China		x		x					x		109
Chinese Academy of Sciences (CAS) — Institute of Applied Ecology, China	x	x				x					110
Chinese Academy of Sciences (CAS) — Institute of Atmospheric Physics (IAP), China				x							111
Chinese Academy of Sciences (CAS) — Institute of Botany, China	x	x		x		x					112
Chinese Academy of Sciences (CAS) — Institute of Computing Technology, China		x		x							113
Chinese Academy of Sciences (CAS) — Institute of Genetics and Developmental Biology, China	x	x									114
Chinese Academy of Sciences (CAS) — Institute of Geochemistry, China				x		x					114
Chinese Academy of Sciences (CAS) — Institute of Geographic Science and Natural Resources Research (IGSNRR), China	x			x		x					115

Centres (in alphabetical order)	Agri	Bio	Chem	Earth	Engg	Env	math	Med	Phys	Soc	Page #
Chinese Academy of Sciences (CAS) — Institute of Metal Research, China			x		x				x		116
Chinese Academy of Sciences (CAS) — Institute of Microbiology (IMCAS), China	x	x				x					117
Chinese Academy of Sciences (CAS) — Institute of Modern Physics (IMP), China		x	x		x				x		118
Chinese Academy of Sciences (CAS) — Institute of Physics & Center for Condensed Matter Physics, China		x							x		119
Chinese Academy of Sciences (CAS) — Institute of Plasma Physics (ASIPP), China		x			x				x		119
Chinese Academy of Sciences (CAS) — Institute of Remote Sensing Applications, China				x		x					121
Chinese Academy of Sciences (CAS) — Institute of Soil Science (ISSCAS), China	x			x		x					121
Chinese Academy of Sciences (CAS) — National Astronomical Observatories, China									x		122
Chinese Academy of Sciences (CAS) — Purple Mountain Observatory (PMO), China									x		123
Chinese Academy of Sciences (CAS) — Research Center for Eco-Environmental Sciences (RCEES), China			x			x					124
Chinese Academy of Sciences (CAS) — Shanghai Institute of Applied Physics (SINAP), China		x	x			x			x		125
Chinese Academy of Sciences (CAS) — Shanghai Institute of Technical Physics, China					x						126

Centres (in alphabetical order)

	Agri	Bio	Chem	Earth	Engg	Env	math	Med	Phys	Soc	Page #
Chinese Academy of Sciences (CAS) — Shanghai Institutes for Biological Sciences (SIBS) — Institute of Materia Medica (SIMM), China		x	x								127
Chinese Academy of Sciences (CAS) — Shanghai Institutes of Biological Sciences (SIBC) — Institute of Biochemistry and Cell Biology (SICB), China		x									128
Chinese Academy of Sciences (CAS) — South China Sea Institute of Oceanology, China		x	x	x							129
Chinese Academy of Sciences (CAS) — Xinjiang Institute of Ecology and Geography, China	x	x		x		x					130
Chulabhorn Research Institute, Thailand		x	x								422
Chulalongkorn University — Environmental Research Institute, Thailand						x					423
Clean Energy Foundation (CEF), Turkey						x					437
Cleantech International Foundation, India		x	x	x	x	x					185
Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET) — Centro de Estudios Fotosintéticos y Bioquímicos (CEFOBI), Argentina		x									3
Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET) — Complejo Astronómico "El Leoncito" (CASLEO), Argentina									x		4
Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET) — Instituto de Biología y Medicina Experimental (IBYME), Argentina		x									5

Centres (in alphabetical order)

	Agri	Bio	Chem	Earth	Engg	Env	math	Med	Phys	Soc	Page #
Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET) — Instituto de Desarrollo y Diseño (INGAR), Argentina					x						6
Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET) — Instituto de Investigaciones Biotecnológicas — Instituto Tecnológico de Chascomús (UNSAM), Argentina	x	x				x					7
Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET) — Universidad Nacional de Córdoba — Facultad de Ciencias Químicas — Centro de Investigaciones en Química Biológica (CIQUIBIC), Argentina	x	x									8
Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET) — Universidad Nacional del Sur (UNS) — Instituto de Investigaciones Bioquímicas de Bahía Blanca (INIBIBB), Argentina		x									9
Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET) — Universidad Nacional del Sur (UNS) — Planta Piloto de Ingeniería Química (PLAPIQUI), Argentina					x						10
Council for Scientific and Industrial Research (CSIR), South Africa	x	x	x	x		x					385
Council for Scientific and Industrial Research (CSIR) — Crops Research Institute (CRI), Ghana	x	x				x					170
Council for Scientific and Industrial Research (CSIR) — Food Research Institute (FRI), Ghana	x				x						171
Council for Scientific and Industrial Research (CSIR) — Forestry Research Institute (FORIG), Ghana	x					x					173

Centres (in alphabetical order)	Agri	Bio	Chem	Earth	Engg	Env	math	Med	Phys	Soc	Page #
Council for Scientific and Industrial Research (CSIR) — Science and Technology Policy Research Institute (STEPRI), Ghana	x				x	x					174
Council for Scientific and Industrial Research (CSIR) — Water Research Institute (WRI), Ghana		x	x	x		x					175
Council of Agriculture — Fisheries Research Institute (FRI), China		x		x		x					131
Council of Agriculture — Livestock Research Institute, China	x										132
Council of Scientific and Industrial Research (CSIR), India	x	x	x	x		x	x		x		187
Council of Scientific and Industrial Research (CSIR) — Central Building Research Institute (CBRI), India			x	x		x					188
Council of Scientific and Industrial Research (CSIR) — Central Drug Research Institute (CDRI), India		x	x								189
Council of Scientific and Industrial Research (CSIR) — Central Food Technological Research Institute (CFTRI), India	x	x	x								192
Council of Scientific and Industrial Research (CSIR) — Central Institute of Medicinal and Aromatic Plants (CIMAP), India	x	x									193
Council of Scientific and Industrial Research (CSIR) — Central Leather Research Institute (CLRI), India		x	x			x					194
Council of Scientific and Industrial Research (CSIR) — Central Road Research Institute (CRRI), India				x		x					194
Council of Scientific and Industrial Research (CSIR) — Central Salt and Marine Chemicals Research Institute, India	x		x	x							196

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Council of Scientific and Industrial Research (CSIR) — Centre for Cellular and Molecular Biology (CCMB), India	x	x									197
Council of Scientific and Industrial Research (CSIR) — Indian Institute of Chemical Biology (IICB), India		x									197
Council of Scientific and Industrial Research (CSIR) — Indian Institute of Chemical Technology (IICT), India	x		x								198
Council of Scientific and Industrial Research (CSIR) — Indian Institute of Petroleum (IIP), India			x								199
Council of Scientific and Industrial Research (CSIR) — Industrial Toxicology Research Centre (ITRC), India		x				x					200
Council of Scientific and Industrial Research (CSIR) — Institute of Microbial Technology (IMTECH), India		x									201
Council of Scientific and Industrial Research (CSIR) — National Aerospace Laboratories (NAL), India					x				x		202
Council of Scientific and Industrial Research (CSIR) — National Botanical Research Institute (NBRI), India	x	x	x								203
Council of Scientific and Industrial Research (CSIR) — National Chemical Laboratory (NCL), India		x	x								204
Council of Scientific and Industrial Research (CSIR) — National Environmental Engineering Research Institute (NEERI), Nagpur, India			x			x					205
Council of Scientific and Industrial Research (CSIR) — National Geophysical Research Institute (NGRI), India				x		x					205
Council of Scientific and Industrial Research (CSIR) — National Institute of Oceanography (NIO), India				x		x					206

Centres (in alphabetical order)

	Agri	Bio	Chem	Earth	Engg	Env	math	Med	Phys	Soc	Page #
Council of Scientific and Industrial Research (CSIR) — National Institute of Science Communication and Information Resources (NISCAIR), India	x	x	x	x	x	x			x		207
Council of Scientific and Industrial Research (CSIR) — National Institute of Science, Technology and Development Studies, New Delhi, India							x				209
Council of Scientific and Industrial Research (CSIR) — National Metallurgical Laboratory (NML), India						x					210
Council of Scientific and Industrial Research (CSIR) — National Physical Laboratory (NPL), India				x							211
Council of Scientific and Industrial Research (CSIR) — Regional Research Laboratory (RRL), Jorhat, India	x	x	x	x		x					212
Council of Scientific and Industrial Research (CSIR) — Regional Research Laboratory, Bhopal, India			x	x		x					214
Council of Scientific and Industrial Research (CSIR) — Regional Research Laboratory, Thiruvananthapuram, India		x	x								215
Cuu Long Delta Rice Research Institute (CLRRI), Vietnam	x										463
D											
Desert Research Center (DRC), Egypt	x	x		x		x					161
Desert Research Foundation of Namibia (DRFN), Namibia	x	x		x		x					327

Centres (in alphabetical order)

E

	Agri	Bio	Chem	Earth	Engg	Env	math	Med	Phys	Soc	Page #
Ecole Nationale d'Ingénieurs de Tunis (ENIT), Tunisia					x	x	x		x		432
Ecole Nationale d'Ingénieurs de Tunis (ENIT) — Laboratoire de Modélisation en Hydraulique et Environnement (LMHE), Tunisia						x					433
Egyptian Petroleum Research Institute (EPRI), Egypt		x	x	x		x					162
Empresa Brasileira de Pesquisa Agropecuária (EMBRAPA) — Centre for Research on Oriental Amazonia (CPATU), Brazil	x	x				x					52
Empresa Brasileira de Pesquisa Agropecuária (EMBRAPA) — Centro de Pesquisa Agropecuária do Trópico Semi-Arido (CPATSA), Brazil	x										53
Empresa Brasileira de Pesquisa Agropecuária (EMBRAPA) — Instrumentação Agropecuária, Brazil	x										54
Empresa Brasileira de Pesquisa Agropecuária (EMBRAPA) — National Research Center for Rice and Beans (CNPAP), Brazil	x	x									55
Empresa Brasileira de Pesquisa Agropecuária (EMBRAPA) — Suínos e Aves, Brazil	x	x				x					56
Environment & Public Health Organization (ENPHO), Nepal			x			x					329
Escola Superior de Agricultura “Luiz de Queiroz” (ESALQ), Brazil	x	x		x		x					57

Centres (in alphabetical order)

	Agri	Bio	Chem	Earth	Engg	Env	math	Med	Phys	Soc	Page #
Escuela Politécnica Nacional (EPN) — Departamento de Metalurgia Extractiva (DEMEX), Ecuador					x						156
Ethiopian Rural Energy Development and Promotion Centre (EREDPC), Ethiopia	x	x			x	x					168

F

Federal Institute of Industrial Research, Oshodi (FIIRO), Nigeria	x	x	x		x	x					334
Federal Ministry of Science and Technology (Enugu) — Projects Development Institute (PRODA), Nigeria	x					x					335
Ferdowsi University of Mashhad — College of Agriculture, Iran, Islamic Rep.	x										250
Food Crops Research Institute (FCRI), Vietnam	x										464
Forest Research Institute of Malaysia (FRIM), Malaysia	x	x				x					285
Forestry Research Institute of Malawi (FRIM), Malawi	x					x					282
Forum for Agricultural Research in Africa (FARA), Ghana	x										176
Fundação Oswaldo Cruz (FIOCRUZ), Brazil		x	x			x					58
Fundacion Instituto Leloir (FIL), Argentina	x	x	x								11

Centres (in alphabetical order)	Agri	Bio	Chem	Earth	Engg	Env	math	Med	Phys	Soc	Page #
Fundación Miguel Lillo, Argentina		x	x	x		x					12
Fuwai Hospital, China								x			132
G											
Ghana Atomic Energy Commission — National Nuclear Research Institute (NNRI), Ghana			x	x	x	x		x	x		177
H											
Higher Institute for Applied Science and Technology (HIAST), Syria					x	x	x		x		413
Housing and Building Research Center (HBRC), Egypt			x	x		x			x		162
Huazhong Agricultural University — National Key Laboratory of crop Genetic Improvement (NKLCGI), China	x	x									133
Hydrometeorological Research Institute (NIGMI) of Uzhydromet, Uzbekistan	x		x	x		x	x				451
I											
Indian Agricultural Research Institute — National Research Centre on Plant Biotechnology, India	x	x									216
Indian Council of Medical Research (ICMR) — National Institute of Malaria Research (NIMR), India		x									217

Centres (in alphabetical order)	Agri	Bio	Chem	Earth	Engg	Env	math	Med	Phys	Soc	Page #
Indian Institute of Astrophysics (IIA), India									x		218
Indian Institute of Science (IISc), Bangalore, India		x	x			x	x		x		219
Indian Institute of Technology (IIT), Bombay, India		x	x	x		x	x		x		220
Indian Institute of Technology (IIT), Kharagpur, India		x	x	x		x	x		x		220
Indonesian Institute of Sciences (LIPI) — Research Centre for Biology, Indonesia		x	x								244
Indonesian Institute of Sciences (LIPI) — Research Centre for Chemistry (RCCChem), Indonesia			x		x	x					245
Institut Agronomique et Veterinaire Hassan II, Morocco	x	x	x	x		x	x				324
Institut de Recherche Scientifique et Technologique (IRST), Rwanda		x	x			x					377
Institut des Régions Arides (IRA), Tunisia	x					x					434
Institut Malgache de Recherches Appliquées (IMRA), Madagascar		x				x		x			279
Institut National de la Recherche Agronomique de Tunisie (INRAT), Tunisia	x	x		x		x					435
Institut National de Recherche Agronomique (INRA), Morocco	x	x				x					324

Centres (in alphabetical order)

	Agri	Bio	Chem	Earth	Engg	Env	math	Med	Phys	Soc	Page #
Institut National des Sciences et Techniques Nucléaires (INSTN), Madagascar			x	x			x		x		280
Institut Pasteur de Dakar (IPD), Senegal								x			380
Institut Pasteur de Madagascar (IPM), Madagascar		x						x			281
Institut Supérieur Inter-Etats de formation et de recherche dans les domaines d l'Eau, l'Energie, l'Environnement et les Infrastructures (EIER-ETSHER Group), Burkina Faso					x						90
Institut Teknologi Bandung — Biotechnology Centre, Indonesia		x				x					247
Institute for Advanced Studies in Basic Sciences (IASBS), Iran, Islamic Rep.			x	x			x		x		251
Institute of Fundamental Studies (IFS), Sri Lanka	x	x	x	x		x	x		x		405
Institute of Meteorology and Hydrology, Vietnam	x			x		x					465
Institute of Molecular and Cell Biology, Singapore		x									381
Instituto Adolfo Lutz (IAL), Brazil	x		x			x					59
Instituto Agrônômico (IAC), Brazil	x	x				x					60
Instituto Argentino de Matemática (IAM), Argentina							x				12

Centres (in alphabetical order)	Agri	Bio	Chem	Earth	Engg	Env	math	Med	Phys	Soc	Page #
Instituto Butantan, Brazil		x									61
Instituto Colombiano de Geología y Minería (INGEOMINAS), Colombia				x		x					138
Instituto de Biofísica Carlos Chagas Filho (IBCCF), Brazil		x				x					63
Instituto de Biomedicina de San Nicolás a Providencia, Venezuela		x									454
Instituto de Botánica "Darwinion" (IBODA), Argentina		x									13
Instituto de Cibernética, Matemática y Física (ICIMAF), Cuba							x		x		151
Instituto de Cibernética, Matemática y Física (ICIMAF) — Centro de Matemáticas y Física Teórica, Cuba							x		x		151
Instituto de Estudios Avanzados (IDEA) — Centro de Biociencias y Medicina Molecular, Venezuela		x									455
Instituto de Hidrología, Meteorología y Estudios Ambientales (IDEAM), Colombia				x		x					139
Instituto de Investigaciones Eléctricas (IIE), Mexico					x						301
Instituto de Medicina y Biología Experimental de Cuyo (IMBECU), Argentina		x									14
Instituto de Pesquisas Tecnológicas do Estado de São Paulo (IPT), Brazil					x						64

Centres (in alphabetical order)

	Agri	Bio	Chem	Earth	Engg	Env	math	Med	Phys	Soc	Page #
Instituto de Tecnología de Alimentos (ITAL), Brazil	x	x	x			x					66
Instituto Evandro Chagas (IEC), Brazil		x				x					66
Instituto Nacional de Biodiversidad (INBio), Costa Rica		x		x							142
Instituto Nacional de Ciencias Médicas y Nutrición "Salvador Zubiran" (INNSZ), Mexico		x									302
Instituto Nacional de Matemática Pura e Aplicada (IMPA), Brazil							x		x		67
Instituto Nacional de Pesquisas Espaciais (INPE), Brazil				x		x	x		x		68
Instituto Nacional de Tecnologia (INT), Brazil			x								69
Instituto Nacional del Agua — Centro de Tecnología del Uso del Agua, Argentina			x		x	x					15
Instituto Nacional del Agua (INA), Argentina				x		x					16
Instituto Nacional do Cancer (INCA), Brazil								x			69
Instituto Venezolano de Investigaciones Científicas (IVIC), Venezuela	x	x	x	x	x	x	x		x		456
Instituto Venezolano de Investigaciones Científicas (IVIC) — Centro de Biofísica y Bioquímica (CBB), Venezuela		x									457

Centres (in alphabetical order)

	Agri	Bio	Chem	Earth	Engg	Env	math	Med	Phys	Soc	Page #
Instituto Venezolano de Investigaciones Científicas (IVIC) — Centro de Ecología, Venezuela						x					458
Instituto Venezolano de Investigaciones Científicas (IVIC) — Centro de Física, Venezuela					x				x		458
Instituto Venezolano de Investigaciones Científicas (IVIC) — Centro de Medicina Experimental, Venezuela								x			459
Instituto Venezolano de Investigaciones Científicas (IVIC) — Centro de Microbiología y Biología Celular (CMBC), Venezuela		x									459
Instituto Venezolano de Investigaciones Científicas (IVIC) — Centro de Química, Venezuela			x								460
Instituto Venezolano de Investigaciones Científicas (IVIC) — Departamento de Biología Estructural, Venezuela		x									460
Instituto Venezolano de Investigaciones Científicas (IVIC) — Departamento de Matemáticas, Venezuela							x				461
Instituto Venezolano de Investigaciones Científicas (IVIC) — Unidad de Tecnología Nuclear, Venezuela					x						461
International Center for Agricultural Research in Dry Areas (ICARDA), Syria	x	x				x					415
International Centre for Genetic Engineering and Biotechnology (ICGEB), India	x	x									221
International Centre for Integrated Mountain Development (ICIMOD), Nepal	x					x					330
International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) — Niger, Niger	x	x									333

Centres (in alphabetical order)	Agri	Bio	Chem	Earth	Engg	Env	math	Med	Phys	Soc	Page #
International Institute of Tropical Agriculture (IITA), Nigeria	x	x									336
International Livestock Research Institute (ILRI), Kenya, Kenya	x	x									267
International Maize and Wheat Improvement Center (CIMMYT), Mexico	x										302
International Plant Genetic Resources Institute (IPGRI), Kenya	x	x				x					267
International Potato Center (CIP), Peru	x			x							368
International Rice Research Institute (IRRI), Philippines	x	x				x					370
International Water Management Institute (IWMI), Sri Lanka	x			x	x	x					405
Inter-university Accelerator Centre (IUAC), India									x		222
Inter-University Centre for Astronomy and Astrophysics (IUCAA), India									x		223
Iranian Research Organization for Science & Technology (IROST), Iran, Islamic Rep.	x	x	x			x					252
J											
Jahangirnagar University — Network of Instrument Technical Personnel and User Scientists of Bangladesh (NITUB) — Department of Chemistry of Chemistry, Bangladesh	x		x								41

Centres (in alphabetical order)

	Agri	Bio	Chem	Earth	Engg	Env	math	Med	Phys	Soc	Page #
Jardín Botánico de Cienfuegos, Cuba	x	x				x					152
Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR), India			x	x							224
Jawaharlal Nehru University (JNU) — School of Physical Sciences, India				x			x		x		225
Jomo Kenyatta University of Agriculture and Technology (JKUAT), Kenya	x	x				x					268

K

Kenya Agricultural Research Institute (KARI), Kenya	x										269
Kerman University — Faculty of Mathematics and Computer Science, Iran, Islamic Rep.							x				252
King Faisal University — Water Studies Center (KFU-WSC), Saudi Arabia	x					x					378
King Saud University — Prince Sultan Research Center for Environment, Water and Desert, Saudi Arabia				x		x					378
Korea University — College of Science, Korea, Rep.			x			x	x		x		274

M

M.S. Swaminathan Research Foundation (MSSRF), India	x	x		x		x					226
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Centres (in alphabetical order)	Agri	Bio	Chem	Earth	Engg	Env	math	Med	Phys	Soc	Page #
Malaysian Agricultural Research and Development Institute (MARDI), Malaysia	x	x	x			x					286
Mauritius Sugar Industry Research Institute (MSIRI), Mauritius	x	x			x	x					296
Ministry of Municipal Affairs and Agriculture — Department of Agricultural and Water Research (DAWR), Qatar	x				x						376
Ministry of Public Health — Department of Medical Sciences — National Institute of Health (NIH), Thailand		x	x			x					424
Ministry of Science and Technology — Pakistan Council of Research in Water Resources (PCRWR), Pakistan	x	x	x	x	x	x					349
Ministry of Water & Irrigation — Water Authority of Jordan (WAJ), Jordan					x						262
Ministry of Water Resources and Irrigation — National Water Research Center (NWRC), Egypt	x				x	x					163
Mongolian Academy of Sciences — Institute of Botany, Mongolia		x				x					315
Mongolian Academy of Sciences — Institute of Chemistry and Chemical Technology, Mongolia			x		x						316
Mongolian Academy of Sciences — Institute of Geocology, Mongolia	x	x	x			x					317
Mongolian Academy of Sciences — Institute of Geology and Mineral Resources (IGMR), Mongolia				x		x					318
Mongolian Academy of Sciences — Institute of Meteorology and Hydrology, Mongolia	x			x		x	x		x		319

Centres (in alphabetical order)

	Agri	Bio	Chem	Earth	Engg	Env	math	Med	Phys	Soc	Page #
Mongolian Academy of Sciences — Paleontological Center, Mongolia						x					320
Mongolian Academy of Sciences — Research Centre for Astronomy and Geophysics (RCAG), Mongolia									x		321
Munasinghe Institute for Development (MIND), Sri Lanka				x	x	x					407

N

Nankai University — Institute of Modern Optics (IMONK), China									x		135
Naresuan University — School of Renewable Energy Technology (SERT), Thailand					x	x					424
National Advanced Polytechnic School (ENSP), Cameroon					x						94
National Agricultural Research Organization (NARO), Uganda	x										442
National Agricultural Research Organization (NARO) — Fisheries Resources Research Institute (FIRRI), Uganda	x	x				x					442
National Bureau of Plant Genetic Resources (NBPGR), India	x	x									228
National Center for Agricultural Research and Technology Transfer (NCARTT), Jordan	x	x				x					262
National Center for Energy Research and Development (NCERD), Nigeria						x					337

Centres (in alphabetical order)	Agri	Bio	Chem	Earth	Engg	Env	math	Med	Phys	Soc	Page #
National Centre for Medium Range Weather Forecasting (NCMRWF), India						x			x		229
National Council for Scientific and Technological Development (CNPq), Brazil	x	x	x	x		x	x		x		70
National Dairy Research Institute (NDRI), India	x										230
National Institute for Agricultural Research (INIAP), Ecuador	x	x		x		x					157
National Institute for Biotechnology and Genetic Engineering (NIBGE), Pakistan	x	x				x					350
National Institute for Forestry, Agricultural and Livestock Research (INIFAP), Mexico	x										304
National Institute for Scientific and Industrial Research (NISIR) — Radioisotopes Research Unit (RIRU), Zambia						x			x		472
National Institute of Agriculture Technology — Climate and Water Institute, Argentina	x					x					17
National Institute of Hydrology, India				x							231
National Institute of Immunology (NII), India		x	x			x					232
National Institute of Oceanography and Fisheries (NIOF), Egypt	x	x				x					164
National Laboratory of Biomacromolecules (NLB), China		x									136

Centres (in alphabetical order)

	Agri	Bio	Chem	Earth	Engg	Env	math	Med	Phys	Soc	Page #
National Mathematical Centre (NMC), Nigeria							x				338
National Museum of Kenya — Phytochemistry Department — Centre for Biodiversity, Kenya		x	x			x					269
National Research Center for Genetic Engineering & Biotechnology (NRCGEB), Iran, Islamic Rep.		x									253
National Research Centre (NRC), Egypt	x	x	x	x		x			x		165
National Research Foundation of South Africa (NRF) — National Zoological Gardens (NZG), South Africa		x				x					385
National Research Foundation of South Africa (NRF) — South African Institute for Aquatic Biodiversity (SAIAB), South Africa		x				x					386
National Research Foundation of South Africa (NRF) — Hartebeesthoek Radio Astronomy Observatory (HartRAO), South Africa				x					x		387
National Research Foundation of South Africa (NRF) — Hermanus Magnetic Observatory (HMO), South Africa				x					x		388
National Research Foundation of South Africa (NRF) — iThemba LABS, South Africa					x			x	x		390
National Research Foundation of South Africa (NRF) — South African Astronomical Observatory (SAAO), South Africa									x		391
National Research Foundation of South Africa (NRF) — South African Environmental Observation Network (SAEON), South Africa		x		x		x					392
National University of Singapore — Department of Biological Sciences, Singapore		x									381

Centres (in alphabetical order)

	Agri	Bio	Chem	Earth	Engg	Env	math	Med	Phys	Soc	Page #
National University of Singapore — Department of Chemistry, Singapore			x								382
National University of Singapore — Institute of Systems Science, Singapore					x						383
National Veterinary Research Institute (NVRI), Nigeria	x										339
Nigerian Institute of Medical Research (NIMR), Nigeria		x						x			339
Nuclear Institute for Agriculture and Biology (NIAB), Pakistan	x	x									352

O

Obafemi Awolowo University — Centre for Energy Research and Development (CERD), Nigeria						x	x	x			340
Obafemi Awolowo University — Department of Microbiology, Nigeria		x				x					341
Obafemi Awolowo University — Institute of Ecology & Environmental Studies (IEES), Nigeria	x					x					342
Observatorio Nacional, Brazil				x					x		71
Observatorio San Calixto (OSC), Bolivia				x							44

P

Pakistan Council of Scientific and Industrial Research Laboratories Complex — Fuel Research Centre (FRC, PCSIR), Pakistan			x			x					353
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Centres (in alphabetical order)

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Pakistan Council of Scientific and Industrial Research Laboratories Complex — Leather Research Centre (LRC, PCSIR), Pakistan					x						354
Pakistan Council of Scientific and Industrial Research Labs. Complex (PCSIR), Lahore, Pakistan	x	x	x		x	x			x		355
Panjab University — Centre for Advanced Study in Mathematics — Department of Mathematics, India							x				233
Philippine Rice Research Institute (PhilRice), Philippines	x										371
Physical Research Laboratory (PRL), India				x					x		234
Planta Piloto de Procesos Industriales Microbiológicos (PROIMI), Argentina		x				x					18
Pontificia Universidad Católica de Chile — Facultad de Ciencias Biológicas — Departamento de Biología Celular y Molecular, Chile		x									97
Pontificia Universidad Católica de Chile (PUC) — Facultad de Ciencias Biológicas — Centro de Regulación y Patalogías 'Joaquín V. Luco' (FONDAP-CRCP), Chile		x									98
Pontificia Universidad Católica del Ecuador — Escuela de Ciencias Biológicas, Ecuador		x									158
Pontificia Universidade Católica (PUC Rio), Brazil		x	x		x	x	x				72
Pontificia Universidade Católica (PUC Rio) — Departamento de Física, Brazil									x		73
Power and Water University of Technology (PWUT), Iran, Islamic Rep.					x	x					254

Centres (in alphabetical order)

Q

Quaid-i-Azam University — Department of Physics, Pakistan

Agri	Bio	Chem	Earth	Engg	Env	math	Med	Phys	Soc	Page #
								x		356

R

Raman Research Institute, India

	x	x						x		235
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Regional Centre for Mapping of Resources for Development (RCMRD), Kenya

			x		x					270
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Research and Development Center for Industrial Fermentation (CINDEFI), Argentina

	x				x					19
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Research Institute for Water Resources (RIWR), Indonesia

x	x				x					247
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Royal Scientific Society (RSS), Jordan

x	x	x		x	x					263
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Rubber Research Institute of Sri Lanka (RRISL), Sri Lanka

x	x									407
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S

S.N. Bose National Centre for Basic Sciences, India

								x		236
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Saha Institute of Nuclear Physics, India

	x	x				x		x		237
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Centres (in alphabetical order)

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Scientific and Applied Research Centre (SARC), Qatar		x		x		x					376
Scientific and Industrial Research and Development Centre (SIRDC) — Energy Technology Institute, Zimbabwe						x					475
Scientific and Technical Council of Turkey (TÜBITAK) — Bursa Test and Analysis Laboratory (BUTAL), Turkey			x			x					437
Scientific and Technical Council of Turkey (TÜBITAK) — Marmara Research Centre — Institute of Energy, Turkey					x						438
Scientific and Technical Council of Turkey (TÜBITAK) — Marmara Research Centre (MRC), Turkey		x	x	x		x					439
Scientific and Technical Council of Turkey (TÜBITAK) — Marmara Research Centre (MRC) — Earth & Marine Sciences Research Institute (EMSRI), Turkey				x		x					439
Scientific and Technical Council of Turkey (TÜBITAK) — Marmara Research Centre (MRC) — Material & Chemical Technologies Research Center, Turkey			x								441
Seoul National University (SNU) — Center for Theoretical Physics (CTP), Korea, Rep.									x		274
Servicio Nacional de Geología y Técnico de Minas (SERGEOTECMIN), Bolivia				x		x					45
Sharif University of Technology — Department of Mathematical Sciences, Iran, Islamic Rep.							x				255
Sheikh Hamdan Bin Rashid al Maktoum Award for Medical Sciences (SHAMS) — Centre for Arab Genomic Studies (CAGS), United Arab Emirates								x			444

Centres (in alphabetical order)	Agri	Bio	Chem	Earth	Engg	Env	math	Med	Phys	Soc	Page #
Shiraz University — Department of Chemistry, Iran, Islamic Rep.			x								255
SODIS Foundation, Bolivia		x				x					45
Solid Earth and Space Physics Research Laboratory (SESP), Nigeria				x					x		343
South African National Biodiversity Institute (SANBI), South Africa		x				x					393
Southern and Eastern African Mineral Centre (SEAMIC), Tanzania			x	x		x					417
Standards and Industrial Research Institute of Malaysia (SIRIM), Malaysia						x					287
Sugarcane Breeding Institute, India	x	x									238
Sultan Qaboos University — Centre for Environmental Studies and Research (CESAR), Oman, Sultanate of						x					344
Sultan Qaboos University — Remote Sensing and GIS Center, Oman, Sultanate of	x			x		x					345
T											
Taiwan Forestry Research Institute (TFRI), China	x					x					136
Tarbiat Modares University (TMU) — School of Medical Sciences, Iran, Islamic Rep.		x									256

Centres (in alphabetical order)

	Agri	Bio	Chem	Earth	Engg	Env	math	Med	Phys	Soc	Page #
Tata Institute of Fundamental Research (TIFR), India		x	x				x		x		239
Tata Institute of Fundamental Research (TIFR) — Department of Biological Sciences, India		x									240
Tea Research Foundation of Kenya (TRFK), Kenya	x	x									271
Tehran University of Medical Sciences — Faculty of Pharmacy, Iran, Islamic Rep.								x			256
Tehran University of Medical Sciences (TUMS) — Pharmaceutical Sciences Research Center (PSRC), Iran, Islamic Rep.		x									257
Telecomunicações Brasileiras S.A. (TELEBRÁS) — Centro de Pesquisas e Desenvolvimento (CPqD), Brazil					x						74
The Energy and Resources Institute (TERI), India		x				x					240
The Hashemite University, Jordan		x	x	x		x	x		x		264
The National Council for Scientific Research (CNRS) — The National Center for Remote Sensing, Lebanon	x					x					276
U											
Unidad de Laboratorios de Ingeniería y Expresión Genéticas (ULIEG), Mexico		x									304
Universidad Autónoma de Puebla — Instituto de Física "Ing. Luis Rivera Terrazas" (IFUAP), Mexico									x		305

Centres (in alphabetical order)

	Agri	Bio	Chem	Earth	Engg	Env	math	Med	Phys	Soc	Page #
Universidad de Buenos Aires — Departamento de Ciencias de la Atmósfera y de los Océanos (DCAO), Argentina				x		x					20
Universidad de Buenos Aires — Facultad de Ciencias Exactas y Naturales — Departamento de Matemática, Argentina							x				21
Universidad de Buenos Aires — Facultad de Farmacia y Bioquímica — Instituto de Química y Fisicoquímica Biológicas (IQUIFIB), Argentina		x	x								22
Universidad de Buenos Aires — Facultad de Medicina — Departamento de Bioquímica Humana — Laboratorio de Hormonas en la Regulación y Diferenciación Celular (HRDC), Argentina								x			23
Universidad de Buenos Aires — Instituto de Química Física de los Materiales, Medio Ambiente Y Energía (INQUIMAE), Argentina			x			x					24
Universidad de Chile — Facultad de Ciencia Físicas y Matemáticas — Centro de Modelamiento Matemático, Chile					x		x				101
Universidad de Chile — Facultad de Medicina — Human Genetics Program, Chile		x									101
Universidad de Costa Rica — Centro de Investigación en Biología Celular y Molecular (CIBCM), Costa Rica	x	x				x					143
Universidad de Costa Rica — Facultad de Microbiología — Instituto Clodomiro Picado, Costa Rica		x									143
Universidad de La Habana — Facultad de Física, Cuba									x		153
Universidad de la Habana — Instituto de Ciencia y Tecnología de Materiales (ICTM- IMRE), Cuba			x			x			x		154

Centres (in alphabetical order)

	Agri	Bio	Chem	Earth	Engg	Env	math	Med	Phys	Soc	Page #
Universidad de La Plata — Facultad de Ciencias Médicas — Instituto de Investigaciones Bioquímicas (INIBIOLP), Argentina		x									25
Universidad de la República — Facultad de Ciencias — Instituto de Física, Uruguay									x		446
Universidad de Los Andes — Facultad de Ciencias — Instituto de Ciencias Ambientales y Ecológicas (ICAE), Venezuela		x				x					462
Universidad Nacional Autónoma de México (UNAM), Mexico		x	x	x	x	x	x		x		306
Universidad Nacional Autónoma de México (UNAM) — Centro de Ciencias de la Atmósfera (CCA), Mexico		x	x	x		x	x		x		307
Universidad Nacional Autónoma de México (UNAM) — Centro de Ciencias Genómicas (CCG), Mexico	x	x									309
Universidad Nacional Autónoma de México (UNAM) — Instituto de Astronomía, Mexico									x		309
Universidad Nacional Autónoma de México (UNAM) — Instituto de Biotecnología, Mexico	x	x				x					310
Universidad Nacional Autónoma de México (UNAM) — Instituto de Ciencias Nucleares (ICN), Mexico			x						x		311
Universidad Nacional Autónoma de México (UNAM) — Instituto de Física (IF), Mexico									x		312
Universidad Nacional Autónoma de México (UNAM) — Instituto de Fisiología Celular (IFC), Mexico		x									313
Universidad Nacional Autónoma de México (UNAM) — Instituto de Geofísica (IGeoF), Mexico				x		x					313

Centres (in alphabetical order)

	Agri	Bio	Chem	Earth	Engg	Env	math	Med	Phys	Soc	Page #
Universidad Nacional de Asunción — Facultad de Ciencias Exactas y Naturales — Laboratorio de Investigación de la Atmósfera y Problemas Ambientales (LIAPA), Paraguay				x		x					367
Universidad Nacional de Colombia — Instituto de Ciencias Naturales (ICN), Colombia		x									140
Universidad Nacional de Colombia (UNC) — Departamento de Química, Colombia		x	x								141
Universidad Nacional de Córdoba — Facultad de Matemática, Astronomía y Física (FAMAF), Argentina							x		x		25
Universidad Nacional de la Plata — Centro de Química Inorgánica (CEQUINOR) — Laboratorio Nacional de Investigación y Servicios en Espectroscopía Óptica (LANAIS-EFO), Argentina			x								26
Universidad Nacional de La Plata — Facultad de Ciencias Agrarias y Forestales, Argentina	x	x									27
Universidad Nacional de La Plata — Facultad de Ciencias Astronómicas y Geofísicas (FCAG), Argentina				x					x		28
Universidad Nacional de La Plata — Facultad de Ciencias Naturales y Museo, Argentina		x		x		x					29
Universidad Nacional de La Plata — Instituto de Investigaciones Fisicoquímicas Teóricas y Aplicadas (INIFTA), Argentina			x								31
Universidad Nacional de la Plata — Instituto Spegazzini, Argentina		x				x					32
Universidad Nacional de San Juan — Facultad de Ingeniería — Instituto de Investigaciones Mineras (IIM), Argentina			x	x		x					33

Centres (in alphabetical order)

	Agri	Bio	Chem	Earth	Engg	Env	math	Med	Phys	Soc	Page #
Universidad Nacional del Cuyo — Facultad de Ciencias Médicas — Instituto de Histología y Embriología Mendoza 'Dr. Mario H. Burgos' (IHEM), Argentina		x									34
Universidad Peruana Cayetano Heredia — Instituto de Investigaciones de la Altura (IIA), Peru		x				x					368
Universidade de São Paulo (USP São Carlos) — Instituto de Física, Brazil		x							x		74
Universidade de São Paulo (USP) — Faculdade de Medicina de Ribeirão Preto (FMRP) — Departamento de Fisiologia, Brazil		x									75
Universidade de São Paulo (USP) — Instituto de Ciências Biomédicas, Brazil		x									77
Universidade de São Paulo (USP) — Instituto de Geociências, Brazil				x							78
Universidade de São Paulo (USP) — Instituto de Química (IQ), Brazil		x	x			x					79
Universidade Estadual de Campinas (UNICAMP) — Faculdade de Engenharia Agrícola (FEAGRI), Brazil	x				x						79
Universidade Estadual de Campinas (UNICAMP) — Instituto de Matemáticas, Estatísticas y Computacao Científica (IMECC), Brazil							x				80
Universidade Estadual de Campinas (UNICAMP) — Instituto de Química, Brazil		x	x								81
Universidade Estadual Paulista (UNESP) — Instituto de Física Teórica, Brazil									x		82

Centres (in alphabetical order)

	Agri	Bio	Chem	Earth	Engg	Env	math	Med	Phys	Soc	Page #
Universidade Estadual Paulista “Julio de Mesquita Filho” — Faculdade de Medicina Veterinária e Zootécnica (FMVZ), Brazil		x				x					83
Universidade Federal de Minas Gerais — Departamento de Física, Brazil									x		83
Universidade Federal de São Paulo (UNIFESP) — Departamento de Biofísica, Brazil		x	x								84
Universidade Federal de Uberlândia — Instituto de Biologia (IB), Brazil		x				x					84
Universidade Federal do Rio de Janeiro (UFRJ) — Instituto de Bioquímica Médica (IBqM), Brazil		x									85
Universidade Federal do Rio de Janeiro (UFRJ) — Instituto de Macromoléculas (IMA), Brazil			x								86
Universite de Cocody — Institut de Recherches Mathématiques (IRMA), Cote d'Ivoire							x				148
Universite de Cocody-Abidjan — UFR des Sciences de la Terre et des Ressources Minieres — Centre Universitaire de Recherche et d'Application en Teledetection (CURAT), Cote d'Ivoire		x		x		x			x		149
Université Mohammad V — Faculté des Sciences — Laboratoire de Physique Théorique (LPT), Morocco									x		326
Universiti Malaysia Sarawak (UNIMAS) — Faculty of Computer Science and Information Technology (FCSIT), Malaysia							x				289
Universiti Malaysia Sarawak (UNIMAS) — Faculty of Engineering, Malaysia					x						289
Universiti Putra Malaysia, Malaysia	x	x	x		x	x					290

Centres (in alphabetical order)	Agri	Bio	Chem	Earth	Engg	Env	math	Med	Phys	Soc	Page #
University Malaysia Sabah — Borneo Marine Research Institute, Malaysia	x					x					291
University of Agriculture, Faisalabad (UAF), Pakistan		x	x				x				357
University of Botswana — Department of Chemistry — Network for Analytical and Bioassays in Africa (NABSA), Botswana			x								47
University of Buea — Faculty of Science — Biotechnology Unit, Cameroon		x						x			94
University of Colombo — Faculty of Medicine — Department of Biochemistry and Molecular Biology, Sri Lanka	x	x									408
University of Colombo — Faculty of Medicine, Sri Lanka		x									409
University of Colombo — School of Computing (UCSC), Sri Lanka					x						409
University of Damascus — Faculty of Agriculture — Department of Soil Sciences, Syria	x	x	x								416
University of Dar es Salaam — Faculty of Architecture and Planning (FAP), Tanzania				x	x	x					418
University of Dar-es-Salaam — Institute of Marine Sciences (IMS), Tanzania		x	x	x	x	x			x		419
University of Dhaka — Faculty of Pharmacy — Department of Pharmaceutical Chemistry, Bangladesh								x			42
University of Hyderabad — School of Chemistry, India		x	x				x		x		241

Centres (in alphabetical order)

	Agri	Bio	Chem	Earth	Engg	Env	math	Med	Phys	Soc	Page #
University of Hyderabad — School of Life Sciences, India		x									242
University of Johannesburg — Department of Geology — Paleoproterozoic Mineralization Research Group (PPM), South Africa				x							393
University of Jordan — Water and Environment Research and Study Center (WERSC), Jordan						x					265
University of Karachi — Department of Botany, Pakistan		x		x							358
University of Karachi — International Center for Chemical and Biological Sciences (ICCBS), Pakistan		x				x					360
University of Karachi — National Nematological Research Centre (NNRC), Pakistan	x										361
University of Kebangsaan — Faculty of Engineering, Malaysia					x						292
University of Kebangsaan — Institut Biologi Sistem (INBIOSIS), Malaysia		x									292
University of Kebangsaan — Institute of Space Science, Malaysia				x	x				x		293
University of Khartoum — Institute of Endemic Diseases, Sudan		x						x			410
University of KwaZulu-Natal — School of Biological and Conservation Sciences — Cryoconservation Centre of Excellence for Sub-Saharan Africa (CCESSA), South Africa		x									395

Centres (in alphabetical order)

	Agri	Bio	Chem	Earth	Engg	Env	math	Med	Phys	Soc	Page #
University of Malaya — Faculty of Engineering, Malaysia		x	x								294
University of Malaya (MU) — Department of Chemistry, Malaysia		x	x			x					294
University of Mauritius, Mauritius	x	x	x	x		x	x		x		297
University of Nairobi — Reproductive Biology Unit (RBU), Kenya		x									271
University of Pretoria — Dept. of Microbiology and Plant Pathology — Water Institute, South Africa	x				x	x					396
University of Pretoria — Forestry and Agricultural Biotechnology Institute (FABI), South Africa	x	x				x					397
University of Stellenbosch — Dept. of Electrical and Electronic Engineering, South Africa					x						398
University of Stellenbosch — DST/NRF Center of Excellence for Biomedical TB Research (CBTBR) — Div. of Molecular Biology and Human Genetics (MBHG), South Africa								x			399
University of Stellenbosch — DST/NRF Center of Excellence for Invasion Biology (CIB) — Dept. of Botany and Zoology, South Africa		x				x					401
University of Stellenbosch — Institute for Wine Biotechnology, South Africa	x	x									402
University of Swaziland — Swaziland Institute for Research in Traditional Medicine, Medicinal and Indigenous Food Plants (SIRMIP), Swaziland	x	x	x								411

Centres (in alphabetical order)

	Agri	Bio	Chem	Earth	Engg	Env	math	Med	Phys	Soc	Page #
University of Tehran — Institute of Biochemistry and Biophysics (IBB), Iran, Islamic Rep.		x	x								259
University of the Philippines — Institute of Plant Breeding (IPB), Philippines	x	x		x							372
University of the Philippines — Marine Science Institute (UPMSI), Philippines		x		x							373
University of the Philippines — National Institute of Physics (NIP) — College of Sciences, Philippines									x		374
University of the Philippines — Natural Sciences Research Institute (NSRI), Philippines		x	x			x	x				374
University of the Punjab — Centre for High Energy Physics, Pakistan									x		362
University of the Punjab — Centre of Excellence in Molecular Biology (CEMB), Pakistan		x									363
University of the West Indies (UWI) — Biotechnology Center, Jamaica, W.I.	x	x									260
University of the West Indies (UWI) — Caribbean Agricultural Research and Development Institute (CARDI), Trinidad & Tobago	x										427
University of the West Indies (UWI) — International Centre for Environmental and Nuclear Sciences (ICENS), Jamaica, W.I.	x			x		x					261
University of the Western Cape — Department of Earth Sciences — UNESCO Chair of Hydrogeology, South Africa				x		x					404
University of Zambia — School of Agricultural Sciences, Zambia	x										472

Centres (in alphabetical order)

	Agri	Bio	Chem	Earth	Engg	Env	math	Med	Phys	Soc	Page #
University of Zambia — School of Mines, Zambia			x	x		x					474
University of Zimbabwe — Department of Biological Sciences, Zimbabwe		x				x					475
University of Zimbabwe — Institute of Mining Research (IMR), Zimbabwe			x	x							476
Uzbekistan Academy of Sciences — V.I. Romanovski Institute of Mathematics, Uzbekistan							x				452

V

Vietnam National University, Vietnam			x	x	x	x	x		x		466
Vietnamese Academy of Science and Technology (VAST) — Institute of Chemistry, Vietnam	x		x			x					468
Vietnamese Academy of Science and Technology (VAST) — Institute of Mathematics (IM), Vietnam							x				469
Vietnamese Academy of Science and Technology (VAST) — Institute of Physics and Electronics, Vietnam									x		470

W

World Agroforestry Centre (WAC), Kenya	x										272
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Y

Yarmouk University — Center for Theoretical and Applied Physics (CTAPS), Jordan									x		266
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Centres (in alphabetical order)

	Agri	Bio	Chem	Earth	Engg	Env	math	Med	Phys	Soc	Page #
Ye-Etiopia Ye-Gibbrina Mirimir Institute (EGMI) Ethiopian Agricultural Research Organization (EARO), Ethiopia	x										169
Z											
Ziauddin Medical University (ZMU), Pakistan								x			364

Aggregate Statistics

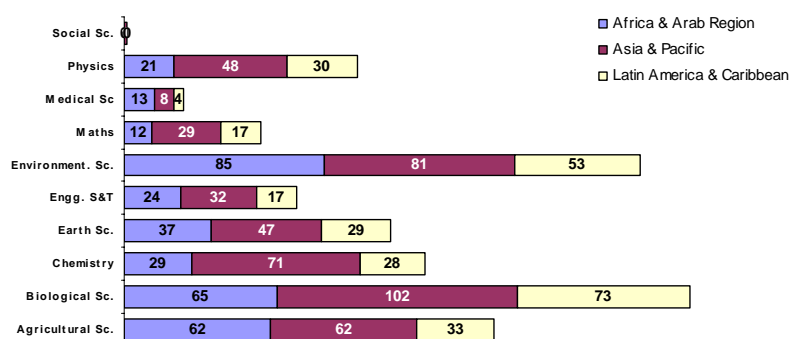
Geographic distribution of research fields among centres profiled

Note: Most centres are multi-disciplinary; therefore, the sum of values by research field exceeds the number of centres. - In bold: LDCs.

Country	Agricultural Sciences	Biological Sciences	Chemistry	Earth Sciences	Engineering S&T	Environmental Sciences	Mathematics	Medical Sciences	Physics	Social Sciences	No. of Centres
Argentina	5	17	9	6	3	12	3	1	5	0	36
Bangladesh	3	4	5	2	2	4	2	1	3	0	7
Bolivia	1	1	0	2	0	2	0	0	0	0	4
Botswana	0	0	1	0	0	0	0	0	0	0	1
Brazil	12	22	11	7	5	17	5	1	9	0	42
Burkina Faso	2	2	1	1	3	3	1	0	0	0	4
Cameroon	0	1	0	0	1	0	0	1	0	0	2
Chile	0	4	0	1	1	1	1	0	1	0	5
China	12	20	8	10	6	12	2	2	11	0	39
Colombia	0	2	1	2	0	2	0	0	0	0	4
Costa Rica	1	3	0	1	0	1	0	0	0	0	3
Cote d'Ivoire	2	2	1	1	0	3	1	0	1	0	4
Cuba	2	2	1	0	0	3	2	0	4	0	6
Ecuador	1	2	0	1	1	1	0	0	0	0	3
Egypt	5	6	4	4	2	8	0	0	2	0	9
Ethiopia	2	2	0	0	1	1	0	1	1	0	4
Ghana	5	2	2	2	3	5	0	1	1	0	7
India	17	36	27	17	5	21	12	1	19	0	63
Indonesia	1	4	2	0	1	3	0	0	1	0	5
Iran, Islamic Rep.	2	5	4	1	1	2	3	2	1	0	13
Jamaica, W.I.	2	1	0	1	0	1	0	0	0	0	2
Jordan	2	3	2	1	2	4	1	0	2	0	6
Kenya	6	6	1	1	0	4	0	0	0	0	9
Korea, Rep.	0	0	1	0	0	1	1	0	2	0	2
Lebanon	2	0	0	0	0	2	0	0	0	0	2
Madagascar	3	4	3	3	0	5	1	2	2	0	7
Malawi	1	0	0	0	0	1	0	0	0	0	1
Malaysia	4	7	4	1	4	6	1	1	1	0	14
Mauritius	2	2	1	1	1	2	1	0	1	0	2
Mexico	5	9	3	4	3	6	4	0	8	0	19

Mongolia	2	2	2	2	1	5	1	0	2	0	7
Morocco	2	3	1	2	0	3	2	0	2	0	4
Namibia	1	1	0	1	0	1	0	0	0	0	1
Nepal	2	1	1	0	0	3	0	0	0	0	3
Niger	2	2	0	1	0	1	0	0	0	0	2
Nigeria	5	4	1	1	1	6	2	2	1	0	11
Oman, Sultanate of	1	0	0	1	0	2	0	0	0	0	2
Pakistan	6	9	4	2	3	5	1	1	3	0	16
Panama	1	1	0	1	1	1	0	0	0	0	1
Paraguay	0	0	0	1	0	1	0	0	0	0	1
Peru	1	1	0	1	0	1	0	0	0	0	2
Philippines	3	4	1	2	0	2	1	0	1	0	6
Qatar	1	1	0	1	1	1	0	0	0	0	2
Rwanda	0	1	1	0	0	1	0	0	0	0	1
Saudi Arabia	1	0	0	1	0	2	0	0	0	0	2
Senegal	1	1	1	1	0	2	0	1	0	0	3
Singapore	0	2	1	0	1	0	0	0	0	0	4
South Africa	4	9	1	6	3	9	0	2	4	0	18
Sri Lanka	4	4	1	3	3	3	1	0	1	0	7
Sudan	0	1	0	0	0	0	0	1	0	0	1
Swaziland	1	1	1	0	0	0	0	0	0	0	1
Syria	4	4	2	1	1	3	2	0	1	0	5
Tanzania	0	1	2	3	2	3	0	0	1	0	3
Thailand	0	2	2	2	1	5	0	0	0	1	6
Trinidad & Tobago	1	1	1	0	0	1	0	1	0	0	3
Tunisia	4	4	1	2	3	8	1	1	1	0	8
Turkey	0	1	3	2	1	4	0	0	0	0	6
Uganda	2	1	0	0	0	1	0	0	0	0	2
United Arab Emirates	0	0	0	0	0	0	0	1	0	0	1
Uruguay	0	0	0	0	0	0	0	0	1	0	1
Uzbekistan	2	1	3	1	2	2	2	0	1	0	4
Venezuela	1	7	2	1	3	3	2	1	2	0	13
Vietnam	4	0	2	2	1	3	2	0	2	0	7
Zambia	1	0	1	1	0	2	0	0	1	0	3
Zimbabwe	0	1	1	1	0	2	0	0	0	0	3
157 240 128 113 73 219 58 25 99 1 485											

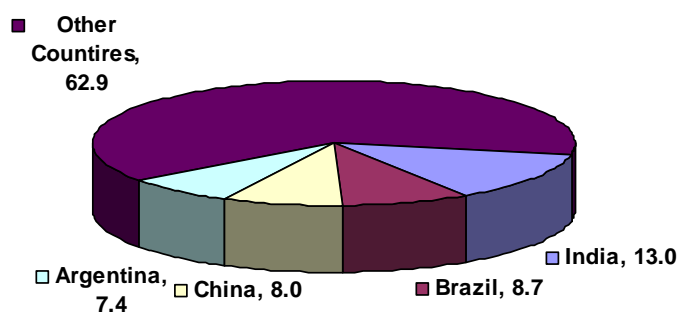
Regional distribution of centres by research fields



Region	Agricultural Sciences	Biological Sciences	Chemistry	Earth Sciences	Engineering	Environmental Sciences	Mathematics	Medical Sciences	Physics	Social Sciences	No. of Centres
Africa & Arab Region	62	65	29	37	24	85	12	13	21	0	131
Asia & Pacific	62	102	71	47	32	81	29	8	48	1	209
Latin America & Caribbean	33	73	28	29	17	53	17	4	30	0	145
	157	240	128	113	73	219	58	25	99	1	485

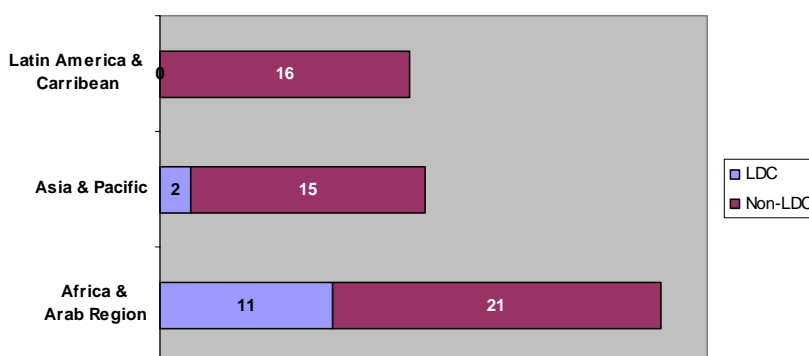
Note: Most centres are multi-disciplinary; therefore, the sum of values by research fields exceeds the number of centres.

Distribution density of centres



180 (37%) of the 485 Centres are located in four nations.

Proportion of centres in Least Developed Countries (LDCs)



The group of LDCs currently comprises 50 countries:
 Afghanistan, Angola, Bangladesh, Benin, Bhutan, Burkina Faso, Burundi, Cambodia, Cape Verde, Central African Republic, Chad, Comoros, Democratic Republic of the Congo [formerly Zaire], Djibouti, Equatorial Guinea, Eritrea, Ethiopia, Gambia, Guinea, Guinea-Bissau, Haiti, Kiribati, Lao People's Democratic Republic, Lesotho, Liberia, Madagascar, Malawi, Maldives, Mali, Mauritania, Mozambique, Myanmar, Nepal, Niger, Rwanda, Samoa, Sao Tome and Principe, Senegal, Sierra Leone, Solomon Islands, Somalia, Sudan, Timor-Leste, Togo, Tuvalu, Uganda, United Republic of Tanzania, Vanuatu, Yemen, Zambia.
 Source: United Nations Conference on Trade and Development (UNCTAD)

Profiles of Centres

Grouped by country

Argentina

Centro de Investigación y Desarrollo en Ciencias Aplicadas 'Dr. Jorge J. Ronco' (CINDECA)

Head of Institution: Horacio J. Thomas.

Address: Calle 17 No. 257, 1900 La Plata, Buenos Aires, Argentina. **Phone:** (+54 221) 421-0711, 422-0288, 421-1353. **Fax:** (+54 221) 425-4277. **Email:** cindeca@quimica.unlp.edu.ar. **URL:** www.cindeca.org.ar.

Scientific Fields of Interest: Chemistry.

Research and training: Catalysts based on heteropolycompounds for hydrotreating and fine chemical synthesis; supported metallic catalysts and organometallic surface chemistry on metals; application to hydrogenation and dehydrogenation reactions; structure and catalytic activity of oxidic systems; study and modeling of heterogeneous catalytic reaction systems; light olefins and clean oxidation of organic compounds; environmental catalytic processes; absorption process for nitrogen production in cereal storage; synthesis and characterization of zeolite molecular sieves and related materials.

Achievements: 60 papers published per year in magazines such as, Applied Catalysis, Catalysis Letters, Chemical Engineering Sciences, Journal of Molecular Catalysis, Journal of Catalysis, Applied Surface Science, etc.; 9 patents in the last five years; 2 thesis per year.

Facilities: Bruker IFS66FT-IR spectrophotometer with DRIF accessory; UV-VIS Varian Super Scan 3 spectrophotometer; IL-457 (AA/AE), IL atomic-absorption and emission spectrometer; Perkin Elmer Q - Mass 910 Quadruple Mass Spectrometer; Gas Chromatograph; HPLC Liquid-chromatograph; DTA-TGA-MTA-DCD Shimadzu Thermo analyzer; XRD Philips PW 1714 diffractometer; Philips 505 Scanning electron microscopy (SEM) with an EDAX 9100 for the electron probe microanalysis; Micromeritics Sorptometer Accusorb E2100.

Future plans: Process and catalysts in fine chemistry, environment and petrochemistry; Training of Human-resources in the field of the catalytic process and materials technology; To advise and lend technical assistance about catalytic processes, material science and general chemical analysis.

Cooperation with developing countries: CYTED Science and Technology Iberoamerican Program; Subprogram V: Catalysts and Adsorbents for Clean Technologies; V.5 Project Computational Catalysts; V.4 Project Catalysts for Environmental Protection; V.3 Project Adsorbent for Gas Separations; V.8 Clean Technology for Light Hydrocarbons Recovering; CONICET (Argentina)/CNPq (Brazil) (2).

International Organization: CONICET (Argentina)/CNR (Italy) (2); UNLP (Argentina)/CNRS (France); CONICET (Argentina)/University Alicante (Spain); CONICET (Argentina)/CSIC (Spain).

Centro de Investigaciones en Láseres y Aplicaciones (CEILAP)

Head of Institution: Eduardo J. Quel.

Address: Juan B. de La Salle 4397 B1603ALO Villa Martelli, Pcia. de Buenos Aires, Argentina. **Phone:** (+54 11) 4709-8217, 4709-8100. **Fax:** (+54 11) 4709-8217, 4709-8228. **Email:** quel@citefa.gov.ar, ceilap@citefa.gov.ar. **URL:** www.conicet.gov.ar, www.citefa.gov.ar.

Scientific Fields of Interest: Physics.

Research and training: Research: Laser systems and applications: solid, gaseous, liquid, CW, pulsed, diode pumped CW, and pulsed solid lasers; lasers for medical, atmospheric and industrial applications; laser theory by Poincare maps; photophysics and photochemistry in gases; spectroscopic techniques for environmental monitoring; optogalvanic and photothermal effect. Lidar systems: Backscattering, DIAL and Raman. Solar Photometer from AERONET (NASA). Training: under-graduate, MSc. and Ph.D. with Univ. of Buenos Aires, Univ. of San Martin, and other Universities of Argentina.

Achievements: Publications in national and international journals; presentations to national and international congresses and symposia; advisory role to industry and governmental institutions; training of foreign graduates and under-graduates; repair of optical equipment; calibration of optical-measurement equipment; development of laser equipment, precision optics and laser-based measurement devices. National and international patents.

Facilities: TEA CO₂ lasers (homemade); Multigaseous pulsed lasers (homemade); Pulsed dye lasers (homemade); CW Nd: YAG laser; Pulsed Nd YAG laser; Frequently stabilized CW CO₂ laser; Quadrupolar mass spectrometer; FTIR spectrometer; UV-visible spectrometers; Digital oscilloscopes; DIAL for stratospheric Ozone measurement (homemade); LIDAR for detection of clouds, aerosols, particulates and boundary layer (homemade); High vacuum systems. Computers with access to Internet. Library containing the last 15 years' complete collections of Journals related to lasers and optics.

Cooperation with developing countries: There exists collaboration between LIDAR groups in Chile, Bolivia and Paraguay concerning atmospheric physics. Participation in Auger Project.

International Organization: Physikalisch-Chemisches Institut (Universtat Heidelberg); Ecole polytechnique, Palaiseau, France; Service d'Aeronomie, Université Pierre et Marie Curie, Paris, France; Instituto di Fisica dell'Atmosfera, CNR, Italia; NASA Goddard Space Research Center.

Centro de Investigaciones Opticas (CIOP)

Head of Institution: Jorge O. Tocho.

Address: Camino Parque Centenario e/505 y 506 Gonnet, CC 124 1897 La Plata, Argentina. **Phone:** (+54 221) 471-5249, 484-0280. **Fax:** (+54 221) 471-2771. **Email:** info@ciop.unlp.edu.ar. **URL:** www.ciop.unlp.edu.ar.

Scientific Fields of Interest: Physics.

Research and training: Image processing (digital and analog); optical metrology; laser spectroscopy; optical spectroscopy; photophysics; technological applications of optics and lasers; optical properties of materials; fiber-optics; Post-graduate courses and continuing education.

Achievements: 700 papers in professional journals, metrological services related with optics and lasers. Research and development of instruments and systems for real-time optical metrology for quality control in products lines. Development of High-School optical equipment.

Facilities: 4 spectrographs covering from VUV up to far IR: Lasers (Ar, He, Ne, Xe, CO₂, N₂, Ns): Optical tables and benches: Supporting optical and laser equipment: Library electronics systems: PC computers: OPO: FTIR spectrophotometer: OTDR: ICCD with temporal gate: Tunable semiconductor laser: 770 sq.m for laboratories.

Future plans: To turn the Centre into an international metrological base and Latin American school in optics for under- and Post-graduate activities, technical consultancy and multidisciplinary education.

Cooperation with developing countries: Colombia, Brazil, Chile Peru, Cuba and Mexico.

International Organization: Laboratories in Spain, Sweden, Germany and Italy.

Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET) — Centro de Estudios Fotosintéticos y Bioquímicos (CEFOBI)

Head of Institution: Dr. Carlos S. Andreo, Director.

Address: Suipacha 531-S2002 LRK Rosario, Argentina. **Phone:** (+54 341) 437-1955. **Fax:** (+54 341) 437-0044. **Email:** carlosandreo@cefobi.gov.ar. **URL:** www.cefobi.gov.ar.

Scientific Fields of Interest: Biological Sciences.

Research and training: NADP-Malic enzyme: cloning, expression, mutagenesis and modification of the expression level in transgenic C3 and C4 plants; identification of factors involved in the protection against chilling injury in peaches and nectarines during post-harvest; metabolism of the carbon in citrus fruits affected by frosts; studies on the effect of UV-B radiation in corn and

Arabidopsis; DNA mismatch repair in higher plants: study of the role of RNAs in seed development in cereals; design, construction and assay of gene-silencing vectors for plants; expression of recombinant protein in cereals.

Achievements: A number of scientific articles in peer-reviewed magazines since 2005.

Facilities: Main Laboratory: Six laboratories with lab benches and desks and six specialized rooms with centrifuges, radioisotope use and chromatography, and two cold rooms are available. Library: CEFOBI has a library with several journals available on Plant Biology, Biochemistry and molecular-biology. Internet: the laboratories and the library are equipped with 20 computers with full access to Internet and DNA sequence software analysis. Other: Two greenhouses are located on the third floor of the building, with 8 growth chambers distributed in the basement and first floor. In addition, field space is located 5 kms from the CEFOBI, at the CERIDER. Other facilities are available from other Institutes in the University. Major equipment: Gel scanner (Biochemical System, UVP), autoclaves, balances, centrifuges (centrivap-centrifugal concentrator, eppendorf micro-centrifuge, eppendorf refrigerated micro-centrifuges, sorvall), PCR and real-time PCR equipments, chromatography columns and equipment (FPLC and HPLC system), conductivity meters, distillation equipment, electrophoresis equipment for protein and nucleic acids, UV-gel documentation equipment, electro transfer equipments, fluorometer, freezer (-20°C and -80°C). Hybridization ovens, pH meters, rotary shakers, spectrophotometers, transilluminators, vacuum pumps, vortex, water baths, water-bath shakers, microscopes.

International Organization: Washington State University, Pullman, Washington USA; Université Paris-Sud, France; Universität Osnabrück, Germany.

Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET) — Complejo Astronómico "El Leoncito" (CASLEO)

Head of Institution: Dr. Orlando Levato.

Address: CC 467, Av. España 1512 Sur, CP J5402DSP San Juan, Argentina.

Phone: (+54 264) 4213-653. **Fax:** (+54 264) 4213-693. **Email:** hlevato@casleo.gov.ar, usuario@casleo.gov.ar. **URL:** www.casleo.gov.ar.

Scientific Fields of Interest: Physics.

Research and training: Provides astronomical observations for the community. The staff works on binaries and binary evolution, chemically peculiar stars, asteroids, stellar abundances, and development of scientific instruments for astronomy.

Achievements: Since 1988 more than 650 papers have been published in scientific journals; various instruments have been developed on site.

Facilities: 2.1 and 0.6 m. telescope; 1.5 radiotelescope for 200 and 400 GHz; 50 computers in net; 40 titles-periodic journals in the library.

Future plans: To install a larger telescope at the site.

Cooperation with developing countries: Agreements with Mackenzie University at Sao Paulo, Brazil.

International Organization: Osservatorio di Torino, Italy; Univ. of Toronto, Canada.

Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET) — Instituto de Biología y Medicina Experimental (IBYME)

Head of Institution: Dr. Alejandro De Nicola.

Address: Obligado 2490 PB, C1428ADN Buenos Aires, Argentina. **Phone:** (+54 11) 4783-2869, 4785-4880, 4785-5928. **Fax:** (+54 11) 4786-2564. **Email:** aboto@dna.uba.ar, ibyme@dna.uba.ar. **URL:** www.ibyme.edu.ar.

Scientific Fields of Interest: Biological Sciences.

Research and training: Research: Biology of reproduction; Neuroendocrine regulation; Steroid hormones; Biochemistry of fertilization process; Cellular biology of fertilization; Biochemistry of second messengers; Immunology; Ovarian physiology; Immunoendocrinology; Molecular oncology; Neuroendocrinology; Neurobiology. Chemistry of proteoglycans and extracellular matrix; Male infertility; Molecular endocrinology; Biology of behavior; Neuroendocrine biochemistry; Renal endocrinology. Training: Post-graduate courses.

Achievements: Mechanisms of hormone action and mammalian fertilization; studies of hormone receptor interaction in cancer; studies of animal behavior and control; in-vitro fertilization in bovines and embryo-transfer.

Facilities: Ultracentrifuges; centrifuges; spectrophotometer; spectrofluorimeter; radioactivity counters (beta and gamma); cell-culture facilities; densitometer; lyophilizer; microfuges; electrophoresis and TLC facilities; freezers and fridges; animal rooms. Library. Computers with connection to the Internet.

Future plans: To continue with research and training programmes in major fields of biochemistry, biology, endocrinology and immunology.

Cooperation with developing countries: Institute of Biomedical Sciences, Federal University of Rio Grande do Sul; Department of biochemistry, School of Science, University of Oriental Republic of Uruguay; Centre for Nuclear Investigation, School of Science, University of Oriental Republic of Uruguay.

International Organization: ICGEB (Italy). Lawson Research Institute, University of Western Ontario (Canada). Focal Point: Fogarty International Fellowship Programme; Focal Point: Americas Reproductive Biology Network (Canada, USA, Mexico, Chile, Brazil, and Argentina).

**Consejo Nacional de Investigaciones Científicas y
Técnicas (CONICET) — Instituto de Desarrollo y Diseño
(INGAR)**

Head of Institution: Dr. Horacio P. Leone.

Address: Avellaneda 3657, S3002GJC Santa Fe, Argentina. **Phone:** (+54 342) 4535-568, 4534-451. **Fax:** (+54 342) 455-3439. **Email:** hleone@ceride.gov.ar, ingar@ceride.gov.ar. **URL:** www.ingar.ceride.gov.ar.

Scientific Fields of Interest: Engineering.

Research and training: Design, modeling and optimization of batch processes; Modeling and informatics applied to production and business processes; Reliability Engineering. Intelligent control and monitoring of systems and processes; Biological reactors, effluents treatment, bio-mass use; Process synthesis, optimization and design.

Achievements: INGAR was the first R&D institute in Argentina that developed basic engineering for the nuclear industry and for the petrochemical industry (1980s). Furthermore, it has several patents registered in the software engineering area. More than 250 papers in the field of chemical engineering have been published.

Facilities: Distillation facilities: Distillation Pilot-plant, Rotovaporizers. Filtration facilities: UF, MF and NF; Membranes. Fermentation facilities: Biological reactors; Bacteria culture reactors (New Brunswick). Pilot-plant fixed bed and fluidized bed biological reactors. Fenton pilot-plant for waste-water treatment. Chemical Laboratory. Personal Computers (40). Software for Chemical Engineering, Industrial Engineering, System Engineering. (20 university fellows doing Ph.D thesis in these branches). Library: Access to Science Direct, Scopus, etc. Access to Ceride utilities in Santa Fe.

Cooperation with developing countries: CYTED: Cuba, Colombia, Uruguay, Brasil, Ecuador, Mexico, Spain and Portugal. SETCYTP-CITMA: Cuba

**Consejo Nacional de Investigaciones Científicas y
Técnicas (CONICET) — Instituto de Investigaciones
Biotecnológicas — Instituto Tecnológico de
Chascomús (UNSAM)**

Head of Institution: Alberto Carlos Frasch, Director.

Address: Universidad Nacional de General San Martín, Av. General Paz 5445, INTI-Ed. 24, 1650 San Martín, Pcia. de Buenos Aires, Argentina. **Phone:** (+54 11) 4580-7255. **Fax:** (+54 11) 4752-9639. **Email:** iib-intech@unsam.edu.ar. **URL:** www.iib.unsam.edu.ar.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences, Environmental Sciences.

Research and training: Biochemistry; molecular genetics and molecular immunology of protozoan parasites; bacteriology; molecular-biology of animal and plant pathogens; genomics and bio-informatics; cell biology of bacteria and eukaryotic cells; biotechnology aspects on agriculture production; biotechnology aspects on animals of economical value (cattle, sheep, fish); studies on environmental conservation.

Achievements: Over 40 publications in international journals per year.

Facilities: Scientific equipment: major scientific equipments are shared by all laboratories and grouped in facilities. The institute has medium- and high-speed ultracentrifuges, scintillation counters, ELISA plate readers, fluorometer, spectrophotometer, HPLC, PCR machines, inverted and upright fluorescence microscopes, -70 degrees centigrade freezers, shakers, and incubators for bacteria growth. Computer facilities: a general room contains 4 computers. In addition, each lab. has at least one computer for internal use. All PCs in the IIB-INTECH building are online and able to access centralized facilities and equipments (ELISA readers, real-time PCR machine, image analysis, etc.).

Future plans: Reinforcement of current research lines; incorporation of young researchers in the fields of research; fund-raising for the refurbishing/construction of general facilities to support researchers' tasks (sequencing lab., facilities for the generation of transgenic mice, confocal microscopy, etc.).

Cooperation with developing countries: Collaborations with institutions from developing countries are most welcome and are established by each of the researchers. Such collaborations are sometimes fundamental to continue research which cannot be done at IIB-INTECH.

**Consejo Nacional de Investigaciones Científicas y
Técnicas (CONICET) — Universidad Nacional de
Córdoba — Facultad de Ciencias Químicas — Centro
de Investigaciones en Química Biológica (CIQUIBIC)**

Head of Institution: Hugo J. F. Maccioni.

Address: Av. Haya de la Torre s/n, Ciudad Universitaria, 5000 Cordoba, Argentina. **Phone:** (+54 351) 433-4168, 433-4171, 433-4164, xt 11. **Fax:** (+54 351) 433-4074, 433-4187, xt 26. **Email:** maccioni@dqbfq.unc.edu.ar, ciquibic@dqbfq.unc.edu.ar. **URL:** www.fcq.unc.edu.ar/ciquibic.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences.

Research and training: Biochemistry and molecular-biology of tubulin and microtubule; membrane-associated proteins, phospholipases, glycolipids, sphingolipids, peptides in biomembranes, protein folding and modeling; synthesis and intracellular transport of glycolipids and glycosyl-transferases; recombinant bacterial strains for DT biodegradation; Bacterial mutations; biochemistry of glycogen synthesis initiation; biological rhythms and early gene regulation of signal transduction; plant molecular-biology and phytopathology; neuronal growth cone glycoproteins and molecular motors during development; cytotoxic effects of lipoproteins. Training: Under-graduate, Ph.D students and Post Doctoral Associates.

Achievements: About 400 publications in international journals and about 100 Ph.D theses since its creation; just in the past 5 years 20 Ph.D theses were defended.

Facilities: CIQUIBIC was originated on the basis of the Departamento de Química Biológica of Facultad de Ciencias Químicas. It was founded in 1963 by Professor Dr. Ranwel Caputto (1916-1994), who was a close collaborator of Dr. Luis F. Leloir, Nobel Prize in Chemistry, 1970. Nowadays, it is properly equipped for research activities in biochemistry, biophysics, and molecular and cell biology. Besides minor equipment and facilities that belong to each research group, CIQUIBIC counts with the following general equipment: ultracentrifuges (3), refrigerated centrifuges (3), scintillation counter (3), differential scanning calorimeter(1), fluorimeter (1), spectrophotometer (3), IR spectrophotometer, monolayers equipment, HPLC, fast chromatography, electrophoresis equipments, cold chamber, freezers, phosphorimager, network of 40 PCs with Internet access, etc. As central facilities, there is a bioterium, a cell-culture laboratory, (100sq.m), advanced optic microscopy laboratory equipped with a confocal microscope (shared with the Research Institute Mercedes and Mart'n Ferreyra-CONICET), fluorescence microscopes (3), micromanipulator, cell micro-injector, CCD photographic cameras, software for image analysis (Metamorph), etc. The covered surface available for this Centre is detailed below.

Future plans: To improve equipment facilities.

International Organization: Joint projects with groups from USA (FIRCA), France (INSERM-CONICET), Brazil (CAPES-SECYT).

Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET) — Universidad Nacional del Sur (UNS) — Instituto de Investigaciones Bioquímicas de Bahía Blanca (INIBIBB)

Head of Institution: Francisco J. Barrantes.

Address: C.C. 857, Camino La Carrindanga km 7, B8000 FWB Bahía Blanca, Argentina. **Phone:** (+54 291) 486-1201. **Fax:** (+54 291) 486-1200. **Email:** inibibb@criba.edu.ar. **URL:** www.criba.edu.ar.

Scientific Fields of Interest: Biological Sciences.

Research and training: Lipid involvement in meiotic maturation in amphibian oocytes. Polyunsaturated fatty acids of lipids and membrane proteins. Structural functional correlates of the nicotinic acetylcholine receptor and its lipid microenvironment. Molecular basis of gating of nicotinic acetylcholine receptor. Lipid signal transduction mechanisms in the central nervous system. Factors intervening in the survival and differentiation of retinal cultured neurons. Effect of ceramides on nicotinic acetylcholine receptor. Plasma membrane Ca-Pase activity in electrocytes. Role of lipids in the modulation of the survival of retinal neurons.

Achievements: Since 1970, more than 360 papers published in refereed international scientific journals, 20 book chapters, 2 books and 730 short communications for international and national scientific meetings. The UNESCO Chair of Biophysics and Molecular Neurobiology was created in 1998 within the Universidad Nacional del Sur operates at INIBIBB.

Facilities: The facilities of the institute include about 2000 square meters well-equipped laboratories, on an area of about 2000 sqm, a seminar room, an auditorium with a capacity of approximately 80 persons, a specialized library for Biochemistry and Biophysics, and administrative facilities. The INIBIBB forms part of the Centro Regional de Investigaciones Básicas y Aplicadas (CRIBABB) which provides back-up workshops (electronics, fine mechanics, etc.).

Future plans: To continue with the on-going research projects related to the above-mentioned research and training lines.

Cooperation with developing countries: TATA Institute for Fundamental Research, IISc Campus in Bangalore; Cochin University of Science and Technology, School of Ind. Fisheries, Cochin, India; Division of Natural Sciences and Mathematics, University of Philippines, College Baguio; Dept of Pharmaceutics, Univ. of Nigeria. TWAS Associate membership Scheme at CEX in the South.

International Organization: University of Bath (UK); Dept. of Pharmacology and Physiology, MCP Hahnemann Univ., Philadelphia (USA); Oxford Biomembrane Structure Unit, Biochemistry Dept., University of Oxford (UK);

Mayo Clinic, Minnesota (US); Centro de Regulación Celular y Patología, FONDAP-Biomedicina, Fac. de Ciencias Biológicas, P. Universidad Católica de Chile.

**Consejo Nacional de Investigaciones Científicas y
Técnicas (CONICET) — Universidad Nacional del Sur
(UNS) — Planta Piloto de Ingeniería Química
(PLAPIQUI)**

Head of Institution: Dr. Daniel Eduardo Damiani.

Address: Camino La Carrindanga Km 7, CC 717, 8000 Bahía Blanca, Pvcia. de Buenos Aires, Argentina. **Phone:** (+54 291) 486-1700. **Fax:** (+54 291) 486-1600. **Email:** plapiqui@plapiqui.edu.ar, gsisul@plapiqui.edu.ar. **URL:** www.plapiqui.edu.ar.

Scientific Fields of Interest: Engineering.

Research and training: Catalysis; Polymer Science and Technology; Food Engineering; Chemical Reactors; System and Process Engineering; Process Thermodynamics; Technological Risk and the Environment; Oleochemistry and Renewable Natural Resources; Graduate Teaching in Chemical Engineering at the Chemical Engineering Department of the National University at Bah'a Blanca; Post-graduate-programmes in Chemical Engineering, Food Science and Technology and Petrochemical Processes Technology at the Chemical Engineering Department of the National University at Bah'a Blanca; Other Post-graduate-programmes: Materials Science and Technology, Chemistry; Computer Science; Courses for professionals, technicians and plant operators from the industrial sector.

Achievements: More than 850 publications in referred international journals, books, book chapters and patents; About 1000 graduates in chemical engineering; 52 M.Sc. and 99 Ph.D. graduates; More than 400 technological projects and 3500 technical services for the chemical, petrochemical and food industries; About 170 presentations per year at national and international scientific meetings and conferences.

Facilities: About 5000 sq.m at the Regional Center complex (CRIBABB) with 22 laboratories, 2 classrooms, offices, library, workshops, 2 pilot-plant areas and approximately 1400 sq.m of teaching facilities at UNS. Laboratories: Polymer and Catalyst Characterization, Testing and Evaluation; Chemical Reactors; Phase Equilibria; Analysis and Characterization of Foods; Analytical Chemistry. Software for modeling and optimization of process equipment, process units and full chemical and petrochemical plants. About 6 million dollars in equipment. Library specialized on chemical engineering and related subjects with more than 6000 books and encyclopedias, about one hundred titles of international journals and access to remote databases. Computing Center which administrates a local area network with more than 150 personal computers and provides services such as Internet access, electronic mail,

shared resources, maintenance. Workshops: Electronics; Mechanical and General Services; Storage Rooms; Centralized Services Equipment Room.

Future plans: To continue and increase the under-graduate teaching activities and the Post-graduate-programmes: To continue with the current research lines and to develop new ones on fields related with new materials and environmental issues; To expand the present relationships with the productive sector; To increase bilateral and multilateral joint research activities and technological cooperation agreements with Academic and Scientific Institutions from foreign countries.

International Organization: Scientific and technological cooperation agreements with research and academic institutions: NSF (U.S.A.); CNRS (France); ICE (Spain); different tematical networks within the ALFA Projects: EMERTEC, PLASTINET, ELAPNET, (European Union); Programa Iberoamericano de Ciencia y Tecnología para el Desarrollo (CYTED); bilateral programmes Italy-Argentina (CNR-CONICET); collaboration programme with Carnegie Mellon University (NSF-CONICET Project); Programme ECOS with Université Rene Descartes; collaboration programme with Denmark Technical University on discontinuous processes for fine chemicals; cooperation project with the Chemical Reactors Engineering Centre, University of Western Ontario, Canadá; collaboration programme between the System and Process Engineering group of PLAPIQUI and the Chemical Engineering Department of Purdue University.

Fundacion Instituto Leloir (FIL)

Head of Institution: Dr. Luis Ielpi.

Address: Av. Patricias Argentina 435-1405 Buenos Aires, Argentina. **Phone:** (+54 11) 5238-7500. **Fax:** (+54 11) 5238-7501. **Email:** lielpi@leloir.org.ar. **URL:** www.leloir.org.ar/fil/.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences, Chemistry.

Research and training: Myelin biology; neuroimmunomodulation and gene therapy; neuronal plasticity; behavior genetics; molecular signaling; cancerology; gene therapy; biochemistry and molecular-biology of development; genetics and molecular physiology; protein synthesis; biosynthesis of complex carbohydrates in bacteria and related subjects; molecular virology; structural and molecular immunology; bacterial genetics; plant biochemistry; glycobiology; protein structure-function and engineering; plant biology; plant molecular-biology; amyloidosis and neurodegeneration; nuclear receptors and architecture.

Achievements: Almost 60 publications in peer-reviewed international journals since 2004 to date (2004: 27 publications; 2005: 22 publications; 2006: 10).

Facilities: The FIL is located in a 6.500 sqm building, specially designed to carry out biochemistry and molecular-biology research. Its library is one of the most important in the country for molecular-biology and biochemistry. The

institute has centralized services, departmental stores (drugs and lab materials), purchase department and an administrative department. It has general facilities available such as cold rooms, centrifuges, culture orbital incubators, protein purification systems (FPLC), peptide purification systems (HPLC), DNA automatic sequencing, lyophilizer, scales, pHmeters, culture room for animal cells, with all the necessary equipment. Each group lab has 30 mq and there are a number of labs of common use, all with optimal infrastructure and service, tables, de-ionized water, compressed water, fume hood, central air conditioning and heating. All the labs have computers, printers and network connection to Internet and to the Institute's server.

Future plans: To continue working on all the lines of research described above.

Fundación Miguel Lillo

Head of Institution: Jorege Alberto Rougés, President.

Address: Miguel Lillo 251, (4000) San Miguel de Tucumán, Argentina. **Phone:** (+54 381) 4330-868. **Fax:** (+54 381) 4330-868. **Email:** direccion@lillo.org.ar.

URL: www.lillo.org.ar.

Scientific Fields of Interest: Biological Sciences, Chemistry, Earth Sciences, Environmental Sciences.

Research and training: Fauna from the Northwest of Argentina; Ecological and zoogeographic Studies; Argentinian flora; systematic and taxonomic botany; geology in Argentina; environment; conservation of nature; economic geology, sedimentology, stratigraphy, mineralogy, vertebrate paleontology, invertebrate paleontology; ecology; evolution.

Instituto Argentino de Matemática (IAM)

Head of Institution: Dr. Gustavo Corach, Director.

Address: Saavedra 15, 1083 Buenos Aires, Argentina. **Phone:** (+54 11) 4954-6781. **Fax:** (+54 11) 4954-6782. **Email:** iam@conicet.gov.ar, corach@iamba.edu.ar, postmaster@iamba.edu.ar. **URL:** www.iam.conicet.gov.ar.

Scientific Fields of Interest: Mathematics.

Research and training: Functional analysis; numerical linear algebra; operator theory; harmonic analysis; mathematics of finance; distribution theory.

Achievements: Researchers and graduate students publish regularly, around 30 papers per year, generally in good international mathematical journals. By law, the institute is not allowed to have an independent Ph.D program, so our students get their Ph.D degrees at different universities, mostly at Universidad de Buenos Aires

Facilities: 25 computers; library.

Future plans: Develop an area in PDE and another in applied mathematics, mainly concerned with transport and cardiological modeling.

Cooperation with developing countries: The institute plans to intensify contacts with Chilean, Brazilian, Uruguayan and Venezuelan centers. Some contacts already exist with Santiago, Sao Paulo, Montevideo and Simon Bolivar University.

International Organization: The institute plans to intensify contacts with universities in Spain, Italy, Germany and France. Some contacts already exist with Madrid, Florence and Lille).

Instituto de Botánica "Darwinion" (IBODA)

Head of Institution: Fernando O. Zuloaga, Director.

Address: Labardén 200, CC 22, B1642HYD San Isidro, Buenos Aires, Argentina. **Phone:** (+54 11) 4743-4800. **Fax:** (+54 11) 747-4748. **Email:** fzuloaga@darwin.edu.ar, secretaria@darwin.edu.ar. **URL:** www.darwin.edu.ar.

Scientific Fields of Interest: Biological Sciences.

Research and training: Botany; systematic of vascular plants; phylogeny of vascular plants; morphogenesis and development of reproductive structures; molecular systematics.

Achievements: Approximately 80 publications per year in international periodical journals, as well as books and chapters of books in botany, particularly in vascular plants. Dissemination of works in both national and international meetings on biology.

Facilities: Herbarium (700.000 herbarium specimens); library (15.000 scientific book and 2.300 periodical journals); Molecular-biology lab (molecular phylogeny equipment); microscopy lab: (bright-dark field, fluorescence, DIC, SEM, microtomy, digital image processing). The Darwinion Institute also has 30 binoculars and around 10 microscopes. Computer equipment: 40 Computers and 3 servers, intranet and connection to Internet, plus printers, scanners and other equipment.

Cooperation with developing countries: Cooperation agreements with Herbario Nacional de La Paz, La Paz, Bolivia; Universidad de Concepción, Concepción, Chile.

International Organization: Smithsonian institution, Washington, DC., USA; Missouri Botanical Garden, St. Louis, USA; Brigham Young University, Utah, USA.

Instituto de Medicina y Biología Experimental de Cuyo (IMBECU)

Head of Institution: Dra. Graciela A. Jahn, Director.

Address: Av. Adrián Ruiz Leal s/n Parque Gral, San Martín, 5500 Mendoza, Argentina. **Phone:** (+54 261) 428-6112. **Fax:** (+54 261) 428-7370. **Email:** imbecu@lab.cricyt.edu.ar. **URL:** www.cricyt.edu.ar.

Scientific Fields of Interest: Biological Sciences.

Research and training: Hormonal regulation of pregnancy, lactation mammary and ovarian functions; hormonal regulation of mammary carcinogenesis; thyroid pathology and female reproduction; molecular mechanisms of cellular resistance to chemotherapeutic agents; cardiac electrophysiology; experimental studies of arrhythmogenic mechanisms at cellular level; reactive oxygen species in ischemia-reperfusion cardiac injury; effects of antioxidant agents; neurochemical effects of Tianeptin in rats models of hypo and hyper sensibility to stress; endogenous NO and angiotensin II interactions in experimental kidney injury; functional lateralization of histaminergic systems in motivation mechanisms; effects of glutamatergic blockage in the Nucleus Accumbens Septi (NAS) on anxiety levels in the plus maze test and its correlates on membrane proteins.

Achievements: Publications in national and international peer-reviewed journals, presentations in national and international scientific meetings. Since 1979 there have been more than 150 papers published and more than 22 Doctoral theses performed in the institute. Mechanisms of Regulation of Hormone Secretion and Action; Hormonal control of female reproduction: pregnancy and lactation, pharmacology of behavior. Neurochemistry. Cardiac physiology; renal pathophysiology. Heat shock proteins in normal and tumoral reproductive tissues and organs. Molecular markers of tumoral response to chemotherapy. Hormonal regulation of breast cancer. Effects of various pathologies (hypo and hyperthyroidism, alcoholism, hypoprolactinemia, etc.) on female reproduction.

Facilities: Laboratories equipped for biochemical determinations, cell-culture, protein and nucleic acid preparations, identification and quantification (PCR, Western blot, electrophoresis, etc.), radioactive handling (RIA and other radio labeling assays), microscopy, immunohistochemistry, neurophysiology, and cardiac electrophysiology. Laboratory equipment, ultracentrifuge, refrigerated centrifuges, refrigerated micro-centrifuges, spectrophotometers, spectrofluorometer, radioactivity counters (beta and gamma), cell-culture facilities, lyophilizer, micro-centrifuges, HPLC, equipment for measuring behavior, electrophoresis, freezers, cardiac perfusion setup, micropipette puller, oscilloscopes, stimulators, animal care facilities (rats, mice and small ruminants), library, computers with Internet connection.

Future plans: Continuation of the present lines of research, establishment of collaborative projects with local institutions for optimization of breeding and

nutrition in small ruminants of local economic interest. Establishment of collaborative projects on basic research in the present line of research, with other research groups in Argentina and abroad.

Cooperation with developing countries: Collaboration with Argentine, Chilean and other Latin American Research Groups with the Programa Latinoamericano de Investigación en Reproducción Humana.

International Organization: Cooperative projects with groups from France and USA.

Instituto Nacional del Agua — Centro de Tecnología del Uso del Agua

Head of Institution: Ing. Carlos A. Gomez.

Address: CC 46 - Aeropuerto Ezeiza, 1802 Prov. de Buenos Aires, Argentina.

Phone: (+54 11) 4480-0855. **Fax:** (+54 11) 4480-9073. **Email:** cgomez@ina.gov.ar. **URL:** www.ina.gov.ar.

Scientific Fields of Interest: Chemistry, Engineering, Environmental Sciences.

Research and training: Water and wastewater monitoring programs; Water-quality mathematical modeling; wastewater treatability tests; optimization of wastewater treatment processes; environmental risk-assessment; environmental analytical chemistry; industrial clean production.

Achievements: Toxic risk-assessment in rural and urban areas (pesticides, hydrocarbons); testing of copper biotic Ligan Model (BLM) in Argentine rivers; clean production technologies for the metal plating industries; development of expert systems for Water-quality assessment in urban river basins; nutrients mass balance modeling in coastal areas; pollution site assessment in airport fields; urban refuse monitoring.

Facilities: Two ISO 17025 accredited labs (Water-quality experimental lab and sustainable technologies experimental lab) with the following main equipment: atomic-absorption with graphite furnace (2); ICP plasma (1); GC-MS (4); HPLC (2); ion chromatographs (2); X-ray fluorometry (1); TOC (1); auto analyzer (1); Water-quality, sediments, soil and air field samplers and monitors; 25 PCs; bioassays lab; sanitary engineering reference centre (library).

Future plans: Research on environmental MTBE risk-assessment; research on cyanides catalyzed oxidation/ozonization; research on risk-assessment with fugacity models.

Cooperation with developing countries: INA-JICA annual course on industrial wastewater management (20 students from Latin America and Caribbean countries); on-site training of technical staff and student in CTUA labs (Bolivia-France).

International Organization: Japan International Cooperation Agency (JICA); UNEP (GEMS/Water focal point); International Copper Association (ICA).

Instituto Nacional del Agua (INA)

Head of Institution: Jorge Santa Cruz.

Address: CC 46, 1802 Aeropuerto Ezeiza, Buenos Aires, Argentina. **Phone:** (+54 11) 4480-9162. **Fax:** (+54 11) 4480-0094. **Email:** ina@ina.gov.ar. **URL:** www.ina.gov.ar.

Scientific Fields of Interest: Earth Sciences, Environmental Sciences.

Research and training: Floods; irrigation and drainage; hydrological warning systems; large water works hydraulics; fluvial, maritime and industrial hydraulics; computational hydraulics; physical modeling and instrumentation in hydraulic labs; water biogeochemistry; pollution site assessment and remediation technologies; Water-quality; environmental impact and risk-assessment due to public works and water courses accidents; minimization; water, wastewater and residues treatment engineering; surface and groundwater hydrology; urban hydrology; water-resources information; scour; erosion control and sedimentation; water economics; planning, legislation and management; water environment and sustainable development; water-resources; standardization.

Achievements: The institute has an integrated research system combining applied research and high-level technological services in the water sciences subjects. Outstanding results can be mentioned in microturbulent flows; aeration against cavitations; fluvial mathematical models; non-structural actions for flood control; environmental problems due to oil pollution and groundwater level rise in urban areas. More than 50 external publications per year; 20 projects for research and 80 projects for applied technology; more than 100 flood forecasting reports and 2,000 Water-quality tests.

Facilities: Hydraulic lab with an area of 22,000 sqm; discharge over 6 m³/s; five fixed bed channels; a fluvial movable bed model basin; a high-velocity flow system (discharge 500 l/s and head 50 m); big pumps testing devices; calibration systems for hydrometric instruments; wave channel with random wave generator; pressure, displacement, acceleration, slope, wave and velocity transducers; random variables detection and analysis. Three water-quality labs equipped with cutting-edge analytical technology as atomic-absorption with graphite furnace and hydride generator; inductively coupled plasma emission spectrophotometer system; high-performance liquid-chromatograph-mass spectrometer system; ion chromatograph; UV and IR spectrophotometers; gas chromatograph-mass spectrometer system; eco-toxicology testing equipment. Surface hydrology field equipment; GPS; geo-electrical prospecting equipment and small hydrometeorological station. Telemetric systems for hydrometeorological and environmental monitoring.

Future plans: According to the 2004-2007 Strategic Plan, the institute will have the following thematic strategic fields: prevention, mitigation and control of flood and pollution disasters; integrated analysis of water problems in urban areas for territorial planning; technology development for design, verification and optimization of water works; assessment of water-resources quality and risks

associated to contamination; surface and groundwater hydrology developments; hydrological networks and information systems.

Cooperation with developing countries: Partner of the FOAR system (Argentine Fund for Horizontal Cooperation); collaboration with Mexico (CAN); Venezuela (CIDIAT) and the Economic Commission for Latin America and the Caribbean (ECLAQ).

International Organization: Agreements with Japan Cooperation Agency (JICA); member of the Ibero-American Network of Hydraulic National Institutes and the Global Water Partnership. It has agreements with CEDEX (Spain) and several universities of USA, France and international organizations.

National Institute of Agriculture Technology — Climate and Water Institute

Head of Institution: Ing. Agr. Cesar Rebella, Director.

Address: Las Cabañas y Los Resero, (1712) Castelar, Provincia de Buenos Aires, Argentina. **Phone:** (+54 11) 4621-0125. **Fax:** (+54 11) 4621-5663. **Email:** iclima@cnia.inta.gov.ar. **URL:** www.intacya.org, www.inta.gov.ar.

Scientific Fields of Interest: Agricultural Sciences, Environmental Sciences.

Research and training: Crop growth and yield modeling; crop diseases and plagues; modeling of weather conditions favoring them; medium term weather forecast; tale-detection; low, high and very high-resolution image processing; impact of the climate in the crop and cattle production; hydrology and management of surface water.

Achievements: Almost all the activities of the institute support the objective of improving and supporting the alert system and damage evaluation for flooding, draughts or other climatic events. The results of the work under the different lines of research are published in international journals.

Facilities: High-resolution weather satellite (NOAA, GOES) image receiving station; digital multispectral airborne high-resolution camera; Doppler meteorological radar available at end of 2005; access to 40 research stations in the country; library; personal computers.

Future plans: To intensify the development of Human-resources, through the offer of formation of students and researchers from the country and from the rest of South America.

Cooperation with developing countries: Uruguay, Paraguay, Chile, Brazil, Ecuador and in the near future also cooperation with Venezuela.

International Organization: ICT (Netherlands), INRA (France), INIA (Spain), CNR (Italy), Universities of Valencia and Valladolid (Spain), Wageningen (Netherlands), Purdue (USA), etc.

Planta Piloto de Procesos Industriales Microbiológicos (PROIMI)

Head of Institution: Dr. Faustino Si-eriz, Chairman.

Address: Av. Belgrano y Pje. Caseros, 4000 San Miguel de Tucumán, Argentina. **Phone:** (+54 381) 434-4888. **Fax:** (+54 381) 344-887. **Email:** proimi@proimi.org.ar. **URL:** www.proimi.org.ar.

Scientific Fields of Interest: Biological Sciences, Environmental Sciences.

Research and training: Biotechnology, especially in the areas of fermentation and use of microorganisms of industrial interest; the microorganisms are employed in a number of processes such as: alcohol production, organic acids, solvents, Amino-acids, vitamins, hormones, cheeses, acid mild, pickled foods, silage, secondary recovery of oil, nitrogen fixation, treatment of wastes, biogas production, compostages, etc. The main aims of PROIMI are: Optimization of microbial processes; study and development of new processes of industrial interest; genetic improvement of industrial strains; design of equipment and fermentation plants. The principal lines of investigation which are developed in the institute are: control of processes; genetic improvement of industrial strains of yeasts; methanic fermentation and treatment of effluents; continuous culture of microorganisms; studies on the biological use of waste lignocellulose substances for animal feed and for other fermentation processes; biological fixation of nitrogen; alcohol fermentation with *Zymomonas*; production of enzymes by *Bacillus* strains; production of biopolymers; xanthan; scleroglucan; downstream processing of biomolecules.

Achievements: 2 Prizes in the 100th General Meeting of the Am. Soc. for Microbiology (ASM) held in LA, CA in 2000; another 2 prizes were awarded also in 2001 at the 101st GM of ASM; special mention of the institute in 2002 for the 102nd GM of the AMS.

Facilities: The pilot-plant is equipped with modular equipment for production and handling of microbial products, including: preparation tanks; sterilizer; mixers; bioreactor for inoculum; 500 lt. bioreactor; continuous centrifuge (17,000 g - 50 lt./hr; micro-ultra filtration equipment (2-200 lt./hr); distillation column; spray dryer; all auxiliary accessories; fermentor 50 lt., completely equipped; Bio Flo fermentors for continuous culture; LH fermentors for batch and continuous operation; micro-ferm fermentors (2-10 lt.); gas chromatographers; Gilson HPLC; spectrophotometer UV and visible; shakers; radioisotopes counter; programmable thermo cycle; electrophoresis equipment for DNA and for protein; electroporator; preparative centrifuges; micro centrifuges; ultracentrifuge; walk-in chamber lab. line; French press; micro manipulator; transilluminator; microscopes; biofreezer (-80); freezers and fridges; peristaltic pumps and other; thermostatic baths; cold chambers; sterilization center equipment; computers.

Future plans: Scaling-up of biotechnological processes in GMP pilot-plant; isolation of biomolecules from extreme and marine environments; bio-remediation.

Cooperation with developing countries: Brazil, Peru, Bolivia, Chile, Uruguay, Colombia, India, Mexico.

International Organization: Spain, Germany, France, Sweden, USA, Italy, GB, Denmark, Netherlands.

Research and Development Center for Industrial Fermentation (CINDEFI)

Head of Institution: Dr. Edgardo Donati, Director.

Address: Facultad de Ciencias Exactas, UNLP, Calles 47 y 115, 1900 La Plata, Argentina. **Phone:** (+54 221) 483-3794. **Fax:** (+54 221) 483-3794. **Email:** cindefi@quimica.unlp.edu.ar, donati@quimica.unlp.edu.ar. **URL:** www.quimica.unlp.edu.ar/cindefi.

Scientific Fields of Interest: Biological Sciences, Environmental Sciences.

Research and training: Microbiology; bioprocesses; environmental sciences; biotechnology; bio-remediation; bioleaching; biocorrosion; bioinsecticides; bioenergetics; metabolism models; enzymes; bacterial vaccines; phytoremediation; microbe-plant interaction; nitrogen fixation; treatment of industrial effluents.

Achievements: 200 scientific papers in international journals, serial book chapters; more than 25 Ph.D graduates, several technological projects and technical services for biotechnological industries.

Facilities: Ultracentrifuges, centrifuges, spectrophotometers, lyophilizer, freezers, fridges, microscopes, HPLC, FTIR, EAA, FPLC, electrophoresis and cell-culture facilities, water baths, shakers, autoclaves, balances, batch/continuous fermentors, bioreactors, library, computers.

Future plans: New laboratories and a library are under construction in order to incorporate new researchers; increase in training activities for foreign students and technological projects for industries; development of new research lines; increase of bilateral and multilateral research activities.

Cooperation with developing countries: Bilateral projects with scientific institutes from Brazil and Chile. Cooperation projects with Cuba, Colombia and Peru are planned for this year. An incipient cooperation project with Poland.

International Organization: Spain, Germany, The Netherlands, France.

Universidad de Buenos Aires — Departamento de Ciencias de la Atmósfera y de los Océanos (DCAO)

Head of Institution: Dr. Susana A. Bischoff.

Address: Ciudad Universitaria, Piso 2 Pabellón 2, C1428EHA Buenos Aires, Argentina. **Phone:** (+54 11) 4576-3356, 4576-3364. **Fax:** (+54 11) 4576-3356, xt. 12. **Email:** secret@at.fcen.uba.ar, bischoff@at.fcen.uba.ar. **URL:** www.atmo.at.fcen.uba.ar.

Scientific Fields of Interest: Earth Sciences, Environmental Sciences.

Research and training: Mesometeorology; regional air pollution models; climate dynamics; micrometeorology; meteorological instruments and observation; synoptic climatology; meteorological satellite images; meteorological radar; urban air pollution; boundary level meteorology; biometeorology; ocean dynamics; air dynamics; sea-atmosphere reactions; sea-river interactions; climatology; climate change and variability; hydrometeorology; climate extremes; oceanography; forecast; numerical modeling (different scales).

Achievements: Operative forecast model of the National Meteorological Service of Argentina; tools to improve weather forecast in the short-term through research in Synoptic Climatology; important results in the fields of climate variability and climatic change through studies in Argentina, Uruguay, Brazil and Paraguay; 40 annual publications in national and international scientific journals; collaboration in the IPCC report in 2001; webpage offering free access to short-term national weather forecasts; public access to updated satellite images of South America property of the department.

Facilities: 90 PC and 9 workstations for researchers; 9 PC for students; 2 DCAO workstations; 100 Mbits intranet and Internet connections; selected FTP 12 connection; GOES and NOAA satellite receivers; meteorological radar; fields station; audio-video system; DCAO library with 525 books and 6 journal collections; (AMS and WMO); Central library (411 books) and 15 journals related to atmospheric and oceanographic sciences; 1900 sqm. in the 2nd floor of the faculty of sciences (UBA).

Future plans: The DCAO is working to sign arrangements with different universities from Brazil to be able to make an important integration in meteorological and oceanographic investigations with the MERCOSUR countries. During the South American Monsoon Experiment (2003), an important rain network in the north-east of Argentina was mounted. Although the experiment has finalized, the DCAO has decided to continue receiving the observed information and to form a precipitation database as long as possible of the region. It will be necessary for future meso-scale information to verify and to evaluate models with precipitation results in the region. It is planned to continue working with project COMET and Unidata in the meteorology project of UCAR and OMM, in the translation and verification of education modules for meteorologists developed by COMET.

Cooperation with developing countries: Based on scientific level and on the international recognition reached by our professionals, the number of international projects has increased, being in all the cases, financed externally by organisms like the Intera-American Institute of Investigation for the Global Change (the IAI) with the sponsorship of the National Science Foundation), GEF, the University Corporation Atmospheric Research (UCAR), the National Oceanic and Atmospheric Administration (NOAA), in addition to the support of bilateral cooperation projects with Germany, Brazil, France and the USA. Program in Climate Variability and Climate Changes in the region of MERCOSUR, with scientists from Argentina, Brazil, Paraguay, Uruguay and USA. Funds from IAI/NSF (proj. n. IA CRN055). Project of Environmental Protection of La Plata River and the Maritime Front: Pollution Prevention and Contro and Habitats Restoration, with scientists from Argentina and Uruguay. Funds from GEF (proj. n. RLA/99/G31). South American Low Level Jet Experiment with scientists from Argentina, Brazil, Bolivia, Paraguay, Uruguay and USA. Funds from NOAA. The Impact of Global Change on the Coastal Areas of the Rio de La Plata: Sea-level Rise and meteorological Effects, with scientists from Argentina and Uruguay. Fund from AIACC. Relationships between the Antarctic vortex Dynamics, Chemistry, Ozone Depletion and Southern Midlatitude Statosphere and Upper Atmosphere, with scientists from Argentina, Uruguay and USA. Funds from IAI/NSF (proj. n. IAI ISP 3-078). For major arrangements, see: www.uba.ar/internacionales/convenios/index.htm

International Organization: Please refer to www.uba.ar/internacionales/convenios/index.htm

Universidad de Buenos Aires — Facultad de Ciencias Exactas y Naturales — Departamento de Matemática

Head of Institution: Dr. Ursula Molter.

Address: Ciudad Universitaria, Pabellón 1, 1428 Buenos Aires, Argentina.

Phone: (+54 11) 4576-3335. **Fax:** (+54 11) 4576-3335. **Email:** fcukier@dm.uba.ar, depto@dm.uba.ar, secre@dm.uba.ar. **URL:** www.dm.uba.ar.

Scientific Fields of Interest: Mathematics.

Research and training: Differential equations; probability and statistics; functional analysis; homological algebra; numerical analysis; computational algebra; harmonic analysis; non-commutative algebra; category theory; logic; differential geometry; number theory; algebraic geometry; algebraic topology; real analysis.

Facilities: Computers: The department has an internal web consisting of a small computer lab for faculty use, a larger lab for student use with about 30 computers and computers in most faculty offices (bought through personal grants). This web has direct access to the Internet. Offices: Full-time faculty and graduate students have offices, usually shared. Library: The mathematics

bibliographic material is located in two libraries on campus (Bibliotheca Leloir: www.bl.fcen.uba.ar - mainly books for under-graduate students). (Bibliotheca Rey Pastor: www.dm.uba.ar/hemeroteca/index.html - research journals and advanced books). The Argentine government is developing the site www.biblioteca.secyt.gov.ar for access to research journals.

Future plans: Increase of exchange students and researchers with TWAS institutions; current fields of research will be pursued and enlarged; maintain a fairly High-quality of under-graduate-programmes and further improve the doctoral programme; new areas of research would be added if the department receives applications from outstanding candidates for faculty positions; interested in attracting more doctoral students and post-docs who have obtained their degrees at other institutions in Argentina and from abroad.

Cooperation with developing countries: Brazil (IMPA - Rio de Janeiro), Belo Horizonte, San Pablo, Porto Alegre. Uruguay (Universidad de la Republica. Chile (Universidad de Valparaiso).

International Organization: Various institutions in Italy, France, Spain, USA, Canada, etc.

Universidad de Buenos Aires — Facultad de Farmacia y Bioquímica — Instituto de Química y Físicoquímica Biológicas (IQUIFIB)

Head of Institution: Patricio J. Garrahan.

Address: Junin 956, C1113AAD Buenos Aires, Argentina. **Phone:** (+54 11) 4964-8289, 4964-8287/88. **Fax:** (+54 11) 4962-5457. **Email:** iquifib@qb.ffyb.uba.ar, garrahan@qb.ffyb.uba.ar. **URL:** <http://qb.ffyb.uba.ar/>.

Scientific Fields of Interest: Biological Sciences, Chemistry.

Research and training: Proteins and Peptides; Transduction of Biological signals; Neurochemistry- Neurobiology; Immunochemistry- Immunobiology; Mechanism of Action of ATPases, Ionic Transport; Free Radicals in Biological Systems; Chemistry structure and function; Enzymes involved in Trypanosoma cruzii metabolism; Natural and synthetic ligands for benzodiazepine receptors; Molecular-biology; D4 dopaminergic receptor in CS.

Future plans: Current fields of investigations will continue to be developed.

Cooperation with developing countries: Joint research programmes with Brazil on proteins and immunology.

International Organization: German government; NIH (USA); Pasteur Institute; University of Louvain and University of Ghent, (Belgium); Mayo Clinic, Rochester (USA) and NSF; Physiological Laboratory, Cambridge (UK).

**Universidad de Buenos Aires — Facultad de Medicina
— Departamento de Bioquímica Humana — Laboratorio
de Hormonas en la Regulación y Diferenciación Celular
(HRDC)**

Head of Institution: Dr. Ernesto J. Podesta, Director.

Address: Paraguay 2155, 5o piso, C1121ABG, Buenos Aires, Argentina.

Phone: (+54 11) 458-3672, xt. 36. **Fax:** (+54 11) 4508-3672, xt 31. **Email:** biohrdc@fmed.uba.ar, bioquimica@fmed.uba.ar. **URL:**

www.fmed.uba.ar/depto/bioqhum/main.htm.

Scientific Fields of Interest: medical Sciences.

Research and training: Relationship between tyrosine phosphatase, acyl-CoA synthetase and acyl-CoA thioesterase and their obligatory role in hormonal regulation of steroidogenesis; transcriptional and post-translational regulation of Acyl-CoA synthetase and Acyl-CoA thioesterase obligatory in the mechanism of action of steroidogenic hormones; mechanism of action of a mitochondrial acyl-CoA thioesterase in cholesterol transport of the mitochondria and nucleus; regulation of the expression of enzymes involved in the cellular control of free arachidonic acid; identification and characterization of tyrosine phosphatases of hormone dependent expression and activity in steroidogenic cells; identification of a protein tyrosine phosphorylated to hormone action in steroidogenic cells and characterization of tyrosine kinases and phosphatases on steroidogenesis; regulation of arachidonic acid production and metabolism in proximal renal tubule cells.

Achievements: Publications.

Facilities: 9 PCs, Liquid scintillation counter, Cell-culture lab, Blotting equipment, Freezer - 70¼ C. GeneAmp PCR System, Gamma counter, Electrophoresis equipment, DNA sequencing equipment, Chromatography.

International Organization: Dept. of cell biology, Texas Tech University, Dept. of Pharmacology and University of Wisconsin Medical School, Madison, USA; Instituto de investigaciones Biomedicas, Consejo Superior de Investigaciones Cientificas, Madrid, Spain.

**Universidad de Buenos Aires — Instituto de Química
Física de los Materiales, Medio Ambiente Y Energía
(INQUIMAE)**

Head of Institution: Roberto J. Fernández Prini, Director.

Address: Ciudad Universitaria, Pabellon II, Piso 3, C1428EHA, Buenos Aires, Argentina. **Phone:** (+54 11) 4576-3358, 4576-3300 xt 228. **Fax:** (+54 11) 4576-3341. **Email:** inquimae@qi.fcen.uba.ar. **URL:** www.inquimae.fcen.uba.ar.

Scientific Fields of Interest: Chemistry, Environmental Sciences.

Research and training: Photochemical probes in micro-heterogeneous and heterogeneous media; particle adhesion on metals; modified electrodes; corrosion; conducting polymers; bioelectrochemistry; crystal growth. Organometallic compounds; structure and reactivity of transition metal complexes; inorganic materials. Behavior of solutions in supercritical solvents; binary clusters; nanostructures, salvation phenomena. Molecular simulation of materials and biomolecules; density functional methods. Monitoring of atmospheric contaminants; automatic trace analysis of metals in environment dispersion in flow-injection methods; chemical biomimetics, biophysical chemistry, molecular recognition, bioinorganic materials.

Achievements: Publication in major international journals, about 50 per year; Organization of workshop and training courses for graduates and also for professionals in industry or government Training courses and workshops were held on salvation dynamics, bioanalytical chemistry, redox processes in organometallics chemistry, new materials and their environmental relevance, tropospheric chemistry, automation in analytical chemistry, biosensors. Ten Ph.D theses were approved in the last 3 years. Activities with the industry: consulting for the industry and government in areas of chemistry. Routine analysis for scientific and industrial users.

Facilities: Spectrophotometers: FTIR, UV visible NIR, diode arrays, luminescence, spectrofluorimeter, atomic-absorption; Differential scanning calorimeter; Time of light mass spectrometer for study of cluster; Single photon counting instrument; Microscopy optical AFM and tunnel microscopy; Chromatographs: gas, HPLC, ionic. X-ray diffractometer; several lasers; potentiostats; work stations; monitoring instruments for atmospheric chemistry; stopped flow and T-jump instruments; CNHOS elemental microanalysis; image analyzer; Workshops: precision mechanical workshop; Glassblowing facilities, libraries.

Future plans: Continuing efforts to attain excellence in the use of Chemistry for environmental and material sciences: developing analytical facilities and benign processes in connection with environmental chemistry. Increasingly involved in research in bioinorganic and biophysical chemistry, chemical biomimetic and molecular recognition.

Cooperation with developing countries: INQUIMAE is a research centre within the CONICET system; hence its activities are covered by the CONICET-

TWAS agreement for the CEX programme. Other cooperation agreements: State University of Sao Paulo (Brazil), University of Guanajuato and National Autonomous University (Mexico), Federal Fluminense University (Brazil).
International Organization: EU, National Science Foundation (USA), Volkswagen Stiftung (Germany).

**Universidad de La Plata — Facultad de Ciencias
Médicas — Instituto de Investigaciones Bioquímicas
(INIBIOLP)**

Head of Institution: Dr. Mar'a Josefa Tacconi de Alan'z.

Address: Calles 60 y 120, 1900 La Plata, Argentina. **Phone:** (+54 221) 428-4894, xt. 31 and 37. **Fax:** (+54 221) 425-8988. **Email:** inibiolp@atlas.med.unlp.edu.ar, mtacconi@atlas.med.unlp.edu.ar.

Scientific Fields of Interest: Biological Sciences.

Research and training: Research: Biosynthesis of fatty acids and lipids, regulation, essential fatty acids in nutrition, transformation and function; Lipid-protein interaction, lipoproteins and membranes, lipid metabolism in modified cells; Biochemistry of invertebrates and microorganisms; Biochemistry of aging; Gene therapy. Training: Ph.D programmes in La Plata University.

Achievements: 163 major scientific publications since 2001 to date.

Facilities: Refrigerated centrifuges; gamma counter; microscopes; culture ovens; scanner; HPLC; GLC; ultracentrifuges; spectrophotometers; fluorometer.

Future plans: Regulation of the biosynthesis of lipids; lipid-protein interaction; lipid metabolism in neoplastic cells; lipid metabolism in invertebrates, plants and microorganisms; insect biochemistry application for plague control; gene therapy for timuline hormone in timodeficient animals.

Cooperation with developing countries: Paraguay, Uruguay, Brazil, Bolivia, Mexico.

International Organization: France, Spain, USA and England.

**Universidad Nacional de Córdoba — Facultad de
Matemática, Astronomía y Física (FAMAF)**

Head of Institution: Dr. Daniel E. Barraco D'az.

Address: Medina Allende S/n, Ciudad Universitaria, 5000 Cordoba, Argentina. **Phone:** (+54 351) 433-4051. **Fax:** (+54 351) 433-4054. **Email:** decano@famaf.unc.edu.ar. **URL:** www.famaf.unc.edu.ar.

Scientific Fields of Interest: Mathematics, Physics.

Research and training: Nuclear-magnetic resonance, nuclear-quadrupolar resonance, materials science, atmospheric physics, nuclear and atomic spectroscopy, condensed matter, gravitation and relativity, physics education

research. numerical analysis and computation, differential equations and harmonic analysis, differential geometry, probability and statistics, algebraic semantic, lie theory, number theory, mathematics education research, stellar astrophysics, celestial mechanics, interstellar medium, extragalactic astronomy, stellar atmospheres, active galaxy nuclei, large-scale structure, variable stars, cluster galaxy, planets, satellites and comets.

Achievements: 10 Ph.D degrees per year; 40 Bachelor degrees per year; Over 150 international publications per year.

Facilities: Computer labs; liquid-nitrogen machine; machine shop; electronic shop; library (16500 books), 500 journals (paper), 70 journals (online); experimental teaching labs.

Future plans: A Computer Science Ph.D programme will be available next year. (At present we also have a Computer Science bachelors degree); A Masters degree in Medical Physics will also be available next year.

Cooperation with developing countries: Arrangements with developing countries are carried out through National Council of Argentina; expansion of this arrangement is underway.

International Organization: Alpha Programme (Network: LENAC Latin American European Network for Astrophysics and Cosmology) which promotes cooperation between higher-educational Institutions in Latin America and Europe; ECOS - SeCyT (France - Argentina) Quantum Coherence; Alpha II Programme (Network: HISIELD) Measuring methods involving High-magnetic Fields for advanced and novel materials; NSF (Argentina- Brazil-USA) Electromagnetic Signal Detection from Thunderstorm; CAPES-SeCyT (Brasil-Argentina) Solid-State Pharmaceutical compounds properties and its impact on bioequivalence.

Universidad Nacional de la Plata — Centro de Quimica Inorganica (CEQUINOR) — Laboratorio Nacional de Investigación y Servicios en Espectroscopía Optica (LANAIS-EFO)

Head of Institution: Pedro J. Aymonino and Enrique J. Baran.

Address: Calle 47 y 115, CC 962, 1900 La Plata, Argentina. **Phone:** (+54 221) 424-0172. **Fax:** (+54 221) 425-9485. **Email:** nem@dalton.quimica.unlp.edu.ar.

URL: www.quimica.unlp.edu.ar.

Scientific Fields of Interest: Chemistry.

Research and training: Coordination compounds; oxidic solids; minerals; covalent halogenated- and thio- compounds; metallopharmaceuticals; study of structural, spectroscopic, thermal and magnetic properties; theoretical (mechano quantical) studies.

Achievements: Basic research; preparation and characterization of new compounds and systems of interest in inorganic and bio-inorganic chemistry; development and application of theoretical models to a better understanding of

the investigated systems; contributions to the fields of catalysis, material chemistry, pharmacochimistry and mineralogy.

Facilities: IR Spectrophotometers: Perkin Elmer 580B, FTIR Bruker 66 and 113v (LANAIS EFO); Raman spectrophotometer; Spex Ramalog # 1403; FTNIRR Bruker (as accessory of the FTIRS 66); UV-VIS spectrophotometers; Shimadzu UV 300; Hewlett-Packard 8452A; Powder X-Ray diffractometer; RIGAKU Miniflex; Magnetic balance; Cahn. thermal analysis; Shimadzu TG A 50H and DTA 1500C units. Electrochemistry: BAS and PRINCETON electrochemical analyzers; Schott automatic titrator karlb Kolb isometer; Displex cryostat; VARIAN gas chromatograph. Direct access to single-crystal X-ray diffraction NONIUS diffractometer. Library with approx. 500 books, 27 international journals. Computers: 33 PCs.

Future plans: Improvement of equipment, laboratories and other facilities; Expansion of international activities; Continuation of main research lines and initiation of new lines.

Cooperation with developing countries: Brazil, Chile, Uruguay, Ph.D students from Bolivia, Colombia and Ecuador.

International Organization: Joint research projects with groups from Germany, Spain, Italy, UK, Sweden and USA.

Universidad Nacional de La Plata — Facultad de Ciencias Agrarias y Forestales

Head of Institution: Ing. Agr. Guillermo Hang.

Address: Calles 60 y 119, CC 31, 1900 La Plata, Argentina. **Phone:** (+54 221) 423-6758. **Fax:** (+54 221) 425-2346. **Email:** academica@agro.unlp.edu.ar, dajo@agro.unlp.edu.ar. **URL:** www.agro.unlp.edu.ar.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences.

Research and training: All aspects of basic biology and biotechnology of agriculture: agronomy; veterinary health; biotic and abiotic factors; plant pathogens (fungi and other microbes) and their biological control methods. Conducted by 40 scientists in the faculty, all of particular relevance to Argentina.

Achievements: Our faculty has the record of being the second Higher Agricultural Institution in the country, measured as number of scientific articles published in journals of international impact (ISI) (Oesterheld et al. 2002. Cienciy Hoy, V12 n. 70).

Facilities: The faculty has a central library, six independent secondary thematic libraries, principally hererotecs, a computer lab with 42 terminals online, three experimental fields totalizing 1250 hectares: the main research in rice fitotechnology, the second in cattle production, and the third in crops and dairy production.

Future plans: Improve our participation in subsidies granted by national research institutions like CONICET, SECYT, CIC, INTA, etc.

Cooperation with developing countries: We participate in ALFA group Agrolatino, and we are also planning our participation in a CA group in the 6th Frame programme of the EC.

Universidad Nacional de La Plata — Facultad de Ciencias Astronómicas y Geofísicas (FCAG)

Head of Institution: Dr. Pablo Cincotta.

Address: Paseo del Bosque s/n, B1900FWA La Plata, Argentina. **Phone:** (+54 221) 423-6593, 423-6594. **Fax:** (+54 221) 423-6591. **Email:** extension@fcaglp.unlp.edu.ar. **URL:** www.fcaglp.unlp.edu.ar/.

Scientific Fields of Interest: Earth Sciences, Physics.

Research and training: Astrometry; Celestial Reference Frames; Earth Rotation; Astrophysics; Stellar Dynamics; Open and Globular Clusters; Binary Stars; Interstellar Medium; Stellar Evolution; Galaxies; Plasma Physics; Celestial Mechanics; Minor Planets; Evolution of planetary systems; Dynamical Systems; Geodesy; Terrestrial Reference Frames; Geoid; Ionosphere; Mean Sea-Level; Geophysics; Seismology; Gravimetry; Geomagnetism; Applied Geophysics.

Achievements: 10 graduates in Astronomy or Geophysics per year; 2 Ph.D. thesis per year; 80 papers published per year in national and international magazines; transfer activities in Applied Geophysics, Geodesy, repair and calibration of optical instruments, meteorological information.

Facilities: The Faculty is located in the La Plata Astronomical Observatory. Permanent stations in different regions of Argentina: 6 GPS, 3 seismological, 2 geomagnetic, 1 DORIS beacon. Computing Equipment: About 50 PCs of different types. Buildings covering about 5000 sq. meters, including offices, optical and electronics laboratories, classrooms, library, telescopes, conference room.

Future plans: The main lines of research listed above have their own objectives and goals.

Cooperation with developing countries: San Pablo University) Paraná University (Brazil); Geographic Military Institute, Concepción University, Valparaiso University, Chile University, Santiago, Catholic University (Chile); Central American Suyapa Astronomical Observatory, Tegucigalpa (Hondura); UNAM (Mexico).

International Organization: GFZ, DGFI, Dresden GFZ, DGFI, Dresden Univ., Germany; IGN, Institut d'Astrophysique, Paris, Observ. De Paris, section Meudon, France; OGS, Italy; Copernicus Astr. Center, Warsaw, Poland; Lowell Observatory, Space Telescope S.I., GSFC, USA; Institut d'Astrophysique et Geophysique, Liege, Belgium; Las Campanas Observatory.

Universidad Nacional de La Plata — Facultad de Ciencias Naturales y Museo

Head of Institution: Dr. Ricardo O. Etcheverry.

Address: Calle 60 y 122, 1900 La Plata, Argentina. **Phone:** (+54 221) 425-8252. **Fax:** (+54 221) 425-8252, xt. 28. **Email:** fcnym@fcnym.unlp.edu.ar. **URL:** www.fcnym.unlp.edu.ar.

Scientific Fields of Interest: Biological Sciences, Earth Sciences, Environmental Sciences.

Research and training: Anthropology, Biology Anthropology, Socio-cultural Anthropology; Ethnology; Auxology; Latin American Archeology; Archeology of American Settlements; Migrations; Biocultural Ecology and Etology; Biology: Botany: Systematics; Morphology; Mycology; Palinology; Phitoplancton Ecology: Vegetal Ecology; Animal Ecology; Aquatic Ecology; Terrestrial Ecology and Applied Ecology. Paleontology: Paleontology of Vertebrates; Paleontology of Invertebrates and Paleobotany. Zoology: Malacology, Herpetology, Ornithology, Mastozoology, Marine Biology, Histology, Parasitology, Bacteriology, Virology and Citogenetics. Geology: Regional Geology, Stratigraphy, Mineralogy, Sedimentology, Vulcanology, Petrology, Geochemistry, Geomorphology, Tectonics, Geology of the Quaternary, Hidrogeology, Pedology, Mineral Resources, Oceanography and Isotopics Analysis.

Achievements: Total of production 2005: 31 books, 154 books chapters and 473 papers. Some Publications in 2005: 2005. Veiga, G.D.; Spalletti, L.A.; Howell, J.A.; Schwarz, E.. The Neuquén Basin, Argentina. A Case Study in Sequence Stratigraphy and Basin Dynamics. Geological Society of London. . Extranjera. 336 páginas. 2005. Riccardi, A.C.. La Paleontología de Invertebrados en la Argentina, 1955-2005. . Asociación Geológica Argentina. . Argentina. . 2005. Ferrario, M.E.; Garibotti, I.A.; Vernet, M.. Palmer LTER. Microscopic analysis of ice assemblages in new-year sea ice in the Western Antarctic Peninsula, June-July 1999. Antarctic Journal of the United States. 33. . 242-244. 2005. Colombo, J.C.; Cappelletti, N.; Barreda, A.; Migoya, M.C.; Skorupka, C.N.. Vertical fluxes and accumulation of PCBs in coastal sediments of the Rio de la Plata estuary, Argentina. . Chemosphere. 61. . 1345-1357. 2005. Sarandón, R.; Gaviao, N.. The Use of Parametrical models for carrying capacity assessment in a natural reserve in Tierra del Fuego (Fireland). . Ecohydrology and Hydrobiology. 4. 3. 281-285. 2005. Frangi, J.L.; Barrera, M.D.; Richter, L.L.; Lugo, A.E.. Nutrient cycling in Nothofagus pumilio forest along an altitudinal gradient in Tierra del Fuego, Argentina. Forest Ecology and Management. 217. . 80-94. 2005. Echavarria, L.E.; Schalamuk, I.B.; Etcheverry, R.O.. Geological and tectonic setting of Deseado Massif epithermal deposits, Argentina, based on El Dorado, Monserrat. . Journal of South American Earth Sciences. 19. . 415-432. 2005. Vucetich, M.G.; Vieytes, E.C.; Verzi, D.; Noriega, J.; Tonni, E.P.. Unexpected primitive rodents in the Quaternary of Argentina. . Journal of South American Earth Sciences. 20. . 57-64. 2005.

Otegui, M.; Noh, Y.S.; Martinez, D.; Vila-Petroff, M.; Staehelin, A.; Amasino, R.; Guamet, J.J.. Senescence-associated vacuoles with intense proteolytic activity develop in senescing leaves of Arabidopsis and soybean. . The Plant Journal. 41. . 831-844. 2005. González, M.; Soloneski, S.; Reigosa, M.A.; Larramendy, M.L.. Effect of the herbicide 2,4-dichlorophenoxyacetic acid (2,4-D) and its derivative 2,4- D dichlorophenoxyacetic acid dimethylamine salt (2,4-D DMA). I. Genotoxic evaluation on Chinese hamster ovary (CHO) cells. . Toxicology In-vitro. 19.

Facilities: This Faculty is a college or academic unit including the Natural Sciences Museum of La Plata, founded by Francisco P. Moreno and where the main collections of South American fossils are deposited, as well as important collections of Archeology, Zoology and Botany, totalizing nearly 3,000,000 objects. This Museum with other related institutes, placed in others buildings, develop several lines of research. Main research facilities in the FCNyM are: 2 scanning electronic microscopes, provided by JICA and CONICET funds, X Ray Laboratory, C14 Laboratory, absorption spectrometry and many chemical equipments. Nearly 500 researchers work in this institution. Teaching university grade facilities includes 17 classrooms for 17/300 pupils (1.800 sq.m sup.), 2 laboratories for 150 pupils (255sq.m sup.), 6 classrooms of microscopy for 250 pupils (330sq.m sup.), informatics cabinet for 36 pupils (80sq.m sup) with 16 interconnected PC, and others equipments. The Library accounts for 30,000 books and 200 magazines subscriptions.

Future plans: Many fellows from the National Research Council (Conicet), Buenos Aires State Research Council (CICBA) and University of La Plata, have been incorporated to accomplish Ph.D thesis, increasing the young base of the researchers' population. So, as soon as possible, it is necessary to improve building and equipment facilities adequately. The Faculty is devoted to academic curricula revision for all the graduate studies in order to face the new millennium expectations.

Cooperation with developing countries: University of Firenze, Italy; The Global Technology Partnership; University of Salamanca; University of Barcellona; UNESCO; University of Cantabria; University of Rome La Sapienza; University of South Carolina (Earth Sciences and Resources Institute); Freshwater Biological Association; Museum of Natural History, LA County.

International Organization: Natural History Museum WIEN, Austria; University of Salzburg, Austria; Paul Getty Foundation; Smithsonian Institution, USA; Museum d'Histoire Naturelle, Paris; University of Wien, Austria; Missouri Botanical Garden, USA.

**Universidad Nacional de La Plata — Instituto de
Investigaciones Fisicoquímicas Teóricas y Aplicadas
(INIFTA)**

Head of Institution: Dr. Eduardo A. Castro.

Address: CC 16, Sucursal 4, 1900 La Plata, Argentina. **Phone:** (+54 221) 425-7430, 425-7291. **Fax:** (+54 221) 425-4642. **Email:** castro@quimica.unlp.edu.ar, direccion@inifta.unlp.edu.ar. **URL:** www.inifta.unlp.edu.ar.

Scientific Fields of Interest: Chemistry.

Research and training: Corrosion and protection of metals; spectroelectrochemistry of coordination compounds; growth kinetics and structures of new solid phases; the influence of mass transfer processes in metal electrodeposition; additives mechanism on the electrocrystallization phenomena; morphology and catalytic properties; physical chemistry of interfaces and electrochemistry; development of advanced electrode materials for energy conversion and storage; energy storage by hydrogen and electrocatalysis; electrochemical and optical properties of thin-films; chemical kinetics, photochemical and photophysical processes in solutions; lipid peroxidation of biological membranes: effect of antioxidants; gas kinetics and photochemistry; development of new methods for surface nanostructuring; surface science and nanoscience; experimental studies based on synchrotron light techniques; physical adsorption and its uses; study development, application and theoretical experimental correlation of mathematical physics and mathematical chemistry methods and models of physical-chemistry interest; computer simulations in the fields of condensed matter, surface physical-chemistry and statistical mechanics; numerical simulations and theoretical modeling of complex systems; theoretical and experimental polymer physics; polymeric materials, microgels and nanocomposites; deterioration of biomaterials; biodeterioration in industrial systems and in Latin-American cultural heritage; control and prevention; physical chemistry of organic systems.

Achievements: Up to 2006 (since 1948) the institute has published a total of 2,943 scientific papers, books and monographs. In 2006 the institute published a total of 113 scientific papers, books and monographs. Participated in 102 international and regional meetings; participated in 84 national meetings. INIFTA had a total of 180 doctoral theses between 1948 and 2006; has 26 doctoral theses in progress and 21 research projects underway.

Facilities: XPS; AST and AFM equipment; N₂ and YAG lasers and laser flash photolysis facilities; conventional flash photolysis; spectrophotometer UVI-vis, IR; time resolved singlet oxygen detector and optoacoustic unit; stopped-flow units; thermostats, criostats; Auger spectrometry; electrochemical devices for voltammetry, amperometry, spectroelectrochemistry, ellipsometry, etc.; chromatographs; TOC equipment; computers (more than 150); 3 cluster units; Internet connection in all labs and rooms; electronic access to scientific libraries through CONICET and SECyT; more than 80 journals and more than 1500

books on general physical chemistry, surface chemistry, quantum chemistry, chemical kinetics, etc.. Other facilities available at the chemistry department are: fluorescence, GC/MS, HPLC, SEM, nmr, etc. and at the University of La Plata, such as the general library services (ISTEC) and the central computer center (CESPI).

Future plans: Contributions to science, academic formation and training of researchers in the framework of the National University of La Plata and National Research Council of Argentina cooperation agreement; cooperation with foreign universities in areas of research, teaching and Post-graduate training; organization of Post-graduate courses and scientific activities both locally and in Latin American countries. Services offered to government institutions and productive sectors: research and development; material testing; advisory activities. Science and society: extension of scientific lectures oriented for the public.

Cooperation with developing countries: In the last 30 years, INIFTA has trained more than 200 Post-graduate students from Argentina, and Latin American universities. Most of them obtained a Ph.D in chemistry, biochemistry, physics, chemical engineering and mathematics. The trained Ph.Ds are engaged to the academic, industrial and government offices. INIFTA maintains more than 20 cooperation research agreements with foreign countries and national institutions allowing a permanent bilateral exchange between researchers, graduate students and Ph.Ds.

International Organization: INFITA continues with the training of foreign students from all over the world through the TWAS academic programmes, as well as other cooperation programmes with Latin American and European countries.

Universidad Nacional de la Plata — Instituto Spegazzini

Head of Institution: Dr. Marta Cabello, Director.

Address: Aven. 53, No. 477-B1900AVJ La Plata, Argentina. **Phone:** (+54 221) 421-9845. **Fax:** (+54 221) 421-9845. **Email:** mcabello@netverk.com.ar, speg_lps@museo.fcnym.unlp.edu.ar.

URL:

www.fcnym.unlp.edu.ar/instituto/spegazzini/indexibs.html.

Scientific Fields of Interest: Biological Sciences, Environmental Sciences.

Research and training: Biodiversity of biotrophic fungi-arbuscular mycorrhizal fungi (AMF) and saprothrophic fungi; conservation and biotechnological potential; biology and biodiversity of Oomycetes and Chytridiomycetes from Argentina; degradation of oil components by fungi.

Achievements: Numerous articles (about 30 per year) published in specialized journals.

Facilities: 1,000 sq. m. well-equipped laboratory space; a specialized library for Mycology; administrative facilities. The institute is part of the Scientific Dept. of the La Plata Museum.

Future plans: To continue on-going research projects related to the above-mentioned research and training lines.

Cooperation with developing countries: CYTED (Ciencia y Tecnología para el Desarrollo); Iberoamerican Network to study microscopic fungi (Mexico, Peru, Brazil, Cuba, Venezuela, Colombia, Argentina).

International Organization: BMDF, Ernet-Moritz-Arndt Universität Greifswald, Germany

Universidad Nacional de San Juan — Facultad de Ingeniería — Instituto de Investigaciones Mineras (IIM)

Head of Institution: Pedro E. Sarqu's, Director.

Address: Av. Libertador Gral. San Martín, No. 1109 (Oeste), CP 5400 San Juan, Argentina. **Phone:** (+54 264) 422-0556. **Fax:** (+54 264) 422-0556. **Email:** psarquis@unsj.edu.ar. **URL:** www.unsj.edu.ar.

Scientific Fields of Interest: Chemistry, Earth Sciences, Environmental Sciences.

Research and training: Study and technical, economic and financial evaluation of natural resources; evaluation and implementation of investment projects; search, exploitation, benefit and management of mineral resources; study and evaluation of natural risks; elaboration of geoscientific charts; evaluation and control of mining environment impact; biogeotechnologies.

Achievements: Pyrometallurgical analysis and tests, teledetection, mining environmental base studies, detection of mineral deposits, set up of treatment plants, normalized analyses and tests for private companies.

Facilities: Documentation center; specialized library; newspapers and periodical library, remote sensor laboratory; topography lab.; cartography and environment lab.; mineralogy and petrology lab. (electronic microscope spectrometer, several microscopes); chemical lab.; sector for sample preparation; pilot-scale plants; petrographical and mineralogical museum; lab. of hydrometallurgy; lab. of rock mechanics; pyrometallurgy sector; lab. of biogeotechnology.

Future plans: Creation of a Ph.D. in mining engineering.

**Universidad Nacional del Cuyo — Facultad de Ciencias
Médicas — Instituto de Histología y Embriología
Mendoza 'Dr. Mario H. Burgos' (IHEM)**

Head of Institution: Dr. Ramon S. Piezzi.

Address: CC 56, 5500 Mendoza, Argentina. **Phone:** (+54 261) 413-5000 ext. 2670. **Fax:** (+54 261) 449-4117. **Email:** ihem@fcm.uncu.edu.ar. **URL:** www3.cricyt.edu.ar/ihem/.

Scientific Fields of Interest: Biological Sciences.

Research and training: Biology of Reproduction: acrosome reaction, sperm capacitation, gonadal development, seasonal reproduction-photoperiod, hemotesticular barrier, heat shock proteins, reproduction and symbiosis in ampullariidae. Molecular and Cell Biology: cytoskeleton, intracellular trafficking, M6P receptors, axon growth. Natural products as cytoprotectors and cell-cycle regulators Dehydroleucodine and other natural synthetics. Applied research: Inheritable diseases, Chagas, Langherans cells in mouth-dental pathology.

Achievements: An average of 25 papers published annually; Publication of a scientific journal BIOCELL, scientific journal with impact factor indexed in ISI and other international systems; confocal, criofracture, laboratory of biochemistry (HPLC, spectrophotofluorometer, espectrophotometer). Center of electron microscopy (TEM and SEM); service of microscopy and microanalysis for the region (LANAIS-UME); participation in the teaching of biomedicine in Universidad nacional de Cuyo; organization of Post-graduate national and international courses in cellular, molecular-biology and biology of reproduction.

Facilities: Equipment: TEM ZEISS EM 902; TEM ZEISS EM 900; TEM Siemens Elmiskop I; TEM Siemens Elmiskop IA; SEM Siemens Autoscan; Cryofracture and surface reply BALSERSBAE 301; confocal microscope Nikon ECLIPSE600 with laser and EZ-CI soft; inverted microscope Nikon TE2000 with MetaMorph software; inverted microscope Nikon T300; other optical microscopes Zeiss; image pro-plus image processing software. Library: 107 books, 24 magazine subscriptions (paper and online).

Future plans: To increase post-doctoral training in international centers of high scientific levels; increase the national and international cooperation; to increase the doctoral formation in biology of reproduction, cellular and molecular-biology, neuroendocrinology and natural products; to start research in experimental pathology and transgenic animals.

Cooperation with developing countries: In 2003 --> ECOS (France); in 2001-2002 --> CONICYT (Chile), UNChile Fundac'on Andes; 2000-2003 --> NIH (USA); 200-2001 --> TWAS (Italy), Marine Biological Lab. Woods Hole (USA); 1999-2001 --> SECyT-ECOS (France).

International Organization: Howard Hughes Medical Institute (USA)

Bangladesh

Bangladesh Council of Scientific and Industrial Research (BCSIR)

Head of Institution: Mahmood Hasan Choudhury.

Address: Dr. Qudrat-I-Khuda Road, Dhanmondi, Dhaka 1205, Bangladesh.

Phone: (+880 2) 966-9886. **Fax:** (+880 2) 861-3022. **Email:** bcsir@bangla.net, chairman@bcsir.org. **URL:** www.bcsir.org.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences, Chemistry, Environmental Sciences, Physics.

Research and training: Analytical Technologies of substances; Animal Food Technology; aromatic and Medicinal Plants; Arsenic Mitigation; Biogas Technology; Biological Science; Biotechnology; Ceramic, glass, tiles and cements; Chemical technology; Conservation of Energy and Exploration of the New Energy Sources; Effect of processing on the nutrient content of foods; Environmental pollution; Fats and Waxes; Fiber, polymer and jute; Food Microbiology; Food science and Nutrition; Food science & Quality control; Human Nutrition; Industrial Physics; Lac; Leather Research and Development; Drugs and toxins; Oil, Oilseeds & Legumes Technology; Pharmacology; Pilot-plant and Techno-economic study; Plant Food Technology; Plant science; Poultry feeds; Processing of Fruits; Production of durable & low-cost housing materials; Production of Instrument useable in Laboratories; Production of various chemicals from organic sources; Pulp & Paper; Renewable energy sources; Tissue-culture.

Achievements: As of 2004: 252 Processes leased out; 635 Processes accepted for leasing out; 286 Patents accepted; 2514 Research papers published.

Facilities: High-tech equipment like NMR, X-ray diffractometer, UNTM, GCMS, AAS, HPLC, FTIR, GC Analyzer, Amino-acid Analyzer, Protein Sequencer, Packaging units, Ion analyzer etc. are available at BCSIR. Apart from that, BCSIR has 4 libraries including one central library located at Dhaka. The central library is a compact one with built-in facilities to provide various S & T information services to scientists, technologists, industrialists, educationists, students and other allied persons and to perform administrative and technical jobs. An IT centre is housed in the central library which is providing Internet and other IT and library services.

Future plans: BCSIR has eight Research Laboratories/ Institutes namely, BCSIR Laboratories, Dhaka; BCSIR Laboratories Chittagong; BCSIR Laboratories Rajshahi ; Institute of Food Science and Technology (IFST), Dhaka; Institute of Fuel Research and Development (IFRD), Dhaka; Pilot-plant and Process Development Centre (PP&PDC), Dhaka; Leather Research Institute (LRI), Nayarhat, Savar, Dhaka and Institute of Glass & Ceramic Research & Testing (IGCRT), Dhaka. Recently BCSIR has started

implementation of the research laboratory namely Institute of Mining, Mineralogy and Metallurgy at Jaipurhat which shall be engaged in R & D activities on the prospects and technologies connected with the mineral resources of the country. Apart from that the following 10 project proposals are being submitted to Government of Bangladesh for approval: 1. Establishment of Research Institute of Ayurvedic, Unani and Homeopathic Medicines, Rajshahi. 2. Establishment Institute of Spices, Vegetable and Fruits processing Research Institute, Rajshahi. 3. Establishment of Institute of Industrial Biology, Rajshahi. 4. Establishment of Institute of Industrial Physics and Physical Instrumentation, Dhaka. 5. Establishment of Leather goods Design and Development Division. LRI, Savar. 6. Establishment of petrochemical Research Institute, Sylhet. 7. Strengthening of BCSIR Substation, Rangamati. 8. Studies on Mycotoxin and Pesticide Residues in Food and Feed Stuffs in Bangladesh, IFST, Dhaka. 9. Development of Advanced Materials Research and Testing Facilities at the PP & PDC, BCSIR. 10. Production of Value-added Materials including food stuffs using Microbes and Preservation of microbial Species with Specific properties.

Cooperation with developing countries: The existing technical cooperation program between BCSIR and CSIR (India) is just over. Further renewal may be beneficial for future collaboration in current areas of R&D work.

Bangladesh Institute of Research and Rehabilitation in Diabetes, Endocrine and Metabolic Disorders (BIRDEM)

Head of Institution: Prof. Mirza Mazharul Islam.

Address: 122 Kazi Nazrul Islam Avenue, Dhaka 1000, Bangladesh. **Phone:** (+880 2) 861-7098, 966-7812, 861-7130. **Fax:** (+880 2) 966-7812, 861-1138.

Email: dgbirdem@dab-bd.org, lali@dab-bd.org, lali@citechco.net. **URL:** www.dab-bd.org/aboutbird.htm.

Scientific Fields of Interest: Biological Sciences, Chemistry.

Research and training: Research: plant-materials as a source of anti-diabetic and anti-inflammatory agents; epidemiology of diabetes and its complications; enopathogenesis of diabetes and its complications in Bangladesh population; nutritional research with particular focus on diabetes and disorder of metabolic syndrome; economics of diabetes and prevention. Training: clinical training on the diagnosis and management of diabetes mellitus and its complications; health and nutrition education to diabetic patients; social support for healthcare to poorer and vulnerable groups; technical training to design and conduct research in the areas of natural product, epidemiology, biochemistry and molecular-biology, nutrition and health economics with particular focus on diabetes and other disorders of metabolic syndrome.

Achievements: BIRDEM has made substantial contribution in expanding knowledge regarding the etiopathogenesis of diabetes mellitus (DM) in Bengali population. The relative role of insulin secretor defect and insulin resistance (the basic 2 defects in DM) has been explored and the classification of young onset

DM on the population has been clarified to a great extent. Search for genes in the young diabetic population has generated useful results regarding HLA involvement and particularly regarding the mutation of SPINK1 gene in the fibrocalculous pancreatic diabetes (FCPD). A good volume of data has been generated on the pathophysiology of micro-vascular complications of DM. These studies include works on gestational diabetes and complications of pregnancy (like preclampsia) related to insulin resistance. BIRDEM has screened more than 70 plant-materials selected from folkloric reputation and a search of literature for the anti-diabetic activities, from Bangladesh as well as countries in Asia and Africa. Methodological improvement of testing in animal models was also achieved and results were published. A few active materials have been investigated for their mechanism of action and only a few of the selected ones have been picked up by commercial organizations for drug development programs. Nutrition plays a major role in the management and prevention of DM and nutritional evaluation of local food materials is a major research area of BIRDEM. It has screened a good number of local food materials for their glycemic index (GI) and a comprehensive table for general consumption is under preparation. A long-term project to identify the cut-point of body mass index (BMI, marker for nutritional state of an individual) in Bangladeshi population is now running actively. The pilot data already indicates that the present lower cutoff point of BMI, suggested by WHO and FAO to define CED, needs to be reviewed. Another group of studies are producing data on the knowledge, attitude and practice (KAP) of the subjects regarding various aspects of health. The health economics unit is conducting studies on cost-effectiveness analysis and other socio-economic aspects of healthcare in the local perspective and a substantial volume of data has been generated. BIRDEM has made a significant contribution in the development of scientific manpower. During the last decade, 127 Post-graduate thesis works were done in BIRDEM and the subjects ranged from basic to clinical disciplines. Most of the works have been published in journals (94 international publications) or printed in scientific meetings (more than 250 conference reports).

Facilities: Binocular dissecting microscope with fiber-optic light source; laminar air flow; CO₂ incubator; dual wavelength fluorimetry; microwell plate reader; HPLC-based HbA1C analyzer; micro particle enhanced fluorescent immunoassay system; electrolyte analyzer ISE-based; high-performance liquid-chromatography (HPLC); gas chromatography; scintillation counters and gamma counters; automated biochemistry analyzer; automated hematology analyzer; platelet aggronometer; chemiluminescence-based immunoassay system; gel electrophoresis system; thermal cycler (96 well); gel documentation system; rotary evaporator; muffle furnace; dry chemistry analyzer; animal house with about 1000 rats; facilities for clinical and well research purpose; multi-slice CT scan; color Dopplers; angiogram and cardiac surgery facilities; ERCP, nerve conduction equipment, laparoscopic surgery, etc.; broad band network for PC with about 200 workstations linked under an Oracle database; 11 HCDP centers; 12 NHN centers and 53 affiliated associations are sister organizations of BIRDEM which are dispersed all over the country. These healthcare facilities

can be used as field stations for clinical and community based health research; a library with medical, scientific and other disciplinary journals, books and Internet-browsing facilities. The library has over 3,150 volumes.

Future plans: BIRDEM is planning to develop itself as a Center of Excellence for basic and clinical research in diabetes. The institute is already constrained regarding physical space, so its parent organization - The Diabetic Organization of Bangladesh - is now implementing another sister project of BIRDEM termed as the Bangladesh Institute of Health Sciences (BIHS). In the future, BIRDEM will consolidate its present research activities, and further expansion in academic and research activities is planned mainly in collaboration with the new Institute BIHS. BIHS will be a Post-graduate degree-giving institute in basic, clinical and allied-health sciences and it will conduct higher levels of research in collaboration with BIRDEM and institutions of DAB. BIHS will not be limited only for diabetes and its complications, but it will be a generalized institute for all areas of health and biomedical sciences.

Cooperation with developing countries: Present: Dept. of Chemistry, Mahidol Univ., Bangkok; HEJ Research Institute of Chemistry, Univ. of Karachi, Pakistan; Natural Products Development Division, Dept. of Plant Resources, Katmandu, Nepal; State Ayurvedic Medical College, Guwahati, Assam, India; SN Pradhan Center for Neurosciences, Calcutta Univ., India. Planned: Further expansion of collaboration with institutes of Bhutan, Nepal, Burma and India.

International Organization: Present: Dept. of Medical Cell Biology, Univ. of Uppsala, Sweden; Dept. of Medicine, Royal London Medical College, Univ. of London, UK; Dept. of Biological Science, Univ. of Ulster, Northern Ireland; Dept. of Internal Medicine, Univ. of Basel, Switzerland; The Royal Veterinary and Agricultural Univ. Copenhagen, Denmark; Cell Biology and Physiology and Human Genetics, Univ. of Pittsburgh, USA; Human Nutrition School of Molecular and Microbial Biosciences, Univ. of Sydney, Australia; Dept. of Animal Nutrition and Physiology Research center, Foulum, Denmark; Univ. of Montpellier, France; Lab de Physiopathologie de la Nutrition, Univ. Paris, France. Planned: further expansion of collaboration with various institutes of Australia and the Netherlands. Major donors: International Program in the Chemical Sciences (IPICS), Uppsala Univ., Sweden; International Foundation for Science (IFS), Sweden; ENRECA project (DANIDA, Denmark); International Diabetes Federation (IDF); Stanley-Johnson Foundation (through Prof. K. Gyr, Switzerland); Novo Nordisk A/S; Univ. of London, UK (through Prof. Graham A. Hitman); WHO, Palm Oil Research Institute of Malaysia (PORIM); Asian Network of Research on Antidiabetic Plants (ANRAP); Diabetic Association of Bangladesh (DAB); Ministry of Science and Technology, Bangladesh; Bangladesh Medical Council; Prof. Mazharul Haq Trust; Hamdard Foundation; various industries."

Bangladesh National Scientific and Technical Documentation Centre (BANSDOC)

Head of Institution: Dr. Quomaran Nessa, Director.

Address: Mirpur Road, Dhanmondi, Dhaka 1205, Bangladesh. **Phone:** (+880 2) 861-0224. **Fax:** (+880 2) 861-3900. **Email:** bansdoc@cgscomm.net. **URL:** www.bansdoc.gov.bd.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences, Chemistry, Earth Sciences, Engineering, Environmental Sciences, Mathematics, Physics.

Research and training: BANSDOC is the only apex body in the field of scientific and technological information and documentation in Bangladesh. It does not conduct laboratory research and development activities, but rather deals with library, documentation, information and cyber services, and publications in the field of science and technology. It provides only internship training facilities on request of the concerned organizations in the field of library and information science, and ICT.

Achievements: Library services; documentation services; bibliographic/literature search services; reprographic services; cyber services and BANSDOC publications.

Facilities: Fax machine; PPC machine; PC with needful accessories including broadband Internet connectivity; CD writer; scanner; multimedia; slides, movie and overhead projectors; SLR camera; spiral binding machine; CD and DVD searching in the field of science and technology; documentation; library; cyber center; website, etc.

Future plans: Establishing a digital/electronic library and a children's library at BANSDOC; providing training support to other libraries, documentation and information centers of the country; arranging higher-education and foreign training courses for BANSDOC personnel; organizing conferences, seminars and workshops from time to time for modernization, expansion and more publicity of BANSDOC activities and services; launching inter-library cooperation and resource-sharing system at national level; launching mobile library services in the country; introducing library bar-coding system to ensure proper library collection of BANSDOC; arranging BANSDOC visit and focus overall BANSDOC activities and services to the students of academic institutions of the country concerned in the field of science and technology and ICT and enabling BANSDOC to furnish relevant scientific, technological and industrial data and information to policy and decision-makers promptly for formulation/revision of science and technology policy best suitable for the country in the next 20 years.

Cooperation with developing countries: Present: National Institute of Science Communication & Information Resources (NISCAIR), India; SAARC Documentation Center (SDC), India; Pakistan Scientific and Technological

Information Center (PASTIC); Royal Nepal Academy of Science and Technology (RONAST); UNESCO/ASTINFO/PGI, Thailand; ISESCO, Morocco.
International Organization: National Library of Australia (NLA); The British Library Document Supply Center (BLDSC), UK; European Patent Office (EPO), The Netherlands; Federation of International Information and Documentation (FID), The Netherlands; European Commission (EC), Belgium; UNESCO, France and The Academy of Sciences for the Developing World (TWAS), Italy.

Bangladesh University of Engineering and Technology (BUET)

Head of Institution: Prof. Dr. Md. Alee Murtuza, VC.

Address: Ramana, Dhaka 1000, Bangladesh. **Phone:** (+880 2) 966-5650 to 80.

Fax: (+880 2) 861-3046, 966-5622. **Email:** regtr@regtr.buet.ac.bd. **URL:** www.buet.ac.bd.

Scientific Fields of Interest: Chemistry, Earth Sciences, Engineering, Environmental Sciences, Mathematics, Physics.

Research and training: Chemical Engineering; Materials & Metallurgical Engineering; Chemistry; Mathematics; Physics; Petroleum & Mineral Resources Engineering; Civil Engineering; Water-resources Engineering; Mechanical-engineering; Naval Architecture & Marine Engineering; Industrial & Production Engineering; Electrical & Electronic Engineering; Computer Science & Engineering; Architecture; Humanities; Urban & Regional Planning; Institute of Water and Flood Management; Institute of Appropriate Technology; Institute of Information and Communication Technology; Center for Energy Studies; Centre for Environmental and Resource Management; Centre for Biomedical Engineering Research; Accident Research Centre; Directorate of Continuing Education; Bureau of Research, Testing and Consultation.

Facilities: The university has 101 (one hundred one) Laboratories and 5 workshops. These Laboratories are equipped with modern equipment, computers (Computer Labs. have all most nine hundred computers)

Future plans: The university has a plan to increase the intake capacity in Post-graduate level and wants to play leading role in production of manpower in oil & gas sector and Textile Engineering, Biomedical department for which new laboratory to be set up.

Cooperation with developing countries: Under consideration

International Organization: Linkage programmes with the following universities: Birmingham Univ.,UK; DUT (Delft Univ. of Technology), USA; EUT; RIT (Royal Institute of Technology), Sweden; DCU (Dublin City Univ.), Ireland; Colorado Univ., USA; IEF (International Energy Foundation); Kuln Univ., Germany; Texas Univ., USA; Kuln Univ., Belgium; Alagappa Univ., India; EEC (European Economic Commission) research project; Saga Univ., Japan; Exeter Univ., UK; Loughborouh Univ., UK; Uppasala Univ., Sweden; NEC (Nepal

Engineering College), Nepal; NCATSU (North Carolina A&T State Univ.), USA; Tuskegee Univ., USA.

**Centre for Health and Population Research [formerly
Intl. Centre for Diarrhoeal Diseases Research (ICDDR),
Bangladesh]**

Head of Institution: Dr. David A. Sack, Director.

Address: GPO Box 128, Mohakhali, Dhaka 1212, Bangladesh. **Phone:** (+880 2) 882-3031, 881-1751. **Fax:** (+880 2) 882-3116, 882-6050. **Email:** dsack@icddr.org, info@icddr.org. **URL:** www.icddr.org/.

Scientific Fields of Interest: Biological Sciences, Environmental Sciences.

Research and training: To develop and promote realistic solutions to the major health, population and nutrition problems faced by the poor in Bangladesh; main themes are child health, reproductive health, nutrition research, infectious diseases and vaccine sciences, health and family planning systems research, population sciences, poverty and health, HIV-AIDS and safe water.

Achievements: Oral dehydration therapy; demographic surveillance system of child mortality; epidemic control preparedness programme for rapid response to outbreaks of cholera and shigella utilized in Zaire(1994) and Peru(1991); family planning; trials for injectable and oral cholera vaccines, killed oral-vaccines for cholera and enterotoxigenic E.coli today recommended by WHO; demonstration of benefits of immunizing women in reproductive age against tetanus and S.pneumoniae.

Facilities: Hospitals, field areas with continuous demographic surveillance, laboratories, computer network.

Future plans: Please refer to the website.

Cooperation with developing countries: Collaboration with different organizations, research institutes and universities in various countries.

International Organization: Over 55 donor countries and organizations, the government of Bangladesh, UN specialized agencies, foundations, universities, research institutes and the private-sector.

**Jahangirnagar University — Network of Instrument
Technical Personnel and User Scientists of Bangladesh
(NITUB) — Department of Chemistry of Chemistry**

Head of Institution: Prof. Mesbahuddin Ahmad, President.

Address: 14/2, Ansari Bhaban (4th floor), Topkhana Road, Shegunbagicha, Dhaka 1000, Bangladesh. **Phone:** (+880 2) 955-326. **Fax:** (+880 2) 770-8069.

Email: nitub@bangla.net, mesbah_ahmad@hotmail.com. **URL:** www.nitub.org.

Scientific Fields of Interest: Agricultural Sciences, Chemistry.

Research and training: Training: on specific group of scientific equipment such as GC, HPLC, GC-MS, UV-VIS and IR; on more commonly used pieces of chemical, biological and medical equipment. Scientific equipment repair and installation program: repairing nonfunctioning scientific equipment and installation of instruments of public and private educational and research organizations.

Achievements: NITUB has conducted so far 25 training programs on various scientific equipment through which more than 300 scientists and technical personnel have been trained. Some 580 pieces of scientific instruments have so far been repaired. These repaired instruments are both major and minor equipment. The major equipment like AS, GC, HPLC and X-ray generators and the minor equipment include balance, pH meter, oven, furnace, etc. The original value of the repair instruments is estimated to be more than 2 million US\$ and NITUB's expenditure is approximately 24,000 US\$.

Facilities: NITUB does not have any research laboratory but it repairs equipment used for research activities of different educational and research organizations.

Future plans: Improve the existing workshop through procurement of spare parts and accessories; provide diploma and certificate courses to relevant persons.

Cooperation with developing countries: Current cooperation with Nepal and Myanmar; future coop with Bhutan, Vietnam, etc.

International Organization: International Foundation for Sciences (IFS); Organisation for Prohibition of Chemical Weapons (OPCW); International Science Program (ISP). The network is a ISP supported network (yearly grants are given to NITUB); various national organizations also give financial support to the Network.

University of Dhaka — Faculty of Pharmacy — Department of Pharmaceutical Chemistry

Head of Institution: Dr. Nurun Nahar Rahman, Chairman.

Address: Dhaka 1000, Bangladesh. **Phone:** (+880 2) 966-1920-73, 966-4842.

Fax: (+880 2) 861-5583. **Email:** duregstr@bangla.net. **URL:** www.univdhaka.edu/department/index.php?bodyid=PCHM.

Scientific Fields of Interest: medical Sciences.

Research and training: Biomedical and chemical research on drug metabolism; drug macromolecular interaction; natural product chemistry; traditional medicine development; screening of synthetic compounds for bioactivity; pharmaceutical analysis.

Achievements: A few projects are supported by the government. About 10-15 papers are published each year. 6 Awards obtained during last 20 years.

Facilities: Higher performance liquid-chromatograph (HPLC); gas liquid-chromatograph (GLC); UV spectrophotometer; Fourier transform infra-red

spectroscopy (FTIR); rotary evaporator; soxhlet apparatus; precision balance; thermostat controlled shaker; vortex mixer; solvent distillation apparatus.

Future plans: Trying to establish international collaboration with various international organizations; establish exchange-programs with internationally reputed pharmacy schools/universities for faculty development, short training for students, credit transfers, etc.

International Organization: National Cancer Institute, USA

Bolivia

Centro de Investigación Agrícola Tropical (CIAT)

Head of Institution: Gustavo Pereyra Carballo, Exe. Dir..

Address: Av. Ejercito Nacional n. 131, PO Box 247, Santa Cruz, Bolivia.

Phone: (+591 3) 334-2996. **Fax:** (+591 3) 333-1009, 334-2996, 334-0178.

Email: gpereyra@ciatbo.org. **URL:** www.ciatbo.org.

Scientific Fields of Interest: Agricultural Sciences.

Research and training: Forestry research; annual crops research (e.g. maize, cotton, soybean); animal research (cattle, pork, chicken).

Achievements: New varieties of annual crops; improvement of traditional cattle; technologies for Agro-forestry systems;

Facilities: Research station (experimental fields); computers (including Internet services); library; agricultural machinery; vehicles; offices; soil laboratory.

Future plans: Currently CIAT is a public organization, but it will be converted in the future into a foundation. We hope that this change will improve the management research and will convert CIAT in a more stable organization.

Cooperation with developing countries: Japan government through JICA; British government through DFID-FIT; México through CIMMYT; Colombia through CIAT.

Observatorio San Calixto (OSC)

Head of Institution: Estella Minaya Ramos.

Address: Calle Indaburo 944, PO Box 12656, La Paz, Bolivia. **Phone:** (+591 2)

240-6222, 240-6706. **Fax:** (+591 2) 211-6723. **Email:** oscdrake@entelnet.bo,

eminaya@entelnet.bo. **URL:** www.observatoriosancalixto.org.bo.

Scientific Fields of Interest: Earth Sciences.

Research and training: Seismic & infrasound monitoring; geophysics research; meteorology.

Achievements: Scientific research in seismology, infrasound and seismic hazard for Bolivia.

Facilities: 8 seismic stations; 1 infrasound station; 5,000 books in library; acquisition equipment; localization equipment.

Future plans: Extend seismic network all over Bolivia.

Cooperation with developing countries: France, USA, European Union, Peru and Central America.

International Organization: CTBTO and National Institutions

Servicio Nacional de Geologia y Tecnico de Minas (SERGEOTECMIN)

Head of Institution: Ing. Oscar Kempff Bacigalupo, Dir..

Address: Casilla 2729 La Paz, Bolivia. **Phone:** (+591 2) 233-0895. **Fax:** (+591 2) 239-1725. **Email:** okempff@siabolivia.com. **URL:** www.sergeomin.gov.bo.

Scientific Fields of Interest: Earth Sciences, Environmental Sciences.

Research and training: Mineral potential mapping; geochemistry; geophysics; remote-sensing; groundwater; paleontology; mining, metallurgy and environmental pollution.

Achievements: Thematic maps: geological, hydrogeological, geophysical, metallogenic, geochemical. Publications: geochemical atlas, open files, special bulletins. Reports: mineral potential, geological hazards, hydrogeological, water-body quality classification, surface and groundwater studies, magnetometric geophysical exploration. Developments: environmental information system, development of a virtual library.

Facilities: Office facilities; computers; laboratories for petrography, mineralogy, metallurgy, water, paleontology and RS/SIG; equipment for geophysics, drilling rigs and field apparel; libraries.

Future plans: Continue research programmes in current areas of interest (mineral potential, metallurgy) and develop new research projects/programmes in areas of environment, water, soil and RS/GIS.

Cooperation with developing countries: Argentina; Brazil; Chile; Colombia; Ecuador; Peru; Venezuela.

International Organization: Present: Japan for mineral exploration; Canada for Geological hazard assessment and management/virtual library (Geo-information). Planned: Germany in Environment.

SODIS Foundation

Head of Institution: Marcelo Encalada.

Address: Universidad Mayor San Simon, Casilla 5783, Calle Sucre, Cochabamba, Bolivia. **Phone:** (+591 4) 454 2259. **Fax:** (+591 4) 454 2259.

Email: sodis@fundacionsodis.org. **URL:** www.fundacionsodis.org.

Scientific Fields of Interest: Biological Sciences, Environmental Sciences.

Research and training: Solar disinfection of drinking water (SODIS); effect of SODIS on different pathogens; health impact of SODIS.

Achievements: Effect of SODIS on different pathogens researched; improved process of SODIS; elaborated indicators for SODIS.

Facilities: UV-A meter; radiometer for total radiation; field kit for Water-quality analysis 9OXFAM-DELAGUA); library; computers.

Future plans: Improve efficiency of SODIS and development of a continuous SODIS reactor.

Bolivia

Cooperation with developing countries: Centro de Aguas y Saneamiento Ambiental (CASA) - Bolivia; Instituto Nacional de Salud Publica, Mexico.

International Organization: AVINA Foundation; Michel Comte Water Foundation; Development Service of Liechtenstein.

Botswana

University of Botswana — Department of Chemistry — Network for Analytical and Bioassays in Africa (NABSA)

Head of Institution: Prof. Berhanu M. Abegaz, Coordinator.

Address: Gaborone, Botswana. **Phone:** (+267) 355-2497. **Fax:** (+267) 355-2836. **Email:** abegazb@mopipi.ub.bw. **URL:** www.nabsa.org.

Scientific Fields of Interest: Chemistry.

Research and training: Promote - intra-African cooperation in chemical sciences. We have committed collaborators in universities in Cameroon (Professors B. T. Ngadjui, and P. Tane and their corresponding research groups), Nigeria (Professor A. Ogundaini), Zimbabwe (Dr. Stanley Mukanganyama) and the Medical Research Council (Dr. G. Matsabisa). Our Network provides access to state-of-art analytical instrumentation and bioassay facilities. The major focus of our research is looking for anti-infectives (malaria and TB) and reversing resistance of parasites and vectors to drugs and pesticides; chromatographic separation - GC, HPLC; Structure elucidation - HRMS, HR-NMR, LC-NMR, HPLC-CD.

Achievements: Major scientific results include the isolation and characterization anti-plasmodial substances (some of our results are patented), and the identification of natural products that bind to enzymes of parasites and vectors that are implicated in the corresponding resistances to chloroquine and DDT.

Facilities: Bruker 300 and 600 MHz NMR spectrometer; Finnigan LCQ-Deca mass spectrometer - ESI and APCI probes; Waters GCT Premier HRMS; CHN Analyzer; Capillary electrophoresis equipment; polarimeter (Autopol IV); Elemental analyzer; HPLC-CD.

Future plans: A new Centre - Centre for Scientific Research, Indigenous Knowledge and Innovation, CESRIKI, is being established

Cooperation with developing countries: Research cooperation with scientists in the following universities - University of Pretoria, University of Zimbabwe, Obafemi Awolow University. University of Dschang, University of Yaounde, Medical Research Council.

International Organization: Cooperation with Gibex, Rutgers University and Cape Town University.

Brazil

Centro Brasileiro de Pesquisas Físicas (CBPF)

Head of Institution: Ricardo Magnus Osorio Galvao, Director.

Address: Dr. Xavier Sigaud, 150-22290-180 Rio de Janeiro, R.J., Brazil.

Phone: (+55 21) 2141-7415. **Fax:** (+55 21) 2141-7400. **Email:** rgalvao@cbpf.br, mreis@cbpf.br. **URL:** www.cbpf.br/.

Scientific Fields of Interest: Biological Sciences, Chemistry, Physics.

Research and training: Condensed matter physics (theoretical and experimental): electronic structure, magnetism, and superconductivity; Nuclear Magnetic Resonance (NMR); Electronic Paramagnetic Resonance (EPR); ENDOR; Mossbauer, magnetometry, resistivity and x-rays; Cosmology, gravitation and astrophysics; Particle physics and field theory; Nuclear physics and cosmic rays; High-energy physics (experimental and theoretical); Biophysics; Theoretical chemistry; Nanotechnology; theoretical physics: non-linear dynamics, statistical mechanics and mathematical physics.

Achievements: On average 200 papers published and 20 Ph.D theses presented per year. 62 international collaborations with scientists and institutions from all continents; Leading role in non-extensive statistical mechanics and cosmology; Important collaborations in High-energy physics and superconductivity and new materials; relevant role for Post-graduate in physics in Latin America.

Facilities: Library - 21,000 books, 865 titles (180 current); Computers 500 workstations and PCs, LAN; Experimental facilities NMR, ENDOR, EPR, Mossbauer, Magnetometry, Spectroscopy, Resistivity and X-ray.

Future plans: Increase cooperation with developing countries and strengthen participation in international collaboration on High-energy, cosmology and low-energy topics.

Cooperation with developing countries: CLAF Latin American Center For Physics: Universidad San Andreas, Bolivia; CINVESTAV, Mexico, Centro Atómico de Bariloche, Argentina; Universidad de La Plata, Argentina; Instituto de Física Teórica, Cuba.

International Organization: FERMILAB, USA; CERN, Switzerland; ICRA (International Center for Relativistic Astrophysics) CNRS, France; Observatory Pierre Auger; Technique University of Braunschweig, Germany; Universidade de Woclaw.

Centro de Pesquisas de Energia Elétrica (CEPEL)

Head of Institution: Joao Lizardo R. H. de Araujo, GD.

Address: Av. Um, s/n, Cidade Universitária, Caixa Postal 68007, 21941-598 Rio de Janeiro - RJ, Brazil. **Phone:** (+55 21) 2598-6202. **Fax:** (+55 21) 2260-2236. **Email:** lizardo@cepel.br. **URL:** www.cepel.br/index.shtml.

Scientific Fields of Interest: Engineering.

Research and training: Electric systems automation; electrical systems analysis; special electrical technologies; electrical installations and equipments; energy planning; environmental impacts.

Achievements: Development of tools for data acquisition, real-time operation of electrical systems and disturbance analysis; an important product is a complete chain of computer programs for online and off-line analysis, in daily use nationally and internationally; development of methods and computer programs to assist in the expansion, supervision, control and operation of electric power systems, within strict requirements of security and quality criteria; a major product is sage (open energy management systems), an open platform, scalable and widely used scada/EMS in the Brazilian power system; research and application of technologies directed at the use of materials in electric installations, energy efficiency and renewable sources, including sustainability and economic analysis; development of technologies to improve electrical equipment used in generation, transmission and distribution of electric energy - computer models, testing and metering techniques, monitoring and diagnostic systems; important developments are the design of high-voltage transmissionlines and devices for remote metering and control, as well as systems for computer-aided diagnosis; development of computer programs for expansion and operation planning of interconnected hydro-thermal electrical systems; a major product is a chain of software programs used in actual planning and operation of the Brazilian power systems; multi-criteria expansion planning tools, fully taking into account the impacts of new project; among the results is a new handbook for inventory of hydropower potential.

Facilities: Laboratories for high-voltage, corona, pollution, current impulse, instrument calibration, high-voltage measurement, high-current, high and medium power, activation and safety in electro-electronic equipments; equipment diagnostics; low-voltage; analytical chemistry; corrosion; metallography; mechanical properties; insulating fluids and paper; refrigeration; lighting; superconductivity; photovoltaic systems; geographical information systems; signal processing, Electronic equipment and electromagnetic compatibility, power and energy quality, advanced supervision and control, center for the application of efficient technologies, reference center for solar and wind energy, lab of energy metering techniques and devices, electronic measurement lab. Library with almost 27,000 books; 4009 technical papers, 3867 patents; 26.823 technical reports; 83 subscriptions to such journals as: Portal Capes, IEEE, Web of Science, DII, INSPEC, COMPENCEX, Science

Direct, Cell Press. Computer facilities: 750 PCs, 15 workstations and 1 computer cluster with 32 nodes.

Future plans: The center's mission is to help technological development for the Brazilian power sector. To this end it supports governmental planning and operational activities with methods, models and software, including hydro inventory and long-range planning. It also plays a central role in R&D activities of its public and private associates, both in hardware and in software. An important part of our activities will be updating and extending our products such as SAGE (Scada/EMS), HSIL transmissionlines, software for system analysis and control, software for expansion and operational planning, methods and software for automated diagnosis of power systems, measurement and control devices, and work related to corrosion and environmental aspects of power system. Besides these continuing activities, research is being carried out on high-power electric arc dynamics, making extensive use of the centers' medium and high-power facilities; on fuel cells based on bioethanol; on improving present tools to deal with a significant degree of distributed generation, controllable as well as volatile. To this end, the center purports to intensify collaboration with other research centers, both national and international.

Cooperation with developing countries: Nanjing Automation Research Institute, (NARI, China; CVG Electrificación del Caroni C.A. (EDELCA), Caracas, Venezuela.

International Organization: IERE - International Electric Research Exchange (Japan); IEA - International Energy Agency; EDF Research; KEMA

Centro de Pesquisas e Desenvolvimento Leopoldo A. Miguez de Mello (CENPES)

Head of Institution: Eng. Carlos Soligo Camerini.

Address: Cidade Universitária - Quadra 7, Petrobras/CENPES, Ilha do Fundão, 21949-900 Rio de Janeiro, RJ, Brazil. **Phone:** (+55 21) 3224-7169.

Fax: (+55 21) 598-6790. **URL:** www.petrobras.com.br/portal/tecnologia.htm.

Scientific Fields of Interest: Earth Sciences, Environmental Sciences.

Research and training: Deep water exploitation systems, refining technologies, advanced oil and gas recovery, extended reach wells, offshore technology, diesel technology, gasoline technology, lubricants technology, environment technology, new exploration frontiers, renewable energy, fuel innovation, racing products, optimization and reliability.

Achievements: In the last 10 years we granted 327 patents in Brazil and 788 all over the world.

Facilities: Total Area - 122.000 sq.m; Installations - 45.000 sq.m; Laboratories - 137; Pilot-plants - 30; 1 Scientific Vax; 30 PC Net Servers; 140 Work Stations; 1 Library with 300.000 documents (books, technical reports, subscriptions, videos, CD Rom, etc...) and facilities for online research.

International Organization: We currently have 79 Joint Industry Projects with partners all over the world.

Centro de Previsão de Tempo e Estudos Climáticos (CPTEC)

Head of Institution: Maria Assuncao Faus da Silva Dias.

Address: Rodovia Presidente Dutra, Km. 39, Cachoeira Paulista, SP 12630-000, Brazil. **Phone:** (+55 12) 3186-8499. **Fax:** (+55 12) 3101-2835. **Email:** coordenador@cptec.inpe.br. **URL:** www.cptec.inpe.br.

Scientific Fields of Interest: Agricultural Sciences, Earth Sciences, Environmental Sciences.

Research and training: Modeling and development: research, development and improvement of numerical techniques for weather and climate forecast and diagnostics. Operation: ingestion and preprocessing of meteorological data, maintenance of the operational forecasting models, evaluation of numerical weather and climate forecast with global and regional models; monitoring climate phenomena associated with El Nino and La Nina and other oceanic SST anomalies in the Atlantic. Environmental systems and satellite: reception and transmission of GOES, METEOSAT and NOAA satellite-data and of automatic meteorological station; research and development of retrieval techniques of the atmospheric, maritime and continental information using remote-sensing by satellites and other techniques. Climate and environment: the main objective is to focus on basic research applied to weather, climate and environment and to develop products oriented towards environmental applications.

Achievements: Short and medium range weather forecasts (up to 12 days); Seasonal forecasts (up to 6 months); ensemble weather and climate forecasts; monitoring environmental parameters and their impact on climate; monitoring hydro meteorological parameter (rain, soil moisture, dry weather periods, etc.); observational studies of weather and climate phenomena and atmospheric and oceanic modeling; graduate programs (master and doctorate levels) in meteorology; public services to the press, government agencies and general public.

Facilities: CPTEC operates a high-performance computer system based on modern vector and parallel technology (NEC SX6) with 12 nodes of 4 processors each.

Future plans: To use fully coupled atmosphere-biosphere-ocean models for climate studies.

Cooperation with developing countries: IAI, Inter American Institute for Global Change Research; internship program at CPTEC INPE for Latin American countries.

International Organization: ECMWF (European Center for Medium Range Weather Forecast); Program EUROBRISA for seasonal climate forecast in South America.

**Empresa Brasileira de Pesquisa Agropecuária
(EMBRAPA) — Centre for Research on Oriental
Amazonia (CPATU)**

Head of Institution: Dr. Jorge Yared, Director.

Address: Trav. Dr. Enéas Pinheiro s/n., Belém, PA, CEP 66095-100, Brazil.

Phone: (+55 91) 3276-1941. **Fax:** (+55 91) 3276-0323. **Email:** chgeral@cpatu.embrapa.br. **URL:** www.cpatu.embrapa.br.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences, Environmental Sciences.

Research and training: Grain production systems; native fruit crop production and management systems; forestry management; familiar agriculture; soil conservation and management; honey production; economic and ecological zoning; plant-breeding; livestock production and management; medicinal planting, handling and use; in-vitro plant propagation production system.

Achievements: Improved varieties of rice, corn and Soya beans, all tested and recommended; improved varieties of fruit trees; food practices in forestry management; software; botanical identification; herbarium; production systems of food crops; Agro-forestry systems; fire-free agriculture systems; animal production systems; strategies to select and obtain superior genotypes; cloning.

Facilities: Soil laboratory and plant analysis, well-equipped; food processing lab; plant pathology lab; library; plant pest lab; biotechnology lab; experimental stations; computer equipment.

Future plans: We plan to continue study and develop new practices of forestry management; studies of other fruit tree species; studies of new native species such as forestry timber and non-timber species; fruit species; medicinal species; studies on product processing; marketing.

Cooperation with developing countries: Consortium Amazon initiative; French Guyana arrangement and administration and capacitation in forestry.

International Organization: ASB, ITTO (International Tropical Timber Organization).

**Empresa Brasileira de Pesquisa Agropecuária
(EMBRAPA) — Centro de Pesquisa Agropecuária do
Trópico Semi-Arido (CPATSA)**

Head of Institution: Pedro Gama da Silva.

Address: BR 428, km 152 - Zona Rural, P.O. Box 23, 56302-970 Petrolina, PE, Brazil. **Phone:** (+55 81) 3862-1711. **Fax:** (+55 81) 3862-1744. **Email:** chgeral@cpatsa.embrapa.br. **URL:** www.cpatssa.embrapa.br/.

Scientific Fields of Interest: Agricultural Sciences.

Research and training: Natural Resources of the Semi-Arid region: characterization/reclamation; Irrigated Crops: mangoes, grapes, guava, bananas, Indian Cherries, melon, onions, watermelon; Irrigation Engineering; Organic Agriculture; Dryland Agriculture; Forestry; Livestock production in semi-arid areas; Rain water capture and conservation, Soil & Water Management; Biological Control of Insects and Diseases; Dryland Agricultural Mechanization; Agrometeorology; Soil Fertility and Conservation.

Achievements: Agro-ecological Zoning of Northeast Brazil (characterization of Northeast Brazil natural resources - soil, vegetation, agroclimatic zoning); Integrated System for production of milk and beef cattle in the semi-arid areas; floral induction on mangoes; tree species for recovery of degraded areas; techniques for table grape production; techniques for seedless grape production; techniques for water capture and storage; control of main pests on fruit crops; techniques for desalting brackish water; socio-economic characterization of small farmers; technology for fruit integrated production; methods for post-harvest conservation of fruits.

Facilities: 15,000 sq.m building; 15 well-equipped laboratories for research on (agro meteorology; biotechnology; remote-sensing; biological control; soil, water and plant tissue; animal nutrition; seed technology; entomology; plant pathology; microbiology; environmental sustainability; enology; plant physiology; molecular genetics; post-harvest and marketing quality); glass-houses; seedling nurseries; auditorium for 300 persons; training rooms; technical support office at Petrolina downtown with a training room for 35 persons; 300 computers; two experimental stations for dryland agriculture studies (2,373 hectares); two experimental stations for irrigated agriculture studies (132 hectares); library specialized on semi-arid agriculture with over 50,000 titles.

Future plans: Database of natural and agro-socio-economic resources; increase R&D on several areas of irrigated and dryland agriculture; increase technical and scientific production; make available new cropping alternatives with effective agronomic potential for irrigated areas; agricultural impacts on the environment; training students, new scientists and farmers; increase technical partnerships; increase emphasis on family agriculture; improve animal production systems for the semi-arid; revitalization of river effluents in the Brazilian semi-arid region.

Cooperation with developing countries: To serve as consultant in technology transfer on semi-arid agriculture to countries located in semi-arid areas of the world; training on cropping techniques under arid/semi-arid conditions for Portuguese speaking countries of Africa (Angola, Mocambique, Bissau, Cape Verde); training on good agricultural practices for South American countries (Brazil, Paraguay, Uruguay, Argentina).

International Organization: Embrapa tropical semi-arid has technical partnerships (cooperation research projects; training of scientists) with the following institutions: CIRAD; FAO; International Atomic Energy Agency - IAEA; Wageningen University (The Netherlands); Estación de Viticultura y Enología de Navarra (Spain); Instituto del Frío (Spain); European Community; ICARDA; World Bank; CGIAR; AENOR (Spain); Volcani Center Institute (Israel).

Empresa Brasileira de Pesquisa Agropecuária (EMBRAPA) — Instrumentação Agropecuária

Head of Institution: Dr. Alvaro Macedo da Silva, Director.

Address: Rua XV de Novembro 1452, Caixa Postal 1452, 13560-970 Sao Carlos, SP, Brazil. **Phone:** (+55 16) 3374-2477. **Fax:** (+55 16) 3374-5958.

Email: sac@cnpdia.embrapa.br, alvaro@cnpdia.embrapa.br, chgeral@cnpdia.embrapa.br. **URL:** www.cnpdia.embrapa.br/.

Scientific Fields of Interest: Agricultural Sciences.

Research and training: Research areas: Precision agriculture / telemetry / automation; nanotechnology applied to the agri-business; methods and equipment for food quality; methods and equipment for natural resource evaluation and monitoring; instrumentation for small farmers; equipment for post-harvesting; new materials and new uses for agricultural products; Instrumentation and methods for biotechnology. Training: Maintenance of laboratory equipment; spectroscopic techniques (RNM, EPR, FTIR, UV-vis.).

Achievements: Method and equipment for the determination of physical characteristics of porous medium as soil, wood and others by gamma and X-ray tomography; Methodology for qualitative studies of organic matter using NMR; Method and equipment for determining oil in seeds and the evaluation of the quality of bio-fuel by nuclear-magnetic resonance (NMR); Method and equipment for particle size distribution analysis by gamma ray attenuation; Process for deposition of thin layer conductive polymers for sensor applications (electronic tongue for quality control of beverages); Process of covering fruits and vegetables by edible films for increasing shelf time of the products; Use of NMR for studying plant diseases; Evaluation of fruits integrity with NMR tomography; Method for the evaluation of organic matter using electronic paramagnetic resonance (EPR); Laser induced fluorescence for analysis of soil organic matter and plant disease; Development of bioactive films for purifying water; Development of software for image processing of roots, plant cover, leaves, seeds, fibers and others.

Facilities: EMBRAPA Instrumentação Agropecuária has fully-functional laboratories and structures. A library with agricultural instrumentation selection in Latin America, intranet (WiFi) and high-speed Internet and other facilities.

Future plans: EMBRAPA Instrumentação Agropecuária intends to apply resources and efforts in restorability, ethanol/energy production, agricultural robotics, equipment for small farm production, instrumentation for greenhouse production, global climate change research and to improve procedures for technological transfers.

Cooperation with developing countries: A member of the India, Brazil and South Africa (IBAS) cooperation programme 'Instruments and measurement technologies for environment-friendly High-quality of agricultural products', cooperation program with the Korea's Rural Development Administration.

Empresa Brasileira de Pesquisa Agropecuária (EMBRAPA) — National Research Center for Rice and Beans (CNPaf)

Head of Institution: Dr. Beatriz da Silveira Pinheiro, Gen. Dir..

Address: Caixa Postal 179, 75375-000 Santo Antonio de Goiás - GO, Brazil.

Phone: (+55 62) 3533-2110. **Fax:** (+55 62) 3533-2100. **Email:** sac@cnpaf.embrapa.br, beatriz@cnpaf.embrapa.br. **URL:**

www.cnpaf.embrapa.br.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences.

Research and training: Investigations on rice and bean production chains, identifying major advantages and constraints to strengthen interaction among different segments; development and adaptation of technologies to family agriculture; development of technologies and machinery to improve production of different crop systems; development of studies to broaden utilization of rice and beans for industrial purposes as well as for consumer improved nutrition; implementation and characterization of the gene-bank for both rice and common beans; increment and utilization of biotech tools in rice and bean research; utilization of computer techniques for crop monitoring and modeling.

Achievements: Release of several common beans and rice (both upland and low-land), resistant to diseases prevalent in different eco-system and with desirable grain characteristics to satisfy market preferences; agroclimatic zoning to minimize Crop-yield losses; germplasm characterization of main morphological and phenological descriptors; integrated pest management focused on resistant varieties, as well as on cultural aspects of management and biological control; forage-crop consortium technology for recovering degraded pastures for both conventional and no-tillage systems.

Facilities: The experimental farm located in Santo Antonio, Fazenda Capivara, is used for upland rice and bean research. It includes well-equipped research labs, a library, computer facilities, greenhouses and a germplasm bank. The site provides over 300 ha of farm land mostly equipped with irrigation facilities,

including 7 center pivots, 50 ha of grown pastures, and 312 ha with natural vegetation. There are also two other experimental field stations, one used exclusively for low-land eco-system research.

Future plans: According to the III Director Plan (2004-2007), CNPAF is concentrating efforts to promote technological innovation and adequate institutional arrangements to increase sustainability and competitiveness of 4 major areas: crop production chains; small farm production; food safety, human nutrition and health; and genetic resources for sustainable utilization. In addition to those, it also searches broadening scientific knowledge frontiers in other strategic areas for both rice and common bean cultures such as advanced biology and bio-informatics.

Cooperation with developing countries: Present: China Future: India

International Organization: Challenge Programs; International Rice Research Institute (IRRI), Philippines; International Center for Tropical Agriculture (CIAT), Cali, Colombia; International Center of Agricultural Research and Development (CIRAD), Montpellier, France.

Empresa Brasileira de Pesquisa Agropecuária (EMBRAPA) — Suínos e Aves

Head of Institution: Elsie Antonio Pereira de Figueiredo.

Address: Caixa Postal 21, CEP 89700-000, Concordia-SC, Brazil. **Phone:** (+55 49) 3441-0400, 3441-0450. **Fax:** (+55 49) 3442-8559. **Email:** chgeral@cnpsa.embrapa.br, sac@cnpsa.embrapa.br. **URL:** www.cnpsa.embrapa.br/index.php.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences, Environmental Sciences.

Research and training: Pig and poultry production; Pig and poultry product safety; Pig and poultry health; Pig and poultry production environment; Pig and poultry production organization.

Achievements: Molecular-biology: Development of a reference population for QTL mapping in poultry; Genetic diversity evaluation in meat chicken lines through DNA; Pale Soft Exudative meat in chicken: mutation on rianodine gene; DNA fingerprinting in the genetic diversity evaluation in meat chicken lines. Food Safety: ELISA test to diagnose Salmonella; Production: Feed composition table; Nutritional requirements of pigs and chickens; Chemical composition and metabolizable energy of feed ingredients; Alternative feed such as: triticale, germinated wheat, rapeseed, whole rice, sunflower, toasted soybean; Ideal corn particle size; Hybrid corn composition; Diet formulation based on ideal protein to reduce manure pollution; Risk factor for rhinitis, pneumonias, diarrheas, linphadenitis and arthritis; Kits for respiratory disease diagnosis; Eradication of mycoplasmas and Aujeszky Disease; Cepas of chicken infection bronchitis virus; Techniques for diagnosis of infectious anemia, avian leucosis, Newcastle Disease and mycoplasma using PCR and ELISA; Kit for diagnosis of pig

pleuropneumonia; Chicken house Prototypes; Prosuino - for Windows; Mobile Chicken house. Coccidiosis in chicken meat. Environment: Solid separator for small and medium size operations; Manure odour reduction through aeration and the use of enzymes in the diet; Validation of technologies for pig manure management, valorization and reduction of its environmental impact; Technologies for environmental improvement; Utilization of biogas for heating poultry houses; Platform for pig manure composting.

Facilities: Physical area of 210 hectares containing: 1 animal health lab: virology, bacteriology, parasitology, anatomo-histopathology, mycology, sperm morphology, clinical analysis and molecular genetics; 1 Physics and Chemistry lab; 1 animal diagnosis-CEDISA; 1 pig production facility: 2,440 animals; 1 pig genetic improvement facility: 1,488 animals; 1 Chicken genetic improvement facility: 25 chicken houses, 50,000 chickens; 1 Hatchery- 160,000 eggs/month; 1 Chicken experimental field with 14 houses - 21,600 chickens; 1 Necropsy installations for pigs and chickens; 1 SPF chicken house - 330 dozens of eggs / month; 1 SPF pig house- 5 dams; 1 Feed mill - 4 ton/hour; 1 House for deep bedding for pigs - 280 animals; 1 House for metabolism test; 1 Weather station; Library with 5,000 books, 800 journals. Network of 146 Computers.

Escola Superior de Agricultura “Luiz de Queiroz” (ESALQ)

Head of Institution: Jose Roberto Postali Parra.

Address: Universidade de Sao Paulo, Av. Padua Dias 11, Caixa Postal 9, 13418-900 - Piracicaba, Sao Paulo, Brazil. **Phone:** (+55 19) 3429-4110 or 3422-5926. **Fax:** (+55 19) 3422-1733. **Email:** diretor@esalq.usp.br. **URL:** www.esalq.usp.br/.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences, Earth Sciences, Environmental Sciences.

Research and training: Biological control of insect and plant disease; agribusiness; cell and molecular-biology in plants and animals; genomics; crop science; plant and animal biotechnology; biodiversity and ecology; animal husbandry; plant and animal genetics; seed technology; forestry; plant pathology and resistance; wood technology; food technology; bio-fuels.

Achievements: The main reference in Latin America for agricultural sciences; vegetable varieties; technologies for biological control of plant insects; eucalyptus pulp and paper technology; wild life management and conservation; Biodiversity; genome recurrences: *Xylella fastidiosa*, *Xantomonas axopodis citri*, cancer, *leifsonia xyli sulis* xili, sugarcane; New under-graduate courses.

Facilities: Electronic microscopes; automatic sequencers, mass spectrometer; 4 field stations (2900 ha); 160 laboratories. Computer center. Libraries 1 main and 5 sectorial (100,000 volumes and 3,400 journals); controlled incubators 50; optical microscopy 600; green houses 70; climatological stations - 10.

Future plans: Consolidation of the new under-graduate courses; Increasing our internationalization: under-graduate and graduate programs and our research activities; creation of a national bio-fuel center for research and policy.

Cooperation with developing countries: All countries in South America and several in Africa.

International Organization: CANADA - Université Laval; COSTA RICA - Escuela de Agricultura de la Región Tropical Húmeda – EARTH; USA - Michigan State University; The Ohio State University; University of Illinois; Rutgers; FRANCE - École Supérieure d'Agriculture d'Angers; Centre de Coopération Internationale en Recherche Agronomique pour le Développement - CIRAD; JAPAN - Yamaguchi University; Tokyo University of Agriculture; MEXICO - Universidad Autónoma/Chapingo; NEW ZEALAND - Massey University; PORTUGAL - Universidade de Coimbra

Fundação Oswaldo Cruz (FIOCRUZ)

Head of Institution: Paulo Marchiori Buss, President.

Address: Av. Brasil, 4365 - Manguinhos, 21040 - 900 Rio de Janeiro RJ, Brazil. **Phone:** (+55 21) 385-1616. **Fax:** (+55 21) 2270-2496. **Email:** buss@fiorcruz.br. **URL:** www.fiorcruz.br/.

Scientific Fields of Interest: Biological Sciences, Chemistry, Environmental Sciences.

Research and training: Biotechnology; fine chemicals; endemic diseases; public-health; applied immunology; blood products; quality control; reagents; tropical medicine; ecology and the environment.

Achievements: As of 2004: 1,200 research projects; Products: drugs, vaccines, diagnostic kits, diagnostic methods and several international patents; Network of Human Milk Bank; Biological control of vectors; quality control of food, drugs, cosmetics, biological products and blood; Educational games for aids; Educational programs in site and for distance education in public-health and health sciences at graduate level; TV programs, daily in close circuit for the health services and twice a week in broadcast for the general public; Publications: 4 periodical, dealing with health research, public-health, history of health and information for the general public; 40 books on health and health sciences subjects during the last 10 years; 800 thesis for MSc and Ph.D, about health topics; Reference healthcare in infectious diseases and maternal & child care.

Facilities: 16 Institutes (in 7 States of the country), with the following distribution: 6 dedicated to biomedical research and education (110 labs). 2 factories (viral and bacterial vaccines, diagnostic reagents and 80 different drugs, including anti-retro virals). 2 dedicated to public-health research and education. 2 hospitals (clinical research in infectious diseases and maternal & childcare). 1 dedicated to historical research. 1 oriented to information and communication in science and technology. 1 National Center of Quality Control. 1 Animal Breeding Unit, Including state of the art equipment notably confocal

microscopy, nucleic acid and protein sequencers and mass spectrometers for proteomics studies as well as real-time PCR and microarray facilities; computer center and bio-informatics group. Natural products center; the only Rhesus monkey reserve in South América; important scientific collections on entomology and microbiology; A central library and a network of 8 specialized libraries; a TV Channel; and a Printing House.

Future plans: In construction, a new plant with 12 platforms for the state of the art technological development (Center of Technological Development for Health); expanding clinical trials for new vaccines; technological transfer.

Cooperation with developing countries: Offer assistance to practically all Latin-American countries, in coordination with Pan American Health Organization; MOU with more than 40 Universities in the area; Continuous cooperation with Portuguese speaking Africa countries; Co-founder and permanent member of Drugs for Neglected Diseases Initiative (DNDi); Interchange with India (ICMR) and South Africa (MRC).

International Organization: World Health Organization/ Tropical Diseases Research; Cooperation from NHI, both from Fogarty Center and NIAID; Cooperation from INSERM, IRD and Pasteur Institute; participant of the AMSUD-PASTEUR; member of the World Network of Pasteur Institute; Cooperation from CIDA, Canada, from JICA, Japan, and European Economic Community; Interchange with several Universities from the United States and Europe; Projects with support from several Foundations (Rockefeller, Kellogg, etc).

Instituto Adolfo Lutz (IAL)

Head of Institution: Carlos Adalberto de Camargo Sannazzaro, GD.

Address: Avenida Dr. Arnaldo 355, Cerqueira Cesar, 01000 São Paulo, SP 01246-902, Brazil. **Phone:** (+55 11) 3068-2802. **Fax:** (+55 11) 3088-3041.

Email: sannazzaro@ial.sp.gov.br. **URL:** www.ial.sp.gov.br.

Scientific Fields of Interest: Agricultural Sciences, Chemistry, Environmental Sciences.

Research and training: Instituto Adolfo Lutz is the Central Public-health Laboratory of the State of Sao Paulo incharge of carrying out laboratory work involving epidemiological, sanitary inspection and regulations; monitoring and supervising, coordinating, regulating, executing and controlling the activities of the State's Public-health laboratories. The Institute also has 12 Regional Laboratories. In addition to It's activities in the State, the Institute is incorporated into the National System of Public-health Laboratories, accredited by the Health Ministry. One of the most important research centers in Latin America, the Adolfo Lutz, attracts innumerable researchers. List of main research and training activities: Food Contaminants: Exposure, Detection and Control (Mycotoxins, Inorganic Contaminants; Pesticides Residues; Veterinary Drugs; PAH); Food Nutrition: Development and optimization of traditional and innovative analytical methods for Folic Acid, Retinol; Microbiology and

Immunology Applied in Public-health; Research, developing and process innovation and products applied in laboratorial diagnostic of infectious and parasite diseases of Public-health concern; Morphological and Molecular pathology of Chronic-Degenerative, Infectious and neoplastic Diseases; Implementation of new laboratory technologies for: epidemiology, hantavirus, botulism; Sensitivity of antibiotic drugs to enterococcus-contaminated chicken meat; Investigation, monitoring and characterization compulsory notification etiologic agents of unusual health injuries; Monitoring veterinary drugs in milk sample; Production of meningococcus monoclonal antibody for bacteria subtyping; Production of hyperimmune sera for laboratorial diagnostic of Salmonella, E.coli, Shigella and others pathogenic enterobacteria; Many other research lines on: Aids, human and canine Leishmaniasis, toxoplasmosis, hepatitis, influenza, etc; Training on Bacteriological techniques and Food safety Control.

Achievements: Infectious and parasite diseases laboratory diagnosis improvement and implementation; Adult and pediatric infectious disease early laboratory diagnosis; Food safety Control and technology transfer.

Facilities: Fluorescence Spectrophotometer; Microplate Reader, Spectrophotometer - UV-VIS; Antibiotic Zone Reader; Atomic-absorption Spectrometer- Graphite Furnace; Inductively Coupled Plasma Spectrometer; Atomic-absorption Spectrometer Flow Injection; HPLC-ICP-MS Spectrometer; HPLC, GC, GC-MS/MS, HPLC/MS; Real-time PCR; DNA Sequencing Equipment; Flow Cytometer; computers (700); freezers; refrigerators; ultrasonic Cleaners; Water Purification; electrophoresis; balances, centrifuge; microscopes and supplies; evaporation systems ; and clean room, library that is in renovation.

Future plans: Biomarkers to estimate individual exposure to aflatoxins and ochratoxin A; Mycotoxins: Implementation of the first Brazilian Total Diet Study; Establishment of bio-safety laboratories level NB2+ and NB3; Equipment for performing molecular-biology techniques; New animal house.

International Organization: University of California, of Los Angeles (UCLA); of San Francisco (UCSF), of Berkeley (UC-Berkeley - USA, Università degli Studi di Padova - Italia; Public-health Laboratory Service- Colindale, London-UK; CDC/Atlanta.

Instituto Agrônômico (IAC)

Head of Institution: Dr. Orlando Melo de Castro.

Address: Av. Barão de Itapura, 1481, CP 28, 13012-970 Campinas, SP, Brazil.

Phone: (+55 19) 3231-5422. **Fax:** (+55 19) 3231-4943. **Email:** iacdir@iac.sp.gov.br. **URL:** www.iac.sp.gov.br/.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences, Environmental Sciences.

Research and training: Agrometeorology; soil sciences; plant physiology; plant-breeding; phytopathology; water-resources; plant molecular-biology;

horticulture; fruticulture; coffee; citrus; sugarcane; cereals and leguminous seeds; plant production systems.

Achievements: IAC is a leading agricultural research institution that has released more than 750 varieties of crops of economic significance and has developed several precision tools for use in agriculture. More recently, it helped research on genome elucidation of several plants (citrus, coffee, and eucalyptus) or plant pathogens (*Xylella fastidiosa*, *Xanthomonas axonopodis* pv. citri, *Leifsonia xyli*). Soil science and agroclimatology assistance in the development of processes to increase Crop-yield and decrease infections by plant pathogens.

Facilities: Laboratories of Soil and Plant Analysis, Plant Molecular-biology, Soil Microbiology, Taxonomy, Plant Physiology, Virology, Phytopathology, Seed Analysis, etc. Facilities include a Central Library and access to Brazil and São Paulo Academic Network, with free access to main international journals on Agronomy, Biology and Earth Sciences. IAC has 5 experimental stations (1 in Campinas, Cordeópolis and Ribeirão Preto and 2 in Jundiaí).

Future plans: The Institute of Agronomy (IAC) increased its scientific staff to about 50% in 2005-2006 aiming to reach a closer connection between classical and molecular geneticists with the objective of developing new varieties of crops able to increase production under environment-friendly practices.

Cooperation with developing countries: The Institute of Agronomy receives, yearly, an average of 4 foreign scientists from developing countries for training and cooperation.

International Organization: Other international cooperation arrangements actually are not made institutionally, but on a personal basis according to a researcher interest. It is expected to change this situation in the near future.

Instituto Butantan

Head of Institution: Dr. Otavio Azevedo Mercadante.

Address: Av. Vital Brasil, 1500, 05503 - São Paulo - SP, Brazil. **Phone:** (+55 11) 3726-7222, 3726-9257, 3726-8381. **Fax:** (+55 11) 3726-1505. **Email:** instituto@butantan.gov.br, diretoria@butantan.gov.br. **URL:** www.butantan.gov.br/.

Scientific Fields of Interest: Biological Sciences.

Research and training: The Butantan Institute is a basic and applied research center in areas that are fundamental for solution of public-health problems. It integrates research, technological development, production of immunobiologicals and biopharmaceuticals and cultural activities. The Institute is a world reference in the study of venomous animals and their toxins including the clinical aspects of envenomed patients, screening of bioactive components from the venoms, development of new therapeutic approaches, and the study of physiology, systematics, ecology and natural history of venomous animals. Microorganisms such as viruses, bacteria and parasites are also studied in association with groups involved in immunogenetics, immunochemistry and

biotechnology. Basic Research - maintains the laboratories: genetics, cell biology, biochemistry and biophysics, pharmacology, physiopathology, bacteriology, herpetology, arthropods, immunochemistry, immunogenetics, immunopathology, viral immunology and also Hospital Vital Brazil, in a multidisciplinary approach involving the major fields of Medical Sciences and Animal Biology. Technological Development - the laboratory 'Center of Biotechnology', dedicated to combine basic research with the development of technology for the production of sera, vaccines and other immunobiologicals and biopharmaceuticals for public-health. In close cooperation with the Production Division on the one hand and on the other with the basic research laboratories, the Center develops projects that start at the laboratory bench and move through a pilot-scale to production plants. Production of Immunobiologicals - the production was directed for the needs of Public-healthcare and supplied to the Ministry of Health that provides all vaccines and hyperimmune sera for free distribution to the public-health system. Most of the technology used in Butantan is its own development. Today Butantan is the leading producer in Latin America, supplying more than half million ampoules per year of 13 different hyperimmune sera and has produced 107 million vials of vaccines in 2005. It's main function is to be responsible for the production of 80% of hyperimmune sera and vaccines consumed in Brazil. Cultural and Educational Activities - about half a million people visit our serpentarium and three museums. Special courses and publications are offered to students, companies, the army corps and the population at large. Historical Museum: in the original building where Vital Brazil began the production of anti-venoms, equipment and other instruments from the beginning of the Institute are exhibited. Biology Museum: presents in glass boxes, in an imitation of the natural environment, snakes and other reptiles from Brazil and other continents, spiders and scorpions. Microbiology Museum: presents information about microbiology, genetics, the production of vaccines and sera and tridimensional models of viruses and other pathogens. It has a laboratory with real instruments and other facilities, where selected students can come with their teachers to perform advanced experiments. The Institute offers a master degree in Biotechnology in association with the University of São Paulo. Several of our leading scientists are also accredited by the University to supervise Ph.D programs.

Achievements: Production of immunobiologicals of the butantan used in Brazil: Vaccines: diphtheria-tetanus (children); diphtheria-tetanus (adults); whole cell DTP (diphtheria-tetanus-pertussis); whole cell DTP+Hib (tetraivalent); BCG intradermic; rabies in vero cell-culture; recombinant hepatitis B; influenza. SERA: anti-bothropic; anti-crotalic; anti-bothropic-crotalic; anti-bothropic-lachetic; anti-elapidic; anti-arachnic; anti-scorpion; anti-lonomia; tetanus antitoxin; diphtheria antitoxin; botulinum antitoxin A,B,E; anti-rabies; anti-human thymocitic; monoclonal anti-CD-3. Products being transferred to private companies: recombinant erythropoetin; rabies veterinary and clostridium vaccine.

Facilities: Library; central animal breeding facilities; computers; and divers equipments used in research and production of immunobiologicals.

Future plans: Important new vaccine projects to be registred and produced in 2006-2007 are: a) combined intradermal BCG-HepB vaccine, for the use in maternity, avoiding vertical transmission of hepatitis B as replacing the more expensive and useless testing of the pregnant women; b) DTP-HepB, whole cell tetravalent vaccine using a pertussis without LPS, that avoid adverse events and will cost almost as today's whole cell pertussis vaccine; c) conjugated Haemophilus b vaccine, now being scale-up, which will compose with DTP-HepB a Butantan pentavalent vaccine; d) a simplified acellular pertussis vaccine, as a byproduct of the whole cell vaccine, to be used by children that has adverse effects with the whole cell vaccine; e) Rotavirus pentavalent vaccine bovine-human reassortment, that covers all prevalent serotypes present in Latin America. New sera under development or studies for production: hyperimmune sera anti-bee (*Apis mellifera*) venom and hyperimmune sera anti-digoxin. Biopharmaceuticals: the more advance project is the production of lung surfactante at very low-cost. Clinical assays now in process have enough date for registration and production in 2006-2007. Butantan is pursuing the production of some biopharmaceuticals, that the Ministry of Health may incorporate for free distribution into the public-healthcare centers. Plasma-fractionation plant: Butantan has been a pioneer in attempting to develop plasma and cells products from human placental blood. A special pilot laboratory that began its operation will complete this investigation and the isolation of other plasma proteins as protein C and anti-1 trypsin. Production of a porcine factor VIII for hemophilics that do not respond to human natural or recombinant factor is under development.

International Organization: Development new vaccines: NIH-National Institutes of Health: Rotavirus and Dengue vaccines; SABIN VACCINE INSTITUTE: Necator vaccine; HARVARD UNIVERSITY: Pneumococcal vaccine.

Instituto de Biofísica Carlos Chagas Filho (IBCCF)

Head of Institution: Dr. Rafael Linden, Director.

Address: Universidade Federal do Rio de Janeiro, Centro de Ciencias da Saude, Bloco G, Cidade Universitaria, 21949-900 Rio de Janeiro RJ, Brazil.

Phone: (+55 21) 2590-3787, 2562-6721. **Fax:** (+55 21) 2280-8193. **Email:** diretor@biof.ufrj.br. **URL:** www.biof.ufrj.br/.

Scientific Fields of Interest: Biological Sciences, Environmental Sciences.

Research and training: Research: Cellular biology and parasitology, immunology, molecular-biology and structural biology, animal bio-engineering and biotechnology, physiology and cellular biophysics, neurosciences, environmental sciences and vegetal biotechnology. Training: M.Sc. and Ph.D. in biophysics and physiociology. Graduate courses begin twice a year in March and August.

Achievements: More than 450 full papers have been published between 2000 and 2003. In the same period 140 students were awarded their MSc. degrees and 122 their Ph.D. degrees. More than 1000 thesis were awarded from the beginning of the Graduate Programs. The relevance of the scientific activity in the institute can be gauged by the significant number of recipients of grants from highly-competitive national and State programs for scientific funding, as well as from international programs such as the Howard Hughes and Guggenheim Foundation.

Facilities: 46 laboratories for cellular and molecular-biology, electrophysiology at both cellular and system levels, confocal and electron microscopy, spectroscopy, cytofluorometry, mass spectrometry, DNA sequencing and transgenic animal house.

Future plans: Stimulate research and cooperation with developing countries and other research centres in Brazil

Cooperation with developing countries: Researchers at Institute of Biophysics participate in joint ventures with other Latin American countries such as Mexico, Argentina and Uruguay.

International Organization: Several research groups in our institute participate in various scientific ventures in countries all over the world (USA, Italy, Scotland, etc.) and in official bilateral cooperation such as CAPES/COFECUB, Brazil/France, and CAPES/DAAD with Max Planck Institut, Frankfurt, Brazil/Germany.

Instituto de Pesquisas Tecnológicas do Estado de São Paulo (IPT)

Head of Institution: Mr. Vahan Agopyan, President.

Address: Av. Prof. Almeida Prado, 532, Cidade Univ., 05508-901 São Paulo, SP, Brazil. **Phone:** (+55 11) 3767-4433. **Fax:** (+55 11) 3767-4030. **Email:** direxec@ipt.br, vahan@ipt.br. **URL:** www.ipt.br.

Scientific Fields of Interest: Engineering.

Research and training: Environmental and energy technology; fashion industry technology; structure and equipment reliability evaluation; naval and oceanic engineering; building technology; construction and infrastructure technology; information, automation and mobility technology; mechanical and electrical metrology; fluid metrology; metrology in chemistry; forest resources.

Achievements: Emerging Technology: Thermal plasma for toxic waste treatment; Biodegradable plastic from sugarcane; microtechnology; microencapsulation. Technological Infrastructure; Renewable energy: Bio-mass gasification; Water laboratory; Gas laboratory; Oil nozzle combustion; Trace analysis; Paper and celluloses laboratory; Optical research; Towing tank; Wind-tunnel; Combustion and gasification laboratory; Vacuum furnace; Engine and emission laboratory. Methods of microencapsulation at IPT: Spray drying; coacervation; Emulsification/solvent evaporation; Ionic complexation; Spray

cooling; Construction technology and geotechnology. Technology for innovation: Biodegradable plastic from sugarcane (1991/2001); Rolling cylinder of lamination; Thermal plasma for furnace aluminum recovery without use of salts; Flat-flame gas burner for glass industry furnace; Electrical steel development for steelmakers and electrical motor manufacture; Design and implementation of automatic temperature control system for MVC polymerization reactor for production upgrade; Technology Henry Ford award; New alloy for Zetec Rocam engine headstock.

Facilities: Thermal plasma for toxic waste treatment; Towing tank; Wind-tunnel; Vacuum furnace; Rolling cylinder of lamination; Thermal plasma for furnace aluminum recovering without use of salts; Flat-flame gas burner for glass industry furnace.

Future plans: R&D, essays, industrial technological support for innovation: Rapid and timely training, increasing capability to serve the needs of industry; New equipment; Benchmarking quality and depth measurement & analysis services; Acquisition of enabling skills to transfer technology to other institutions. Management for innovation and competitiveness: Cost reduction of industrial products, increasing in marketability, development of standards, training, use of domestic resources, reduction of know-how importation and enhancement of innovation. New technologies in different areas, such as petroleum, gas, ethanol, renewable energies, civil infrastructure, roads, identification of risk situations, contamination, etc. Intensifying the technological support for quality in products and services for the internal market and exports.

Cooperation with developing countries: IPT has Memoranda of Understanding with: Instituto Nacional de Tecnologia Industrial (Argentina); Centro de Estudios, Medición y Certificación de Calidad, CESMEC (Chile); Empresa de Gestão do Conhecimento e da Tecnologia, GECYT (Cuba); Asociación Latinoamericana de Laboratorios de Ensayos de Fuego; Centro de Investigación, Desarrollo e Inovación de Estructuras y Materiales de la Universidad de Chile, IDIEM (Chile); Instituto Ecuatoriano de Normalización, INEN (under development) (Ecuador).

International Organization: Memorandum of Understanding between IPT and other institutions: ASTM International (USA); Centre For Marine - CNG (Canada); Istituto Motori del C.N.R (Italy); Laboratório Nacional de Engenharia Civil - LNEC (Portugal); National Institute of Standards and Technology of The Department of Commerce of The United States of America - NIST (USA); St. Petersburg state academy of aerospace instrumentation (Russia); TUV NEL Limited (Scotland); Universidad de la Republica (Uruguay); Universidade de Aveiro (Portugal); Technische Universität Clausthal (IAM - IEV - IUW) - (Germany); Technische Universität Clausthal (RFA) - (Germany); UNLP - Universidad Nacional de La Plata (Argentina).

Instituto de Tecnología de Alimentos (ITAL)

Head of Institution: Airton Vialta, General Director.

Address: CP 139, 13073-001 Campinas S.P., Brazil. **Phone:** (+55 19) 3743-1800. **Fax:** (+55 19) 3743-1799. **Email:** diretor@ital.sp.gov.br. **URL:** www.ital.org.br/.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences, Chemistry, Environmental Sciences.

Research and training: Research in food technology, particularly juices, pulp, concentrates, and canning of fruits and vegetables; industrial fermentation; storage of grains; post-harvest of fruits and vegetables; baking, beverages; edible oils; dehydrated foods; fish and marine resources; meat and derivatives; dairy products; engineering properties of foods; microbiology; quality control; pesticides residues.

Achievements: The scientific results published in the Brazilian Journal Of Food Technology and Revista Brasileira de Ciencia e Tecnologia de Alimentos (where there is an abstract in English for each article) and several other publications about foods in general.

Facilities: Well-equipped and modern labs on food science; chemistry, biochemistry, physico-sensorial evaluation, microbiology, pesticides residues, etc., which enable the staff to conduct very sensitive analysis and tests, e.g. plasma spectrometer, atomic-absorption spectrophotometer, texture analyzer, gas chromatograph, Amino-acid analyzer, multichannel fluoroptic thermometer, stereomicroscope zoom, impedance system, electronic centrifuges, hunterlab colorimeter, etc. Computers; micros AST 3/25s. Pilot-plants for milk and dairy; meat and derived products; flours and bakery; fermentation and distillery; dehydrated food; fruit juices and soft drinks; horticulture products processing, canning, aseptic line; fish and marine resources; fats and edible oils. The best library on food in South America with a Sectorial Nucleus for Information on Food linked to a national chain for information on other areas of knowledge.

Cooperation with developing countries: Past and present: South America, Latin America: Caribbean countries; Suriname, Portuguese-speaking countries of Africa (Angola and Mozambique) and others.

Instituto Evandro Chagas (IEC)

Head of Institution: Paulo Cruz, Secretary General.

Address: Av. Almirante Barroso 492, CP 1126, 66090-000, Belém, Pará, Brazil. **Phone:** (+55 91) 226-7732. **Fax:** (+55 91) 226-1284. **Email:** edvaldoreiro@iec.pa.gov.br, diretoria@iec.pa.gov.br. **URL:** www.iec.pa.gov.br/.

Scientific Fields of Interest: Biological Sciences, Environmental Sciences.

Research and training: Research including tropical medicine; biotechnology; endemics; public-health; virology; parasitology; microbiology; pathology; epidemiology; environment.

Achievements: As of 1998, isolation and characterization of 183 arboviruses; studies on AIDS, rotaviruses, hepatitis, papillomaviruses, enteroviruses, and other viruses; bacterial and parasitological diseases; epidemiological studies, especially the course of epidemics; products: sera and antigens, serological techniques, other biological products.

Facilities: modern laboratory equipment; electronic microscopy centre; central animal house (mice, rabbit, sheep, monkey); computer centre; library (tropical medicine and biology).

Future plans: Molecular-biology studies; experimental studies; development of new sera, antigens and other products; testing vaccine centre; joint ventures' agreements.

Cooperation with developing countries: Pan American Health Organization; NAMRID (Peru).

International Organization: British Council, Rockefeller Foundation; World Health Organization; Yale University; Center for Disease Control and Prevention (CDC); ORSTOM (France); European Economic Community; London School of Tropical Medicine and Hygiene; Wellcome Trust.

Instituto Nacional de Matemática Pura e Aplicada (IMPA)

Head of Institution: Dr. César Camacho, Director.

Address: Estrada Dona Castorina 110, Jardim Botânico, 22460-320 Rio de Janeiro, RJ, Brazil. **Phone:** (+55 21) 2529-5270. **Fax:** (+55 21) 2512-4115.

Email: director@impa.br, dgeral@impa.br. **URL:** www.impa.br.

Scientific Fields of Interest: Mathematics, Physics.

Research and training: Algebra; analysis/partial differential equations; computer graphics; fluid dynamics; holomorphic dynamics and complex foliations; mathematical economics; differential geometry; optimization; probability; dynamical systems and ergodic theory.

Achievements: Advanced research in mathematics mainly in the research areas above. The scientific productin of the institute can be seen on the web page www.impa.br.

Facilities: Excellent library on mathematics and computer facilities for research visitors and students.

International Organization: TWAS; IMPA is 'Unité Mixte International of CNRS'

Instituto Nacional de Pesquisas Espaciais (INPE)

Head of Institution: Luiz Carlos Moura Miranda.

Address: Avenida dos Astronautas 1758, Jd. Granja - CEP 12227-010, 12201-970 São José dos Campos, SP, Brazil. **Phone:** (+55 12) 3945-6000. **Fax:** (+55 12) 322-9285. **Email:** director@dir.inpe.br. **URL:** www.inpe.br.

Scientific Fields of Interest: Earth Sciences, Environmental Sciences, Mathematics, Physics.

Research and training: Space and Atmospheric Sciences (Geophysics, Astrophysics, Aeronomy), Earth Observation, Meteorology (Weather Forecast and Climate Studies, Oceanography, Geodesy and Navigation), Space Engineering (Satellites, Payloads and Ground Stations), and Space Technology (Remote-sensing, Geoprocessing, Image Processing, Sensors and Materials). Also Computation and Applied Mathematics, Combustion and Propulsion, Plasma. Post-graduate programs: Astrophysics, Computer Science, Space Engineering and Technology, Space Geophysics, Meteorology and Remote-sensing.

Achievements: Fundamental and applied research in all areas described above. Methodologies for utilization of meteorological and remote-sensing satellite-data for applications in agriculture, cartography, geology, forestry, fishing, operational numerical weather and climate forecasting.

Facilities: Facilities for reception, processing and dissemination of meteorological and remote-sensing satellite-data such as LANDSAT, SPOT, TIROS, ERS-1, METEOSAT, GOES; laboratories of plasma, combustion and propulsion, sensors and materials, satellite tracking and control center; laboratory of satellite integration and tests; balloon launching facility; supercomputing facility.

Future plans: Improve technological capacity, especially in utilization of data from international satellites with microwaves sensors; development of new missions in meteorology, remote-sensing and oceanography; establishment of international satellite-data center for earth observation satellites.

Cooperation with developing countries: PNAE Brazil cooperation with China for developing CBERS satellites, participation in international programs of Earth Observing and Global Change, e.g. EOS, RADARSAT, GCRP, IGBP, WCRP.

International Organization: INPE maintains contact and cooperation with the main space agencies in the world, such as, NASA and NOAA (USA), CNES (France), DLR (Germany), ESA (Europe), CONAE (Argentina) and CAST (China). Joint programs including France-Brazil Micro-satellites; Brazil-Argentina Satellite to investigate food, water and environment; China-Brazil Earth Resources Satellite with the Peoples Republic of China; Brazilian participation in the International Space Station (ISS); Mission to Planet Earth with USA and Large-scale Biosphere-Atmosphere Experiment in Amazonia.

Instituto Nacional de Tecnologia (INT)

Head of Institution: João Luiz Hanriot Selasco, Director.

Address: Av. Venezuela 82 Centro, Rio de Janeiro, 20081 RJ, Brazil. **Phone:** (+55 21) 2123-1284, 2123-1285. **Fax:** (+55 21) 2123-1284. **Email:** divulga@int.gov.br. **URL:** www.int.gov.br.

Scientific Fields of Interest: Chemistry.

Research and training: PDTI (research, development and innovation): catalysis and chemical processes; characterization and processing of materials; corrosion and protection; industrial design; energy; environment; chemical meteorology; production management; technological information. CSTE (certification and technical services): certification, tests, analysis and legal engineering. CPTe (technical training and capabilities development): Post-graduate courses in production management; short-courses in design, energy and IT.

Achievements: 115 technical and scientific publications per year; 132 processes, products, models and prototypes developed in design and material science and chemical science in cooperation with industries. As of 2003, the institute has 82 software licenses; 34 licenses (yearly average).

Facilities: 24 laboratories; 1 pilot-plant for chemical processing, scale-up; 1 product certification organism; 1 library with 15,000 books; 63 journals and periodical subscriptions and databases; 1 auditorium; 400 PC workstations.

Future plans: Increase technological development, focusing on cost reduction and quality of life of low-income populations; cooperation in regional integration through business incubators, technological parks and local productive networks; increase of international cooperation, mainly in Latin America.

Cooperation with developing countries: Cooperation with Ecuador in MBA in management production; joint program with Argentina, Paraguay and Uruguay.

International Organization: Meteorology: IMGC - Italy; NIST - USA; Energy: GTZ - Germany; Catalysis: CNRS -France; Corrosion: Univ. Manchester - UK; Environment: Karlsruhe - Germany; Design: WEAR (World Engineering Anthropometry Resource).

Instituto Nacional do Cancer (INCA)

Head of Institution: Jamil Haddad.

Address: Praça da Cruz Vermelha 23 Centro, 20230-130 Rio de Janeiro RJ, Brazil. **Phone:** (+55 21) 2506-6004. **Fax:** (+55 21) 2509-2004, 2242-2420. **Email:** jtemporao@inca.gov.br. **URL:** www.inca.gov.br.

Scientific Fields of Interest: medical Sciences.

Research and training: Cell biology; genetics; experimental medicine; pharmacology; clinical trials in oncology; epidemiology.

Achievements: Full papers in international journals; papers read at scientific meetings; post-doctoral thesis and dissertations; technological products.

Facilities: DNA sequencer; FISH equipment; Cell counters; Electron Microscope; HPLCs and mass spectrometer; Intranet Facilities; Biomedical library; microarray.

Future plans: Expand international cooperation and research; training of researchers in oncology the division of bio-informatics.

International Organization: Offer training in our institute for experimental and clinical researchers from developing countries.

National Council for Scientific and Technological Development (CNPq)

Head of Institution: Dr. Erney Felicio Plessmann Camargo, President.

Address: SEPN 507, Bloco B, Ed. Sede CNPq, 70740-901, Brasília DF, Brazil.

Phone: (+55 61) 2108-9440. **Fax:** (+55 61) 2108-9442. **Email:** ascin@cnpq.br.

URL: www.cnpq.br.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences, Chemistry, Earth Sciences, Environmental Sciences, Mathematics, Physics.

Research and training: The National Council for Scientific and Technological Development (CNPq) is a foundation linked to the Ministry of science and technology (MCT), to support Brazilian research. Since it was set up, CNPq has always been one of the major public institutions for the support of science, technology and innovation (ST&I), contributing directly to the training of researchers (Masters, Doctors and specialists) in the various fields of knowledge.

Achievements: All CNPq's actions are established in the federal government's pluriannual plan, with programs from the Ministries of science and technology (MCT), of Defense (MD), of mining and energy (MME) and of development, industry and foreign trade (MDIC). Today, some 30,000 active professionals hold a doctorate, and at least 22,000 of them gained their Ph.D with the help of CNPq. These investments contribute both to the increase in the production of knowledge and to the generation of new growth opportunities for the country.

Facilities: CNPq provides financial support for research directly to researchers, universities and research institutions, with already established facilities and for acquisition of various sorts of instrument necessary for conducting selected research projects.

Future plans: According to the Brazilian budget for 2004-2007, the objective of the federal government regarding science and technology includes democratization and universalization of access to information and knowledge by development of new technologies, as well as the overall strengthening of scientific and technological bases as a path for development.

Cooperation with developing countries: Besides specific bilateral cooperation with various developing countries from LA, Asia and Africa, CNPq's

main multilateral agreements are: inter-american collaboration on materials (CIAM); Ibero-American program on science and technology for development (CYTED); Argentina, Bolivia, Chile, Colombia, Costa Rica, Cuba, Ecuador, El Salvador, Spain, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Portugal, Dominican Republic, Uruguay, Venezuela, South American Pro. S&T; ProAfrica, REC-PG, etc.

International Organization: European Organization for Nuclear Research (CERN); Marine Science Program (Germany); Deutsche Forschungsgemeinschaft fuer Luft und Raumfahrt EV Cologne Environmental Program (DLR -Germany); Mata Atlantica Program, Madam Program; and other bilateral agreements with Belgium; Chile; Canada; Italy; United Kingdom, etc.,

Observatorio Nacional

Head of Institution: Sergio Luiz Fontes, Director.

Address: Rua General José Cristino, 77, 20921-400 Rio de Janeiro, RJ, Brazil.

Phone: (+55 21) 2580-6087. **Fax:** (+55 21) 2580-6041. **Email:** diretoria@on.br, sergio@on.br. **URL:** www.on.br/institucional/index.html.

Scientific Fields of Interest: Earth Sciences, Physics.

Research and training: Research and development in the areas of astronomy; astrophysics; geophysics and time and frequency metrology; Ph.D and M.Sc programmes on astronomy, astrophysics and geophysics.

Achievements: Participation in international scientific-cooperation projects, such as: the Space Project in Astrophysics Corot (Convection Rotation and Planetary Transit), the Dark Energy Survey Project, the Climate and Weather of the Sun-Earth System Project and the International Global Astrometric Interferometer for Astrophysics (GAIA) Project; Generation and dissemination of the official Brazilian time; scientific and technological cooperation with universities and Brazilian Companies; programmes and courses for undergraduate students, teachers in physics and astronomy, children and people interested in sciences.

Facilities: As a research centre placed in an area of 40,000 square metres, the Observatorio Nacional (ON) has a telescope (46 cm. refractor) and a Danjon astrolabe in operation; 4 geophysics labs; 2 metrological labs and a specialized library. All equipment and computational systems in the campus are linked by optical fiber cables. There are 2 field stations for geomagnetic research in Vassouras (RJ) and Tatuoca (PA); a field station for gravity determination studies localized at Vassouras. This field station has the first absolute gravimeter in Latin America. Other facilities: Use of observing time on international telescopes (SOAR, ESO and Gemini South); use of observing time on Brazilian telescopes; use of scientific journals' databases.

Future plans: Application of geophysics methods to oil, water and mining exploitation; implantation of the national geophysics data collection system; consolidation of the commercial use of synchronism and time stamp services; improvement of Post-graduate-programmes.

Cooperation with developing countries: Cooperation with Pan-American Institute of Geography and Geophysics (PIGH), Mexico; CERESIS, Regional center for seismology, Peru.

International Organization: Paris Observatory; observatory of the Russian Academy of Sciences; Harvard Smithsonian Center of Astrophysics; European Southern Observatory; Cote d'Azur Observatory; the Korea Institute of Geosciences and Mineral Resources of the Republic of Korea.

Pontifícia Universidade Católica (PUC Rio)

Head of Institution: Prof. Jesus Hortal Sanchez, President.

Address: Rua Marquês de São Vicente, 225 Ed. Kennedy, 2o andar, Gávea, 22451-900 Rio de Janeiro, RJ, Brazil. **Phone:** (+55 21) 3527-1120. **Fax:** (+55 21) 3527-1119. **Email:** hortal@reit.puc-rio.br. **URL:** www.puc-rio.br/.

Scientific Fields of Interest: Biological Sciences, Chemistry, Engineering, Environmental Sciences, Mathematics.

Research and training: Metallurgical and materials engineering: extractive metallurgy including mineral technology and extractive processes; materials science including characterization, properties and materials performance. Civil engineering: Structures; geotechnic. Electrical engineering: electrical power systems; decision aid methods; signals processing and control; applied electromagnetism; communication systems. Industrial engineering: operations management; finance and investment analysis; systems planning and organization; transportation and logistics. Mechanical-engineering: thermoscience; mechanics of solids; graphic computing and automation. Physics: atomic and materials physics; applied physics; condensed matter physics; particle physics. Informatics: algorithms, parallelism and optimization; databases; computer graphics; software engineering; hypertext and hypermedia; human-computer interaction; programming languages; computer networks; distributed systems; theory of computing. Mathematics: pure mathematics; applied mathematics. Chemistry: analytical chemistry; inorganic chemistry. Metrology: metrology for quality and innovation.

Achievements: Programming language (LUA); middleware Ginga; Prevcar; instrumented PIG's; project and construction of robots.

Facilities: Rio DATA center (13 labs equipped with micro computers with broadband connection to the web and an auditorium with multimedia resources. The latest innovation is the wireless fidelity (Wife) system that allows students to access the Internet from their laptops on campus; SPA, psychological assistance service; judicial assistance service; 3 main buildings: Kennedy, Cardeal Leme and Frings; 13 labs; 1 central library; 6 sectorial libraries; 3 auditoriums; Wife language labs; Wife Internet spaces; international programs office; 27 departments; 68 fields of studies; 4 academic teaching and research centres; social sciences; science and technology; geological sciences and medicine (diploma level only).

Cooperation with developing countries: PUC-Rio has over 180 academic cooperation agreements signed: general academic cooperation, research cooperation, product development cooperation and exchange (student, faculty and staff) cooperation. Such cooperations involve: Argentina; Bolivia; Chile; Colombia; Costa Rica; Czech Republic; Ecuador; Ghana; Mexico; Mozambique; Panama; Paraguay; Peru. Two multilateral agreements that include student exchange opportunities in developing countries: Asociación de Universidades Confiadas a la a Compa-ia de Jescos en América Latina (AUSJAL) and International Student Exchange Program (ISEP).

International Organization: Australia; Canada; China, Taiwan; Finland; France; Germany; Italy; Japan; Korea; Norway; New Zealand; Netherlands; Puerto Rico; Portugal; Sweden; Switzerland; Slovenia; Spain; Taiwan; UK; US.

Pontificia Universidade Católica (PUC Rio) — Departamento de Física

Head of Institution: Fernando Lázqaro Freire Jr..

Address: Rua Marques de Sao Vicente 225, Gavea, Caixa Postal 38071, Rio de Janeiro 22451-970 RJ, Brazil. **Phone:** (+55 21) 3527-1268. **Fax:** (+55 21) 3114-1271. **Email:** majo.soares@fis.puc-rio.br. **URL:** www.fis.puc-rio.br/.

Scientific Fields of Interest: Physics.

Research and training: Optoelectronic; solid-state theory; atomic and molecular optoelectronic; solid-state theory; atomic and molecular physics; High-energy physics; statistical physics; nanostructured materials (thin-films and carbon nanotubes; organic devices; magnetism.

Achievements: International refereed publications in 2006: 62; in 2005: 48; in 2004: 63.

Facilities: Van de Graff 4 MV accelerator HVEE; AFM Veeco; UHV STM omicron; Nanoindenter Hysitron; Squid; Film deposition systems, Leybold and home made systems; Surface analysis (XPS), VG; MALDI (mass spectrometer), Bruker; Nd:YAG laser (1,064nm), Q-Switched, mode-locked with second and fourth harmonic (532 e 266nm respectively); argon laser (20 W CW) with optics for visible and UV (Coherent), Ti:safira laser; 150 microcomputers; Library with more than 2000 titles.

Future plans: New facilities planned for nanotechnology, such as FIB (focused ion-beam) and confocal Raman.

Cooperation with developing countries: Bilateral programs with Cuba, Mexico, Argentina and Chile currently running.

International Organization: France, Portugal and USA supported by Brazilian and foreign agencies currently running.

Telecomunicações Brasileiras S.A. (TELEBRÁS) — Centro de Pesquisas e Desenvolvimento (CPqD)

Head of Institution: Helio Marcos Machado Graciosa.

Address: Rodovia Campinas a Mogi-Mirim, km 118,5, CEP 13086-902, Campinas - SP, Brazil. **Phone:** (+55 19) 3705-6200, 3705-6953. **Fax:** (+55 19) 3705-6135, 3705-7276. **Email:** marketing@cpqd.com.br. **URL:** www.cpqd.com.br.

Scientific Fields of Interest: Engineering.

Research and training: Digital TV; network convergence (NGN switching; optical packages; IP/WDM; adhoc optical communication equipment and systems; multimedia communication systems); business and operations support systems; telecommunications scenarios and prospecting; security; digital inclusion; environment and health.

Achievements: Billing solutions for telecommunication and energy; outside plant management systems; workforce management systems; switch management; telecom resource management; optical supervision; management systems for public administration; telephone for the deaf and hard of hearing; optical communication systems; NGN systems; inductive card; pay phone; text-to-speech solutions.

Facilities: Labs: digital TV; speech processing; optical communications; wireless communications; geographic information systems. Equipment: Server: Sun Enterprise 220R, 250, 280, 450, 4500, 3000, 6000; Dell Poer Edge 2600, 2850, 6400, 6450, 6650; NetAPP filer. Equipment network: router and switch Cisco. Field stations: Dell Optiplex GX110, 240, 260, 270, 280, 620. Library: Dell PV136T, Sun storage L3500. Facilities for electronic reliability.

Future plans: IP Telecommunications network; optical networks; broadband wireless access; electromagnetic radiation effects on health; digital TV; network security; technologies for reducing digital divide.

International Organization: Under negotiation with Brazilian Ministry of Communications.

Universidade de São Paulo (USP São Carlos) — Instituto de Física

Head of Institution: Roberto Mendoca Faria.

Address: Av. Trabalhador São-Carlense, 400, P.O. Box 369, 13560-250 São Carlos, SP, Brazil. **Phone:** (+55 16) 3373-9758. **Fax:** (+55 16) 3371-3365. **Email:** dirifsc@if.sc.usp.br. **URL:** www.if.sc.usp.br/cgi-bin/w3-mysql/Gera_Home-Page.htm.

Scientific Fields of Interest: Biological Sciences, Physics.

Research and training: Biophysics, crystal growth, X-ray diffraction crystallography, atomic physics, polymers, electronic instrumentation, ceramics, non-linear optics, nuclear-magnetic resonance, optical spectroscopy, semiconductors, statistical mechanics, magnetism, complex systems, cybernetic vision, parallel-processing, science education.

Achievements: Nuclear-magnetic resonance tomography at local hospital; atomic clock; molecular structure-determination of proteins; large number of experimental and theoretical results in areas listed above.

Facilities: FIR-Spectrometer; Bomem MBE equipment; X-ray diffractometers, CCAD-4, RAXIS-II and Powder; Langmuir-Blodgett; VAX-6420 vector mainframe computer; 20 workstations; MNR, NMR and optical spectrometers; photon correlator; laser Ar, Kr, ND:Yag; scanning microscope; Czochralski equipment for crystal growth.

Future plans: Expansion in basic physics biomolecular physics, and materials science, increase cooperation with industry.

Cooperation with developing countries: Informal arrangements between research groups in Chile, Argentina and Mexico.

International Organization: France, Germany, Spain, Portugal, USA, England and Portugal.

Universidade de São Paulo (USP) — Faculdade de Medicina de Ribeirão Preto (FMRP) — Departamento de Fisiologia

Head of Institution: Benedito Honório Machado.

Address: Av. Bandeirantes, 3900, 14049-900 Ribeirão Preto, SP, Brazil.

Phone: (+55 16) 3602-3015. **Fax:** (+55 16) 3633-0017. **Email:** bhmachad@fmrp.usp.br. **URL:** <http://rfi.fmrp.usp.br/>.

Scientific Fields of Interest: Biological Sciences.

Research and training: The graduate program in physiology is oriented to the integrative physiology from the cell to the regulatory systems in whole animals. In this scenario we have faculties working on cell physiology, endocrine and metabolism, respiratory, cardiovascular, neurophysiology and renal physiology and the students play a very active role in our publications. The major topics that our faculties are working on are: Comparative respiratory physiology - Professor Mogens Lesner Glass, his laboratory studies the central neural control of the respiration and the characteristics of the blood gases transport; Central neural control of the circulation - Professor Benedito Honório Machado, his laboratory studies the central mechanisms involved in the generation and modulation of the sympathetic activity; Cardiovascular regulation in pathophysiological models of hypertension - Professors Hélio César Salgado and Rubens Fazan Jøenior, their laboratory studies the cardiovascular regulation in experimental models of diabetes and in spontaneously hypertensive rats; Hypothalamus-hypophysis-adrenal axis and the central

melanocortin system - Professor Lucila Leico Kagohara Elias, her laboratory studies the interaction of proopiomelanocortin in the hypothalamus and hypothalamus on the control of food ingestion and the energetic balance; Hypothalamic and extra-hypothalamic control of the hypophysis function - Professor Celso Rodrigues Franci, his laboratory studies the mechanisms involved in the regulation of the reproductive function in normal and under stress conditions; Neuroendocrine mechanisms involved in the hydro-electrolytic homeostases - Professor José Antunes Rodrigues, his laboratory studies the interaction of several hormonal systems (ANP, oxytocin, vasopressin, nitric oxide, and others) on the balance of sodium and water intake/excretion; Electrophysiology of ionic channels - Professor Wamberto Antonio Varanda, his laboratory studies the mechanisms of transport of ions throughout ionic channels in different types of cells; Synaptic transmission - Professor Ricardo Xavier Leão, his laboratory studies synaptic plasticity in the central nervous system related to learning and memory; Progression of renal diseases - Professor Terezila Machado Coimbra, her laboratory studies the cellular and molecular mechanisms associated to renal fibrosis and the role of several hormones (TGF- β , PDGF e endotelina and angiotensin II) and mitogenic-activated protein and nuclear factor - κ B (NF- κ B) on this process; Neurobiology of epilepsy - Professor Norberto Garcia Cairasco, his laboratory studies different aspects of epilepsy and Parkinson with focus on the mechanisms involved in the changes in the motor control; Neurobiology of defense behavior - A comparative approach - Professor Anette Hoffmann, her laboratory studies the mechanisms associated to the defense behavior, mainly in the tonic immobility and the endogenous analgesia as part of this behavior; Neurobiology of tonic immobility and antinociception - Professor Leda Menescal de Oliveira, her laboratory studies the neural and neurochemical aspects involved in the defensive behavior and in the antinociception; Neurobiology of chronic pain - Professor Guilherme de Araújo Lucas, his laboratory studies the neural plasticity associated to the neuropathic pain in response to lesion in the peripheral nervous system; Neuroanatomy of the predatory behavior - Professor Eliane Comoli, her laboratory study the neural pathways involved in the predatory behavior combining the functional and structural bases of this behavior.

Achievements: In 2005 the faculty members published 46 papers in international journals. The center also has a very strong graduate-programme, which is considered by the Brazilian federal agency for graduate-programmes (CAPES) as one of the best in terms of the number of students that obtain Ph.D every year and the qualification of our faculty.

Facilities: We have 16 laboratories in our department fully equipped with the most contemporary techniques including optical and confocal microscopy, electrophysiology setup, immunohistochemistry, recording systems for all physiological parameters; radioimmunoassay; animal care for experimentation; computerized system for data evaluation in all laboratories. One of the best health sciences library in Brazil is located in our Campus. We are planning to expand our Department and more physical area is required for the laboratories

of the new faculties that we are hiring these days. We also need more space for the animal care of the department. This new extra space will be useful for increasing the number of Ph.D. students in our department from 50 to more than 80, when all the new laboratories will be fully equipped.

Future plans: We are planning to expand the physical area of the department as well the number of faculty members. These new faculty teams will be using the most recent advances in technical approach to physiology from the cell to integrative systems. The combination of molecular-biology and system physiology is the most important aspect of this department in order to training a new generation of physiologists able to handle the challenges for expanding the frontiers of the physiological sciences in the genomic era.

Cooperation with developing countries: Our efforts are in direction of academic and scientific-cooperation with the South American countries and India. We are working in all possible directions to obtain some grants to support our collaboration with Physiologists in the Southern Hemisphere.

International Organization: Traditionally our department has had strong scientific-cooperation with several laboratories in North America and Europe and several of our former Ph.D. students did their post-doctoral training in USA or UK. The financial support from the North hemisphere is not significant in the context of our budget, which is mainly dependent on the Brazilian federal (CNPq and CAPES) and state (FAPESP) agencies for research development.

Universidade de São Paulo (USP) — Instituto de Ciências Biomédicas

Head of Institution: Prof. Luiz Roberto Giorgetti de Brito.

Address: Av. Prof. Lineu Prestes 2415, 05508-900 São Paulo, SP, Brazil.

Phone: (+55 11) 3091-6440. **Fax:** (+55 11) 3091-7423. **Email:** britto@icb.usp.br, britto@icb.usp.br. **URL:** www.icb.usp.br.

Scientific Fields of Interest: Biological Sciences.

Research and training: Functional anatomy; cellular and tissue biology; pathogen-host relation; molecular and structural biology; endocrinology and metabolism; molecular epidemiology; genetics and physiology of microorganisms; immunodeficiency and immunogenetics; clinical immunology; molecular immunology, immunodiagnostics and immunotherapy; bioenergetics, channel and transport; mycology; environmental microbiology; medical and veterinarian microbiology; neuroscience and behavior; biologically active peptides, natural products; cellular proliferation; receptors and mechanisms of cellular signalization; cardiovascular/renal/respiratory systems; virology.

Achievements: About 200 publications on average per year.

Facilities: Electron microscopy; light microscopy; special optics (confocal microscopy and fluorescence); DNA sequencing; oligonucleotide synthesis; PCR and real-time PCR; nucleotide imaging; flow cytometry; protein sequencing; peptide synthesis; library with over 71,000 titles and a circulation of

almost 66,000 titles; online access to more than 10,000 journals through a federal government portal.

Future plans: The institute is engaged in an effort to strengthen its applied research program through increased cooperation with the pharmaceutical industry and with end-product facilities such as the university-affiliated hospitals and clinics. This effort is highlighted by the allocation of space, resources and personnel to a soon-to-be-named full professor in experimental medicine. The institute is also committed to upgrading its animal facilities and to develop an in-vivo imaging facility and molecular modeling unit.

Cooperation with developing countries: There are agreements with all MERCOSUL countries (Argentina, Uruguay, Paraguay and Venezuela). Also agreements with Cuba and Angola.

Universidade de São Paulo (USP) — Instituto de Geociências

Head of Institution: Jorge Kazou Yamamoto, Director.

Address: Rua do Lago 562, Cidade Univ., CEP 05508-080, São Paulo - SP, Brazil. **Phone:** (+55 11) 3091-4274. **Fax:** (+55 11) 3091-4295. **Email:** igc@usp.br. **URL:** www.igc.usp.br.

Scientific Fields of Interest: Earth Sciences.

Research and training: Metamorphic and igneous petrology; geochemistry; tectonic; isotope geochemistry and geochronology; mineralogy; environmental geochemistry; hydrogeology; metallogenesis; micro-paleontology and paleontology; stratigraphy; remote sensing and geological interpretations; structural geology; magnetic anisotropy.

Facilities: The largest geological library of South America; mass spectrometers; ion microprobe; scanning electronic microscopy; ICP-Ms; ICP; complete chemistry labs; complete geochronology lab

Future plans: New SHRIMP geochronological lab; new high-resolution ICPMS lab

Cooperation with developing countries: Mozambique; Peru; Colombia; Argentina; Chile; Angola; Bolivia; Cameroon; South Africa; Ghana; China.

Universidade de São Paulo (USP) — Instituto de Química (IQ)

Head of Institution: Dr. Hans Viertler, Director.

Address: Avda. Prof. Lineu Prestes 748, CP 26077, São Paulo SP - 05508-000, Brazil. **Phone:** (+55 11) 3031-2858. **Fax:** (+55 11) 3815-3257, 3031-2858.

Email: diretor@iq.usp.br. **URL:** www.iq.usp.br.

Scientific Fields of Interest: Biological Sciences, Chemistry, Environmental Sciences.

Research and training: Analytical sciences; lab-on-a-chip; nanotechnology, organic-synthesis; theoretical and computational chemistry; environmental chemistry; photochemistry; natural products; electrochemistry; spectroscopy; colloid chemistry; kinetics and catalysis in chemistry and biochemistry; coordination chemistry; chemistry, structure and interactions of polymers and biomolecules; genomics; transcriptomics; proteomics; proteins and their interactions; membranes, channels and transport; signal transduction; free radicals and redox processes; cellular biology; education in chemistry and biochemistry.

Achievements: Our academic staff members have regularly published their research results in international journals and some of the papers have made covers of journals; several applications of patents were submitted.

Facilities: Center for Chemical Analysis; Center for the Treatment of Chemical Residues and Solvents; The Informatics Technical Center; Animal House; Library; Brazilian reference in Chemistry.

Future plans: A new building will be constructed.

Cooperation with developing countries: Some research groups have cooperation arrangements with groups in South-American countries.

International Organization: Several initiatives to establish international cooperation arrangements are being discussed.

Universidade Estadual de Campinas (UNICAMP) — Faculdade de Engenharia Agrícola (FEAGRI)

Head of Institution: Prof. Roberto Testezlaf, Dean.

Address: CP 6011, 13083-875 Campinas SP, Brazil. **Phone:** (+55 19) 3521-2900. **Fax:** (+55 19) 3521-1010. **Email:** diretor@agr.unicamp.br, feagri@agr.unicamp.br. **URL:** www.feagri.unicamp.br.

Scientific Fields of Interest: Agricultural Sciences, Engineering.

Research and training: Sustainable system design using natural resources; farm machinery and equipment design; rural construction for animal and crop production; post-harvest system design; farm planning and management using remote-sensing; adaptation of conventional and alternative energy resources.

Achievements: Electronic control of tractor diesel engine operation; rotary tiller energy requirements; tractor implement optimization; plant-machinery interaction; whole stalk sugarcane harvester; mathematical models for decision support; watershed environmental impacts; water and wastewater treatment systems; optimization of production system design; cooling system design for fruits and vegetables; energy use optimization in animal production; crop production forecast.

Facilities: The college has a building area of 10,000 square metres in three academic sectors: computing lab; experimental field (130,000 square metres); prototype design lab; and 16 teaching and research labs including: labs for soils, physical properties of agricultural products; Water-quality; farm machinery design; controlled environment for plants and animals; instrumentation and control systems; remote-sensing; thermodynamics, irrigation and hydraulics.

Future plans: Improve research facilities to work with bio-fuels and alcohol production from sugarcane; conduct research in natural resources sustainable technology.

Cooperation with developing countries: The college will seek agreements with Latin American universities from Argentina, Chile, Colombia and Peru.

Universidade Estadual de Campinas (UNICAMP) — Instituto de Matemáticas, Estadísticas y Computacao Cientifica (IMECC)

Head of Institution: Prof. Dr. João Frederico da Costa Azevedo Meyer.

Address: Rua Sergio Buarque de Holanda 651, ciudad Universitaria - Barão Geraldo, CP 6065, 13083-859 Campinas SP, Brazil. **Phone:** (+55 19) 3788-5921, 3788-5920. **Fax:** (+55 19) 3788-6094. **Email:** dirimecc@ime.unicamp.br.
URL: www.ime.unicamp.br

Scientific Fields of Interest: Mathematics.

Research and training: Computational methods of optimization; applied analysis; biomathematics; arithmetics of bodies and Galois theory; algebra theory; geometric theory of groups; inverse problems; operational research and mathematical economy; mathematical physics; non-linear analysis, differential equations and applications; Riemannian geometry; applications of geometry and topology; dynamic systems; functional analysis; combinatory and numbers theory; linear models and experiment planning; harmonic analysis; mathematical statistics; biostatistics; Lie's theory; probability and stochastic processes; computer statistics and geophysics; numerical analysis; genetics statistic; statistical methods; mathematic education; algebraic geometry.

Achievements: As per 2005: 52 thesis; 349 bibliographical publications; 7 books; 222 articles; 13 book chapters; 12 books; 21 complete papers following congress proceedings; 26 summaries published in annals; 1 patent; 68 participations in congresses; 9 publications of variable character; 58 technical

reports; 19 lectures; 12 extension courses; 1 event organization; 18 event promotions.

Facilities: Parallel computing lab; statistics lab (2); geophysics computing lab; graduation-education lab; mathematics education lab; extension lab

Universidade Estadual de Campinas (UNICAMP) — Instituto de Química

Head of Institution: Dr. Francisco de Assis Machado Reis.

Address: Cidade Universitária Zeferino Vaz, Caixa Postal 6154, Campinas, 13084-862 SP, Brazil. **Phone:** (+55-19) 3788-3001. **Fax:** (+55-19) 3788-3023.

Email: diriq@igm.unicamp.br. **URL:** www.igm.unicamp.br.

Scientific Fields of Interest: Biological Sciences, Chemistry.

Research and training: Sol-gel synthesis; bioorganic chemistry; colorimetry and microcalorimetry; catalysis; biocompatible ceramics from calcium phosphate; materials science; polymers; combustion; radicals and mechanisms; energetic of bonding; teaching of chemistry; chemical equilibrium in solution; mass spectrometry; spectroscopy; nuclear-magnetic resonance spectroscopy; vibrational spectroscopy; organic physical chemistry; classical and laser-based photo chemistry and photo physics; organic geochemistry; instrumentation and automation in analytical chemistry; analytical separation methods; kinetic methods in analytical chemistry; spot-test methods; membrane-based chemical separation methods; electroanalytical methods; spectroanalytical methods; modeling of semi-amorphous conductors; sample preparation; natural products; environmental chemistry; biological chemistry; colloid chemistry; coordination chemistry; materials chemistry; theoretical chemistry; chemometrics; electrical and magnetic rheology; partial and total syntheses of organic molecules; thermodynamics; thermochemistry.

Achievements: In 2003 over 230 papers were published; 89 master and doctoral thesis and 28 patents.

Facilities: The library of the institute is available for educational and research activities with 13,000 books, 278 periodic journals and access to online services like Web of Science., etc. The institute is formed of 8 laboratories for teaching activities; 45 research laboratories; 17 instrumental rooms, 1 laboratory of small industrial preparation and 2 laboratories for general analytical identification. Instruments for research and teaching activities: 650 PCs, Internet access, nuclear-magnetic resonance spectrometers, mass spectrometers, pentaquadropole mass spectrometer, spectrophotometers, reflective spectrofluorimeter, atomic-emission and absorption spectrometer, X-ray, diffractometers, X-ray fluorescence, X-ray dispersion spectrometer, CHN elemental analyzer, polygraph, polarimeters surface area analyzer, multi volume picnometer, Amino-acid analyzer, potentiostat-galvanostat, calorimeters, instruments for thermal analysis, universal testing equipment, mono and multichannel radiochemistry, counting systems, chromatography and

gel-permeate chromatography, optical microscope, electron microscopes, atomic force microscope.

Future plans: Continue to pursue main research lines: material chemistry, synthetic chemistry, natural products, analytical methodology, theoretical modeling. More emphasis will be placed on material-recycling, environmental chemistry, biochemistry and biotechnological synthetic procedures and low-waste chemical processes.

Cooperation with developing countries: Graduate Ass. Centre Program - Brazil-Argentina (Prof. Munir Skaf)

International Organization: UNICAMP/HAW Hamburg (Germany) - Prof. Matthieu Tubino. UNICAMP/Universidade Piemont Oriental (Italy) - Prof.sa Helois de Oliveira Pastore.

Universidade Estadual Paulista (UNESP) — Instituto de Física Teórica

Head of Institution: Gastão Inacio Krein.

Address: Rua Pamplona 145, 01405-900 São Paulo, SP, Brazil. **Phone:** (+55-11) 3177-9090. **Fax:** (+55-11) 3177-9080. **Email:** diretor@ift.unesp.br. **URL:** www.ift.unesp.br/.

Scientific Fields of Interest: Physics.

Research and training: Research activities: Atomic and molecular physics; Condensed matter physics; Econophysics; Elementary particle physics; Experimental high-energy physics; Field theory; Gravitation and cosmology; Hadron Physics; Mathematical physics; Non-linear physics; Nuclear physics; Statistical physics. Training activities: M. Sc. program; Ph.D program; Post-doctoral program.

Achievements: Over 100 scientific publications per year in international journals with high-impact parameters; M. Sc. and Ph.D theses.

Facilities: Library with more than 60.000 volumes; More than 100 personal computers; 5 workstations for numerical calculations; Two clusters of PC's for large-scale numerical simulations.

Cooperation with developing countries: Univesidad Tecnica Federico Santa Maria, Valparaiso (Chile); JINR, Dubna (Russia).

International Organization: Fermilab - USA; CSSM - University of Adelaide - Australia; University of Montpellier - France; Forschungszentrum Juelich - Germany; Universite Pierre-et-Marie-Curie, Paris 6 - France.

Universidade Estadual Paulista “Julio de Mesquita Filho” — Faculdade de Medicina Veterinaria e Zootécnica (FMVZ)

Head of Institution: Dr. Edson Ramos de Siqueria, Dean.

Address: Campus de Botucatu, Distrito de Rubiao Junior, S/N, 18610-000 Botucatu/SP, Brazil. **Phone:** (+55 14) 3811-6002. **Fax:** (+55 14) 3815-4398.

Email: diretor@fmvz.unesp.br. **URL:** www.fmvz.unesp.br.

Scientific Fields of Interest: Biological Sciences, Environmental Sciences.

Research and training: Veterinary surgery; veterinary clinics; animal reproduction; animal health; veterinary public-health and food safety; evaluation of vegetal and animal origin food; animal performance; nutritional requirements; production and preservation of forage plants.

Achievements: Center for equine sport medicine; tomography service; center for the recovery of wild animals; embryos technology center.

Facilities: Several specific computers for laboratory exams; tomograph; library.

Future plans: Installation of a wireless network (intranet); construction of a new ration factory.

Cooperation with developing countries: Angola, Chile, Colombia, Mexico and Peru.

International Organization: Germany.

Universidade Federal de Minas Gerais — Departamento de Física

Head of Institution: João Antonio Plascak.

Address: Caixa Postal 702, Belo Horizonte, 30161-970 Minas Gerais, Brazil.

Phone: (+55 31) 3499-5662. **Fax:** (+55 31) 3499-5600. **Email:** pla@fisica.ufmg.br. **URL:** www.fisica.ufmg.br.

Scientific Fields of Interest: Physics.

Research and training: Theoretical physics; experimental physics; astrophysics.

Achievements: More than 100 papers in international journals.

Facilities: Library; 4 computer labs; more than 12 labs including: MBE; Mossbauer; X-ray; crystal growth; surface-hyperfine spectroscopy; electronic microscopy; Raman scattering; magnetic resonance; semiconductor processing; infra-red; nanoscopy; surface physics.

Cooperation with developing countries: Colombia, Portugal, Chile

International Organization: USA, England, Germany, France, Spain, Japan.

Universidade Federal de São Paulo (UNIFESP) — Departamento de Biofísica

Head of Institution: Viviane A. Louise Nouailhetas, Director.

Address: Rua Botucatu 862-7º andar, 04023-062 São Paulo, SP, Brazil.

Phone: (+55 11) 5576-4530. **Fax:** (+55 11) 5575-9617. **Email:** vivi@biofis.epm.br. **URL:** www.biof.epm.br/.

Scientific Fields of Interest: Biological Sciences, Chemistry.

Research and training: Chemical, physicochemical and biological study of peptides; enzyme mechanism; electrophysiology; cell-culture; molecular-biology; transgenic animal modeling; polymer chemistry and biotechnological application; blood pressure regulation; genetic and immuno-genetic therapy.

Achievements: Publishes about 70 papers in refereed international journals and submits about 3 patents a year. The department produces peptides, polymers, enzyme substrates and oligonucleotides for the community.

Facilities: Four Automatic peptide synthesizers; Amino-acid analyzers; Oligonucleotide synthesizer; Automatic DNA sequencer; Spectrofluorimeters; Spectrophotometers; electrophysiology equipment; HPLC; Silicon graphic station; 40 microcomputers (network). LC/Mass spectrometry (ion spray), maldi-Tofl mass spectrometry; circular dichroism; FT-IR; cyto-sensor equipment.

Future plans: Follow-up with researchers' projects in many fields from chemistry to physical chemistry, biophysics, biochemistry and pharmacology.

Cooperation with developing countries: Some joint projects are currently in progress with developing countries mainly from South America.

International Organization: Joint projects also in progress with developing countries outside South America.

Universidade Federal de Uberlândia — Instituto de Biología (IB)

Head of Institution: Dr. Jimi Naoki Nakajima, Director.

Address: Campus Umarama, BI 2D, SI 28, Uberlândia, MG, 38400-902, Brazil.

Phone: (+55 34) 3218-2243. **Fax:** (+55 34) 3218-2243. **Email:** inbio@ufu.br. **URL:** www.ib.ufu.br.

Scientific Fields of Interest: Biological Sciences, Environmental Sciences.

Research and training: Tropical botany; tropical ecology; tropical zoology; education.

Achievements: Papers in scientific journals.

Facilities: 10 labs with equipment and computers; Herbarium Uberlandense (HUFU); 1 field station with Savanna formation; main library.

Future plans: Construction of one building for scientific collections (Botany and zoology).

Cooperation with developing countries: Cooperation with other research institutes (planned).

Universidade Federal do Rio de Janeiro (UFRJ) — Instituto de Bioquímica Médica (IBqM)

Head of Institution: Dr. Franklin David Rumjanek.

Address: CEP 21941-590, Bauhinia 400, Bloco E sala 22, Rio de Janeiro, RJ, Brazil. **Phone:** (+55 21) 2562-6789. **Fax:** (+55 21) 2270-8647. **Email:** franklin@bioqmed.ufrj.br. **URL:** www.bioqmed.ufrj.br/bioquimica/.

Scientific Fields of Interest: Biological Sciences.

Research and training: Research: cell biochemistry and immunology; energy transduction in biological systems; tumor immunology and multidrug resistance; connective tissue macro-molecules; protein biophysical chemistry, muscle contraction and cell-virus interaction; Structural biology, immunopharmacology, ectoenzymes; biochemistry of toxins; insect biochemistry and hematophagy; plant molecular-biology; biochemistry of *S. Mansoni*; emerging infectious diseases; protein synthesis. Training: M.Sc. and Ph.D. in biological chemistry; education in bioscience: summer courses for High School teachers and students.

Achievements: 70 full papers per year published in international journals: average impact index 4.0. Since 1988 - 150 Doctoral thesis and 240 M.Sc theses defended.

Facilities: 22 research laboratories with equipment for cellular macromolecular and DNA technologies. Computer facilities, silicon graphics stations, spectrofluorometers, HPLCs, protein-peptide sequanators, fluorescence microscope, ultra centrifuges, circular dichroism, NMR spectrometers.

Future plans: Continue with main research and training listed above; Development of genome and post-genome technologies with structural approaches. The institute intends to develop X-ray crystallography studies in the coming years. Expand research field in cellular biology; Hire new professors; Strengthen links with industry.

Cooperation with developing countries: Collaboration with countries such as Korea, Argentina, Uruguay, Venezuela, Nigeria, Chile and Mexico.

International Organization: Joint research programs and scientific exchange with institutes and centres in the European Union - Italy, Germany, France, Spain, UK, Portugal, US & Canada. Grants from the Howard Hughes International Scholars' program.

Universidade Federal do Rio de Janeiro (UFRJ) — Instituto de Macromoléculas (IMA)

Head of Institution: Ailton de Souza Gomes.

Address: Centro de Tecnologia, BL.J Ilha do Fundao, Caixa Postal 68525, Rio de Janeiro, 21945 RJ, Brazil. **Phone:** (+55 21) 2562-7031. **Fax:** (+55 21) 2270-1317. **Email:** asgomes@ima.ufrj.br. **URL:** www.ima.ufrj.br/.

Scientific Fields of Interest: Chemistry.

Research and training: Modification of natural and synthetic polymers; Ziegler-Natta catalyst polymerization; Synthesis of ion-exchange resins; Synthesis of graft copolymers; Cationic and anionic polymerization; Polymer-solvent interaction; Hydrosoluble polymers; Polymer blends; Rheology of polymers; Elastomeric composites; Liquid crystal polymers; Industrial polymers identification; Recycling of plastic waste; Collaboration with the Brazilian Polymer industry.

Achievements: More than 150 M.Sc and 105 Ph.D. degrees concluded. Several research programmes for technology development for the Brazilian polymer industry, particularly the adaptation of foreign technology to Brazilian conditions.

Facilities: IMA has all facilities to conduct research in polymer science and technology.

Future plans: One plan is the expansion of IMA's building. In relation to this expansion, IMA is seeking sources of financing, including international agencies. IMA also intends to strengthen its international ties to enhance the quality of its research by interchange of professionals.

Cooperation with developing countries: IMA has an active scientific exchange with universities in Chile and Argentina, in spite of the fact that there are no formal agreements between the Institutions. Cuba and Colombia are also part of an exchange program.

International Organization: IMA has a scientific exchange cooperation with GKSS, Portugal, and Japan.

Burkina Faso

Centre National de la Recherche Scientifique et Technologique (CNRST)

Head of Institution: Prof. Basile Laetare Guissou.

Address: BP 7192 or 7047, Ouagadougou, Burkina Faso. **Phone:** (+226) 5032-4504, 5032-4648. **Fax:** (+226) 5031-5003. **Email:** dg.cnrst@fasonet.bf. **URL:** www.cnrst.bf.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences, Chemistry, Earth Sciences, Engineering, Environmental Sciences.

Research and training: Plant crop production and agronomy; animal production; forestry research; natural-resource management and production systems; macro-economics and commodity economics; science of education; linguistics and national languages; sciences of population; socio-economic indicators and anthropology of development; law, political sciences and administration; traditional medicine and pharmacopoeia; biomedical research; energy; natural substances; food processing; agricultural mechanization.

Achievements: Creation and accommodation of improved varieties, development of disease-resistant varieties (rice, maize...); Development of water saving management practices at the level of parcel; Diseases control of animals; Development of fertilization and of soils fertility systems; Studies of cotton tree; The production of Burkina Faso socio-linguistic atlas, identifying, locating and classifying languages; Edition of one book relating the history of Ouagadougou 's town; Databank of sounds archives and visual archives for scientific exploitation; Medicines for treatment of hepatic diseases from medicinal plants and other prototypes based on plants; Results of studies on plants in relation to infectious pathologies, and to metabolic diseases; Results of ethno-botanical studies, on infections and parasitic diseases (paludism,...), on infectious diseases (AIDS, ...); Implementation and trials of photovoltaic equipments; adaptation of burners for kitchens; An automatic cooker named Bitatoré; Knowledge of potentialities in natural substances; Valorization of non edible plant oils; Dispollution of industrial waste-waters; Improvement of the technology of local beer from sorghum; Development of farming tools.

Facilities: The CNRST has a relatively weak computer park; the centre has five field stations defined to analyze the specific constraints of each region delimited on the basis of climatic, pedologic and socio-economic criteria and to precise some of its potentialities; Each field station has laboratories to analyze soil, water and plants. Existence of experimental stations for the cultivation of medical plants and for the production of vegetal raw materials; a pharmaceutical unit for the production of medicines from medicinal plants and other prototypes based on plants. The CNRST has documentary funds of which 25% is computerized: 50,000 books and booklets; 600 periodicals; 1,100 microfiles; 400 national archives. Publication of Science et Technique: a scientific biannual

review in two series: Natural sciences and Social and Human sciences. Publication of a popularizing magazine Eureka.

Future plans: The CNRST intends to vary his technical and financial partnership through Africa and the rest of the world; elaborating a new version of a strategic plan for scientific research; digitalization of all documentary funds in his library and put them online; coordination of all research activities to achieve by others research institutions in Burkina Faso.

Cooperation with developing countries: Cooperation with Universities and Research centres of Senegal; Agronomy Institute Hassan II of Morocco; Universities and Research centres of Ghana; Universities of Togo, Benin, Ivory Coast.

International Organization: Cooperation arrangements with Universities, Research centres (IRD, CIRAD) of France; Universities (Uppsala, Um'a) of Sweden (SIDA/SAREC); Universities of Netherlands; Université Libre de Bruxelles, Belgium; Universities of Canada and USA; Universities in Qatar, Cuba, etc.

Centre National de Semences Forestieres (CNSF)

Head of Institution: Dr. Moussa Ouedraogo, Director.

Address: 01 BP 2682, Ouagadougou, Burkina Faso. **Phone:** (+226) 5035-6111, 5035-8013. **Fax:** (+226) 5036-6110. **Email:** cnsf@fasonet.bf. **URL:** www.cnsf.gov.bf.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences, Environmental Sciences, Mathematics.

Research and training: Tree improvement and forest genetic-resource conservation; silviculture, ecology and taxonomy; seed technology; training in forest management and biodiversity conservation, seed handling and processing, seed storage and plant propagation techniques; distribution of research results.

Achievements: Inventory mapping & characterization of seed stands and natural population of trees; publications related to species, provenance and progeny trials; publications related to genetic structure of tree populations, reproductive biology, seed physiology, and socio-economic aspects of trees; manual of tree propagation methods and techniques; establishment of a herbarium, an arboretum, germplasm conservation.

Facilities: 1 seed laboratory with rather old material; 1 population genetics laboratory for isozym studies; 5 Nurseries and 5 experimental stations; 8 PCs; Library; Transport vehicles.

Future plans: Develop capacity in research and training for both partners and staff; increase office capacity (space and computers); Create the Sahelian seed bank and manage it.

Cooperation with developing countries: CNSF has already contacts with many research institutes in Africa such as EIER in Mali; INRAN in Niger;

PRONASEF in Senegal. We are planning to work in collaboration with any National Tree Seed Centre in Africa.

International Organization: Danida Forest Seed Center, Denmark; Royal Botanic Gardens, Kew UK; European Union (INCO Project); International plant Genetic Resources Institute (IPGRI); Japan Tree- Breeding Center.

Centre Regional pour l'Eau Potable et l'Assainissement (CREPA)

Head of Institution: Dr. Cheick tidiiane Tandja.

Address: 03 BP 7112, Ouagadougou, Burkina Faso. **Phone:** (+226) 5036-6210/11. **Fax:** (+226) 5036-6208. **Email:** reseaucrepa@fasonet.bf. **URL:** www.reseaucrepa.org.

Scientific Fields of Interest: Engineering, Environmental Sciences.

Research and training: CREPA covers 17 countries of West and Central Africa. It has some operational representatives in 15 countries. The core activities of CREPA's network are research and capacity-building activities that can be lined as follow: Development of training packages and pedagogical material related to water supply, hygiene and sanitation; Participatory action research; Communication, social intermediation, information and documentation; Capacity-building and Human-resources development; Funding mechanisms in water and sanitation sector; Community water, hygiene, and sanitation projects management; Management and treatment of solid and liquid waste; Hygiene education and participatory approaches: SARAR/PHAST, Hygiene and sanitation promotion at schools, MARP...; Water treatment; Studies of legal and institutional frameworks; Gender issues; Elaboration of strategic sanitation plans and communal development plans; Runoff water in urban areas; Institutional studies: Partnership between the public and the private-sectors; Geographic Information System GIS.

Achievements: Ecological sanitation projects going on in 10 countries of West and Central Africa; Effects of urine as fertilizer in soudano-sahelien areas shown; Promotion of school sanitation and hygiene methods and approaches developed and currently used; Legal and institutional aspects of waste sludge management developed for West Africa; Research outputs on small bore sewage system in urban poor areas.

Facilities: Only at CREPA Headquarter (like the above mentioned number of staff): 1 library of 6000 books, 200 video tapes, 75 DVDs on CREPA activities; 28 desktop computers, 14 laptops; 9 printers; 1 scanning machine; 3 photocopy machines; 1 beamer; 1 retro projector; 2 field cars pick-up 4x4; 9 ecosan experimental sites in West Africa; Joint laboratory with the Ministry of Environment and Belgium Government.

Future plans: Increase research on appropriate and low-cost water supply and sanitation technologies for poor populations; increase research in local

agencies and communities based on organization capacity-building on integrated and sustainable aspects of waste and water management.

International Organization: DDC, SIDA.

**Institut Supérieur Inter-Etats de formation et de
recherche dans les domaines d l'Eau, l'Energie,
l'Environnement et les Infrastructures (EIER-ETSHER
Group)**

Head of Institution: Dr. Paul Ginies, Director.

Address: BP 594, Ouagadougou 01, Burkina Faso. **Phone:** (+226 50) 302-053.

Fax: (+226 50) 312-724. **Email:** gee@eieretsher.org. **URL:** www.eieretsher.org.

Scientific Fields of Interest: Engineering.

Research and training: The Groupe EIER-ETSHER is an inter-state higher-education and research institute for water, energy, environment and infrastructures, based in Burkina Faso's capital, Ouagadougou. Created 35 years ago by 14 French-speaking African states (Benin, Burkina Faso, Cameroun, Centrafrique, Congo, Côte d'Ivoire, Gabon, Guinée, Mali, Mauritanie, Niger, Sénégal, Tchad, Togo) the school has since graduated 805 engineers and 1114 technicians, and graduated 787 DESS (a diploma in specialized high-level studies). The GROUPE EIER-ETSHER also offers 7,000 days of continuing education per year as well as engineering consultancies, in close collaboration with the private-sector. In collaboration with both north and south institutions, such as IRD, CIRAD and EPFL, it undertakes research in the areas of water, energy and environment. Since September 2005 the Groupe EIER-ETSHER is a UEMOA recognized Centre of Excellence. The Groupe EIER-ETSHER already avails itself of a high-level technology platform (12,000 sq.m of built space), which comprises classrooms, auditoriums, laboratories, experimental sites, and boarding for over 320 students. It counts about 40 permanent teaching and research fellows from over 16 countries and about 15 associate professors. Its two campuses have the status of a diplomatic enclave. With its location in the Burkina Faso's capital it benefits from a favorable environment, enhanced by the presence of many regional or sub-regional organizations, such as UEMOA, Conseil Africain et Malagache pour l'Enseignement Supérieur (CAMES) and many specialized inter state organizations such as the Comité Permanent Inter Etats de Lutte contre la Sécheresse au Sahel (CILSS, etc.). Training Activities: License (Bachelor): Water and environment sciences and technology; water sanitation and land reclamation; infrastructures and equipment. Master of engineering: Water and environment engineering; water, land reclamation and facilities; energy and sustainable development. Specialized Post-graduate-programmes: Sanitary engineering, water-resources management and water for agriculture; energy and refrigeration; applied computing and GIS. Several multidisciplinary research teams are currently working on topics such as: biological and photo-chemical

purification of waste-water and its recycling in urban agriculture; multi-disciplinary analysis of the African monsoon and tropical hydrology; impact of climatic changes on water-resources in the Sahara eco-hydrology and management of water-resources and watersheds; water eco-systems and population health; dynamics of water and nutrients in hydro-agricultural development under the Saharan climate.

Achievements: For three (3) decades, the strategy of the EIER-ETSHER Group has been to contribute to the development of knowledge and the emergence of technological innovations in the Water and Environment sectors, in the service of the development of African States. It has adopted a partnership approach: with professionals and end-users to identify, organize and conduct its research programs ; and with training and research institutions to pool their resources and share the results. The evaluation and dissemination of research findings constitute an integral part of its approach and research programs. The GROUPE EIER-ETSHER disseminates its findings through its half-yearly journal *Sud Sciences et Technologies* (Southern Science and Technologies), conferences and scientific workshops it organizes, articles in international journals, and attendance to international conferences. The GROUPE EIER-ETSHER assists development actors in the implementation of its technological innovations. Thus the Groupe EIER-ETSHER has worked with water companies on innovative technologies for water supply to low-income populations; with municipalities for the treatment of waste-water through recycling; with agricultural cooperatives on water management, etc. As of today, the GROUPE EIER-ETSHER has some fifteen well-equipped laboratories and experimental sites to support training and research activities in water and environment issues. It offers a top-notch scientific environment to researchers and foreign students in Africa who participate to high-level scientific activities on topics relevant to the Sub-Saharan African context.

Facilities: Laboratories and technical buildings: Hydraulics laboratory (2); Civil Engineering laboratory (2); Photovoltaics laboratory; Electrical Engineering and Electro-Technology laboratory (2) Refrigeration laboratory; Water and waste-water-quality laboratory; Microbiological laboratory; Laboratory for Soil Mechanics; Technical facilities and workshops; Water and waste-water treatment plant. Documentary resources: A considerable specialized collection is available within an Information and Documentation Center (IDC). The current collection which already boasts 24 500 references, is composed of a unique and historical collection of 14 500 references on research works on Water in West Africa conducted during more than 30 years by the now-defunct Inter-African Committee of Hydraulic Studies (1964-1994). It is supplemented with 10, 0000 references on Water, the Environment, Energy, Infrastructures, Groupe EIER-ETSHER Research works, students' theses, and about fifty specialized reviews. The catalogue is accessible on the Internet.

Future plans: Specific Objective 1 : To contribute more effectively to the economic development of member states in water, environment and infrastructures. Water, environment, energy and public works are the main priorities in the integration and development policies for the whole of Africa, and

sub-regional organizations (ECOWAS, WAEMU, CEAC, SADEC) are including them in their various operations. The management of these actions requires qualified Human-resources in sufficient numbers, and whose skills match the labor market needs. The GROUPE EIER-ETSHER's new ambition is to be able to train enough women and men with the capacity to meet the challenge of development. To that end, the Group intends to turn to ICTs and to give to a greater number of students a flexible and varied access to its international high-level training, taking into account the international evolution in education, i.e. the LMD system (license, master, doctorate). Specific Objective 2 : To increase the training and research offered by GROUPE EIER-ETSHER by improving its adaptation to private-sector and labor market needs. The above mentioned program developments will lead to a significant increase in the number of graduates, whose professional integration through internships during school cycle will be continuously stressed. They indeed allow for a dynamic and fruitful relationship with the private-sector that is maintained by a specific Department within GROUPE EIER-ETSHER, the Engineering and Private-sector Support Department. Through the CEFOC, GROUPE EIER-ETSHER's specialized centre, the continuing education program has experienced a significant expansion, and enjoyed international recognition. It responds to an increasing demand that arise from deficiencies in initial training and at the same time seeks to adapt Human-resources to the emerging needs of the private and public-sectors. The development of continuing education activities is a cornerstone of the strategy that has been devised for the whole of the GROUPE EIER-ETSHER. Specific Objective 3: To set up a real Inter African Institute for Water, Energy, Environment and Infrastructures. The principle of a new legal status has been adopted, which should open the way to a real re-founding of the GROUPE EIER-ETSHER, with the aim of creating a Science and Technology Institute. The Council of Ministers has agreed to submit at the end of 2006 a new international convention for signature by the current and future member states; it will establish the transformations that are in progress and endorse the membership of the new member states. These changes will enable the GROUPE EIER-ETSHER to become a crucial element in a great initiative proposed to serve Africa through knowledge diffusion within the framework of the African Institute of Science and Technology. The GROUPE EIER-ETSHER current juridical situation and its land and real estate assets give it the means for this development. The two campuses will be strengthened by undergoing a specialization. The Government of Burkina Faso has given its consent for the expansions required to create a high-level international campus.

Cooperation with developing countries: The GROUPE EIER-ETSHER is guided by a Council of ministers which establishes the main strategic objectives and acts as a Board of Directors. This Council does not intervene in the day to day management or in pedagogical issues and scientific programs; these are dealt with by scientific and pedagogical councils comprised of outside personalities of international renown. The EEB is being supported by cooperation partners that contribute long-term financing in various forms, thus securing some stability for the institution and adapting to its evolving qualitative

needs. Among the partners are: Coopération Française, Agence Universitaire de la Francophonie, Coopération Suisse, and the Danish (Danida), German (DAAD) and UEMOA cooperation. GROUPE EIER-ETSHER and its personnel in Burkina Faso benefit from a diplomatic status and are thus immune to the economic and political changes occurring in the member states. Education and research programs in partnership with Southern Institutions: Safe drinking water with University of Bamako; Waste-water with Ouagadougou, Dakar and Niamey city councils; Hydrology with Agrihmet, University of Dakar, CNRST Burkina; Water management and planning with GWP West Africa, UCRE/ECOWAS.

International Organization: Agence Française de Développement (AFD); Agence Universitaire de la Francophonie (AUF); Commission Européenne (CE); Communauté Économique des États d'Afrique de l'Ouest (CEDEAO); Office Allemand d'Échanges Universitaires (DAAD); Danish International Development Agency (DANIDA); Ministère des Affaires Étrangères (MAE); Direction du développement et de la Coopération (DDC); Food and Agriculture Organisation (FAO); Institut de la Banque Mondiale (IBM); Institut de l'Énergie et de l'Environnement de la Francophonie (IEPF); Organisation Météorologique Mondiale (WMO); Union Économique et Monétaire Ouest Africaine (UEMOA).

Cameroon

National Advanced Polytechnic School (ENSP)

Head of Institution: Mr. Awono Onana, Director.

Address: PO Box 8390 Yaounde, Cameroon. **Phone:** (+237) 222-4547. **Fax:** (+237) 222-4547. **Email:** charles_awono@yahoo.fr.

Scientific Fields of Interest: Engineering.

Research and training: Material science; systems analysis and modeling; image processing; remote-sensing and GIS; information systems and multimedia systems; telecommunication.

Achievements: About 100 publications in the past 2 years; an image processing software made by the team of the electronic and signal processing laboratory; a distance learning platform realized by the team of the computer systems and multimedia laboratory; an antenna design software made by the team of the electronic and signal processing laboratory.

Facilities: 100 computers; one library; an Internet connection.

Future plans: Construction of new rooms to accommodate staff members and training engineers per year.

International Organization: Cooperation agreements with: INSA de Lyon (France); Université de Sherbrooke (Canada); Ecole Polytechnique Fédérale de Lausanne (Switzerland); Université de Marne-la-Valle (France); Université de Bourgogne (France) and also World Bank (ppte project). Planned: Fonds Francophone des Inforoutes; Agence Universitaire de la Francophonie; Commonwealth.

University of Buea — Faculty of Science — Biotechnology Unit

Head of Institution: Vincent P. K. Titanji, Coordinator.

Address: Box 63, Buea, SW Province, Cameroon. **Phone:** (+237) 775-6389. **Fax:** (+237) 332-2272. **Email:** vpktitanji@yahoo.co.uk. **URL:** www.ub.cm.

Scientific Fields of Interest: Biological Sciences, Medical Sciences.

Research and training: Research: application of molecular-biology techniques to tropical diseases including malaria, onchocerciasis, tuberculosis and rickettsiae with a view to developing diagnostic tests, candidate vaccines and drug targets; investigation of medicinal plants for new medicines for the treatment of malaria, river blindness, bacterial infections, etc. Training: M.Sc biochemistry (1 year course + 1 year thesis research for a total of 2 years). Ph.D. biochemistry (3-5 years with first year dedicated to course work). Short courses in biotechnology and bio-informatics.

Achievements: Discovery and cloning of new genes from *O. Volvulus* for testing as candidate drugs against river blindness; development of molecular

diagnostic tests for river blindness and tuberculosis; discovery and cloning of a dominant antigen involved in the protective immunity against malaria; isolation and characterization of new plant products for the treatment of river blindness; discovery and characterization of stage-specific phospho-proteins and molecular markers of maturation in *Onchocerca Volvulus*, the causative agent of river blindness.

Facilities: ELISA reader; centrifuges; CO₂ incubator; laminar flow hoods; precision balances; inverted microscope; UV trans-illuminator; bacteriologic incubators; cell harvester; freezer (-20 deg.); beta counter; fluorescence microscope; hybridization incubator; dissecting microscope; Beckman DU 500 spectrophotometer; 3 laboratory rooms and one animal house.

Future plans: for Onchocerciasis: To characterize further the identified vaccine relevant antigens (OV47, OVL3.CI) by cellular assays and vaccination/challenge experiments in mice; to identify and further test the efficacy and toxicity of the plant filaricides identified in 2001-2004; to clone and characterize as drug targets, adult worm-specific antigens that have been identified with monoclonal anti-bodies developed in our group in 2001-2004; to finalize the formatting of both antigen and antibody capture tests developed in our lab For Malaria: To express and characterize the newly identified malaria antigens (including UB5) for potential protective immunity; to identify by differential screening of *P. falciparum* DNA libraries additional antigens recognized by semi-immune subjects; to isolate and characterize new anti-malarials from medicinal plants and their efficacy and safety in mouse-models.

Cooperation with developing countries: Prof. Tommie Victor, Dept. of Microbiology, Stellenbosch Univ., South Africa to train our researchers on molecular techniques; shared research prospects on malaria and tuberculosis with Prof. Rose Leke and Prof. Wilfred Mbacham, researchers at the Biotechnology Center, Nkolbisson, Yaounde; Collaboration with Prof. Pierre Tane, Dept. of Chemistry, Univ. of Dschang on the study of medicinal plants.

International Organization: Prof. Salam Al-Karadaghi, Univ. of Lund, Sweden; Prof. Anders Liljas, Univ. of Lund, Sweden; Prof. Klavs Berzins, Univ. of Stockholm, Sweden; Prof. Kjell Olov Gronvik, SVA, Uppsala, Sweden; Prof. Lars Rask, MBC, Uppsala, Sweden; Prof. JE Bradley, Univ. Of Nottingham, UK ; Prof. Richard Lucius, Humboldt Univ. Germany.

Chile

Centro de Estudios Científicos (CECS)

Head of Institution: Claudio Bunster, Director.

Address: Avda. Arturo Prat 514, Casilla 1469, Valdivia, Chile. **Phone:** (+56 63) 234-550. **Fax:** (+56 63) 234-515. **Email:** info@cecs.cl. **URL:** www.cecs.cl/.

Scientific Fields of Interest: Biological Sciences, Earth Sciences, Environmental Sciences, Physics.

Research and training: Structure and function of ion-channels; epithelial cell physiology; neurobiology of learning and memory; cell death; brain glucose transport; functional genomics; volcano and glacier interaction; study of ice-cores in the Central Andes and Patagonia; development of geophysical and geodetic methods to study glaciers; cosmological constant problem; black holes; extensions of gravitation theory; duality between super gravity and gauge theories.

Achievements: Airborne exploration of glaciers in West Antarctica (2002); ground exploration of 1000 km. track between Patriot Hills and the South Pole (2004); exploration of the Ellsworth sub-glacier lake in Antarctica (2006); advanced in the relation between structure and function of ion-channels; identification of the molecular mechanism for temperature-sensing calcium channels; identification of the channel responsible for volume regulation in epithelial cells; discovery of acute mechanisms for the coupling between brain-activity and brain metabolism; classical and quantum theory of constrained Hamiltonian systems; novel black hole solutions in diverse dimensions, including the BTZ solution; Chem-Simon super gravity theories; novel mechanism for the neutralization of the cosmological constant.

Facilities: Electrophysiology lab; lab for the study of brain-activity in drosophilae; lab for the study of membranes; facility for production of genetically modified mice; lab for ice penetrating radars and field equipment for ground work in glaciers; cryostat; phospho-imager; centrifuges; fluorescence imaging facility; computers; small libraries.

Future plans: Moderate growth and consolidation of established lines of research.

Cooperation with developing countries: Agreements with different universities in Chile, Argentina and Uruguay; exchange of researchers within the region.

International Organization: Collaborations with NASA for ice-exploration; exchange of researchers in Europe and in the US; agreement with ICTP through the office of external activities to train researchers from less- developed countries in South America.

**Pontificia Universidad Católica de Chile — Facultad de
Ciencias Biológicas — Departamento de Biología
Celular y Molecular**

Head of Institution: Dr. Enrique Brandan, Chairman.

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www.bio.puc.cl/departamentos/home.asp?id_section=75.

Scientific Fields of Interest: Biological Sciences.

Research and training: The Department of Cell and Molecular-biology is devoted to research and both graduate and under-graduate teaching. The research is orientated mainly to the understanding of pathologies at the cellular and molecular level. As a result of this research in Molecular and Cellular Biology, the Department is focused to relate the basic principles of cellular function to field of Biomedicine. Specific areas of research focus on neurobiology, traffic of proteins in polarized cells, developmental biology, human genetics, cell ultrastructure, transcription and its regulation, cell metabolism, cell differentiation, tumor biology, cytogenetics, apoptosis and the study of stem-cells. Particularly, the Department is interested in understanding neuro-degenerative diseases, skeletal muscle dystrophies, fibrotic diseases, metabolic diseases, cancer and hereditary diseases. The approach is to carry out cell and molecular biological analyses in relation to the intact cell and how this state is affected in certain pathologies. This research will continue and improve the mission of increasing the Human-resources for science in Chile. In a joint effort with the Departmental Ph.D program, a more biomedical-oriented training approach will be fostered. To achieve the same end, further collaborative programs with members of the Faculty of Medicine will be promoted.

Achievements: At present, it is organized into the Center FONDAPE Cell Regulation and Pathology: Joaquin V. Luco, and the laboratories of Developmental Biology, Cell Differentiation and Pathology, Biochemical Pharmacology, Human Molecular Genetics, Molecular Nutrition and the Units of Cell Biochemistry and Genetics and, Cell Function and Structure. The Department is also associated with the Millennium Institute in Basic and Fundamental Biology which incorporates investigators from several Departments of our Faculty, as well as from another university and a private research institute.

Facilities: Tissue-cultures rooms; 40 computers; Several Well-equipped laboratories; Confocal microscope.

Future plans: In a joint effort with the Departmental Ph.D program, a more biomedical-oriented training approach will be fostered. To achieve the same end, further collaborative programs with members of the Faculty of Medicine will be promoted; Stem-cell Program.

Cooperation with developing countries: The academic staffs are members of several Latin American scientific societies and attend and organize several meetings.

International Organization: Grants from International agencies: Howard Hughes Medical Institute; Muscular Dystrophy Association; Fogarty International Research Collaboration Award (FIRCA); Ara Parsogian Medical Research Foundation.

**Pontificia Universidad Catolica de Chile (PUC) —
Facultad de Ciencias Biológicas — Centro de
Regulación y Patalogías ‘Joaquín V. Luco’ (FONDAP-
CRCP)**

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Scientific Fields of Interest: Biological Sciences.

Research and training: Role of the Wnt Signaling Pathway in Synaptic Function and Neurodegenerative Diseases (Dr. Nibaldo C. Inestrosa); Function of Proteoglycans in myogenesis and fibrosis (Dr. Enrique Brandan); Intracellular protein traffic: molecular mechanisms, functional implications and disease (Dr. Alfonso González); Role of nuclear receptors PPARs in neural cell function. Identity of PPARs as physiological ligands (Dr. Miguel Bronfman); Role of plasma membrane nucleotide receptors (Dr. Juan Pablo Huidobro-Toro); Studies on Early development of Xenopus (Dr. Juan Larra'n); Traffic of LRP Receptors (Dra. Mar'a Paz Marzolo); Traffic of Neurotrophin-related Receptors (Dra. Francisca Bronfman). To increase the quality and quantity of Human-resources qualified in the field of biological sciences. Organize scientific courses, conferences and meetings aimed at disseminating knowledge and facilitating contacts between scientists still in their formative years and those at the frontline of biological research, of either national or international origin.

Achievements: Intracellular protein traffic: molecular mechanisms, functional implications and disease (Dr. Alfonso González); Assignment of the site of function of the AP1B adaptor complex to a perinuclear compartment crossroads of the post-TGN exocytic and recycling pathways; Novel cross-talks between different signaling systems (PA and CAMP/PKA; P2Y1 receptor) regulates EGFR function; Function of proteoglycans in myogenesis and fibrosis (Dr. Enrique Brandan); A novel signaling mechanism for betaglycan, which is independent of the canonical TGF-beta signal pathway although it involves TGF-beta receptors and takes place through p38 pathways; Electrical activity can modulate the responsiveness to TGF- β during skeletal muscle differentiation by regulating the level of the TGF- β RI levels on the cell surface; The endocytic receptor for decorin is LRP; Role of plasma membrane

nucleotide receptors (Dr. Juan Pablo Huidobro-Toro); Heavy metal interactions with P2X2 receptors; identification of Cys430 as a novel site related to mercury sensitivity and the cell oxido-redox potential. Identification of critical extracellular histidines of the P2X2 and likely P2X7 receptors, involved in trace metal modulation; Role of P2Y1 receptors in cell proliferation; trans activation of EGF receptors and identification of the signaling cascade involved; Role of peroxisome proliferators activated receptors (PPARs) in neural cell function. Identity of PPARs physiological ligands (Dr. Miguel Bronfman); PPARs in neuronal systems. PPAR gamma is a novel target of the NGF TrkA-mediated neuronal cell survival and differentiating pathway in PC12 neuronal cells. The Bcl-2 anti-apoptotic protein is a target gene of PPAR gamma_ These results may have important implications in the pharmacological treatment of neurodegenerative disorders; Role of the Wnt Signaling Pathway in Synaptic Function and Neurodegenerative Diseases (Dr. Nibaldo C. Inestrosa); Several molecules, including trolox, 17-__estradiol, PPAR_ agonists and IBU-PO (a drug that combines an anti-inflammatory drug (Ibuprofen) and a cholinesterase inhibitor), prevent Abeta-neurotoxicity by interaction with canonical Wnt signaling; Peroxisomal proliferation protects against Abeta _neurotoxicity by activating the Wnt pathway; Two different Wnt ligands induce presynaptic and postsynaptic differentiation, in fact, a canonical ligand (Wnt-7a) controls the presynaptic region and a non-canonical ligand (Wnt-5a) controls the postsynaptic region; Studies on Early development of Xenopus (Dr. Juan Larrain); Identified and characterize two novel molecules involved in early development of Xenopus embryos; Role of xSyndecan-1 as a maternal determinant in Xenopus oocytes; Identification of novel molecules that interact with Shh; Traffic of LRP Receptors (Dra. Maria Paz Marzolo); Endocytosis of ApoER2 is clathrin-dependent, uses the adaptor protein Dab2 and is independent of the lipid rafts association of the receptor; Role of apoER2 in APP processing and Abeta production; LRP contains multiple sorting motifs, acting at the TGN and in recycling compartments and that are decoded equally in epithelial cells and neurons; Traffic of Neurotrophin-related Receptors (Dra. Francisca Bronfman); The trafficking and processing of the p75 Neurotrophin Receptor; The response of Cholinergic neurons to axotomy and delayed infusion with NGF.

Facilities: The Faculty of Biological Sciences is formed by 53 Scientist, 60 associated researchers and 120 technical and administrative Staff, within 10.000 sq.m of laboratories containing 1000 sq.m of animal housing, including primates. The laboratories that conform the FONDAP Center are in 1900 sq.m, including facilities for cell-culture (4 independent rooms), general equipment for Molecular-biology Research and microscopy in all the laboratories and a central facility for Confocal microscopy. Three of the FONDAP laboratories have HPLC and ultracentrifugation facilities, and one of them Gas Chromatography with Mass Detection. The Center has a confocal microscope. The Center has also access to the central Faculty facilities for electron microscopy and for DNA sequencing. The equipment of the center is worth about US\$1.000.000 in reposicion cost; The different Center programs interact, mainly informally, by

interchange of protocol, reagents, use of common equipment, including ultracentrifuges, cryostat, Confocal Microscope localized at the CRCP Direction. **Future plans:** A Latino American facility for research and training in *C. elegans*. In 2005, a graduate student from Argentine spent a month at the facility working on Circadian Rhythm, and leader Dr. Minniti travel to Buenos Aires for training activities; Collaboration with the Telethon-Chile in the analysis of samples from their patients. An agreement between Telethon Chile (Soc. Pro Ayuda del Ni-o Lisiado) and the Catholic University have been established. The Telethon together with the Faculty of Biological Sciences and Medicine of the Catholic University has established an agreement which main objective is to develop a joint research project in patients with muscular diseases. Funding will be shared by patients from Telethon Chile, research projects from Professors of the Faculties of Biological Sciences and Medicine and the Center for Cell Regulation and Pathology (CRCP), located at the faculty of Biological Sciences. The CRCP Center and the Faculty of Medicine will have access to the biopsies from the patients to conduct basic research in diverse muscular dystrophies to understand the cellular and molecular bases of skeletal muscle dystrophies and fibrosis. The main researchers are Dra. Jenny Holmgren from Telethon Chile, Dr. Ricardo Fadic from Faculty of Medicine and Dr. Enrique Brandan from the CRCP Center; The Center will publish some general books on health and social problems. A book on Alzheimer«s for the lay people, is in preparation and it is expected to be published during the first semester of 2006; Dr. Mar'a Paz Marzolo, will organize the second semester of 2006 the International Symposium on Lipoprotein Receptors: From Cell Biology to Disease; Seminars: A weekly seminar and a monthly CRCP-MIFAB seminar, attracted between 40-50 participants from the major Universities of Santiago, Valparaiso, and Concepción; The web page was finally uploaded and it is available at URL (www.fondap-crcp.cl).

Cooperation with developing countries: The different Center programs interact, mainly informally, by interchange of protocol, reagents, use of common equipment, including ultracentrifuges, cryostat, Confocal Microscope localized at the CRCP Direction. (2) More formally at a weekly Seminar on research activities of the different Center programs (3) Numerous Inter-Program Publications generated during the reported period are available upon request.

International Organization: International Networking: With Dr. Ernest Arenas from the Molecular Neurobiology Laboratory of the Karolinska Institute, Stockholm, Sweden. Dr. Arenas spend a week in Chile giving talks and an initial agreement to share students and post-docs with our Center was obtained; With Dr. Walter Durán from the UMDNJ - New Jersey Medical School, Newark, NJ, USA, post-doctoral stay of Fabiola Sánchez (Ph.D with Dr. Alfonso González, Catholic University of Chile), during a couple of years. A manuscript of Fabiola's work is being corrected by Drs. Durán and González; With Dr. Francisco Barrantes from the Instituto de Bioquímica de Bahía Blanca, Argentina, stay of Miss Sofia Vallés (Ph.D student of Dr. Barrantes) in Chile for 2 months, then Miss Ginny Farias (Ph.D student of Dr. Inestrosa) for a 2 weeks period, both financed by a grant from Conicyt-Conicet (Chile-Argentina); With Dr. Guojun Bu

from the Department of Cell Biology, Washington University of Medicine, St. Louis, MO, USA, Dr. Rodrigo Fuentealba (Ph.D. of Dr. Inestrosa and Post doctoral fellow of Dr. Marzolo, is going for a second post-doctoral stay to St. Louis with Dr. Bu. Dr. Marzolo and Dr. Bu had a FIRCA grant from a number of years (April 2004 to April 2006). With Dr. Janet Heasman from the Cincinnati Children's Hospital, OH, USA, stay of Mr. Gonzalo Olivares for two months (Ph.D student of Dr Juan Larrain) financed by a grant from the journal Development); With Dr. Palmer Taylor, University of California, San Diego, CA foreign visit for four month of Margarita Dinamarca (Ph.D student of Dr. Inestrosa).

Universidad de Chile — Facultad de Ciencia Fisicas y Matematicas — Centro de Modelamiento Matematico

Head of Institution: Prof. Rafael Correa.

Address: Blanco Encalada 2120, Piso 7, Santiago, Chile. **Phone:** (+56 2) 978-4870. **Fax:** (+56 2) 688-9705. **Email:** rcorrea@dim.uchile.cl, vojeda@dim.uchile.cl. **URL:** www.dim.uchile.cl.

Scientific Fields of Interest: Engineering, Mathematics.

Research and training: Differential equations; discrete mathematics; mathematical mechanics; numerical analysis; optimization and equilibrium; stochastic modeling; applied research projects in sectors such as mining, forestry, energy, telecommunications; transportation, information technology and education; applied and fundamental research capabilities empowered by the multidisciplinary dimension of our research; strong interaction between mathematicians, engineers and scientists from various fields; approaches to modeling from various areas of applied mathematics. Training: Ph.D program on mathematical modeling at DIM; Post-doc fellowships at CMM and DIM

Universidad de Chile — Facultad de Medicina — Human Genetics Program

Head of Institution: Dr. Angel Spotorno, Director.

Address: ICBM, Clasificador n. 7, Casilla 70061, Santiago 7, Chile. **Phone:** (+56 2) 678-6469. **Fax:** (+56 2) 737-3158. **Email:** aspotorn@med.uchile.cl. **URL:** www.med.uchile.cl/index.html.

Scientific Fields of Interest: Biological Sciences.

Research and training: Cytogenetics; karyobiology; vertebrate cytogenetics; evolutionary cytogenetics; human cytogenetics; genetical epidemiology; genetical ethology and evolution of behavior; population genetics and human evolution; human molecular genetics.

Achievements: Nearly 20 papers per year in ISI journals.

Facilities: *Drosophila ceparium*, *Mus*-, *Phyllotis*-, *Octodon-Cavia* breeds; computers with accessories; standard software for genetic and phylogenetic analysis; 5 PCR thermocyclers; 4 deep freezers; 6 fluorescent and light microscopes; 9 laboratories with diverse full equipments.

Future plans: Center and platform for the study and analysis of human and medical genetics; human genomics, genomics and diversity of animal models; genetics and genomics of ancient and actual human populations; genetics and genomics of hereditary diseases.

Cooperation with developing countries: Academic interactions with those from most South American countries, USA, Italy and England.

China

Academia Sinica

Head of Institution: Dr. Chi-Huey Wong, President.

Address: 128 Sec. 2, Academia Road, Nankang, Taipei 115, Taiwan, China.

Phone: (+886) 2 2789-8023. **Fax:** (+886 2) 2783-4496. **Email:**

iao@gate.sinica.edu.tw. **URL:** www.sinica.edu.tw.

Scientific Fields of Interest: Mathematics, Physics.

Research and training: Mathematics and physical sciences; Life-Sciences; humanities and social sciences.

Achievements: A supermassive black hole was found at the center of the Milky Way (Nature, 2005, 438:62); Measuring the weight of a cell for the first time by microscopy-based mass spectrometer (Angewandte Chemie International Ed., 2006, 45:8131); Developing powerful sugar probes and sugar chips for tracking protein glycosylation (Proc. Natl. Acad. Sci. USA, 2007, 104:2614); Pregnenolone stabilizes microtubules and promotes zebrafish embryonic cell movement (Nature, 2006, 439:480); The role of numerals in Formosan languages (Oceanic Linguistics, 2006, 45:133); Discovery of an enzyme structure useful for anti-parasite drug design (EMBO J., 2006, 25:5970); A new theory in Economics: bargaining with interdependent values (Econometrica, 2006, 74:1309). For more details, please visit URL: www.iao.sinica.edu.tw/results.htm

Facilities: The Yuan Tseh Lee Array for Microwave Background Anisotropy (AMiBA) located on Mauna Loa, Hawaii; High-field Nuclear-magnetic resonance Centre; Ultrahigh throughput screening systems for drug discovery; Magnetoencephalography laboratory (the cognitive neuroscience platform in Taiwan); National Synchrotron Radiation Centre, Micro MRI Centre. For more details see: www.sinica.edu.tw/as/adm/Scientific_Instrument_Center_e.html.

Future plans: To pursue excellence in natural science, applied engineering, biology, and social/economical science to benefit individual health and to improve societal well-being.

Cooperation with developing countries: Present: Encourage scholar exchange, publication-exchange, and joint project with institutions from Vietnam, Korea, China, Thailand, Malaysia, and India.

International Organization: Present: Provide technology licensing of amphipatic protein-1 with African Agricultural Technology Foundation (AATF) freely to solve banana bacterial wilt disease in East Africa including great lakes region; Join the Consortium and Secretariat for the Barcode of Life program and provide our research data base of biodiversity to members of the program. Planned: Collaborate with National Astronomical Observatories of Chinese Academy of Sciences (NAOC); National Astronomical Observatory of Japan (NAOJ), and Korea Astronomy and Space Science Institute (KASI) to set up a new organization; The East Asian Core Observatories Association.

Academia Sinica — Institute of Atomic and Molecular Sciences (IAMS)

Head of Institution: Yuh-Lin Wang, Director.

Address: PO Box 23-166, Taipei 10764, China. **Phone:** (+886 2) 2362-0212.

Fax: (+886 2) 2362-0200. **Email:** office@po.iams.sinica.edu.tw. **URL:** www.iams.sinica.edu.tw/.

Scientific Fields of Interest: Chemistry, Physics.

Research and training: Atoms and molecules, clusters, surfaces and bulk condensed matters, including theoretical atomic physics, molecular dynamics and spectroscopy, photo dissociation of polyatomic molecules, laser chemistry, structural stability of metal surfaces, NMR study of zeolites and multi-quantum relation in liquids, laser spectroscopy in condensed phases, inorganic chemistry, ultrafast pulsed lasers and their application.

Achievements: More than 300 papers in international journals.

Facilities: MSL-90NMR, MSL-300NMR, Lasers (Excimer, Dye, CO₂ Q-switched Nd: YAG Ar Ring), Supersonic Molecular Beam Apparatus, Photo fragment translation spectrometer, quadruple and Fourier transform mass spectrometer, Ultra-high Vacuum system fully equipped for surface analysis.

Future plans: Combustion and Atmospheric Chemistry. Application and Synchrotron Radiation. Foundation and Application Studies of laser spectroscopy in biophysics, surface science and material chemistry; clusters, nanocrystals and nanostructures.

Cooperation with developing countries: Major affiliations: Institute of Molecular sciences, Okazaki, Japan; Dalian Institute of Chemical Physics, China; Institute of Molecular Science, Yonsei University, Korea.

Academia Sinica — Institute of Earth Sciences (IES)

Head of Institution: Dr. Bor-ming Jahn, Director.

Address: PO Box 1-55, Nankang, Taipei, Taiwan 115, China. **Phone:** (+886 2) 2783-9910. **Fax:** (+886 2) 2788-3493. **Email:** jahn@earth.sinica.edu.tw. **URL:** www.earth.sinica.edu.tw.

Scientific Fields of Interest: Earth Sciences.

Research and training: Plate Boundary Observatory: Observation of crystal deformation; Seismic activity and active fault distribution; Long-term seismic and fault activities. SAFE-Taipei (Strong-motion, Active Faults and Earthquakes in the Taipei Metropolitan Area); Ocean Bottom Seismometers (OBS); Structure, dynamics and evolution of the earth: 3D seismic imaging of the earth's interior; Physical and chemical properties of the earth's interior; Constitution and evolution of the terrestrial planets; Geochronometry of the early history of the earth. Earthquake mechanism; Seismogenic structure; Earthquake physics. Dust-Buster: an ultra-sensitive mass spectrometer for

stardust. Cosmochemistry: Nucleosynthetic vs. cosmogenic processes; Nature and timing of disk processes; Planetary accretion and differentiation. Mineral and Rock Physics; High-pressure mineralogy and deep mantle processes. Asian Orogens; formation of accretionary orogens (Central Asian Orogenic Belt); formation of collisional orogens (Himalayas, Dabieshan-Qinling); growth of the continental crust in Asia since the Archean. Continental Subduction and Ultrahigh-Pressure Metamorphism. Subduction zone dynamics; 3D structure and dynamics of the mantle wedge; Generation and evolution of island arc magmas; Volcanology. Environmental Geochemistry and Surface Processes; Environmental hydrology; Soil erosion, transport and deposition of sediments; Paleo-environmental changes in Asia. Origin of mantle sulfides: in-situ Re-Os isotopic evidence. Characterization of mantle xenoliths and composition of the SCLM in East Asia. Volcanology and magma chamber processes.

Achievements: Numerous scientific publications (see web site www.earth.sinica.edu.tw)

Facilities: Electron Probe Micro-Analyses Lab; Uranium Series & Anthropogenic Radionuclides Lab; Stable Isotope Mass-spectrometer Lab; Radiogenic Isotope Mass-spectrometer Lab; Mineral Physics Lab; Seismic Recording Lab; Paleo-magnetic Lab

Cooperation with developing countries: Research Institute for Humanity and Nature (RIHN) Japan and Institute of Earth Sciences, Academia Sinica, Republic of China; PHIVOCS and IES-Academia Sinica - to study the neotectonics and crystal evolution of the Philippine Islands.

International Organization: A cooperative program between the California Institute of Technology ('Caltech') and Academia Sinica ('Academia Sinica'); LIA - a new cooperative program with the French CNRS, aiming to study the tectonic evolution of the Taiwan island, subduction zone processes near Taiwan and the Ryukyu Islands, neotectonic processes on Taiwan, earthquake geology of Taiwan, seismology and oceanography.

Academia Sinica — Institute of Molecular Biology

Head of Institution: Dr. Meng-Chao Yao, Director.

Address: 128, Academic Road, Sec. 2, Nangang, Taipei 115, China. **Phone:** (+886 2) 2782-1236. **Fax:** (+886 2) 2782-7784. **Email:** mcyao@imb.sinica.edu.tw. **URL:** www.sinica.edu.tw/imb.

Scientific Fields of Interest: Biological Sciences.

Research and training: Cellular communication and signal transduction; Nuclear structure and function; Genetics and development; Structural biology; Biotechnology.

Achievements: Solved the 3D structure of Toc34, the first solved structure of a chloroplast envelope membrane protein; found the prp 19-associated complex plays a role in remodeling of snRNPs; showed that the Eye Pax protein acts as a transcriptional repressor during *Drosophila* eye development; found Scabrous protein controls ommatidial rotation in the *Drosophila* compound eye; identified

a drug for the treatment of spinal muscular atrophy; generated a mouse model for the effect of a c/EBP gene replacement on mitochondrial biogenesis in fat cells; developed a rice cysteine proteinase gene promoter.

Facilities: Rigaku RU300, 18 Kw rotating anode X-ray generator; MicroMax 007; RaxisIV++ imaging plate system; Yale mirror; confocal mirror; Reflex-A modular time-of-flight mass spectrometer system; bio-fluorescence luminescence microplate detection system; microarray facilities.

Future plans: Molecular genetics of neuro-development; cellular basis and structural aspects of gene regulation; identification of genes related to human development and diseases; advanced genome research.

Cooperation with developing countries: A joint graduate student program has been established with the University of Hyderabad, India.

China Agricultural University — State Key Laboratory of Agrobiotechnology (SKLAB)

Head of Institution: Dr. Jialin Yu, Director.

Address: No. 2 Yuanmingyuan Road, Beijing 100094, China. **Phone:** (+86 10) 6273-3332. **Fax:** (+86 10) 6273-2012. **Email:** agrocbi@cau.edu.cn. **URL:** www.cau.edu.cn/agrocbi.

Scientific Fields of Interest: Agricultural Sciences.

Research and training: The SKLAB is affiliated to the China Agricultural University (CAU) and conducts comprehensive research and development on agricultural biotechnology and biological sciences in China. The lab also plays a constructive role as an incubator for training senior researchers in the fields of biological sciences and biotechnology.

Achievements: Functional genomic research for important economic animal and crops, including mapping and cloning of biological functional genes in chicken, pig and maize; the system of cell cloning techniques for animal reproduction and bio-reactor, including high-efficiency platform of transgenic cow with NTC technique and the mammary product of therapeutic or nutritional proteins; molecular breeding for important crops and economic plants including maize, wheat, rice, sugar beet and grasses; molecular virology, immunology and nucleic acid vaccine.

Facilities: Automatic DNA sequencer; real-time PCR apparatus; confocal microscope; capillary electrophoresis system; HPLC; bio-chip array maker; microarray scanner; electroporator; -80 degrees Centigrade freezer; ultra-speed centrifuge; high-speed centrifuge; refrigerated centrifuge; digital gel imaging system; gene gun; DNA cross-link apparatus; hybridization oven; heated air sterilization cabinet; spe-Vac drier; autoclave; ice machine; shaker; PCR amplifiers, fluorescent microscope.

Future plans: Academically, it is specialized in the following 3 research areas: functional genomic research for important economic animal and crop, animal cloning and bio-reactor technique system and gene engineering for breeding of

good quality, stress-resistant and lower-cost crops. Meanwhile, SKLAB places a special emphasis on innovation and application of agricultural biotechnology. In addition, it has deployed resources to inter-disciplinary research such as DNA vacancies, stem-cell and development of biology.

International Organization: SKLAB concludes joint research projects with Cambridge University; Minnesota State Univ.; Connecticut State Univ. and other famous academic establishments. It actively takes part in various programmes of organizational activities and academic exchange sponsored by international organizations for animal genomic research. In collaboration with giant animal breeding companies such as PIC, it co-establishes a number of labs for cooperative research.

Chinese Academy of Medical Sciences (CAMS) — Institute of Medicinal Plant Development (IMPLAD)

Head of Institution: Dr. Shilin Chen, Chairman.

Address: 151 Ma Lian Wa North Road Haidian District, Beijing 100094, China.

Phone: (+86 10) 6281-8235, 6289-9700. **Fax:** (+86 10) 6289-9714. **Email:** scslchen@implad.ac.cn, impladcams@263.net. **URL:** www.implad.ac.cn.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences, Chemistry, Medical Sciences.

Research and training: Research including medicinal plant cultivation and resources, medicinal fungus, herbarium, phytochemistry, analytical chemistry, pharmacology and toxicology, immunology, etc.

Achievements: Since 2003, more than 900 scientific papers on the research and development of medicinal plants have been published.

Facilities: HPLC, GC, GC-MS, HPLC-MS, IR, CD, NMR, MS, Ultraviolet, botanical garden, seed bank of medicinal plants.

Future plans: To establish a demonstrating centre for the cultivation of medicinal plants according to the criterion of GAP and a Test Centre for Green Crude Drugs in order to promote standardization of traditional Chinese medicine and medicinal raw materials.

Cooperation with developing countries: The institute has trained many scientists from developing countries in medicinal plant research, ranging from cultivation to preparation, and it hopes to expand this unique role in the future as well.

International Organization: International exchanges and cooperation with WHO, UNIDO, Royal Gardens, Kew UK; Hong Kong Baptist University; Karachi University (Pakistan); UBC, Brain Research Centre (Canada); NRHG Foundation (USA), Harvard University (USA), Cayetano Heredia Univ, (Peru); Institute of Materia Medica (Vietnam).

Chinese Academy of Sciences (CAS) — Academy of Mathematics and Systems Science (AMSS)

Head of Institution: Lei Guo.

Address: No. 55, East Road, Zhong Guan Cun, Hai Dian District, Beijing 100080, China. **Phone:** (+86 10) 6255-3005. **Fax:** (+86 10) 6255-2927. **Email:** sci@amss.ac.cn. **URL:** <http://info.amss.ac.cn/amssite/amss-e/amss-e.html>.

Scientific Fields of Interest: Mathematics.

Research and training: Analysis; number theory algebra, geometry and topology; operations research; differential equations; probability and statistics; mathematics mechanization; theoretical computer science; computational mathematics; geometric analysis; control theory; systems analysis; systems management; discrete mathematics; scientific and engineering, computing.

Achievements: The academy of mathematics and system sciences was established in December, 1998, based on the four mathematics related institutes of the Chinese Academy of Sciences, the institute of mathematics, the institute of applied mathematics, the institute of systems science and the Institute of Computational Mathematics. In all 13 main research fields stated above the academy of mathematics and system sciences has achieved magnificently and has been awarded many national as well as some international prizes.

Facilities: A highly equipped library with 120,000 volumes and journals; advanced computing facilities such as SGI Origin 2100 (8CPU) two SUN E3500 and one 124-node PC cluster, one 34-node PC cluster and more than 50 workstations.

Future plans: Within the next 5 to 8 years, to become an important innovator and world renown research center of mathematical and system sciences, a training center for young mathematicians, and a center for solving mathematical problems through practice.

Cooperation with developing countries: Cooperation with various countries that will continue in the future.

Chinese Academy of Sciences (CAS) — Beijing Institute of Genomics (BIG)

Head of Institution: Dr. Huanming Yang.

Address: B-6, Beijing Airport Industrial Zone, Beijing 101300, China. **Phone:** (+86 10) 80491181. **Fax:** (+86 10) 80491181. **Email:** yhm@genomics.org.cn, yanghm@genomics.org.cn. **URL:** www.genomics.org.cn/bgi_new/english/index.htm.

Scientific Fields of Interest: Biological Sciences.

Research and training: The research activities in our institute are focused on genomics, bio-informatics, proteomics and pharmogenomics. Our training program includes: Post-graduate students training (Masters and Ph.D); joint raining program with other institutions for graduate students; regular training workshops on genomics, bio-informatics and proteomics, open to all interested students.

Achievements: Our major scientific results are publications.

Facilities: Super computers: IBMP690, SUN10000, Dawning300; DNA sequencers: MegaBACE1000, ABI3730, ABI377, AB3130XL; SEQUENOM from PE, ultraflex tof/tof and MALOI-TOF from Bruker.

Chinese Academy of Sciences (CAS) — Beijing Laboratory of Electron Microscopy (BLEM)

Head of Institution: Dr. Li Jianqi.

Address: P.O. Box 603, 100080 Beijing, China. **Phone:** (+86 10) 8264-9524.

Fax: (+86 10) 6256-1422. **Email:** LJQ@aphy.iphy.ac.cn. **URL:** www.blem.ac.cn.

Scientific Fields of Interest: Biological Sciences, Engineering, Physics.

Research and training: The goals of the research programmes are to study structural issues in correlation with solid-state physics, new materials and life science; advanced quantitative electron microscopy techniques, such as atomic imaging, dynamics of electron diffraction and 3D structure of virus, are developed and employed to study a variety of different samples. BLEM provides highly developed techniques for the new scientific subjects and promotes the intersection as well as cooperation among different research fields (modern analytical electron microscopy and application in material sciences; crystal structure, phase transition and structure-property relationships of advance materials; nano-materials and mesoscopic physics; electron microscopy on functional materials and electron crystallographic image processing). There are also training activities on TEM sample preparation and new TEM techniques.

Achievements: Several papers published in different journals (including Phys. Rev.B, Applied Physics, Journal of Physical Chemistry, Science).

Facilities: Philips CSQ.M00ST/FEG TEM, space resolution 0.2 nm; Gatan Mod. 691PIPS ion miller; XL30 S-FEG SEM space resolution 0.2 nm.

Future plans: Training on making TEM samples, operation of high-resolution TEM and analysis of high-resolution TEM images.

Cooperation with developing countries: Collaborated with other international TEM labs and working on training special skills.

Chinese Academy of Sciences (CAS) — Institute of Applied Ecology

Head of Institution: He Xingyuan.

Address: 72 Wenhua Road, Shenyang 110016, Liaoning 024, China. **Phone:** (+86 24) 8397-0316, 8397-0430. **Fax:** (+86 24) 8397-0300. **Email:** yuanzw@iae.ac.cn. **URL:** www.iae.ac.cn/iae-en/index.asp.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences, Environmental Sciences.

Research and training: Structure, function, biodiversity and dynamics of forest eco-system; Forest interface ecology; restoration; desertification control; productivity of agro-eco-systems; improvement of soil quality; major nutrients and water cycling processes; purification mechanisms and function of plant-soil system to pollutants; plant taxonomy, plant ecology, photochemistry; exploitation and utilization of plant microbial resources.

Achievements: The Institute forms an integrated research system combining basic research, application and exploitation. More than 480 research achievements have been rewarded, including state prize and 163 provincial class prizes. Besides these, 230 monographs and more than 4900 papers were published, and 198 national invention patents were obtained.

Facilities: 4000 instruments (in labs for organic, inorganic, biochemical, environmental chemical and microscopic analysis); 30 large pieces of equipment; nationally certified labs; herbarium is store to 350,000 plant specimens. 20,000 soil specimens, 40,000 insect specimens and more than 3000 microbe strains mainly collected in northeast China; four field research stations. 50 computers. Library with nearly 100,000 books and 1,500 different journals.

Future plans: Ecological processes and eco-construction ecology in forest ecology, agro-ecology, pollution, landscape ecology, plant and microbial resources, including topics on resources, environment and sustainable development. The institute strives to become one of the leading institutions in the field of applied ecology in the future.

Cooperation with developing countries: International academic exchanges with about 100 institutions in more than 30 countries and regions; technical and scientific-cooperation with many countries including some developing countries; member of TWAS Associate Membership Scheme of Centres of Excellence in the South; joint projects on biodiversity and eco-systems dynamics with North Korea, Poland, Hungary, Nigeria, including exchange of experts and young specialists for cooperative work.

Chinese Academy of Sciences (CAS) — Institute of Atmospheric Physics (IAP)

Head of Institution: Dr. Wang Huijun.

Address: Chao Yang District, P.O. Box 9804, Beijing 100 029, China. **Phone:** (+86 10) 6205-7555. **Fax:** (+86 10) 6202-8604. **Email:** zhangl@mail.iap.ac.cn. **URL:** www.iap.ac.cn/english/iap/Default2.htm.

Scientific Fields of Interest: Earth Sciences.

Research and training: The institute's focus is to discover new laws in the atmosphere with various physical, chemical and biological processes' interaction with human activities, to offer advanced theory, methods and techniques for monitoring, forecasting, and modifying the weather, climate and environment, to train top-talent in the atmospheric sciences, and to lay foundations for the sustainable development of society, science and national security. The main research direction include the dynamics of the East Asian monsoon system, severe weather and climate disasters, remote-sensing theories and the middle-high layer atmosphere, atmospheric chemistry, regional environment systems dynamics and the simulation and forecasting of the climate and environment system. Exploring the basic laws governing atmospheric motion, physical and chemical processes in the atmosphere, and the interaction between the atmosphere and it's surrounding environment, especially the study of the mechanism of weather, climate and environment in East Asia, prediction theory and observation techniques under the combined influences of the Tibetan Plateau, the tropical Pacific Ocean and the complex topography of China.

Achievements: The systematic prediction of short-term climate program won the second-class national prize for natural sciences; the research on the farmland greenhouse gases observation and techniques won the second-class national prize for technology advance; the project of the global impact of regional monsoon climate-eco-system of East Asia won the second-class national prize for natural science, two items of the first-class CAS prize for natural sciences, and one item of the second-class CAS prize for natural sciences, one item of the second-class CAS prize for technology advance, one item of the first-class prize for national defense technology and eight other items of prizes from related national ministries and commissions. IAP has acquired eight Chinese patents. Ye Duzhen won the 48th IMO prize, which was the most honorable prize granted by the WMO in 2004; and in 2005, he also won China's top science and technology award.

Facilities: The institute possesses an advance IBM-P690 computer; a Lenovo Shenteng 1800, an SGI Origin 300 server, an SGI origin 2000 high-performance parallel computer, and a couple of SGI Origin 3400 high-performance parallel computers. IAP is also in possession of 325 m. high meteorological tower and the boundary-layer remote-sensing detection system and a series of equipment for atmospheric chemistry, boundary layer physics, greenhouse gases,

mesoscale atmosphere and remote-sensing, etc. The library has collected over 35,000 volumes of books on meteorology; atmospheric physics, and the like; e-journals include all American Meteorological Society (AMS) full-text online journals, American Geophysical Union (AGU) full-text journals of atmosphere and ocean, Elsevier, Springer, John Wiley and Blackwell online full-text database, etc.

Future plans: Promote international collaboration, through international projects, academic communication, transferring and fostering of talent, construction of joint research centers, joining international scientific plans and publishing results in international journals. Launch international programs for collaboration and academic communication; to intensify international exchanges and to foster talent, to build joint research centers promoting the Nansen-Zhu International Research Center (NZC), the International Center of Climate and Environment Science (ICCES), and the Center of Regional Climate-Environment Research for Temperate East Asia (RCE-TEA); to become famous international research centers of great importance; to build an arena for international academic activities; to actively participate in international scientific plans; to realize the progressive internationalization of the administrative systems; to build high-level, international periodicals.

Cooperation with developing countries: The international high-level academic forum founded in cooperation with CAS, WMO, and TWAS, the CAS-TWAS-WMO Climate Forum (CTWF) has boosted high-level academic communication and growth of young talents of the institute. The institute is planning to enhance the international cooperation with Pakistan, Philippines in climate prediction and remote-sensing.

Chinese Academy of Sciences (CAS) — Institute of Botany

Head of Institution: Dr. Han Xingguo, Director.

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Phone: (+86 10) 6283-6688. **Fax:** (+86 10) 6259-0833. **Email:** xghan@ibcas.ac.cn. **URL:** <http://english.ibcas.ac.cn/>.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences, Earth Sciences, Environmental Sciences.

Research and training: The main research orientation of IBCAS is focused on studying the basic biological issues of how plants adapt to the fluctuating and/or stressed environment. The major research fields are: national eco-security under the background of global change; the mechanisms of biodiversity formation and conservation; the biological bases of green and high-efficiency agriculture at both molecular and organism levels and biotechnology for the utilization of plant resources. Our policies on human resource enhancement are to properly use existing talents, attract excellent young talents and initiate training programmes for future talents.

Achievements: The institute has made major scientific results on the following research fields: Mechanisms of light energy conversion of photosynthesis and its application in agriculture; experimental demonstration of ecological restoration of the Otindag sandland and the agricultural pastoral ecotone in the Northern part of Beijing; phylogenetic reconstruction and molecular evolution of important plant groups; flora of China; plant systematics and evolution; global change and terrestrial vegetation system; conservation and sustainable use of biodiversity and biosecurity; basic research for plant proteomics and high-efficiency agriculture. From 1994 to 1998, 705 papers have been published, of which 67 were published in SCI journals. From 1999 to 2003, 708 out of a total of 1638 papers were published in SCI journals.

Future plans: Being a comprehensive research institution of basic plant sciences, the future development plan of the institute will take integrative plant biology as its strategic orientation, with biological basis of plant adaptation to environments as its major direction of studies. The nation's demand for environmental-friendly and High-efficiency agriculture and well-conserved and managed habitats are also important fields of investigation. Taking advantage of its existing strength in the fields of systematic and evolutionary botany, biology, molecular and developmental biology of resource plants, and plant photosynthesis physiology, IBCAS will conduct basic research on the relationships between plants and their environments, and on biotechnology and sustainable use of resources in the field of green and high-efficiency agriculture.

Cooperation with developing countries: Mongolia, China, India, Russia.

International Organization: USA, Denmark, Germany.

Chinese Academy of Sciences (CAS) — Institute of Computing Technology

Head of Institution: Guojie-Li.

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Fax: (+86 10) 6252-7488. **Email:** lig@ict.ac.cn. **URL:** www.ict.ac.cn/ (Chinese only).

Scientific Fields of Interest: Biological Sciences, Engineering.

Research and training: CPU and SOC core technology; high-performance computing and grid-computing environment; network technology; pervasive computing; knowledge processing and intelligent Internet software; information security; bio-informatics.

Achievements: Dawning series high-performance computer; Godson CPU; IPv6-based next generation Internet; Vega grid; Bluewhale network storage system; AVS encode and decode standard (stream medium).

Facilities: Digital library; high-performance computers; CPU EDA environment; network test equipment.

Future plans: CPU/SOC and high-performance computer; network and pervasive computing; grid and intelligent software.

Cooperation with developing countries: Sino-Brazil software science park in Guangdong Province, China.

International Organization: IA-64 compiler project with Intel; CPU project with ST micro corp. in Europe.

Chinese Academy of Sciences (CAS) — Institute of Genetics and Developmental Biology

Head of Institution: Yongbjiao Xue.

Address: Datun Road, Andingmen Wai, Chaoyang District, Beijing 100101, China. **Phone:** (+86 10) 6488-9332. **Fax:** (+86 10) 6485-4896. **Email:** genetics@genetics.ac.cn. **URL:** www.genetics.ac.cn.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences.

Research and training: Genetic control of growth and development in plants and animals; gene expression; signal transduction; structural and functional genomics and bio-informatics.

Achievements: 4000 original research articles published; 76 patents granted; 65 new crop varieties developed.

Facilities: The institute has large-scale instrumentation including a mass-spectrometer, Gel and Blot analysis, Image Quant system, and Sequence Decoding. It has 2 experimental farm stations; one experimental animal center, and one library.

Future plans: Within 5-10 years the institute is expected to become one of the top 5 life-sciences research institutions in China and one of the top Life-Sciences research institutions in the world.

Cooperation with developing countries: Thailand, Pakistan and Korea.

International Organization: USA, UK, Japan, Germany, France, Russia, Hungary and Singapore.

Chinese Academy of Sciences (CAS) — Institute of Geochemistry

Head of Institution: Liu Cong-Qiang.

Address: Guanshui Road No.73, Guiyang, Guizhou Province 550002, China. **Phone:** (+86 851) 589-5095. **Fax:** (+86 851) 589-5574. **Email:** liucongqiang@vip.skleg.cn. **URL:** www.gyig.ac.cn/english/.

Scientific Fields of Interest: Earth Sciences, Environmental Sciences.

Research and training: Mineralogy (iron-ore), environmental monitoring (in trees, lakes), rare earth element geochemistry as well as physico-chemical properties of materials under ultra-high-pressure and high-temperature; Astrobiology and the evolution of the earth; Isotope study of greenhouse gases

and global change; Resource exploitation and environmental protection in Karst region.

Achievements: Numerous prizes and distinctions including geochemistry of strata-bound ore deposits in China (State Natural Science Prize, first-class); geochemistry of Baiyun Ebo Nb-REE-Fe ore deposit; study of cosmochemistry.

Facilities: Gas mass spectrometer; multichannel analysis system; atom absorption spectrometer; electron probe microanalysers; spectrometer; X-ray fluorescence spectrometer; X-ray diffractometer; high-resolution electron microscope. Super-microcomputer workstation; laboratory of experimental geochemistry.

Future plans: Ore-deposit geochemistry and mineral resource in Southwest of Yangzi platform; ecological environment in Karst region; global environmental change (greenhouse gases and air dust); formation and evolution of terrestrial planets; study of mineral materials; study of nonmetal mineral resource.

International Organization: International Development Office of Canada; University of Ghent, Belgium; EEC; Institute of Environment, Japan; US Geological Survey.

Chinese Academy of Sciences (CAS) — Institute of Geographic Science and Natural Resources Research (IGSNRR)

Head of Institution: Liu Jiyuan, DG.

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Phone: (+86 10) 6485-4841, 6488-9276. **Fax:** (+86 10) 6485-4230, 6485-1844.

Email: ign@igsnr.ac.cn. **URL:** www.igsnr.ac.cn.

Scientific Fields of Interest: Agricultural Sciences, Earth Sciences, Environmental Sciences.

Research and training: Changing patterns and evolution processes of the terrestrial surface and the dynamic mechanism; optimum allocation of territorial resources and eco-system construction; mechanism of man-land system and regional development; monitoring and environment information system.

Achievements: In 2002, the institute has published 720 papers including 62 embodied by SCI and SSCI index. From 2000 to 2002, 8 key consulting reports at national level, 22 patent applications and 16 software registrations have been completed.

Facilities: 4 research divisions and 2 research centers; the national key laboratory of resources and environment information system; Center of resource and environment data; GIS industrialization center; Yucheng, Qianyanzhou, Lhasa and Luancheng experimental stations as well as CERN headquarters; SUN 5500 Super-server; library; publications in over 10 academic journals.

Future plans: The institute plans to complete a central experimental lab for biological and chemical analyses and some separate analytical labs during the

10th 5-year plan period; initially renovate an integrated simulation lab including fluvial geomorphology and runoff for terrestrial surface processes research; installation of a carbon flux observation system in experimental stations; more participation in national projects; systematic cooperation with international organizations; further promotion of the use of new technology in research.

Cooperation with developing countries: Thailand, India, Nepal, Pakistan, Indonesia, Malaysia, Mongolia.

International Organization: Countries: USA, Canada, Germany, UK, Japan, France, The Netherlands, Australia. International Organizations: UNDP, UNESCO, FAO, CIDA, ICIMOD, IGU.

Chinese Academy of Sciences (CAS) — Institute of Metal Research

Head of Institution: Prof. Ke Lu.

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Scientific Fields of Interest: Chemistry, Engineering, Physics.

Research and training: Research: Non-equilibrium metallic materials; high-performance ceramics; advanced carbons; magnetism and magnetic materials; micro-electronic interconnect materials; solid atomic imaging; materials fatigue and fracture; metal corrosion and protection; environmental corrosion research, high-performance homogenized alloys; corrosion control; super alloys; titanium alloys; metallic composites; foreface engineering; materials for special environments; synthesis and processing. Training: masters and post-docs in material science and engineering.

Facilities: All kinds of facilities for materials science research.

Future plans: To excel in materials research; develop advanced materials technology; foster exceptional talents; serve the nation, society and mankind.

Cooperation with developing countries: Korea, Singapore, India, Brazil, Pakistan, etc.

International Organization: Mainly with the foreign institutions or universities who are strong in materials science and engineering, including institutions in USA, Russia, Japan, Germany, UK, etc.

Chinese Academy of Sciences (CAS) — Institute of Microbiology (IMCAS)

Head of Institution: George Fu Gao.

Address: 13 Beiyitiao, Zhongguancun, Beijing 100080, China. **Phone:** (+86 10) 6255-2178. **Fax:** (+86 10) 6256-0912. **Email:** gaof@im.ac.cn. **URL:** www.im.ac.cn/en/new/index.php.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences, Environmental Sciences.

Research and training: Research focused primarily on Bio-resource and biodiversity: culture collection, systematics, screening for lead compounds and new metabolic products, ecology, molecular virology; Molecular genetics and breeding: molecular genetics of prokaryotic cell, expression and regulation of genes; Biotechnology: plant genetic engineering, enzyme engineering, fermentation engineering, protein-engineering, pharmaceutical biotechnology, glycotechnology. Also: molecular immunology; genomics; pathogenic microbiology; biological energy and materials development.

Achievements: As of 2004, about close to 400 awards were obtained from CAS, central and local governments; hundreds of scientific papers (including over 100 SCI papers) published each year.

Facilities: Amino-acid analyzers; HPLC system; capillary electrophoresis system; automated peptide synthesizer; ultracentrifuge; DNA sequencer; molecular imager; bench top fermentor; complete glyko FACE workstation; fluorescent gel; computers and documentation system; DNA synthesizer; cell analyzer; gene gun; protein purification system; high throughput screening platform; laser confocal microscope; environmental scanning electron microscope; freeze drier.

Future plans: Strengthening basic research and high-tech innovation; enhancing cooperation with enterprises at home and abroad; advancing technology transfer and commercialization of scientific achievements.

Cooperation with developing countries: To boost the scientific development of the developing countries, the authorities of both CAS and TWAS signed an agreement recently to initiate the CAS/TWAS fellowship program that annually provides fellowships and scientific training to 50 scholars from the developing world. Around 40 CAS research institutes were selected as the training bases, and the Institute of Microbiology (IMCAS) was one of them. In the coming five years, the IMCAS will supply scientific training in the field of microbiology to scholars from the developing countries.

International Organization: Joint research programmes with USA, Japan, UK, France, Germany, Holland, Belgium and Singapore in the research fields of microbial resources, molecular genetics, immunology, virology, enzymology, plant-biotechnology and molecular systematics of fungi.

Chinese Academy of Sciences (CAS) — Institute of Modern Physics (IMP)

Head of Institution: Prof. Wenlong Zhan.

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Scientific Fields of Interest: Biological Sciences, Chemistry, Engineering, Physics.

Research and training: Heavy-ion physics, especially focusing on the study of the radioactive ion-beam physics and exploration of the existing limits of nuclei; studies and applications on the atomic physics with highly charged heavy-ions, molecular as well as hot and dense plasmas; Hadron physics with High-energy proton beam delivered by Cooling storage Ring (CSR); study on High-energy density physics; biological effects by heavy-ion irradiation and tumor therapy with ion-beams; ion-accelerator physics and technology as well as the High-Power electron accelerator.

Achievements: IMP has made important contributions to both basic research and applied studies. It has set up large-scale facilities such as HIRFL, RIBLL, SECRL, HIRFL-CSR, etc., synthesized first time in the world, more than 25 new nuclides far from stability; achieved 129 major research successes. Of these, 10 won national prizes; 119 won national ministries and Gansu Province prizes including 7 scientific and technological prizes; 4 prizes for natural sciences from the nation; 3 awards of the Wu You-Xun prize in Physics; 1 top-grade prize of scientific and technological progress from CAS. Moreover, the researches at the institute have led to about 72 patents. Around 623 articles have been published in SCI journals.

Facilities: Heavy-ion research facility at Lanzhou (HIRFL); Radioactive- ion beam line in Lanzhou (RIBLL); Super ECR ion source in Lanzhou (SECRL); cooler storage ring-heavy-ion research facility at Lanzhou (HIRFL-CSR); a library with over 100,00 books, journals and documents.

Future plans: Development of technologies for tumor therapy with the use of heavy-ions.

Cooperation with developing countries: 4 physicists from developing countries have been trained since 1995 and the IMP continues to receive physicists from developing countries for training in the future.

Chinese Academy of Sciences (CAS) — Institute of Physics & Center for Condensed Matter Physics

Head of Institution: Prof. En-ge WANG.

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Scientific Fields of Interest: Biological Sciences, Physics.

Research and training: Low-temperature behavior of strongly correlated electronic systems; transport of Mesoscopic and nano-system; metastable materials; high-pressure materials and physics; new Josephson junction devices; photonic crystals and applications; quantum information and quantum computation; tunable solid-state laser; new magnetic materials design.

Achievements: Every year the Institute publishes over 700 papers of which about 500 appear in international journals (SCI), among them about 20 in PRL, Nature and Science.

Facilities: SQUID; VSM; low-temperature stm; magnetic torquemeter; Mossbauer spectroscopy; neutron scattering spectrometer; single crystal growing system; temperature variable STM-MBE system; XPS; AES; EELS; SMS; pulsed lasers with nanosecond; excimer laser; laser molecular beam epitaxy; ultra-low-temperature, ultra-high-magnetic field and ultra-high-pressure equipment for extreme condition physics; advanced TEM and SEM; ECR microwave plasma CVD device.

Future plans: To engage in the building of the Beijing Spallation Neutron Source (BSNS) and Shanghai Synchrotron Radiation Facility (SSRF).

Cooperation with developing countries: The Plasma Division of the Institute has joined the Asian African Association for Plasma Training (AAAPT). We are planning to set up an AAAPT Research Centre.

International Organization: Agreements with numerous institutions and universities in the US, UK, Germany, France, Japan, Belgium, Russia, Netherlands, Ukraine.

Chinese Academy of Sciences (CAS) — Institute of Plasma Physics (ASIPP)

Head of Institution: Prof. Li Jiangang.

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Scientific Fields of Interest: Biological Sciences, Engineering, Physics.

Research and training: High-temperature plasma physics and controlled fusion research; ion-beam bi-engineering; applied techniques of

superconducting magnet and power saving; applied low-temperature plasma physics research; high-field magnet technology and property research under high-magnetic field; R&D on fusion engineering and applied techniques.

Achievements: 306 second long discharge has been achieved on HT-7 tokamak in 2005; EAST, the first totally superconducting Tokamak, has been assembled and ready to do experiments in mid 2006; EAST, a test bench before ITER, is open to the world fusion community. Among the many honors ASIPP has won, there is one special progress prize of the National Science and Technology; 6 times 1st class progress prize of S&T of CAS; twice 2nd class prize of natural science of CAS; once 1st class progress prize of S&T of Anhui Province. ASIPP is also honored as an 'excellent research centre' by TWAS; 'Institute of the Year' by CAS; and 'Excellent workgroup' by Anhui Province.

Facilities: In the institute there are 3 experimental devices for the controlled fusion research: EAST, the first totally superconducting tokamak in the world; HT-7, the first superconducting tokamak in China; and HT-6M, a small-scale conventional tokamak. The auxiliary systems include one 1.5MW radio frequency (RF) wave heating system; one 1.2MW lower hybrid wave current drive system; one 200MW AC/DC pulse motor generator and one liquid helium cryogenic system (the largest in China). Besides this, ASIPP possesses one 20-Tesla steady-state hybrid magnet, manufacturing and testing facilities for big superconducting magnets and the first single particle microbeam facility in China.

Future plans: ASIPP's mission is to meet China's demand for the new, applicable energies in the long run. To realize this, ASIPP will carry out the magnetically confined fusion studies on the large-scale technical physics facilities by implementing the National Large-scale Science Project. In a few years, ASIPP will be developed to be the national research base for the innovative energies in China and a well-known institute in the world fusion research community.

Cooperation with developing countries: ASIPP can enroll foreign graduate students, and can accept researchers to work in ASIPP within the TWAS scholarship program.

International Organization: ASIPP has benefited from strong collaborations with the international laboratories and universities, and has been supported in the form of tens of millions of USD worth of experimental devices. At the same time, ASIPP has been promoting the international cooperation actively by frequently holding workshops and seminars on fusion related research or providing experimental facilities for the institutions abroad. In recent years, the joint project on HT-7 experiments, HT-7U construction and solar cells studies with the scientists from EU, USA, Japan, RF and Australia won a wide international fame for the institute.

Chinese Academy of Sciences (CAS) — Institute of Remote Sensing Applications

Head of Institution: Li Xiaowen.

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Phone: (+86 10) 6487-9458. **Fax:** (+86 10) 6486-4643. **Email:** proj@irsa.ac.cn, lixw@irsa.ac.cn. **URL:** www.irsa.ac.cn/en/index.htm.

Scientific Fields of Interest: Earth Sciences, Environmental Sciences.

Research and training: Remote-sensing, GIS, GPS, WebGIS and remote-sensing application to environmental ecology, land-use, disaster monitoring, agriculture, public-health, archaeology, crop estimation, resource management, transportation, mineral exploration, etc.

Achievements: As of 2004, scientific projects undertaken totaling 222 projects.

Facilities: 2 Cessna Citation S/II aircraft and equipment for data acquisition, processing and analysis of remote-sensing (airborne GPS, meteorological satellite ground station), workstation and large-scale network and RS-GIS software, static color plotter, large-scale digitizing scanner; IRSA library.

Future plans: Enhance technical strength by attracting more Post-graduates and doctoral students and absorbing advanced techniques on RS in other countries; gain more projects (national, provincial or ministerial); further develop cooperation at local and international levels.

Cooperation with developing countries: With Eritrea in Africa in RS field.

International Organization: Oil-gas resources in Tarimu in Xinjiang between Japan and China; RS testing in Tarimu in Xinjiang; AGIP of Italy and Texaco of America; close contacts with over 20 countries.

Chinese Academy of Sciences (CAS) — Institute of Soil Science (ISSCAS)

Head of Institution: Dr. Jianmin Zhou, DG.

Address: PO Box 821, 71 East Beijing Road, Nanjing, China. **Phone:** (+86 25) 8688-1188. **Fax:** (+86 25) 8688-1000. **Email:** jmzhou@issas.ac.cn. **URL:** www.issas.ac.cn.

Scientific Fields of Interest: Agricultural Sciences, Earth Sciences, Environmental Sciences.

Research and training: Research: Soil research and management; soil fertility and its regulation; soil environment and health. Training: M.Sc. and Ph.Ds in soil science.

Achievements: 44 State level awards; 188 CAS ministry and province level awards

Facilities: Equipment: the center for analysis and tests, certified by the state measurement certification agency, is equipped with mass spectrometers;

Matrix-assisted laser desorption time-of-flight mass spectrometer; isotope mass spectrometer model 251; Poemsl, Plasma optical emission spectrometer; F-2500, Fluorescence spectrophotometer; atom fluorescence spectrophotometer; gas chromatograph, FTS165, FT-IR spectrometer; gas chromatograph/atom emission spectrometer; ion chromatograph, Dionex; capillary electrophoresis CE; micro-continuous flow chemistry analyzer; supercritical fluid extractor; isotope mass spectrometer; FEI Sirion scanning electron microscope; GENESIS imaging 60 SEM-EDAX; GC-MS-MS; speedwave. Laboratories for: soil and sustainable agriculture; soil resources and remote-sensing application; soil-plant nutrition and fertilizer; soil chemistry and environmental protection; soil physics and saline soils; soil biology and biochemistry; soil and environmental bio-remediation research center; soil utilization and environmental change research center. Library: FAO contracted library with a collection of over 230,000 books and periodicals. Field station: one national agro-ecological experiment station, two ecological experiment stations and one soil sub-center of CERN.

Future plans: To provide a scientific basis for decision-making and key practical techniques for guaranteeing food safety, for increasing soil productivity and for improving environmental quality and to take an active part in development of modern theories of soil science.

International Organization: Every year the institute sends 4-5 staff member as visiting scholars to study in developed countries for 2-3 months. The institute also sends about 100 people for visit to institutes abroad and receives about 100 foreign scientists to visit the institute in order to exchange scientific theories and experiences.

Chinese Academy of Sciences (CAS) — National Astronomical Observatories

Head of Institution: Ai Guo-Xiang, Director.

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Phone: (+86 10) 6488-8712, 6488-8708. **Fax:** (+86 10) 6488-8731. **Email:** naocoffice@bao.ac.cn. **URL:** www.bao.ac.cn/English/home.asp.

Scientific Fields of Interest: Physics.

Research and training: Astronomy; astrophysics and relative studies; large-scale structure of universe; formation and evolution of galaxies; high-energy and catadysmic processes in celestial objects; formation and evolution of stars; solar magnetic activity and heliogeospace environment; astrogeodynamics; dynamics of celestial bodies in solar system and artificial bodies; observational facilities for space astronomy and space exploration; development of new astronomical techniques and methods.

Achievements: 195 papers published in 2003; 207 papers published in 2004; 158 papers published in 2005.

Facilities: Solar magnetic telescope; 2.16 m. optical telescope; antenna array of the meter-wave aperture synthesis radio telescope and other smaller telescopes; a library with approx. 60,000 volumes of books and 50,000 copies of periodicals in multi-languages; more than 100 computers and working stations; three observing sites (Huairou solar observing station, Miyun station and Xinglong station); headquarters building; guest-house; dining hall and meeting rooms.

Future plans: To build 4 major scientific projects: Space Solar Telescope (SST); Large Sky Area Multi-object Fiber Spectroscopy Telescope (LAMOST); 500 m. aperture Spherical Telescope (FAST) and 2.3 m. optical telescope for the Southern China Observational site in Yunnan province.

Cooperation with developing countries: Keep cooperations with Korea, India, Argentina, etc.

International Organization: Cooperated with Russia, Japan, US, Germany, etc.

Chinese Academy of Sciences (CAS) — Purple Mountain Observatory (PMO)

Head of Institution: Dr. Jun Yan, Director.

Address: 2 West Beijing Road, Nanjing 210008, China. **Phone:** (+86 25) 8333-2288, 8333-2000. **Fax:** (+86 25) 8333-2091. **Email:** pmoo@pmo.ac.cn, bf.dai@pmo.ac.cn. **URL:** www.pmo.ac.cn.

Scientific Fields of Interest: Physics.

Research and training: Solar physics; solar system research; stellar physics; cosmology; astronomical instruments; radio and space astronomy.

Achievements: Research papers; receivers for mm-wave telescopes; detectors for space astronomy; data of observations.

Facilities: Five observing stations at Delingha, Xuyu, Honghe and Ganyu; three labs (mm and sub-mm wave lab; space astronomy lab; celestial chemical lab).

Future plans: Large space programme concerning solar active region research (optical, X-ray and gamma ray) called Solar-B will probably be made in the coming few years; possibility of developing technique of detecting system on non-solar X-ray satellite with USA.

Chinese Academy of Sciences (CAS) — Research Center for Eco-Environmental Sciences (RCEES)

Head of Institution: Dr. Qu Jiuhui.

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Scientific Fields of Interest: Chemistry, Environmental Sciences.

Research and training: Environmental chemistry, engineering and systems ecology; aquatic environmental chemistry; environmental analytical chemistry and ecological toxicology; atmospheric pollution chemistry, atmospheric pollution control; water pollution control technology; environmental biotechnology; membrane technology; systems ecology and ecological engineering; environmental policy and sustainable development. New research and training activities include Soil-plant interactions and its eco-environmental impacts; soil environmental quality and assessment; agricultural clean production; remediation of contaminated soils.

Achievements: Industrial incineration technique of PCBs and Dioxins, High-efficiency polymer flocculant; Poly-aluminum chloride manufacturing; Control techniques for different water treatment and water pollution; Environmental effects of typical chemical pollutants; Environmental interface processes and bio-availability of persistent toxic substances; Ecotoxicological research of persistent toxic chemical pollutants; Research on analytical methodology of toxic chemical pollutants; Development of microfluidic chip specially used for environmental monitoring and integration of related instruments; Research on the assessment of drinking Water-quality based on risk analysis; the mechanisms and technologies for controlling the transfer of heavy metals in soil-plant systems; Key technology and integrated system development for the safety assurance of drinking water.

Facilities: High-resolution Gas Chromatography/High-resolution Mass Spectrometer; Transmission-electron microscope; Scanning Electron Microscope; High-performance Liquid-chromatography/Mass Spectrometer; Gas Chromatography/Mass Selective Detector; Accelerated Surface Area and Porosimetry; Capillary Ion Analyzer; Atomic-absorption Spectrophotometry; Fourier Transform Infrared Spectrometers; Inductively Coupled Plasma Mass Spectrometers; Electromotive Microscope; Laser Light-scattering System; Microstation, Microbial\Community Analysis System; Separation System for Biomolecules; Microwave Accelerated Reaction System; Laser Particle Size Analyzer; Scanning Probe Microscope; Chemiluminesce Immunoassay Equipment.

Future plans: Research fields to be extended to Environmental Biology, Eco-material and so on.

Cooperation with developing countries: Cooperation with developing countries: Cooperation with Pakistan, India, Thailand, Kenya, Vietnam, Nepal,

and Laos in the field of environmental analytical chemistry, environmental water chemistry, air pollution, soil pollution and waste-water treatment.

International Organization: Cooperation with the Netherlands and Sweden on EU project of Land Ecological Evaluation and Sustainable Use in the Loess Plateau of Northern China; Cooperation with Indonesia, India, Vietnam, Philippines and Thailand on Sweden SIDA projects of Asian regional research programme on environmental technology; Cooperation with Australia on Sino-Australia Joint Lab on Soil Environmental Sciences.

Chinese Academy of Sciences (CAS) — Shanghai Institute of Applied Physics (SINAP)

Head of Institution: Xu Hongjie.

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Phone: (+86 21) 5955-3998, 5955-3476. **Fax:** (+86 21) 5955-3021. **Email:** sinap@sinap.ac.cn. **URL:** www.sinap.ac.cn.

Scientific Fields of Interest: Biological Sciences, Chemistry, Environmental Sciences, Physics.

Research and training: Main Academic Fields: 1) Advanced light sources and beam-lines, advanced ion-beam technology and applications; 2) Nuclear physics and inter-disciplinary studies; 3) Nuclear technology application; 4) Radiopharmaceuticals; 5) Accelerator science and technology; 6) Nano-technology.

Achievements: SINAP explores various approaches, such as the research on advanced light sources & beam-lines; the research on advanced ion-beam; the experimental & theoretical research of nuclear physics; the research of inter-discipline and marginal disciplines based on nuclear and nano-technology; radiopharmaceuticals; the research of new materials with the properties converted by radiation processing and the development of applied accelerator and the research of advanced detector technology etc. Conducted such as: R&D of Shanghai Synchrotron Radiation Facility; The studies of radioactive ion-beam physics and nuclear astrophysics; The prophase research of Free Electron Laser(FEL); Critical technical research on the application of nuclear techniques; Critical techniques in ultra-High-Power accelerator for flue gas desulphurization and prototype manufacture; Researches on the mechanism of micro-beam channeling in clusters and related effects; Atmospheric environmental sciences based on advanced nuclear analysis techniques etc.

Facilities: 100MeV Electron Linac, Ps and Fs Electron Beam Facilities, T-ray source, BSRF-3B3 Beam-line, Micro-focusing X-ray Phase Contrast Imaging facility, Ultra-High-Power Accelerator, the Scanning Electron Microscope (SEM), the Inductivity-coupled Plasma Mass Spectrometer (ICP-MS), 4UH pelletron accelerator.

Future plans: The accomplishment of the SSRF project and its application in related fields; further R&D on nuclear physics and inter-disciplinary studies; further R & D on nuclear analysis and the other technology applications.

International Organization: SINAP has established cooperative relationship with various universities and institutes in Japan, Korea, Singapore, Switzerland, Italy, France, Australia, Germany and America etc. in the field of Light Sources, Free-Electron Laser technology, Radiopharmaceuticals etc.

Chinese Academy of Sciences (CAS) — Shanghai Institute of Technical Physics

Head of Institution: Jianyu Wang, Director.

Address: 500 Yutian Road, Shanghai 200083, China. **Phone:** (+86 21) 6542-0850. **Fax:** (+86 21) 6324-8028. **Email:** kgc@mail.sitp.ac.cn. **URL:** www.sitp.ac.cn.

Scientific Fields of Interest: Engineering.

Research and training: Research: Basic research in material science: growth and characterization of narrow band gap semiconductors, ferroelectrics, thin film dielectrics; basic research in physics: electronic states in low-dimensional systems, transport in low-temperature and strong magnetic field, spectroscopic investigations, many particle interactions including electrons, holes, excitons, phonons, photons, etc.; materials and devices: preparation of novel materials for devices including photo detectors in UV, visible and infrared region; infrared systems and circuits; remote-sensing; signal and image process. Training: Graduate programs including Master and Ph.D degrees in physics, materials and engineering sciences and technology; training program for technicians and engineers.

Achievements: Scientific publications and patents. Products: single element, multi-elements, focal plane: 1-14 mm; instruments: multi-channel scan radiometer; imaging spectrograph; ocean color and temperature scanner; infrared spectrometer; infrared camera, etc...

Facilities: For material growth: molecular beam epitaxy, rf sputtering, metallization system, liquid phase epitaxy, sol gel. For basic research and material characterization: magnetic transport system (0-17T and 1.5-300K), magneto-optical spectroscopy, Raman, Fourier transform spectroscopy, spectroscopy ellipsometry, scanning probe microscopy, time-resolved spectroscopy, scanning electron microscopy, modulation spectroscopy. For System: systems for infrared instruments, cryostat dewar. For devices: cleaning with well-equipped device facility. Library for books and magazines.

Future plans: In addition to the current research activities, the institute plans to broaden research areas to biotechnology, environmental technology, photovoltaic and more infrared systems.

Cooperation with developing countries: Collaboration with Malaysia, Russia, Singapore, etc. Plans to increase collaboration activities with more developing countries.

International Organization: USA, Germany, UK, Russia, France, Sweden, Japan, Canada, etc.

Chinese Academy of Sciences (CAS) — Shanghai Institutes for Biological Sciences (SIBS) — Institute of Materia Medica (SIMM)

Head of Institution: Dr. Ding Jian, Director.

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Phone: (+86 21) 5080-6600. **Fax:** (+86 21) 5080-7088. **Email:** suoban@mail.shcnc.ac.cn. **URL:** www.simm.ac.cn.

Scientific Fields of Interest: Biological Sciences, Chemistry.

Research and training: Chemistry of natural products, neuroactive substances, antineoplastic drugs, fertility-regulatory compounds, immunomodulatory agents, cardiovascular remedies, medicinal chelating agents, antibiotics, genetic engineering and computer-aided drug design, organic-synthesis, pharmacology, toxicology and new medicines, pharmacokinetics, traditional Chinese medicines (TCM), TCM modernization, drug and gene delivery, pharmaceuticals; isolation and structure elucidation of bioactive natural products; design, synthesis and structure modification of bioactive compounds; studies on mechanisms of drug actions at molecular and cellular levels; CAD drug discovery and design; high through-put screening; pharmacokinetics and pharmacodynamics; drug safety evaluation.

Achievements: 200 basic and applied research achievements yearly; Artemether; Dimercaptosuccinic acid; disodium salt; Subuxozane.

Facilities: About 100 large and medium-sized instruments for biological and chemical research; State key laboratory of new drug research; National drug screening center; Systematic platforms for new drug evaluation, including: Center for drug safety evaluation & research and Center for drug metabolism and pharmacokinetics; Experimental animal house; Herbarium; Library (30,000 books and 900 periodicals).

Future plans: Adequate attention is paid on the cutting-edge science such as proteomics, system biology, and embryo stem-cells. The new technologies are used immediately with an aim of identifying new drug targets and lead compounds. Besides, the major research directions of SIMM include drugs against tumors, neurological diseases, metabolic diseases as well as those infectious or paroxysmal diseases which have severe influence on public-health. SIMM is also committing itself to Traditional Chinese Medicine (TCM) focusing on natural products through the use of China's abundant natural resources and scientific tradition in this area, thus making strategic and far-reaching contributions to the modernization of TCM.

Cooperation with developing countries: With Brazil in field of natural products.

International Organization: Foreign pharmaceutical companies and academic bodies in Japan, USA, European countries and Israel.

Chinese Academy of Sciences (CAS) — Shanghai Institutes of Biological Sciences (SIBS) — Institute of Biochemistry and Cell Biology (SICB)

Head of Institution: Prof. Dr. Lin Li, Director.

Address: 320 Yue-Yang Road, Shanghai 200031, China. **Phone:** (+86 21) 5492-0000. **Fax:** (+86 21) 5492-1011. **Email:** hxu@sibs.ac.cn, sibcb@sibs.ac.cn, lli@sibs.ac.cn. **URL:** www.sibcb.ac.cn/eindex.asp.

Scientific Fields of Interest: Biological Sciences.

Research and training: Biochemistry and molecular-biology: protein science, gene regulation and function. Cell biology: signaling network of cell activities, stem-cell biology, immunology and developmental biology.

Achievements: Several publications: - An Antimicrobial Peptide Gene Found in the Male Reproductive System of Rats, *SCIENCE*, 291: 1783-1785 (2001). - Low-density lipoprotein receptor-related protein-5 binds to Axin and regulates the canonical Wnt signaling pathway, *Mol. Cell*, 7:801-809 (2001). - Induction of tumor angiogenesis by Slit-Robo signaling and inhibition of cancer growth by blocking Robo activity, *Cancer Cell*, 4:19-29 (2003). - Nudel functions in membrane traffic mainly through association with Lis1 and cytoplasmic dynein. *J. Cell Biol.* 164:557-66 (2004). - Identification of b-arrestin2 as a G protein-coupled receptor-stimulated regulator of NF-kB pathways. *Mol. Cell*, 14:303-17 (2004). - Regulation of PTEN by Rho small GTPases, *Nature Cell Biol.* 7:399-407 (2005). - hDOT1L Links Histone Methylation to Leukemogenesis, *Cell*, 121: 167-178 (2005). - A Nuclear Function of beta-Arrestin1 in GPCR Signaling: Regulation of Histone Acetylation and Gene Transcription, *Cell*, 123:833-847 (2005).

Facilities: Leica TCS SP2 Laser scanning confocal microscopy system; FACSAria Flow Cytometer System; FACScalibur Flow Cytometer System; X ray generator; DNA fragment Detector; Molecule image construction; upright microscope; real-time PCR system; (HPLC) high-pressure Liquid-chromatography; microscope; mass spectrograph; DNA synthesis; continuous free flow electrophoresis; (CE) Capillary Electrophoresis; dynamic Light Scanner (DLS); FPLC/HPLC, acto protein purification system; library.

Future plans: Flow Cytometer System; laser capture microscope; biochip detection system; FTIR spectrometer (fourier transform infra red); micromanipulator; Laser scanning confocal microscopy system; differential scanning calorimetry (DSC); LC-Mass; cryo-electron microscopy.

Cooperation with developing countries: Future Research Directions will focus on Stem-cell Biology: Pluripotency and Differentiation, and Drug Discovery on New Targets and New Mechanisms.

International Organization: Max-Planck Society has two Junior Scientist Groups in IBCB; A-IMBN sets up the joint professorship with IBCB; IBCB scientists collaborate with INSERM scientist.

Chinese Academy of Sciences (CAS) — South China Sea Institute of Oceanology

Head of Institution: Dr. Shi Ping.

Address: 164 West Xingang Road, Guangzhou 510301, China. **Phone:** (+86 20) 844 51335. **Fax:** (+86 20) 844 51672. **Email:** scsio@scsio.ac.cn. **URL:** <http://english.cas.cn/eng2003/dmk01a/pdf/37/Institute%20of%20Oceanology.pdf>.

Scientific Fields of Interest: Biological Sciences, Chemistry, Earth Sciences.

Research and training: Research: Tropical Marine Environmental Dynamics; Marginal Sea Geology and Paleo-environment; Utilization of Marine Biological Resources. Training: Master's degree in physical oceanography, marine chemistry, marine biology, marine geology, marine environment and aquaculture, also for doctoral degrees in physical oceanography and marine biology.

Achievements: Multidisciplinary oceanographic investigations on Nansha Islands and adjacent sea areas, northeastern South China Sea, and central waters of South China Sea; selective breeding, cultivation & development of superior spirulina species; development of marine instruments. Products: marine spirulina, marine health food, marine medicine, vibrocorer, shipboard ocean optical profiling system, pressure wave and tide gauge.

Facilities: Biological Specimen Collection, Library, Research vessels (2), Field stations (4), Computer Working Station, CTD, ADCP, S4ADW Wave, Current Direction-meter, Wave Track 1156, Auto-weather station, Aanderaa Currentmeter, 48 Channel seismic system, Marine gravimeter, Sea-air proton magnetometer, Seabeam SeaBat 8111, Geopulse, Geochirp subbottom profiler, DSM-1, Electronic probe, Ionic-chromatograph, Liquid-chromatograph, Gas chromatograph, Element analyzer, ICP spectrometer, Ultra-violet spectrometer, Varian ProStar-200 HPLC, 761 Compact IC (ion chromatographic analyses), AVANCE 500 MHz NMR spectrometer.

Future plans: Major scientific and technological problems concerned with tropical marine environment, resources and marine development, emphasizing basic studies on marine ecological evolution, ecological system, sustained utilization of bio-resources in South China Sea and adjacent oceans.

International Organization: Present ongoing collaborative projects are on physical oceanographical research with HK (1) on marine bioactive compounds from marine organisms (2) as well as 1 project with Australia and 1 other with

Germany. Plans to continue cooperation in marine studies and investigations with concerned countries.

Chinese Academy of Sciences (CAS) — Xinjiang Institute of Ecology and Geography

Head of Institution: Prof. ZHANG Xiaolei, DG.

Address: 40-3 South Beijing Road, Urumqi, Xinjiang 830011, China. **Phone:** (+86 991) 788-5304. **Fax:** (+86 991) 788-5300. **Email:** goff@ms.xjb.ac.cn. **URL:** www.egi.ac.cn.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences, Earth Sciences, Environmental Sciences.

Research and training: Oasis eco-system and its evolution mechanism; ecological process of oasis eco-system; coupling mechanism of oasis-desert ecotone; oasis environment evolution and degeneration mechanism. Oasis ecological construction and environment improvement: collection of desertification control technology; restoration and reconstruction of the damaged eco-system; experiment and demonstration of oasis eco-agriculture. Exploitation and utilization of resources and regional development: information system of regional sustainable development; regulation of industrial structure and urban rural development; rational exploitation and utilization of resources.

Achievements: 1. An experiment study on drifting sand control in Qira. 2. Afforest technology of restoring *Tamaris* sp. by channeling flood water into saline or alkaline land and sandy land in large areas. 3. The Tarim Desert Highway Project. 4. Synthetic scientific investigation into Taklamakn Desert. 5. Study on realignment of Tarim river watershed and protection of its ecological environment. 6. Study on the desertification control at the lower research of Tarim River and the management demonstration of oasis eco-system. 7. Technological train for increasing yield of cotton and cultivation model of 'double-trunk and double-layer'. 8. Model of 'Biological control of cotton pests' was popularized in demonstrative meeting held by Xinjiang government. 9. Study on control of silt erosion and clearing ways by sluicing water in Toutunhe reservoir, Xinjiang.

Facilities: The institute possesses a library; 7 field stations; Internet connection; various scientific equipments including ICP-MS, LC, electron microscopy, X-fluorescence, DNA-sequencing, PCR, electrophoresis, automatic green house. The Botanical Society of Xinjiang, Zoological Society of Xinjian, Sil society of Xinjian, and the Association for Science and Exploitation et all are affiliated to the institute. Additionally, the institute also possesses two magazines; the Arid with Zone Research and the Arid-land Geography, and several certificates on hydrological survey and assessment of water-resources, environment impact assessment, mapping, tourism planning and design, and engineering design for agriculture and forestry.

Future plans: Based on the advantages of the geographical location, the future development of the institute is to promote the multi-discipline development by research work and to gradually promote the institute into a domestic first-class institute with distinct characteristics and an important influence in the international research domain of arid areas.

Cooperation with developing countries: 1. MOU for scientific-cooperation between China and Egypt. 2. Cooperative study on biodiversity between China and Kazakhstan 3. Memorandum of Sino-Pakistan Collaboration

International Organization: 1. Outbreak and transport mechanism of Aeolian dust and its impact on climate and environment between China and Japan. 2. Eco-system restoration and reconstruction at the lower reaches of Trim River between China and Germany 3. Global MODIS resources satellite receiving system (Japan).

Council of Agriculture — Fisheries Research Institute (FRI)

Head of Institution: Dr. Wei-Chen Su, Director.

Address: 199 Hou-lh Road, Keelung 202, China. **Phone:** (+886 2) 2462-2101, 2462-8283. **Fax:** (+886 2) 2462-4254. **Email:** weicheng@mail.tfrin.gov.tw.

URL: www.tfrin.gov.tw/.

Scientific Fields of Interest: Biological Sciences, Earth Sciences, Environmental Sciences.

Research and training: Biology and aquaculture of aquatic organisms; coastal offshore and deep-sea fisheries stock assessment; aquaculture engineering; processing of fishery products.

Achievements: Freshwater and marine aquaculture; fisheries management; investigation and assessment of fishery resources, improvement of fishing gears, processing and inspection of aquatic food.

Facilities: Headquarters and 5 centres all equipped with advanced instruments; Research vessels; Public aquarium; Land-based and offshore facilities for finfish and shellfish aquaculture; Fish processing facilities/laboratories; Computer facilities linked to a satellite and the Internet; Library with 478 journals (9,103 vol.), 13,023 books and 125 related publications.

Future plans: Investigation of coastal and deep sea fishery resources; development of offshore aquaculture technologies; application of biotechnology in aquaculture; improvement of formulated feeds; monitoring of the quality of fishery products; establishment of fisheries information data base; engineering of fishing gear and innovation of fishing methods.

Cooperation with developing countries: Burkina Faso and Belize.

Council of Agriculture — Livestock Research Institute

Head of Institution: Cheng-Taung Wang.

Address: 112 Farm Road, Hsinhua, Tainan 21246, China. **Phone:** (+886 6) 591-1211. **Fax:** (+886 6) 591-1754. **Email:** Rainbow@mail.tlri.gov.tw. **URL:** www.tlri.gov.tw.

Scientific Fields of Interest: Agricultural Sciences.

Research and training: Herbivorous animals; swine; poultry; livestock products processing; forage crops; livestock management; reproductive physiology and biotechnology.

Achievements: Taishi No.1 White Tsaiya duck obtained by breeding; Improved crossbreeds of beef cattle obtained; 3-way crossbred hogs with better growth performance and carcass quality; Native black pigs obtained through breeding and selection; Eradicating of hog stress gene by Halothane test; New varieties of napiergrass obtained; New variety of sudangrass obtained; Manure-bed pig house and 3-step treatment of animal wastes for pollution control; Device of dead animal treatment; New processing technique for meat, milk and egg developed.

Fuwai Hospital

Head of Institution: Dr. Hu Shengshou, President.

Address: 167 Bellishi Road, Xicheng District, Beijing 100037, P.R. China. **Phone:** (+86 10) 6831-4466. **Fax:** (+86 10) 6831-3012. **Email:** mail@fuwaihospital.org. **URL:** www.fuwaihospital.org.

Scientific Fields of Interest: medical Sciences.

Research and training: Fuwai Hospital is one of the largest centers specialized in treatment, prevention and research in cardiovascular disease in the world. The hospital is mainly engaged in: Clinical diagnosis and treatment, large clinical trials in cardiology; basic research including epidemiology, clinical pharmacology and molecular-biology. The hospital also offers Post-graduate education; fellowships and continuous medical training throughout the nation. Fuwai Hospital is the base for the following training centers: WHO Beijing training center for cardiac surgery; Fuwai-Oxford training center for cardiology; Medtronic Pace training center; Edward training center for cardiac surgery; national training center for cardiac surgery; national training center for interventional cardiology; national training center for pacing and electrophysiology.

Achievements: Founded in 1956, Fuwai hospital now has 17 clinical departments, 13 medical supporting departments and 5 research laboratories. The hospital has 542 licensed beds for patients with cardiovascular diseases and additional 6 ICU. Annually outpatients are more than 200,000 and around 5,000 cardiac surgical cases (including CABG, valve replacement, great vessels

operation and operation of complicated congenital heart disease such as Fontan and double switch) and 16,000 interventional procedures (including CAG, PTCA, RF ablation, pacemaker implantation, interventional treatment for great vessel and congenital heart disease) are performed in this hospital each year. Basic medical research and cardio vascular epidemiology are also investigated widely and deeply. Clinical cardiology, clinical epidemiology, caridomyopathy research and population genetics have reached international level. Large clinical trials such as CCS-1 were led by this hospital. The hospital has won numerous national scientific research awards and published hundreds of articles in peer-reviewed journals including Circulation and JAMA.

Facilities: Digital substrate angiography; magnetic resonance imaging; electron-beam CT; multidetector row spiral CT; SPECT; PET; color doppler echocardiography; EnSite 3000; CARTO mapping system; medical biochemical analyzer; high-performance liquid-chromatography; Sino-German lab for molecular medicine.

Future plans: Working together, sharing resources, knowledge and experiences, implementing new programs, services and technologies to meet the highest standards for medical care and healthy improvement; keeping the leadership status in cardiology in China and striving to become one of the first-class cardiovascular disease centers in the world.

Cooperation with developing countries: Indonesia, India, Vietnam

International Organization: 9 international cooperation projects such as: CCS-2 (The Second Chinese Cardiac Study) with Oxford University, UK; PURE (The Prospective Urban and Rural Epidemiological Study) with MacMaster University, Canada; OASIS; CREATE; ONTARGET/TRANSCEND;ADVANCE.

Huazhong Agricultural University — National Key Laboratory of crop Genetic Improvement (NKLCGI)

Head of Institution: Dr. Qifa Zhang, Director.

Address: Wuhan 430070, China. **Phone:** (+86 27) 8728-2104. **Fax:** (+86 27) 8728-0016. **Email:** croplab@mail.hzau.edu.cn. **URL:** www.hzau.edu.cn/en1.htm.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences.

Research and training: List of main lines of research and training activities: The overall goals of the Laboratory are to solve fundamental scientific problems in genetics and crop improvement by combining biotechnology with conventional genetic analysis and breeding, to develop new strategies and critical technologies for breeding applications, and to breed novel germplasms and new varieties. The research activities cover a number of major crops including rice, rapeseed, cotton, maize, citrus, and tomato, at molecular, cellular, individual and population levels. The areas of the current research work include: 1) genome mapping; 2) cloning genes of agricultural importance; 3) functional genomics; 4) biological mechanisms and utilization of heterosis; 5)

germplasm evaluation and enhancement; 6) breeding technology and varietals development. The target traits are yield, product quality, insect and disease resistance, drought resistance and nutrition-efficiency.

Achievements: Main research progresses having gained international recognition include: (1) Discovery of *Pol cms* in *B. napus* that has been widely used in hybrid breeding programs of *B. napus* and *Cruciferae* vegetables in the world; (2) Establishment of technological platforms for functional genomic studies including T-DNA insertional mutant libraries, cDNA microarray in rice, cotton and maize, full-length cDNAs and related information platforms; (3) Genetic and molecular basis of heterosis in rice and rapeseed; (4) Gene cloning and functional identification, such as genes for agronomically important traits and disease resistance in rice; (5) Somatic hybridization between upland cotton and wild cotton; (6) Collection and discovery of citrus bud mutants; (7) Development of crop varieties widely used in commercial production combining conventional breeding with molecular marker and transgenic technologies, in particular oil-seed rape hybrids gained a total planting area of over 4 million hectares annually. In the last five years, 496 research papers have been published, of which 175 papers appear in the international Journals such as PNAS, The Plant Journal, Genetics, Theor. Appl. Genet. etc. A total of 39 new crop varieties were released. The Laboratory was rated excellent in the two consecutive nationwide evaluations taking place in 1996 and 2001, organized by the National Natural Science Foundation of China.

Facilities: The Laboratory is Well-equipped for molecular-biology research and field breeding. The major pieces of equipments include: 13200 sq.m space of the laboratory; 66,700 sq.m crop breeding fields; 835 sq.m greenhouse, 620 sq.m seed storage, filed house and 4662 sq.m bird-net equipped fields. A set of DNA Chip facility, a QSTARXL LC/MS/MS System, a Leica TCS SP2 Laser Confocal Microscope, two Automated DNA Sequencers, a FLA-5100 Fluorescent Image Analyzing System, a 4300 Genetic Analyzer, a Preparative Ultracentrifuge, two High-Power Liquid-chromatographers, a set of Convion CMP4030 Controlled Environment System, Differential Scanner, a 7500 Real-time PCR System, an Amylose Analyzer, a Somatic Hybridizer, a Soft X-ray Irradiator, three UV-Spectrophotometers.

Future plans: Further development in functional genomics of rice, rape-seed, cotton and maize; Fully characterizing the biological mechanism of heterosis; Developing environment-friendly crop varieties with high productivity particularly adapted to low input conditions, using a combination of technologies.

Cooperation with developing countries: Technical expertise to India, Sri Lanka, Egypt; Training students from India, Sri Lanka, Korea and Bangladesh; Collaborative projects with India for exploitation and utilization of rape-seed; An ongoing regional training course for characterization of tropical fruit genetic resources, involving countries include: Malaysia, Thailand, Indonesia, India, Sri Lanka, Philippines, Vietnam, and Colombia.

International Organization: Grants from Rockefeller Foundation, IFS and IRR for research in rice and citrus. Agreements with SWAB, Monsanto Company, FAO, and institutions in Canada, Japan, Netherlands, Australian, EU and UK.

Nankai University — Institute of Modern Optics (IMONK)

Head of Institution: Guoguang Mu, Head.

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Scientific Fields of Interest: Physics.

Research and training: Research: Optical image and information processing; Optical design; Optical neural networks and pattern recognition; Holography; Vision optics; Laser spectroscopy and spectrum technique; Laser physics and devices; Optoelectronics; Optical fiber communication and fiber devices; Ultratrafast laser pulse techniques and applications; Biomedical photonics; Training: BS, MS and Ph.D programmes.

Achievements: More than 120 research projects are underway and 90 have been accomplished, 45 projects were appraised, 6 were patented including one US patent, 30 received awards including 2 State Invention Awards and one State Nature Science Award. More than 1200 academic papers and 32 academic or translated books were published.

Facilities: All-solid-state green laser£"Coherent Verdi-5W£©, Argon laser(SP2060-5), Excimer laser(M-100), Multi-wavelength pulsed mode-locked YAG laser, He-Cd laser(Kimmon IK4171-G), Semiconductor laser (SDL-TL30), Digital communication analyzer, Synthesized sweeper, Optical spectrum analyzer(Ando AQ6315E), Optical spectrometer(Q8383 Japan) , Q-switched laser, Micro-densitometer(1010M), Optical multichannel analyzer, Wide-band spectroscopy analyzer , Selectscan plus color scanner, Fs laser amplifier system(50fs, 1~1kHz, 2mJ),Vision diagnosis system(WF-Z180 USA), Tek 83480A oscilloscope, Tek 54750A sampling oscilloscope, Sampling integrator(162 USA), SR240 Gating, High speed CCD sensor (CA-D6-0256W), AGFA image scanner,Newport RS-3000£"L-Shape£©optical isolation table, Newport ESP300 linear stage sets, Nanometer position system (P-611.38 Germany), OLYMPUS BX51 microscope, OLYMPUS FV300 confocal laser scanning biological microscope Ver 4.3a, Coupling workstation (ACMS-300A USA), 100 personal computers.

Future plans: Developing binary optics including different kinds of devices, wireless optical communication, photonics in biology and medicine, image science, optics/digital technique for optical instruments, femtosecond laser ultra-micro machining, femtosecond laser propulsion.

Cooperation with developing countries: Nanyang Technological university, Singapore.

International Organization: Institut d'Optique Orsay, France; University of Dundee UK; Pennsylvania State University USA; Syracuse University USA; Heidelberg University, Germany; Lavel University, Canada. Over 100 foreign

professors visited IMONK and more than 40 IMONK researchers visited other faculties for academic purposes.

National Laboratory of Biomacromolecules (NLB)

Head of Institution: Zi-he Rao.

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Scientific Fields of Interest: Biological Sciences.

Research and training: Research: Study of the structure and function of biomacromolecules; Enzyme catalytic and regulatory mechanisms; Kinetics of irreversible modification of enzyme activity; Folding of the nascent peptide chain into a biological active protein; Structural-function relationship of biomembranes centered on the interaction of membrane lipids and membrane protein.

Achievements: Numerous articles in refereed national and international publications.

Facilities: Major instruments include: 400 and 600 MHz spectrometer; Siemens X-200B area detector system; Rota flex 18-Kw stabilized rotating; Anode X-ray generator and attachment; 38LA-00 DNA synthesizer; Bio-rad poly-peptide synthesizer; Dionex temperature jump and stopped flow fast kinetics; 299T nanosecond spectrofluorimeter; JASCO-720 and 500A spectropolarimeter; Bio-rad FT-65A FT-IR and FT-Raman spectrometer; Waters HPLC; Pharmacia FPLC.

Future plans: Advanced research on structural Biochemistry and molecular-biology.

International Organization: Scientific exchange of scientists and graduate students, joint studies with scientists in USA, Australia, Germany, France, UK and Japan.

Taiwan Forestry Research Institute (TFRI)

Head of Institution: Hen-Biau King, Director.

Address: 53 Nanhai Road, Taipei, China. **Phone:** (+886 2) 2303-9978. **Fax:** (+886 2) 2305-2027. **Email:** extension@mail.serv.gov.tw. **URL:** www.tfri.gov.tw.

Scientific Fields of Interest: Agricultural Sciences, Environmental Sciences.

Research and training: Forest biology; silviculture; forest management; forest economy; forest protection; watershed management; wood utilization; forest chemistry; pulp and paper; forestry extension

Achievements: Publish of Taiwan Journal of Forest Science (quarterly) and contributions to several domestic and international journals; active participation in the International Long-Term Ecological Research Network.

Facilities: SEM, GC-MS and all essential physical, chemical and biological facilities needed to carry out all assortments of forestry and forest product researches, including genetics, bio-engineering, taxonomy, wood processing, pulp and papermaking, etc.; 45Mbps Internet connection, LANs for documentation, personnel management, upland soil databases, email and libraries. Computer hardware includes 1 router, 1 core exchanger, 22 hubs, 20 servers, 1 firewall, 400 PCs and 80 notebooks; 6 field stations (research centers) with a total area of 13,600 ha.; central library with 30,000+ books and 550 journals.

Future plans: The TFRI will be undergoing consolidation with other research institutions under the Council of Agriculture to become an administrative incorporation: The National Institute of Agricultural Research largely supported by the government. Then the institute will be at liberty to adjust its personnel need with possibility of hiring or training local and foreign students.

Cooperation with developing countries: As a regional center of forestry related researches, the institute has always been interested in international cooperation and exchanges. Over the years the institute has had many visitors from developing countries, particularly from SE Asia (Indonesia, Philippines, Vietnam, Thailand, Malaysia, Korea and Mongolia). The International Long-Term Ecological Research Network is bringing many such guests to the institute. TFRI intends to fortify these activities in the future.

International Organization: The institute has an active exchange program with the USDA Forest Service, in particular, the Pacific Northwest Stations. An MoU of exchange and cooperation has been signed with a Canadian delegation. There is also an active cooperation study with Waikato University (New Zealand). In an effort to establish and eco-grid, the institute is collaborating with several US institutions as well.

Colombia

Instituto Colombiano de Geología y Minería (INGEOMINAS)

Head of Institution: Eng. Julian Villarruel Toro.

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www.ingeominas.gov.co.

Scientific Fields of Interest: Earth Sciences, Environmental Sciences.

Research and training: Geology; geochemistry; geophysics; mineral resources and hydrogeology; geohazards; mining (development and control); geoscientific information.

Achievements: Geoscientific cartography; geology, geochemistry, geophysics; geoscientific database; geoscientific information (GIS analysis); mineral resources potential and targets for exploration; geohazard information of Colombia: landslides, seismic, volcanic; geohazards and risk analysis; hydrogeology resources potential.

Facilities: Computers and specialized software for geo-scientific information management and analysis (GIS); library covering subjects related to earth sciences such as mining and development; geochemistry lab facilities and equipment including AAS, ICP-DES, coal analysis LECO, GFAAS-Zeeman, HGAAS, UV-VIS, ISIE, HPLC, IC sedimentography, CVA; Geomechanics: consolidometer; triaxial, piezocone, classification devices; TRIGA reactor: commissioning phase; nuclear techniques: XRFNITON (field), X-Ray microprobe; ash coal analyzer; Geology: OM, EM-ECAX and microprobe, XRD, petrology facilities.

Future plans: TRIGA reactor commissioning for research application; mineral resources and groundwater exploration projects; follow-up geology, geochemistry and geophysics projects; geohazard and mining projects; geoscientific information system.

Cooperation with developing countries: MAP (Multinational Andean Project: Geoscience for Andean communities (MAP-GAC); cooperation activities with Latin American countries.

International Organization: IAEA (International Atomic Energy Organization).

Instituto de Hidrologia, Meteorologia y Estudios Ambientales (IDEAM)

Head of Institution: Carlos Costa Posada.

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Fax: (+57 1) 352-7131, xt. 2131. **Email:** direccion@ideam.gov.co, claudiac@ideam.gov.co. **URL:** www.ideam.gov.co.

Scientific Fields of Interest: Earth Sciences, Environmental Sciences.

Research and training: Research for Weather forecast and climate prediction: sinoptics scale, global-scale and microscale to Prevention and Attention of Disasters National System; Research for flood forecast and hydrological Model. IDEAM is making the hydrological model of Colombia for application to territorial environmental arrangement; The Environmental Information System of Colombia, SIAC (acronym in Spanish). IDEAM is managing the environmental data base of Colombia, in order to obtain, safe and file the environmental statistic information of Colombia.; Technical support to make decisions by environmental authorities, the Environmental, Housing and Territorial Development Department, MAVDT (acronym in Spanish) and regional authorities like Regional Autonomous Corporations and National Environmental System, SINA (acronym in Spanish); Technical support to develop quality air regulation, quality water regulation and establish monitoring protocols of water, air and forest; Improvement and assuring of hydrological, meteorological and environmental Colombian data base; Environmental laboratories accreditation; Research of basic Meteorology: climate variability, atmosphere composition and Climate Change; Research of applicator Meteorology: Agrometeorology, Aeronautic meteorology and Quality air.

Achievements: For the prediction and mitigation of natural disasters, IDEAM made 417 warning and 883 release of press, In 2005; Monitoring to the Southern Oscillation Phenomenon (ENSO) of 1997; Permanent monitoring of Caribbean hurricane season; The Water National Study, which establish the lack of water on municipal scale; The First National Communication on Climate Change of Colombia; Colombia's National Greenhouse Gas Inventory; The Annual Report of Colombian Natural Resources, since 1997; Modernization, operation and management of hydrological, meteorological and environmental monitoring stations of the Colombian network: 2580 conventional stations and 203 automatical stations; Accreditation of 29 Colombian Environmental Laboratories, on water analysis.

Facilities: 2783 hydrological, meteorological and environmental monitoring stations; 11 Operative Regional Offices in Colombia; 1 National reference laboratory on water analysis.

Future plans: Development of hydrological national model: Development of climate modeling and national study of climate; Improvement customer service; Establish of Monitoring Standards and Monitoring Protocols; Risk Information to planning and territorial arrangement.

International Organization: Agreements with multilateral cooperation (World Bank). Integrated National Adaptation: High mountain eco-systems, Colombia's Caribbean insular areas and human health (INAP); Swiss Agency for Development and Cooperation (SDC); Scientific exchange IDEAM - Swiss institution; National Oceanic and Atmospheric Administration (NOAA). Scientific exchange IDEAM - USA Institutions; Japan International Cooperation Agency (JICA). Scientific exchange IDEAM - Japan Institutions; International Civil Aviation Organization (ICAO). Agreement of technical cooperation.

Universidad Nacional de Colombia — Instituto de Ciencias Naturales (ICN)

Head of Institution: Jaime Aguirre Ceballo.

Address: Edificio 425, Apartado 7495, Bogotá, Colombia. **Phone:** (+57 1) 316-5000 (ext.11503). **Fax:** (+57 1) 316-5365. **Email:** inscien-bog@unal.edu.co, jaguirrec@unal.edu.co. **URL:** www.icn.unal.edu.co.

Scientific Fields of Interest: Biological Sciences.

Research and training: Flora of Colombia; Fauna of Colombia; Biodiversity Analysis; Palinology; Biogeography; Population and Community Ecology; Ethnobiology and Economic Botany; Floristics and Vegetation; Archaeobotany and Archaeozoology.

Achievements: Institutional publications: CALDASIA, Colombia Diversidad Biotica, Red books of flora and fauna of Colombia.

Facilities: Colombian National Herbarium (COL), more than 500,000 specimens (the largest colombian herbarium); Zoological collections (ICN), more than 240,000 specimens; Library 'Armando Dugand, specialized on Taxonomy, systematics and ecology.

Future plans: One of the main objectives is to have all our collections (the largest of Colombian biota) digitalized and available throughout the University website. To compile and analyze information about conservation priorities in Colombia at Eco-systems and species level.

Cooperation with developing countries: Active cooperation for collection and scientific interchange with many Latin American institutions.

International Organization: CITES authorities for Colombia; Members of the Global Taxonomy initiative (GTI); Members of the AudioNet (CBD); Part of the BIOMAP alliance.

**Universidad Nacional de Colombia (UNC) —
Departamento de Química**

Head of Institution: Prof. Isabel Cristina Perilla, Director.

Address: Faculty of Sciences, Ciudad Universitaria, Apdo Aereo 14.490, Bogotá, Colombia. **Phone:** (+57 1) 316-5210. **Fax:** (+57 1) 316-5220. **Email:** depquimica_bog@unal.edu.co. **URL:** www.unal.edu.co.

Scientific Fields of Interest: Biological Sciences, Chemistry.

Research and training: Biochemistry; coordination compounds; organometallic compounds; natural products; materials science; heterogeneous catalysis; fuels; carbon; thermodynamics; theoretical chemistry; bioinorganic chemistry; electrochemistry; environmental chemistry.

Achievements: About 100 publications each year

Facilities: Library, computers, HPLC, gas chromatography; mass spectrometer, IR, UV-VIS spectrometers, RMN.

Future plans: Renewal of equipment; to offer graduate studies in other cities of the country.

Cooperation with developing countries: Venezuela, Mexico, Cuba

International Organization: US, Belgium, Spain

Costa Rica

Instituto Nacional de Biodiversidad (INBio)

Head of Institution: Rodrigo Gámez-Lobo, President.

Address: P.O. Box 33-3100, Santo Domingo, Heredia, Costa Rica. **Phone:** (+506) 507-8100. **Fax:** (+506) 507-8274. **Email:** rgamez@inbio.ac.cr. **URL:** www.inbio.ac.cr.

Scientific Fields of Interest: Biological Sciences, Earth Sciences.

Research and training: Research focused on inventory, bioprospecting, eco-tourism, information management and dissemination programs, environment. Training: short-term programs, workshop, internships and volunteer programs.

Achievements: As of 2004, collection and computerized information on more than 2 million specimens; taxonomic revision and field guides; cutting-edge technology for the management, analysis, presentation, distribution and integration of biodiversity information.

Facilities: Laboratory facilities and equipment for taxonomic identification, classification and monitoring systems, biodiversity management system hardware and software, specimen storage facilities, chemical extraction laboratories, 22 field biodiversity offices; biology screening laboratories.

Future plans: Completion of national biodiversity inventories; further development of the biodiversity information management system, GIS modules, international networking and multimedia software to support INBio's multi-user information dissemination programme; development of 12-hectare institutional campus.

Cooperation with developing countries: Collaborations with Mexico, Kenya, Philippines and Indonesia for information-exchange, training and technical assistance. Regional Central American biodiversity management support programme.

International Organization: Cooperative agreements on biodiversity and its sustainable use with universities and research Centres in Costa Rica, Europe and the United States. Programmed collaborations with bilateral and multilateral agencies, foundations and other entities interested in financing biodiversity programmes.

Universidad de Costa Rica — Centro de Investigación en Biología Celular y Molecular (CIBCM)

Head of Institution: José A. Bonilla Vargas, Director.

Address: CIBCM, Ciudad de la Investigación, Universidad de Costa Rica, Sabánilla, San José, Costa Rica. **Phone:** (+506) 207-3204. **Fax:** (+506) 207-3190. **Email:** jbonilla@cariari.ucr.ac.cr.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences, Environmental Sciences.

Research and training: Human genetics and pathology; plant biology and biotechnology; biodiversity and prospection; plant pathology.

Achievements: Association of genes to diseases; transgenic plants (rice); new species described; several new viral diseases described in plants; support to regional farmers and producers.

Facilities: Ultracentrifugation; PCR; cold rooms; green house; sequencing; transfection lab; cell-culture lab; access to electron microscope; biochemistry lab

Future plans: PCR real-time technology for diagnostics and genetics; proteomics.

Cooperation with developing countries: CIAT (Colombia); CINVESTAV (Mexico); ICGEB (India, Mexico, Argentina).

International Organization: NIH, IFS, EU, several US universities.

Universidad de Costa Rica — Facultad de Microbiología — Instituto Clodomiro Picado

Head of Institution: Dr. Yamileth Angulo Ugalde, Director.

Address: San Pedro, San José, Costa Rica. **Phone:** (+506) 229-0344, 229-3135. **Fax:** (+506) 292-0485. **Email:** yangulo@cariari.ucr.ac.cr. **URL:** www.icp.ucr.ac.cr.

Scientific Fields of Interest: Biological Sciences.

Research and training: Biochemical and molecular characterization of toxic proteins from snake venoms and bacteria; toxicological characterization of venoms and toxins; experimental pathology of envenomings; biology of venomous animals; technological development for antivenom production; immunological studies on venoms and antivenoms.

Achievements: Scientific papers on a variety of subjects dealing with venomous animals, their venoms and antidotes, as well as with bacterial toxins; production of antivenoms, which are distributed in Central America for the treatment of snakebite venoms.

Facilities: Equipment for protein isolation and characterization; equipment for molecular-biology studies; equipment for histology/pathology work (microtomes,

microscopes); equipment for blood plasma fractionation; equipment for cell-culture.

Future plans: Increase the capacity of characterizing proteins and performing structure-function relationships; deeper understanding of the mechanism of action of toxins at the cellular level; biotechnology for the development of novel pharmaceutical products.

Cooperation with developing countries: Brazil, Colombia, Peru, Mexico. Plans to increase collaboration with Latin American countries.

International Organization: Financial support to research projects from a number of international agencies; research collaborations with groups in USA, France and Sweden.

Cote D'Ivoire

Centre National de Recherche Agronomique (CNRA)

Head of Institution: Dr. Tiemoko Yo, DG.

Address: 01 BP 1740 Abidjan 01, Cote d'Ivoire. **Phone:** (+225 23) 472-424.

Fax: (+225 23) 472-411. **Email:** info@cnra.ci. **URL:** www.cnra.ci.

Scientific Fields of Interest: Agricultural Sciences, Chemistry, Environmental Sciences.

Research and training: Crop production: Perennial crops (coffee, cocoa, cola, oil palm, rubber, and fruit crops); Annual crops (rice, corn, millet, sorghum, root plants and tubers, cotton, sugarcane, market garden products and proteaginous). Forestry and environment: parceling out, silviculture, Agro-forestry; systems of sustainable production; sustainable management of natural resources. Animal and fishery productions: rearing of ruminants; short cycle rearing; fishing and aquaculture. Modern technologies: agricultural biotechnologies; food technologies; wood technologies.

Achievements: High-yielding varieties of cash crops and food crops; Improved cropping systems; Good post-harvest practices; Biotechnology tools; Gene-banks.

Facilities: CNRA headquarters is located at Adiopodoumé. The centre has 5 regional offices at Abidjan, Bouaké, Gagnoa, Korhogo and Man representing the main agro-ecologies of Cote d'Ivoire. Research infrastructures comprise; 18 experimental stations, 1 modern biotechnology laboratory, one soil laboratory with nitrogen 15 analysis facilities; one food technology laboratory; one wood technology lab; four pathology laboratories (entomology, mycology, nematology, and virology); over 20 controlled-environment greenhouses; several ex-situ gene-banks (coffee, cocoa, yam, coconut, palm oil tree, rubber tree, É); one insectarium. Computing facilities support all research activities. Every research station has farm equipment, field plots, a specialized library and cold storage facilities.

Future plans: Recent conflicts in Cote d'Ivoire have significantly damaged the research for development capacity of CNRA. Immediate plans consist of revitalizing the agricultural research and innovation systems to reduce poverty in post-conflict regions of Cote d'Ivoire. Thus there is need to reconstruct or rehabilitate seven research stations, one soil laboratory with Rhizobium production facilities, one entomology laboratory, one phytopathology lab and one gene-bank for food crops.

Cooperation with developing countries: Partnership is an important aspect of CNRA operations. Our partners include stakeholders in agricultural development; i.e. community based organizations, private-sector, universities, research institutes in Africa, Asia, Europe, America and international donor agencies. At the regional level CNRA is an active member of West and Central African Council for Agricultural Research and Development (CORAF/WE CARD). In addition, the center has bilateral partnerships with the

National Agricultural Research Services in Gabon, Guinea, Congo Brazzaville, Burundi, and Senegal as well as collaborative research projects with the International Institute of Tropical Agriculture (IITA), Africa Rice Centre (WARDA), International Plant Genetic Resources Institute (IPGRI), The World Vegetable Centre (AVRDC), Confederacion de Asociaciones Rurales de Buenos Aires y La Pampa (CARBAP), international Network for Improvement of Banana and Plantain (INIBAP), WorldFish Centre (ICLARM), and the Centre International de Recherche - Développement sur l'Élevage en zone Subhumide (CIRDES).

International Organization: CNRA develops and conducts collaborative research programmes with institutions in Europe (Belgium, Denmark, France, and Germany), America and Asia. Major donors include the International Scientific-cooperation Section of the European Commission (EU-INCO), CFC, FAO, IFAD, African Development Bank and the World Bank.

Centre Suisse de Recherche Scientifique en Cote d'Ivoire (CSRS)

Head of Institution: Prof. Guéladio Cisse, Director.

Address: 01 BP 1303, Abidjan, Cote d'Ivoire. **Phone:** (+225 23) 472-790. **Fax:** (+225 23) 451-211. **Email:** gueladio.cisse@csrs.ch. **URL:** www.csrs.ch.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences, Environmental Sciences.

Research and training: Research Axis Natural environment and biodiversity: botanic in fragmentary forest areas; active compounds from the most promising medicinal plants; animal diversity; study of chimpanzees in the National Park; research on monkeys (ethology, functional anatomy and locomotion, cognitive abilities and conservation); impact of poaching on monkeys; diversity of the dung-beetles; diversity of rodents; Research Axis Nutrition and Food Security: causes of iron deficiency; roots and tubers (mainly yam and cassava); intensive culture of food plants; interdependence between the health status of farmers and their productive capacity; food chain (production, biochemical, economical, social aspects); Research Axis Parasitic diseases and development: intestinal parasites and ticks in cattle; mortality of calves; risks and opportunities of different systems of cattle-raising; new antihelminthic substance against gut nematodes in sheep; control of human parasitic diseases (mainly malaria, schistosomiasis and geohelminth infections); Research Axis Urban Environment: waste and wastewater management in underprivileged areas; health impact assessment of water pollution and bad environmental conditions; demography and family planning in poor urban settlements; major diseases of poverty in urban context (malaria, Tuberculosis, HIV/AIDS); economy, health and environment; vulnerability and resilience; overlapping syndromes of global change; health and global change.

Achievements: The scientific results are generated by the diverse partners using the CSRS platform for their research activities. Many of the results are contributing to fundamental research advancing knowledge in science (botany, zoology, etc). Many other results are more dedicated to foster the development dynamics in the study areas; that is due for a large part to our wide use of the process of 'Research - Action - Capacity-building', which is an iterative process involving the laboratory and the field, and which involves all the various actors and the beneficiaries. - Our researches highlighted on maps how the forests in Cote d'Ivoire have been severely reduced in recent years, because of the strong pressure caused by the increase in population. Outside the National Parks and a few classified forests, there are only fragmentary forest areas, which are vestiges of what was once continuous vegetation. The project for the study of chimpanzees in the National Park is now in its 24th year. The chimpanzee is the closest relative of humans, so the findings (published in high international scientific journals) give a lot of fundamental information that deepens our understanding of our own species. The results of activities in forests allowed the development of new, practical tools which will help in the management of protected areas and improve the efficacy of protective measures. Some of the studies showed that the main cause of iron deficiency is a very low intake coupled with poor bio-availability. A study of food consumption in three geographical zones (Bouaké, Boundiali and Abidjan) showed that no special weaning foods and that supplementary feeding of infants (4-24 months) is unbalanced and there are anti-nutritional factors in the diet. The studies on agriculture and health showed that there appears to be a close linkage between the health of market gardeners and their productivity. Particularly, the fight against malaria in hyperendemic areas must therefore be encouraged, and carried out in synergy with programmes for more intensive cultivation. Health and environmental issues are exacerbated in poor urban settlements; the resilience of these vulnerable groups is complex and innovative strategies are required; innovative pilot projects have been implemented: in 2005, 5 Ph.D have been completed; in 2006, 37 Ph.D studies are running (27 South, 10 North).

Facilities: 1 field station at Bingrakro (200 kilometers from Abidjan); 3 laboratories (Botanics, Chemistry, Microbiology); first equipment available for molecular-biology; 50 computers; 1 library with more than 6'000 books, a virtual library, and possible access to thousands of international journals (Hinari, Agora, É); 13 vehicles; 1 special training room, equipped with 24 computers connected to Internet, allowing video conferences.

Future plans: development of researches using molecular-biology; strengthening the supervision capacities (involvement of more seniors and advanced post-docs); strengthening the scientific advisory board; increasing funds for young researchers and more projects; offer of useful and specific training modules for young researchers (statistics, scientific writing, etc.); reinforcement of affiliation to regional and international networks (English and French, north and south).

Cooperation with developing countries: Presently: Agreements signed with partners in Mauritania, Burkina Faso, Chad, and Nigeria. Planned: agreements to be signed with partners in Tanzania, South Africa; links to be reinforced with South East Asia in the framework of the international research Programme NCCR-NS Research Partnership for Mitigating Syndromes of Global Change.

International Organization: Swiss National Science Foundation, Switzerland; Swiss Development Cooperation Agency, Switzerland; Swiss Academy of Science, Switzerland; International Foundation for Science (IFS), Sweden; International Research and Development Centre (IRDC), Canada.

Universite de Cocody — Institut de Recherches Mathématiques (IRMA)

Head of Institution: Dr. Bla Toh Lambert.

Address: 08 BP 2030, Abidjan 08, Côte d'Ivoire. **Phone:** (+225) 2248-0149.

Fax: (+225) 2248-6400. **Email:** irma@ucocody.ci. **URL:** www.ci.refer.org/ivoir_ct/edu/sup/uni/abi/irma/accueil.htm.

Scientific Fields of Interest: Mathematics.

Research and training: Normed algebras A whose Squares are finite dimensional; module algebras; Computer processing of the spoken language; development of NTIC applications in the nuclear domain; Filtrations in a semi-ring an study of Samuel numbers; Research of bio-morphologic standards of prosthetic references about the melano-african subject; Analysis of qualitative methods of resolution of ill-posed problems, and interpolation spaces and their applications; Information System in computer using management; Security in Technology of Information and Communication.

Achievements: Preparation and defense of two theses in 1984 and 1992; publications of papers appeared in the following journals: Africa Mathematika; Travaux Mathématiques - Publications du Centre Universitaire de Algebras, groups and Geometrics; proceedings of the American Mathematical Society; Writing of secondary school mathematic books.

Facilities: 1 data server, 5 desktop computers, 1 scanner, 5 printers, a library containing many mathematics and informatics books, journals reviews and scientific productions of the researchers of the Institute.

Future plans: Writing pedagogical mathematics books at the university level and opening of a laboratory in tele-detection and observation of the seasons and climate.

Cooperation with developing countries: Morocco and Benin

International Organization: The institute is affiliated to TWAS-ICTP donation program (books).

**Universite de Cocody-Abidjan — UFR des Sciences de
la Terre et des Ressources Minieres — Centre
Universitaire de Recherche et d'Application en
Teledetection (CURAT)**

Head of Institution: Prof. Affian Kouadio.

Address: 22 BP 801, Abidjan 22, Cote d'Ivoire. **Phone:** (+225 22) 445-270.
Fax: (+255 22) 445-270. **Email:** k_affian@yahoo.fr. **URL:** www.centre-
curat.salifa.com.

Scientific Fields of Interest: Biological Sciences, Earth Sciences,
Environmental Sciences, Physics.

Research and training: Research: Environment; Ground Water Management;
Eco-system forest Management; Territorial Management; Coastal zone
Management; Impact of the war on the Environment. Training activities: Master
Degree in Remote-sensing and Ph.D Programme.

Achievements: Suspended sediment classification within the Koumassi Bay
using remote-sensing; chart of sediment content of iron, zinc and copper withing
3 Bays of Abidjan lagoon; forest degradation study between 1986-2000 using
remote-sensing and GIS; anthropogenic pressures in the Marahoue Park;
rainfall variability in Cote d'Ivoire; building a GIS system for pollution studies in a
tropical lagoon (the case of the Ebrié Lagoon in Cote d'Ivoire);

Facilities: PCs; client server network allowing file sharing and other resources;
table to digitalize and trace A0 paper format; A4 scanner. Software: PCI-
GEOMATICS; IDRISI (for Windows and DOS); MULTISCOPE (for Windows);
ENVI; Erdas Imagine. GIS software: PAMAP (for DOS); MAP-INFO; ARCVIEW.

Future plans: Investigate the possibility of combined telecon/Internet
conferencing to run some courses and seminars.

Cooperation with developing countries: University of Yaounde and
University of Lomé.

International Organization: Present: collaboration in the field of remote-
sensing between A&M University and CURAT. Future: collaboration with
Michigan State University.

Cuba

Centro de Biopantas (Plant Biotechnology Centre)

Head of Institution: Ramón Santos Bermúdez.

Address: Universidad de Ciego de Avila, Carretera a Morón km. 9, Ciego de Avila 069450, Cuba. **Phone:** (+53 33) 225-768, (+53 7) 510-994. **Fax:** (+53 33) 266-340. **Email:** rsantos@biopantas.cu. **URL:** www.biopantas.cu.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences, Environmental Sciences.

Research and training: Plant-cell & Tissue-culture: Plant micropropagation through organogenesis and somatic embryogenesis. Automation and environmental control of Temporary Immersion Bioreactor. Ecological and physiological aspects of plant tissue-culture. Molecular markers of plant morphogenesis. Artificial Seed. Host-Pathogen interaction: (Plant-fungus interaction) - Early selection systems for plant resistance. Isolation and cloning of Avr and R genes for diagnosis and plant-breeding. Mechanisms of Systemic Acquired Resistance. (Plant-bacteria interaction) - Strategies to improve plant resistance. Molecular tools for diagnosis. Strategies for plant-breeding. Plant Metabolic Engineering: Production of proteolytic enzymes in Bioreactors. Secondary metabolites from plant, cell and tissue-cultures: metabolic changes to over express their production. Metabolic regulation of flowering and maturation processes. Metabolic profile of transgenic plants. Plant-breeding: In-vitro and ex vitro conservation of germplasm. Somaclonal variation and induced mutagenesis. Breeding and production of commercial hybrids. Haploid production. Molecular marker-assisted selection. Plant transformation for biotic and abiotic stress tolerance and herbicide resistance. Biotechnology-applied Computer Science: Bio-informatics. Computer vision. Tools for molecular-biology. Modeling and automation of biological biotechnology."

Achievements: Design, assembly and operation of micropropagation commercial Laboratories (Biofactories). Temporary Immersion Bioreactors: Equipment and technologies. Proliferation technologies of agriculturally and commercially important plants. Procedures for commercial production of secondary metabolites from plant-cell and tissue-culture. Vitroplants from more than 30 tropical species for the international market. Software as tools for Biotechnology and biofactories management. More than 40 relevant scientific papers and a group of patents. (see www.biopantas.cu)

Facilities: Plant-cell & Tissue Laboratory: With all facilities, including IRGA equipment for plant physiology; Plant Biochemistry and Molecular-biology Laboratory; Intranet network with 28 computers, two servers for INTERNET access and INTRANET functionality; Field station (c.a. 150 ha); Digital Library for plant-biotechnology.

Future plans: Our Scientific Council had point out that the main aspect for the future development are related with proteomic and metabolomic techniques as well as the current methods on genomic and plant-cell & Tissue-culture.

Cooperation with developing countries: Different arrangements with Caribbean, Latin- and South- American countries as well as African countries had been carry out, including academic services, technology transfer and vitroplants supply. For the future a special attention it will be keep in mind with developing countries.

International Organization: Other international cooperation arrangements including Companies, Research Centers and Universities from Canada, Netherlands, Sweden, France, Belgium, Spain, Germany, and Italy for development of join research project, technology transfer as well as international market of ornamental, fruit and woody vitroplants.

Instituto de Cibernética, Matemática y Física (ICIMAF)

Head of Institution: Manuel Lazo Cortés.

Address: Calle 15 No. 551, entre C y D, Vedado, La Habana 10400, Cuba.

Phone: (+53 7) 832-7764. **Fax:** (+53 7) 833-3373. **Email:** icimaf@icmf.inf.cu.

URL: www.icmf.inf.cu.

Scientific Fields of Interest: Mathematics, Physics.

Research and training: Research: commutative algebra, differential geometry, optimization, numerical methods, statistics, pattern recognition and field theory, automatic control, ultrasonics. Training: Post-graduate studies, masters and Ph.Ds in mathematics, theoretical physics and technology. Consultation on specialized lines of mathematics and cybernetics, software and applications.

Achievements: Papers in national and international publications; specialized software; graduate and Post-graduate studies; medical equipment.

Facilities: Library with over 5000 titles and 100 journals; local computer network; over 50 computers.

Future plans: Increase the volume and diversity of research topics; greater cooperation at Post-graduate level with national and foreign universities.

Cooperation with developing countries: Universities in Bolivia, Colombia, Argentina, Mexico, Venezuela, Chile and Brazil.

International Organization: Abdus Salam ICTP, Trieste, Italy; universities in France, Spain, Germany, Japan, UK, Canada and Finland.

Instituto de Cibernética, Matemática y Física (ICIMAF) — Centro de Matemáticas y Física Teórica

Head of Institution: Roberto Rodriguez.

Address: Calle n. 309, Esq A 15, Vedado, La Habana. **Phone:** (+53 7) 832-8007, 832-4085. **Fax:** (+53 7) 833-3373. **Email:** rrm@icmf.inf.cu. **URL:** www.icmf.inf.cu.

Scientific Fields of Interest: Mathematics, Physics.

Research and training: Numeric methods; statistics; optimization; theoretical physics; differential equations; geometry; adaptive systems; digital image processing.

Achievements: The most remarkable scientific results are located in the publications in journal of impact of great international circulation. For example, publications in ELSVIER; Springer-Verlag; Phys. Lett. A; Phys. Rev. A, B, E; Int. Jour. of Mod. Phys. A and D; Journal of Applied Numerical Mathematics; Journal of Linear and Multilinker Algebra; Journal of Computational and Applied Mathematics; Journal of Time Series Analysis; Evolutionary Computation and many more; personnel formation through Master and Ph.D thesis; exchange visits and training of young researchers from many different countries.

Facilities: A net with more than 80 computers.

Future plans: To deepen the collaboration with ICTP; to increase the collaboration with countries from the south; continue with formation of young personnel.

Cooperation with developing countries: Brazil, Chile, Costa Rica, Mexico, Colombia, Peru, etc.

International Organization: ICTP.

Jardín Botánico de Cienfuegos

Head of Institution: Lázaro D'az Ojeda Quintana, Director.

Address: Calle Real n. 136, Pepito Tey, Cienfuegos CP 5, Cuba. **Phone:** (+53 43) 545-334, 545-115. **Fax:** (+53 43) 545-326. **Email:** Lazaro@jbc.perla.inf.cu. **URL:** www.jbc.perla.inf.cu.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences, Environmental Sciences.

Research and training: Plant conservation; environmental and biodiversity conservation; economic botany; environmental education; agriculture and sustainable development; administration sciences.

Achievements: Program and strategy for environmental education in botanical gardens; conservation system for threatened plants; management and conservation of the environment and agricultural eco-systems.

Facilities: Library; computers; various equipment; lodging for 4 people; field facilities.

Future plans: Growing and strengthening of research in above mentioned lines; facilitate links with farmers for reproduction materials.

International Organization: Presented a project to IFAD.

Universidad de La Habana — Facultad de Física

Head of Institution: Osvaldo de Melo Pereira.

Address: San Lázaro y L., 10400 Vedado, La Habana, Cuba. **Phone:** (+53 7) 879-0743. **Fax:** (+53 7) 878-3471. **Email:** omelo@fisica.uh.cu. **URL:** www.fisica.uh.cu.

Scientific Fields of Interest: Physics.

Research and training: Condensed matter; physics of complex systems; physics teaching.

Achievements: some selected papers published during 2005: (1. A. Peláiz Barranco, P. Marin Franch. Piezo-, pyro-, ferro-electric and dielectric properties of ceramic/polymer composites obtained from two modifications of lead titanate. J. Appl. Phys. 94, 034104, 2005. (2. O. Raymond, R. Font, N. Suárez, J. Portelles, J. M. Siqueiros. Frequency- temperature response of ferroelectromagnetic PFN ceramics obtained by different precursors. J. Appl. Phys. 97, 084107, 2005. (3. S. Garcia, M. G. das Virgens, M. A. Continentino, L. Ghivelder. Intergranular pinning potential and critical current in the magnetic superconductor $\text{RuSr}_2\text{Gd}_{1.5}\text{Ce}_{0.5}\text{Cu}_2\text{O}_{10}$. Physica Review B, 71, 064520, 2005. (4. R. Espinosa, I. Zumeta, J. L. Santana, F. Martinez, B. González, S. Docteur, E. Vigil. Nanocrystalline TiO_2 photosensitized with natural polymers with enhanced efficiency from 400 to 600 nm. Solar Energy Materials and Solar Cells, 85, 359-369 (2005) (5. E. M. Larramendi, O. de Melo, and I. Hernández-Calderón. Cd desorption induced by Zn exposure during atomic layer epitaxy of $\text{Cd}_x\text{Zn}_{1-x}\text{Te}$. Phys. Sta. Sol. (b), 242, 1946, 2005 (6. Brouers, F., Sotolongo-Costa, O. Relaxation in Heterogeneous systems: a rare event dominated phenomenon. Physica A 356, 359-374 (2005). (7. M. Hernández-Guía, S. Rodríguez-Pérez and R. Mulet. Simulated Annealing algorithm for the multiple sequence alignment problems: the approach of polymers in a random media. Phys. Rev. E 72, 16059 (2005). (8. E. Reyes Gomez, L.E. Oliveira, M. de Dios-Leyva. Magnetic field effects on quasi-two dimensional excitons in coupled Ga-As(Ga, Al) As quantum wells, Phys. Rev. B 71, 045316 (2005). (9. A. H. Rodriguez, C. Trallero-Giner, Martin Muñoz, and Maria C. Tamargo Electroreflectance spectroscopy in self-assembled quantum dots: lens symmetry, Phys. Rev. B 72, 045304 (2005).

Facilities: 100 computers interconnected; DLTS; X-rays diffractometer; Systems for materials preparation; Some optical measurements techniques; Vibrational Magnetometer.

Cooperation with developing countries: Latin American Network on Ferroelectrics Materials (ICTP). Coordinator: Aime Peláiz.; Latin American Network on Slow Dynamics of Complex Systems (ICTP). Coordinator: Roberto Mulet.; Latin American Macrouniversities Network.

International Organization: Federation agreement with ICTP.

Universidad de la Habana — Instituto de Ciencia y Tecnología de Materiales (ICTM-IMRE)

Head of Institution: Prof. Carlos Rodríguez Castellanos.

Address: San Lazaro y L., CP 10400, Habana, Cuba. **Phone:** (+53 7) 870-7666. **Fax:** (+53 7) 879-4651. **Email:** dir@imre.oc.uh.cu. **URL:** www.imre.oc.uh.cu.

Scientific Fields of Interest: Chemistry, Environmental Sciences, Physics.

Research and training: Host of the only Master and doctor degree program in Material Sciences and Technology in Cuba; Doctor degree studies in physics and chemistry; training activities in solar cells, analytical chemistry, quality control; natural and synthetic polymers, nano-encapsulation of pharmaceutical compounds, natural products and inorganic materials for life-science applications; semiconductors, conventional and alternative solar cells developments; optoelectronic devices, semiconductors lasers; mathematical and theoretical crystallography, X-ray diffraction, electron microscopy, structural characterization of materials; ionic conductors, solid-state batteries; hard and soft magnetic materials, ferro electric, superconductors, GMR and CMR materials; zeolites and micro-porous materials; pharmaceutically and environmental applications of micro-porous materials; atomic simulation of materials; nano-materials and nanotechnology; molecular assembled materials; analytical chemistry for environmental control, live science and health; lasers for industrial applications.

Achievements: From 2000-2005: 719 published papers in peer-reviewed scientific journal indexed in the SCI; 13 patents granted and 5 registered products; 16 books published; graduated 43 Ph.Ds, 81 M.Sc., 84 B.Sc.; 528 presentations in international congress and scientific events; 7 international scientific meetings organized; 5 international awards; 21 Cuban academy of science annual awards; 26 University of Habana awards.

Facilities: X-ray diffraction equipment; thin film deposition techniques; laser deposition techniques; infrared Raman spectroscopy; differential thermal analysis; optoacoustic installation; HPLC analysis; specific area measurements; UV spectrometers; ICP analysis.

Future plans: The institute is the host of the Cuban National Scientific Program in Material Sciences. The organization is getting involved in projects concerning nano materials development, giving special emphasis to applications in drug delivery as well as nano particles and thin film for other applications. Lasers for therapeutical uses are also among current developments. Laser for industrial use and materials processing are among the fastest growing areas of the center. Our involvement in the national efforts for alternative energy use should grow in the future.

Cooperation with developing countries: The Institute is an active member of the CLAF (Latin America Center of Physics) through which exchange of students are carried out. It belongs to several ibero-american CYTED networks

which also encourages exchange of researchers and students. As part of the University of Havana it is member of the Latin American and the Caribbean Network of Public Universities. It has several bilateral agreements with universities and institutes in Latin America.

Ecuador

Escuela Politécnica Nacional (EPN) — Departamento de Metalurgia Extractiva (DEMEX)

Head of Institution: Ing. Ernesto de la Torre Chauvin/ Ing. Alfonso Espinosa Ramón.

Address: PO Box 1701-2759, Quito, Ecuador. **Phone:** (+593 2) 223-6562. **Fax:** (+593 2) 223-6562. **Email:** edelator@interactive.net.ec. **URL:** www.demex-epn.org.

Scientific Fields of Interest: Engineering.

Research and training: Development of processes for the production of magnetic active carbon and new active carbon-polymer materials; New processes for gold lixiviation; Recycling of different industry residues; Development of processes to recover metals from minerals, residues and industrial effluents; Geo-chemistry and stability of industrial and mining residues; Biofilters for cyanide degradation; Clay inhibition in drilling sludge; Influence of the volcanic ash in soils.

Achievements: Patent Pirólisis y fusión de envases compuestos flexibles y/o rígidos para la recuperación de aluminio puro SP-06-6287 (Provisional code); Patent Desinfección de agua mediante tratamiento con carbón activado biocida (In progress); Industrial implementation of five flowsheets developed in the laboratory; Optimization of ten metallurgical industries; Four (4) books and one hundred forty (140) international publications; Two hundred (200) of clients from different industries.

Facilities: Equipment for sample preparation (crushing, grinding, pulverization); For control (pH-Eh meter, balances, others); For chemical analysis (classic, atomic-absorption and fire assay); Basis equipment for leaching; A complete mineralogy laboratory; Roasting and fusion furnaces; Nichols-Herreshof for pilot roasting and active carbon production; Pilot-plant for crashing, grinding, flotation, cyanidation, cementation, gravity concentration, sedimentation, filtration with a capacity of 2 Ton per day Computers and specialized software for metallurgical plants simulation, mineralogical analysis, and atomic-absorption analysis; Specialized Library in mineral processing, extractive metallurgy and environment with approximately 1000 books.

Future plans: Generation of researches project grants, to obtain national or international financial support in the following lines of research: Development of industrial adsorbents; Development of extractive metallurgy processes for the recycling and valorization of sub-products and residues; Treatment of cyanide effluents by using alternative methods.

Cooperation with developing countries: Cooperation with Belgium Government: (CIUF); the academy of sciences for the developing world (TWAS); Cooperation with Utah University.

International Organization: Cooperation with: Belgium Government: (CIUF); Corporación Andina de Fomento (CAF); PUCP (Catholique University of Peru); University of Concepción (Chile); University of Nariño (Colombia).

National Institute for Agricultural Research (INIAP)

Head of Institution: Dr. Julio Cesar Delgado, Dir. Gen..

Address: Casilla 17-17-1362, Quito, Ecuador. **Phone:** (+593 2) 256-7645. **Fax:** (+593 2) 250-4996. **Email:** iniap@iniap-ecuador.gov.ec. **URL:** www.iniap-ecuador.gov.ec.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences, Earth Sciences, Environmental Sciences.

Research and training: Local food security and provision of inputs for agro-industry; studies of advantages and disadvantages between traditional and nontraditional production systems; development of new varieties and agricultural technologies for important crops for local food security and for export.

Achievements: Conservation of native and introduced species; genetic identification of vegetable species; release of new hybrids and varieties; multiplication and virus-cleaning of different kinds of plants; identification and control systems for fungi, insects, bacteria, nematodes and virus; laboratory analysis: soil, physical and chemical, water, vegetable tissues; quality: nutrient proximal analysis, toxic residual analyses; marketing of biological agents; seed, plants and animal production for farmers; farmer training at different levels; different kinds of agricultural publications.

Facilities: INIAP carries out agricultural research in 7 experimental stations and 3 sub-stations along the country. All of them have libraries, field equipment, computers, and administrative personnel. Three of the field stations have soil, pathology and food quality laboratories. Recently the center has established a biotechnology lab in one of the experimental stations, to support the breeding programs in the other stations.

Future plans: Help maintain the local food security crops and help improve the quality of traditional and non-traditional products for export.

Cooperation with developing countries: In 2005 INIAP had about 100 agreements with different national and international organizations, directed mainly to special research subjects.

International Organization: Cooperation agreements with CIMMYT, CIAT, PREDUZA, WAGENINGEN, Univ. of Michigan, GIZ, COSUDE.

Pontificia Universidad Católica del Ecuador — Escuela de Ciencias Biológicas

Head of Institution: Dr. Renato Valencia.

Address: Av. 12 de Octubre y Carrión, Apartado 17-01-2184, Quito, Ecuador.

Phone: (+593 2) 299-1685. **Fax:** (+393 2) 299-1687. **Email:** lrvalencia@puce.edu.ec. **URL:** www.puce.edu.ec.

Scientific Fields of Interest: Biological Sciences.

Research and training: Biochemistry and molecular-biology; Genetics; Microbiology; Developmental biology; Zoology; Entomology; Botany; Biotechnology; tropical diseases.

Achievements: The largest Herbarium in Ecuador; the most important collection of frogs and insects.

Facilities: Herbarium 1, 2 and 3 with working spaces and Internet connections; museum of invertebrates; museum of vertebrates with special emphasis in herpetology; Yasuni research station located in the Amazon (it has a local herbarium with collections of flowers, seeds and fruits) and basic labs with air conditioners (capacity of 40 pax max.); several laboratories of biochemistry, genetics, virology and space for academic experiments.

Future plans: Graduate-programme in biology, several projects for bio-remediation of areas contaminated by the oil industry.

Cooperation with developing countries: Bolivia and Colombia.

International Organization: Botanical agreement with the University of Aarhus, Denmark (present). Stronger cooperation with the University of Ohio, Texas Tech University, Smithsonian Tropical Research Institute, University of Pisa and Urbino (future).

Egypt

Ain Shams University — Institute of Environmental Studies and Research

Head of Institution: Prof. Mohamed A. El-Khafif, Dean.
Address: 11566 Abbasia, Cairo, Egypt. **Email:** mohamedaalkhafif@hotmail.com, mohamed_alkhafif@yahoo.com.
Scientific Fields of Interest: Agricultural Sciences, Biological Sciences, Chemistry, Environmental Sciences.
Research and training: Environmental pollution; environmental health; environmental engineering and technological solutions; environmental psychology and sociology; environmental economics.
Achievements: Bio-remediation of environmental pollution; innovative technologies for liquid and solid waste treatment; GIS-based management systems.
Facilities: Computer laboratory; biotechnology laboratory; biology lab; central lab; agricultural research lab; multi-disciplinary library.
Future plans: Upgrading of teaching curricula, laboratory facilities; computer lab and automating the library; develop specialized diplomas in the environmental fields.
Cooperation with developing countries: Provide educational and academic support for different countries of the region.
International Organization: Regular cooperation with UNESCO and WHO. Some bilateral arrangements to cooperate in environmental fields with DANIDA.

Cairo University — Faculty of Science — Entomology Department

Head of Institution: Dr. Amina M. Abdel Rahman.
Address: 12613 Giza, Egypt. **Phone:** (+20 2) 567-6800. **Fax:** (+20 2) 572-7556. **Email:** drabelrahman_egy@hotmail.com. **URL:** http://science.cu.edu.eg/english_interface/english_interface.htm.
Scientific Fields of Interest: Biological Sciences, Environmental Sciences.
Research and training: Control researches including radiation; medical research (insect micro-organisms relationships); molecular-biology, genetics, physiology, biochemistry of insects, ecology taxonomy and classification of insects, general biology.
Achievements: Use of radio-modifiers especially radio-protectors in research with the use of radiation.
Facilities: Library

Future plans: Adopting advanced methods in planning experiments and advanced equipment in the new field of entomological sciences.

Cooperation with developing countries: Cooperation with all developing countries in all entomological science branches; student exchange to/from Egypt.

International Organization: Future: USA

Central Metallurgical Research and Development Institute (CMRDI)

Head of Institution: Prof. Mahmoud Ibrahim Nasr.

Address: P.O. Box 87, Helwan, 11722 Cairo, Egypt. **Phone:** (+20 2) 501-0640.

Fax: (+20 2) 501-0639. **Email:** info@cmrdi.sci.eg, minasr@cmrdi.sci.eg. **URL:** www.cmrdi.sci.eg.

Scientific Fields of Interest: Engineering.

Research and training: Minerals beneficiation; mineral chemical, thermal and electro processing; industrial waste management; ferrous and nonferrous alloys; plastic deformation; corrosion protection; metal melting and casting; metal joining, non-destructive testing and failure analysis; powder metallurgy; industrial rapid prototyping; advanced materials.

Achievements: Maximizing indigenous mineral ores such as sand, kaolin, feldspar, talc, ilmenite, etc.; industrial waste treatment for production of valuable materials such as copper sulfate, zinc metal, zinc sulfate, lead, etc.; introducing new products to local industry such as steel rolls, molds, steel alloys, spare parts, special cutting tools, etc.; introduction of new technologies such as vacuum melting of special alloys, high-pressure metal melting, bimetallic casting, laser technology, powder metallurgy, industrial rapid prototyping, etc.

Facilities: Well-equipped labs; pilot-plant facilities for mineral processing, hydrometallurgy, foundry shop, powder metallurgy and advanced metal melting techniques; modern equipment for material evaluation and testing including chemical, physical, mechanical and microscopic testing; facilities for metal joining and welding, non-destructive testing and technical inspection; industrial rapid prototyping; library and information center.

Future plans: Increase the activities of advanced and new materials such as composites, magnetic and electronic materials; nano-structured materials, shape memory materials, functional materials, etc.

Cooperation with developing countries: The institute has scientific and technological cooperation agreements with leading scientific and research organizations in many countries such as USA, Japan, Germany, Austria, France, Russia, Slovakia, Ukraine, Bulgaria, Poland, Italy and Canada.

International Organization: JICA (Japan); SIDA (Sweden); CIDA (Canada); USAID.

Desert Research Center (DRC)

Address: P.O. Box 11753, El-Mataria, Cairo, Egypt. **Phone:** (+20 2) 6335-449.

Fax: (+20 2) 6357-858. **URL:** www.drc-egypt.com/main.html.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences, Earth Sciences, Environmental Sciences.

Research and training: Research: Aquifers in desert regions, drilling and testing wells; Monitoring newly reclaimed areas; Surveying surface water in the coastal regions; Monitoring of agriculture; Protection and improvement of range forage resources; protection of plant biodiversity and via biotechnology (tissue-culture, molecular markers, gene-banks); Increasing productivity of animals; Socio-economic studies in marketing, cooperatives, settlements and labor; Monitoring and control of desertification; Establishment of green belts. Training Post-graduate students from Arab, African and Asian countries.

Achievements: Several national research projects in the field of soils; Production of leguminous and cereal plants under desert soil conditions; Establishing a farm in burg El Arab; Production of seedlings from various types of plants; Protecting the Eastern portion of Siwa Oasis from sand dunes encroachment; Surveying of the economic, social and urban studies in the five Egyptian desert governorates. The Centre issues a biannual scientific periodical (Desert Institute Bulletin) and detailed scientific reports in the various fields of desert research.

Facilities: Satellite receiving station (NOAA); Geographic Information System (GIS); Computer Center; Library; Laboratories for: soil, geology, geophysics, hydrogeology, ecology, tissue-culture, plants and animal production; training center, sand dune tunnel, electronic computer search.

Future plans: Quantification of ground water potentiality; Development of experimental station to cover the whole desert development programme; Conducting feasibility studies for agricultural desert development; Desertification and its control, potentiality; Assessment of land reclamation projects; Establishment of a cartographic division; Improvement of range-land under rain-fed conditions; Sand dune fixation around the important projects; Agricultural extension.

Cooperation with developing countries: Cooperation with Arab countries in the field of agricultural development of Arid-lands; Exchange of experts in soil, water, plant and animal production; Training courses for the Afro-Asian developing countries; Cooperation between the DRC and Sahel-Saharan countries in Africa; Information-exchange between the DRC and the similar centres in developing countries; Cooperation between the medicinal plant section of the DRC and drug factories.

International Organization: UNDP, FAO, UNESCO International Center for Advanced Mediterranean Agronomic studies (CIHEAM), World Bank and other organizations. Cooperation with European and North and South American countries, particularly in training programmes and scientific missions.

Egyptian Petroleum Research Institute (EPRI)

Head of Institution: Prof. Dr. Mahmoud H. El-Batanony.

Address: Zohhor Area, Nasr City, 11727 Cairo, Egypt. **Phone:** (+20 2) 274-7847, 274-7917. **Fax:** (+20 2) 274-7433. **Email:** research@epri.sci.eg. **URL:** www.epri.sci.eg/.

Scientific Fields of Interest: Biological Sciences, Chemistry, Earth Sciences, Environmental Sciences.

Research and training: Exploration, production, analysis and evaluation, and refining of petroleum; petroleum application; petrochemicals; process design and development.

Achievements: Sample projects' results included upgrading of asphalt and asphaltic mixture; prevention of sludge formation in crude oil tanks; production of chemicals used by petroleum industry.

Facilities: P.V.T. core analysis; mud and cement; X-ray analysis; electron microscopes; gas chromatograph; infrared; ultraviolet; oil- testing; water-analysis; condensate lab; relative permeability setup; high-mercury in section capillary pressure.

Future plans: Pilot catalyst preparation facilities; special core analysis; pilot thin film distillation; polymer preparation and evaluation facilities.

Cooperation with developing countries: Training for Arab and African personnel, workshops in collaboration with UN Industrial Development Organization (UNIDO) and/or UN Development Programme (UNDP).

Housing and Building Research Center (HBRC)

Head of Institution: Prof. Omaina A. Salah El Din, Chairman.

Address: 56 El-Tahrir Street Dokki, Cairo, Egypt. **Phone:** (+20 2) 335-6853, 335-6722. **Fax:** (+20 2) 335-1564. **Email:** hbrc@hbrc.edu.eg. **URL:** www.hbrc.edu.eg.

Scientific Fields of Interest: Chemistry, Earth Sciences, Environmental Sciences, Physics.

Research and training: Research: all areas related to building and housing, including preparation of standards in architectural design, structures, building materials, geotechnical engineering, raw material, processing and building physics, analysis and development of new building materials, economic analysis for building systems, construction management, theoretical and experimental evaluation of physical performance of buildings, preparation of building specification and codes of practice. Training: HBRC presently covers several topics aiming to enhance the capabilities of technical staff of contractors, consultants and governmental organizations. The center also offers short-term courses in building codes, building technology, research methodologies, urban management and upgrading of informal housing.

Achievements: National research investigation reports for major topics in the construction and building industry. Technical publication in international conferences and journals. MSc. and Ph.D theses in cooperation with national and international universities.

Facilities: Well-equipped testing laboratories (reinforced concrete, soil mechanics, and materials, raw materials, building physics, sanitation and structures). Training center, library, conference and seminar halls, building industry exhibition; field testing equipment and computers.

Future plans: Extension for the information center building to accommodate additional staff. Construction of new compounds outside Cairo to include new laboratories.

Cooperation with developing countries: Cooperation with various Arab countries through the Arab League to standardize the Arab Unified Building Code.

International Organization: Cooperation in training with IHS in Rotterdam, Netherlands; Brick industry, Canada; Wood technology, Sweden; National Science Foundation, USA; International Accreditation Services, USA.

Ministry of Water Resources and Irrigation — National Water Research Center (NWRC)

Head of Institution: Dr. Shaden Abdel Gawad, President.

Address: Fum Ismailiya Canal, P.O. Box 74, Shoubra El-Kheima 13411, Cairo, Egypt. **Phone:** (+20 2) 444-7353. **Fax:** (+20 2) 444-7846. **Email:** nwrc@nwrc-eg.org. **URL:** www.nwrc-egypt.org.

Scientific Fields of Interest: Agricultural Sciences, Engineering, Environmental Sciences.

Research and training: Water-quality and control; water management; drainage; water-resources (Nile); hydraulics; channel maintenance; groundwater; construction; mechanical and electrical; survey; costal; environment and climate change; gender; GIS; result based management (RBM) and other water related research fields.

Achievements: National guidelines on drainage water reuse in arid and semi-arid regions; Egyptian hydrological atlas; national Water-quality programme; construction of hydrogeological map of Sinai.

Facilities: LAN/WAN communications system; central GIS library; central library allowed to be one of eight nodes with the Egyptian National Science and Technology Information Network (ENSTINET); up to date environmental quality monitoring laboratory equipments and tools; video conference facility; well-equipped in-house printshop.

Future plans: Publicity of research findings into the arid and semi-arid regions; dissemination of the results of the research projects; research project on virtual water; Water-quality management; integrated water management; public-private partnership; water as a human right.

Cooperation with developing countries: Present: Nile Basin Initiative; Arab Water Council. Planned: Mediterranean/arid countries; ICID countries

International Organization: Present: National Water-quality and Availability Management Project (CIDA); FRIEND/Nile Project (UNESCO Cairo office), a very important project in the context of the regional North-South and South-South Cooperation); Sounding survey for 30 sites along the Nile river between Cairo and Assult, (Japan International cooperation Agency JICA); Cooperation with Dutch Development Institute and Ministry of International Cooperation of the Netherlands; Nile Basin Capacity-Building Network Project (Gov. of the Netherlands); Wadi Water project (Italian Gov.); Construction hydro geological map of Sinai (JICA). Planned: IPTRID (International Programme for Technology and Research in Irrigation and Drainage); Scientific coop. with the Swiss Science Agency, Federal Dept. of Home Affairs of the Swiss Confederation; Scientific coop. with the Italian Gov.

National Institute of Oceanography and Fisheries (NIOF)

Head of Institution: Prof. Ezzat A. Ibrahim.

Address: 101 Kasr El-Aini Street, Cairo, Egypt. **Phone:** (+20 2) 7921-341, 7921-342. **Fax:** (+20 2) 7921-341. **Email:** niof@hotmail.com. **URL:** www.niof.sci.eg/.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences, Environmental Sciences.

Research and training: Maintain and develop the different water bodies and their natural resources; propose measures for the protection of the aquatic environment; conduct and supervise research programmers in order to establish better management for the country's aquatic resources; develop new techniques for improving aquaculture in terms of quality and quantity; develop fish production from natural fisheries, both inland waters and marine.

Achievements: Reducing the cost of water-pond fertilizer from 600 to 50 L.E. during one harvest season; using unconventional aquafeeds for marine fish (mainly seabream sparus aureate) and shrimp, using local (mainly waste) ingredients; successful feed formulation and preparation for fry up to marketable size has reduced the cost from 4000 to 1200 LE per feddan; max. production of cultured fish or shrimps per unit area with the least cost.

Facilities: Advanced equipment; 50 computers; 12 field stations; 4 libraries; 2 research vessels.

Future plans: Increasing fish stock of Nile basin and Lake Nasser by stock enhancement; conserving aquatic environment and pollution treatment; increasing production of marine fish fry for aqua-culture (mullet, sea bass and sole).

Cooperation with developing countries: Yemen, rmk for training UAE; Tunisia

International Organization: IOI, Stevens.

National Research Centre (NRC)

Head of Institution: Prof. Dr. Hany El-Nazer.

Address: El-buhouth Street, 12311 Cairo - Dokki, Egypt. **Phone:** (+20 2) 337-1010. **Fax:** (+20 2) 337-0931, 760-1877. **Email:** helnazer@nrc.sci.eg, info@nrc.sci.eg. **URL:** www.nrc.org.eg/.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences, Chemistry, Earth Sciences, Environmental Sciences, Physics.

Research and training: Research: Textile; food industry and feeding; pharmaceutical and drug; chemical industries; inorganic chemical industries and mineral resources; engineering; agricultural and biological; veterinary; environmental; medical; human genetics and genome; physics and genetic engineering. Training: M.Sc. & Ph. D. programmes in collaboration with universities and specialized training for staff members, general public and young graduates.

Achievements: Active participation with production and service-sectors through research plan projects namely: cleaner production in the textile industry; production, development and evaluation of food; development of know-how for production of pharmaceutical raw material through chemical synthesis or from natural source; preparation and improvement of multi-purpose organic chemical intermediates as well as end products for various applications; preparation and development of industrial products; mineral deposits, intermediate chemicals and wastes; engineering and chemical industry incubators; applications of modern technologies for clean agriculture; improving the productivity of local buffalo, poultry and fish breeds; environmental management of the new industrial city: 'Sadat City'; a call to osteoporosis action; an integrated programme for the prevention of genetic disorders and malformations; study of the physical properties of some advanced materials and their applications in the industry; and the use of genetic engineering and biotechnological technologies for the improvement of genetic characters of some living organisms and their products for the economic use; 43 applied research contracts in the private-sector.

Facilities: 101 departments; central unit for analysis and scientific services; medical services unit; agricultural experimental station; technical services unit; environmental consultation and Water-quality unit; waste management and environmental studies; special character of the textile industry unit; civil engineering unit; polymers and pigments unit; dairy and food industry unit; engineering development and consultancies; air-quality improvement unit; air protection against pollution specialized unit; ceramic industry unit; agricultural consultation and application services unit; virology research unit; technical consultation; production and marketing of seedlings and fruits; chemical industries unit; tanning materials and protein chemistry unit; conference unit; Internet unit; electronic library.

Future plans: Greater involvement with industry and other users. Develop marketing capabilities. Become more active in molecular genetics, molecular-biology, drug discovery, and advanced materials. Integrate with other S&T organizations within a national S&T plan. Electronic decentralized administration.

Cooperation with developing countries: Most Arab countries, and many African and Asian countries (Lebanon, Saudi Arabia, Jordan, Libya, Tunisia, Algeria, Morocco, Qatar, Kuwait, UAE, Syria, Pakistan, Malaysia, South Africa).

International Organization: Cooperation with universities and research centers in most European, Asian and American countries through joint research projects; bilateral agreements and cooperation with many scientific and international organizations in USA, Germany, Canada, China, Finland, Italy and UK.

Ethiopia

Addis Ababa University (AAU) — Department of Physics

Address: P.O. Box 1176, Addis Ababa, Ethiopia. **Phone:** (+251 1) 223-931.

Fax: (+251 1) 223-931. **Email:** phys@phys.aau.edu.et. **URL:** www.aau.edu.et.

Scientific Fields of Interest: Physics.

Research and training: Astrophysics; laser optics (optical and electrical characterization); nuclear physics; quantum optics; solid-state physics, semiconductor physics; statistical physics.

Achievements: Publications.

Facilities: Computers; laser source; UV/VIS/IR Lambda 19, spectrophotometer; Edward deposition unit; Spim coater; semiconductor parametric analyzer.

Future plans: Expand current research facilities to accommodate more graduate students.

Cooperation with developing countries: Planned joint research activities with Universities in Kenya, Sudan, Tanzania and Uganda.

International Organization: ICTP, IPPS, DAAD.

Addis Ababa University (AAU) — Institute of Pathobiology

Head of Institution: Yalemtehay Mekonnen.

Address: P.O. Box 1176, Addis Ababa, Ethiopia. **Phone:** (+251 1) 763-091.

Fax: (+251 1) 755-296. **Email:** aau-ipb@telecom.net.et. **URL:** http://www.aau.edu.et/faculties/Fac_Patho/His_Patho.php.

Scientific Fields of Interest: Biological Sciences, Medical Sciences.

Research and training: Microbiology and infectious diseases; vector biology and control; human parasitic diseases; animal health and zoonotic diseases; endod and other medicinal plants.

Achievements: Over 400 publications in refereed journals; the discovery of endod (*Phytolacca dodecandra*) as a low-cost plant molluscicide; mapping out of the geographical distribution of schistosomiasis and leishmaniasis.

Facilities: Documentation center; diagnostic laboratory; microbiology laboratory; snail room; insectary to keep and breed vectors; computers (486, Pentium III & IV); animal house; Reading Room and a small *Phytolacca dodecandra* garden.

Future plans: To continue with the R&D institutes agenda in the fields of microbiological study of major infectious diseases, vector biology and control, endod and other medicinal/pesticidal plants, human parasitic diseases, animal health and zoonotic diseases.

Cooperation with developing countries: Kenya and Sudan in some areas of research (Vector biology, parasitic diseases).

International Organization: HIV-leishmania co-infection surveillance and other leishmaniasis research with WHO and the French government; research on leishmaniasis and schistosomiasis with TWAS.

Ethiopian Rural Energy Development and Promotion Centre (EREDPC)

Head of Institution: Dr. Asres W. Giorgis, Director.

Address: P.O. Box 8063, Addis Ababa, Ethiopia. **Phone:** (+251 11) 515-3689.

Fax: (+251 1) 517-874. **Email:** eesrc@ethionet.et.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences, Engineering, Environmental Sciences.

Research and training: Household energy efficiency improvement; renewable energy technology development; rural electrification (isolated or stand alone) using renewable energy sources such as solar, wind, microhydro, etc., : environmental impact analysis (techno-economic); research on energy resources; development of energy-saving and generating equipments; conducting training on energy-saving and generating equipments; conducting calorific value and gas analysis; production of hardware for bio-mass carbonization.

Achievements: Improved bio-mass stoves (both for baking and cooking); efficient charcoal production kins.

Facilities: GIS hardware and software and computers. Laboratory testing facilities: bomb calorimeter; gas analyzer; BOD and COD system equipment; digital PH meters; TDS/conductivity meters; smoke and particulate monitor; gas/vapor and particulate detector; orsat gas analyzer; infrared gas analyzer and gas analyzers for measurement of flue gas. Workshop equipment: lathe, mining, welding, shearing and bending machines. Library with collection of different books, magazines and journals on energy issues.

Future plans: Work on rural electrification programme; develop efficient household energy technologies; develop pre-and post-harvesting energy technologies for agricultural sector; organize energy workshop and laboratory facilities; develop a well-organized wind and solar energy database which comprises a spatial component.

International Organization: Major projects are implemented under the assistance of the World Bank and UNEP.

**Ye-Etiopia Ye-Gibbrina Mirimir Institute (EGMI)
Ethiopian Agricultural Research Organization (EARO)**

Head of Institution: Dr. Tsedeke Abate.

Address: PO Box 2003, Addis Ababa, Ethiopia. **Phone:** (+251 116) 462-270.

Fax: (+251 116) 461-251. **Email:** dg@earo.org.et, dg@eiar.gov.et. **URL:** www.eiar.gov.et.

Scientific Fields of Interest: Agricultural Sciences.

Research and training: Crops; livestock; natural resources; pastoral/agro-pastoral systems; forestry; crop protection; agricultural engineering; food sciences; biotechnology; socio-economics; research-extension-farmers linkage and gender.

Achievements: 435 crop varieties revealed over the years; 49 technologies released on livestock; 45 technologies released on natural resources; 9 technologies released on agricultural engineering (farm implements, etc.).

Facilities: 55 Research centers spread across the country; many are well established, some have been constructed recently and need equipping.

Future plans: To catalyze scaling-up of available and proven agricultural technologies; develop appropriate agricultural technologies that enhance productivity and quality of crops, livestock, fisheries, and forestry to contribute to food security and economic development; strengthen natural resources management research for sustainable agricultural production and maintenance of the integrity of the environment; develop and promote commercialization of underutilized and nontraditional resources; build capacity for agricultural research for development.

Cooperation with developing countries: These are being effected through networking under sub-regional organizations such as ASARECA (Ass. for Advancement of Research in Eastern and Central Africa); Collaboration with some national programmes in the region (not very strong yet).

International Organization: Collaboration with CGIAR through networks; World Bank, IFAD.

Ghana

Council for Scientific and Industrial Research (CSIR) — Crops Research Institute (CRI)

Head of Institution: Dr. J.A. Otoo.

Address: P.O. Box 3785, Kumasi-Ashanti, Ghana. **Phone:** (+233 51) 60389, 60391, 60425, 502-221/22. **Fax:** (+233 51) 60308/60396/60425/60142. **Email:** cridirector@africaonline.com.gh. **URL:** www.csir.org.gh/cri.html.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences, Environmental Sciences.

Research and training: Development of improved varieties of production of maize, rice, legume, roots and tubers; horticulture; resource and crop management; socio-economic studies; crop protection; biotechnology; post-harvest research; seed technology; biometry and computer services; technology transfer.

Achievements: Improved varieties of the following crops and their production technologies made available to farmers: 12 varieties of Maize (including quality protein maize), 8 of Cowpeas, 2 of Soy bean, 1 Rice, 1 Plantain, 1 Banana, 3 cassava, 8 Sweet potato, 4 groundnut, 2 pepper; biological control of Siam weed (*chromolaena odorata*); integrated pest-management strategies; technologies for mass production of planting materials of yam, plantain/banana, citrus and avocado.

Facilities: Training and conference center; labs for plant pathology, biochemistry, tissue-culture and crop physiology; 6 field stations located in the various agro-ecological zones of the country; seed development unit with seed processing plant serving seed industries of the West-Africa (sub-region); computers (30 PCs and 22 printers); Internet connectivity; LAN.

Future plans: Commercialize research activities to generate funds to support research programmes; Train more staff to Ph.D. level to handle IPM, Biotechnology, post-harvest research and IT; Develop a LAN and improve the Information System at the Institute; Improve facilities for biotechnological application; Increase farmers' participation in research activities.

Cooperation with developing countries: IITA Nigeria, CIMMYT Mexico, AVRDC Taiwan, Wada Côte d'Ivoire, ICRISAT India.

International Organization: Clemson University USA, Natural Rescues Institute UK, INIBAP France, University of Reading UK.

Council for Scientific and Industrial Research (CSIR) — Food Research Institute (FRI)

Head of Institution: Dr. W.A. Plahar.

Address: P.O. Box M20, Accra, Ghana. **Phone:** (+233 21) 519-091/92/93/94/95/96. **Fax:** (+233 21) 500-331. **Email:** fri@ghana.com. **URL:** www.csir.org.gh/fri/html.

Scientific Fields of Interest: Agricultural Sciences, Engineering.

Research and training: Pilot studies and transfer of processing technologies; technical and analytical services; food biotechnology; food evaluation and product development; training; food safety and quality assurance; community outreach; knowledge and performance management.

Achievements: Food product development: several food products have been developed by the institute, which are either adequate alternatives to imported materials or have export potential. Some of these are fufu flours, High-quality cassava flour, fermented maize meal, weaning foods, etc. The local production, utilization and export of some of these products constitute a large saving on foreign exchange for the country. Improved rural technologies: improved rural technologies including the Chorkor fish-smoking oven, different designs of solar dryers, improved maize storage cribs and small-scale cassava processes have been developed and promoted to stakeholders. Formulation of recipes: recipes and recipe manuals have been developed for diversified uses of sweet potatoes, cassava, soybean, cow pea and maize. Analytical services to industry: a regular and consistent provision of good quality analytical service and advice to Kool bottling, Tema Food complex, etc. As a result the operation so these companies have been sustained, jobs maintained and social harmony ensured. Food composition table: composition of foods commonly used in Ghana covering over 300 Ghanaian foods have been analyzed in the raw, processed and cooked state for their nutritional value and published as a food composition table. Contribution to Agric. development: contributed to agric. development through screening and selection of improved varieties of cereals, legumes, root and tubers for anti-nutritional factors and suitability for processing and local dish preparation. Design and construction of food processing equipment: the institute has designed and constructed high-performance hot-air dryers, flour sifters, cassava graters, hammer mills, and other food processing equipment that have helped various local food processing industries to establish their businesses while saving on imported alternatives to these equipment. Some of these industries are: Praise Exports Ltd., Gracem Enterprise, Elsa Foods, Ebenut, etc. Model Pilot-plants: pilot-plant for cassava, maize, cow pea and winged bean has been established as models for dissemination of technology. A selected commercial kenkey factory has been upgraded by the institute to serve a similar purpose. Establishment of Cassava Processing Plant: the institute has sourced funds through collaborative project to set up cassava processing plants for various cassava producing communities in the country.

This is greatly improving the processing of cassava and reducing post-harvest losses. It is eventually expected to help in alleviating poverty and improving on the livelihood of rural people. The communities include Mantsi, Doblo Gonno, Brofoyeduro and Bepose Nkran. Food safety: food safety awareness has been created through screening of raw and processed foods for mycotoxins, heavy metal contamination, agrochemical residues, pathogens, etc., and advice given on preventive measure. Development and application of HACCP systems for food quality assurance: HACCP systems have been developed for traditional small and medium scale enterprise (fermented foods, fish and street foods) to enhance competitiveness in international trade. Improved nutritional status of rural communities: nutritional and health status of some farming communities have been improved through development and extension of household soybean utilization. Training in microbiological safety and quality control: the institute has trained several quality control officers and technical staff of various industries in the microbiological safety and quality control of foods. This has led to improvement in the quality of manufactured foods products and has automatically impacted on the health and productivity of the population. Training of local entrepreneurs: a number of potential local entrepreneurs have been trained in technologies developed by the institute. These technologies include: fish smoking, fruit and vegetable dehydration, salt iodination, mushroom production, cassava processing, soy milk and soy flour production, etc. Most of the trainees have set up businesses based on the technologies and are producing to meet the needs of both the local and export market. The result is that jobs have been created, foreign exchange is earned and the livelihoods of people improved. Notable among some of these entrepreneurs are: Elsa Foods, Gracem Enterprise, Darkrubby Enterprise, Ebenut, etc.

Facilities: The institute is equipped with analytical labs for chemistry, microbiology, biochemistry, toxicology and nutrition. It also has an engineering and maintenance workshop and a test kitchen. In addition, the institute has a pilot-plant equipped with operational wet and dry processing lines. The institute has established a Cassava processing and demonstration unit at Poluase, near Accra. It also has facilities for mushroom cultivation at the site at Okponglo, Accra.

Future plans: The current strategic plan recognized that research will continue to be done by individuals in areas other than those identified in the strategic plan document, but identifies eight areas of strategic focus that capitalize on existing strength of the FRI and the unique socio-economic and industrial developmental needs, and cultural setting of the country: pilot studies and transfer of processing technologies; technical and analytical services; food biotechnology/molecular-biology; food evaluation and product development; training; food safety and quality assurance; community outreach; knowledge management (encompassing information/performance/change management). The plan is to expand the level of our research and training of our staff in these and other areas of fundamental research to achieve international prominence. Our strategic research plan is a crucial element in determining how we allocate our resources and it is shaping an institute that is both a leader in and an

integral part of its surrounding environment. We are actively pursuing partnerships that will increase our ability to support research excellence, enhance our technological and technology commercialization capacity, and further our contributions to national genomic development. Successful measurement of our performance will be based on the balanced scorecard approach.

Council for Scientific and Industrial Research (CSIR) — Forestry Research Institute (FORIG)

Head of Institution: Dr. J.R. Cobbinah, Director.

Address: University PO Box 63, Kumasi, Ghana. **Phone:** (+233 51) 60122, 60123, 60373. **Fax:** (+233 51) 60121/3. **Email:** director@forig.org. **URL:** www.forig.org.

Scientific Fields of Interest: Agricultural Sciences, Environmental Sciences.

Research and training: Research Programmes. Natural Forest Management Programme; Plantation Development Programme; Processing and Utilization Programme; Non-Timber Forest Products Programme; Policy and Socio-economics Programme. Training Programmes: Mushroom Cultivation; Snail Farming; Bee Keeping; Capacity-building in Forest trees nursery.

Achievements: Ecotourism: Our ecotourism site - Bobiri Forest and Butterfly Sanctuary - has won 3 awards from the Ghana Tourist Board since 1999. Publications: FORIG publishes a wide range of publications on all its research programmes. They are classified into: Refereed Journal Papers; Technical Reports and Conference Papers. FORIG has developed a number of technologies from its key research findings, of value to the users and for impact on the national economy such as employment, wealth creation, poverty reduction, and sustainable utilization of forest resources. These programmes focus on natural forest management, plantation development, processing and utilization and non-timber forest products.

Facilities: Natural Forest Division: Two (2) Research Stations: Wet/Moist Evergreen (Benso); Moist Semi-Deciduous, N/E - (Bobiri). Seed Tech. & Tree Improvement Division: Biotechnology Laboratory; National Tree Seed Centre. Plantation Production Division: Four (4) Research Stations. Engineering and Mechanical Processing Division: Woodworking workshop. Testing Lab. Chemistry and Chemical Technology Division. Biology & Forest Health Division: Bambusetum. Pathology Section. Entomology Section. Commercialization and Information Division.

Future plans: We reviewed our 1995 user-focused strategic plan in 2003 titled the Roadmap for 2003-2008 in which our Mission, Vision, Mandate, Objectives, and Research Programmes & Projects were also reviewed. Our Strength, weaknesses opportunities and threats were identified to which Six (6) Change Plans or Strategic Thrusts have been developed for implementation namely, Strategic Human Resource Development Plan; Funding Plan; Research

Management Plan; Infrastructure Development Plan; Administrative/Financial/Information Management Plan; Outreach (Publicity) Plan.

Cooperation with developing countries: La Societe pour le Developement des Plantations Forestieres (SODEFOR) in Cote d'Ivoire; Forestry Research Institute of Nigeria (FRIN); National Forestry Development Agency (ONADEF) in Cameroon; National University of Cote d'Ivoire (now University of Cocody); Kenya Forestry Research Institute (KEFRI); University of Benin; University of Togo.

International Organization: Northern Arizona University, U.S.A.; University of Aberdeen, U.K.; University of Florence, Italy; Form Ecology Consultants, Netherlands; Natural Resources Institute, Greenwich, U.K.; University of Wales, Bangor, U.K.; Green College, University of Oxford; CIRAD-Foret Montpellier, France; Forestry Research Institute of Malaysia; DANIDA Seed Centre, Denmark; Department of Plant Sciences, University of Oxford; Michigan Technological University; World Agro-forestry Centre; ITTO - International Tropical Timber Organization; DFID - Department for International Development (U.K); EC/EU - European Community/Union; CIFOR - Centre for International Forestry Research; AFORNET - African Forestry Research Network; AAS - Academy of African Science; IUFRO - International Union of Forestry Research Organizations; TWAS - The Academy of Sciences for the Developing World. FORIG is the service centre for Global Forestry Information Service (GFIS) - Africa Project. The West Africa (Anglophone) Regional Office of the Plant Resources of Tropical Africa (PROTA) is located at FORIG.

Council for Scientific and Industrial Research (CSIR) — Science and Technology Policy Research Institute (STEPRI)

Address: PO Box C 519, Cantonment, Accra, Ghana. **Phone:** (+233 21) 773-856, 779-401. **Fax:** (+233 21) 773-068. **Email:** director@stepri.csir.org.gh. **URL:** www.csir.or.gh/stepri.html.

Scientific Fields of Interest: Agricultural Sciences, Engineering, Environmental Sciences.

Research and training: New technologies, especially biotechnology and ICT; economics; sociology; agriculture; development studies; innovation studies.

Achievements: Diagnostic studies of the small and medium enterprises; food processing and capital goods sector report; traditional medicine (Ghana Herbal Pharmacopoeia); research documents in ICTs and renewable energy sub-sectors; research into policy research for biotechnology development in the country.

Facilities: Computers - LAN; Internet connectivity; at least one computer per office; conference auditorium; library; LCD projector; vehicles for field work.

Future plans: Continue to do socio-economic studies on new technologies (i.e. biotechnology and ICT mainly); S&T policy studies, monitoring and assessment; innovation studies and diffusion; facilitate commercialization of innovations; S&T acculturation and popularization; surveys of S&T potential for facilitating S&T human resource development and management.

Cooperation with developing countries: Memorandum of understanding with NISER of Nigeria; India and Ecuador in the TELFUN project; collaboration with 14 African countries through research ICT Africa Network based in South Africa.

International Organization: International Development Research Center of Canada; The Netherlands Government.

Council for Scientific and Industrial Research (CSIR) — Water Research Institute (WRI)

Head of Institution: Dr. Charles A. Biney.

Address: PO Box AH38, Achimota, Ghana. **Phone:** (+233 21) 775-351/2, 779-514/5, 775-511. **Fax:** (+233 21) 777-170. **Email:** wri@ghana.com. **URL:** www.csir.org.gh/wri.html.

Scientific Fields of Interest: Biological Sciences, Chemistry, Earth Sciences, Environmental Sciences.

Research and training: Hydrology, hydrogeology, environmental studies, watershed management, waste-water studies, fisheries/aquaculture, shoreline management, environmental impact assessment, groundwater assessment, Water-quality studies, aquatic weeds management, limnology, invertebrate biodiversity studies, hydro biological monitoring, biological control of water-related disease vectors.

Achievements: All male tilapia fingerlings; Databases; Technologies; Technical/Project reports.

Facilities: Hydrometeorological station for weather monitoring; labs for biochemical, microbiological and parasitological, physical and chemical analyses; lab for sediment studies; geophysical information system/digitizing facilities; geophysical instruments; fish hatcheries; library documentation and printing facilities.

Future plans: Centre for Excellence for WRM research and development; commercialization of R&D activities; strengthen efforts at offering consultancy and advisory services; establishment of partnerships with national, regional and international institutions.

Cooperation with developing countries: Collaborative research with the Comité Inter-Africain d'Etudes Hydrauliques (CIEH) in Burkina Faso. The Water-resources Research Institute is affiliated to the water-dependent and water-related institutions in Ghana, including the Ghana Water Company, the Irrigation Development Authority, the Volta River Authority, the Architectural and Engineering Services Corporation (Hydro Division), and the Meteorological Services Division.

International Organization: Project sponsorship and cooperation with FAO, ENEP, WHO, IOC, IAEA, Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ), EU, ICLARM, Danish International Development Agency (DANIDA), Universities of Hamburg and Bergen.

Forum for Agricultural Research in Africa (FARA)

Head of Institution: Dr. Monty Jones, Ex. Secretary.

Address: n. 2 Gowa Close, Roman Ridge Accre, PO Box CT 173, Cantonments Accra, Ghana. **Phone:** (+233 21) 772-823, 779-421. **Fax:** (+233 21) 773-676. **Email:** mjones@fara-africa.org. **URL:** www.fara-africa.org.

Scientific Fields of Interest: Agricultural Sciences.

Research and training: Framework for African Agricultural Productivity (FAAP); Sub Saharan Africa Challenge Programme (SSA CP); Dissemination of New and Proven Agricultural Technologies in Africa (DONATA); Building Africa's Scientific and Institutional Capacity (BASIC); Regional Agricultural Information and Learning Systems (RAILS); African Bio-technology and Bio-Safety Initiative (ABBI).

Achievements: In partnership with stakeholders: Nerica Rice Variety; Improved Cassava Variety; Tissue-culture Banana; Sweet Potato; Pigeon Pea; Integrated Natural-resource management Tools (INRM); Bio-fortified Sorghum # 2; Fish processing.

Facilities: Laboratories; Cutting edge science facilities (Biotechnology/Biosafety); Computers; On farm and on station research fields; Libraries and documentation center.

Future plans: Promoting Innovation Systems in African Agricultural Research and Development (ARD); Strengthening Scientific & Institutional Capacity; Effective & Efficient information communication and learning technology; Promoting Civil Society involvement in African (ARD), including the private-sector and farmer groups, and NGOs.

Cooperation with developing countries: South-South Cooperation with Regional Fora in Asia, Latin American and Caribbean, e.g., AARINENA, FORAGRO, APARI, CACARI.

International Organization: Canadian International Development Agency; The World Bank; DFID; African Development Bank; The Netherlands; European Commission; USAID; France; Norway; Italy; Japan; The Rockefeller Foundation; Gatsby Foundation; CGIAR; Natural Resources Institute (NRI); ICRA; NATURA; NASULGC.

Ghana Atomic Energy Commission — National Nuclear Research Institute (NNRI)

Head of Institution: Prof. Yeboah, Director.

Address: PO LG80, Legon, Accra, Ghana. **Phone:** (+233 21) 401-272. **Fax:** (+233 21) 400-807. **Email:** g.atomic@gaecgh.org. **URL:** www.gaecgh.org/webmail.

Scientific Fields of Interest: Chemistry, Earth Sciences, Engineering, Environmental Sciences, Medical Sciences, Physics.

Research and training: Application of Molecular Isotopic Techniques in the Control and Management of Communicable Diseases; Neutron Activation Analysis using 30kW Research Reactor; Radiation Stability of Materials; Bio-monitoring of air pollution through trace element analysis using NAA and XRF techniques; Isotope techniques for assessment of ground water-resources.

Achievements: Two Radio-therapy Centres completed and functioning in Accra and Kumasi Molecular-biology Laboratory; A 30kW Research Reactor heavily utilized by both Ghanaians and other West Africans; A Well-equipped Non-Destructive Testing outfit including Radiation Tracer Technology facility; X-ray fluorescence laboratory for trace metal analysis; Radon-Monitoring; Ground water research estimation.

Facilities: 30kW Research Reactor; Non-Destructive Testing Unit; Radiography System; Ultra Sound Systems; flaw detector & thickness gauge; Magnetic Particle; Liquid Penetrant; Concrete Testing Facility; X-Ray fluorescence Analytical Facility; Flame Photo meter; Radioactive Source for column scanning; Am-Be neutron source; Co-60 Teletherapy facility; Simulation Unit; Brachytherapy System; 30 Computers; Printed Circuits Board manufacturing machine; Polymerized Chain Reactic (PCR) System; Radioimmunoassay (RIA) System; Alpha Particle Spark Counter.

Future plans: The immediate plans are to intensify the Institute's drive to generate funds to support the research activities internally.

Cooperation with developing countries: We have in the past had cooperative arrangements with La Cote d'Ivoire in the area of Environmental monitoring and currently with Nigeria in Reactor Utilization. We have exchanged scientists and students in the past and have trained some of their scientists on our Research Reactor and still continue to exchange and train staff on the Research Reactor and other facilities.

International Organization: IAEA, FAO; WHO ICTP Dalhousie University, Halifax Canada. We cooperate with the IAEA in most of our activities through Technical Cooperation programmes. Additionally Research Contracts are very active in all the AFRA programmes.

India

Banaras Hindu University — Department of Zoology

Head of Institution: Prof. M.J. Raman.

Address: Varanasi 221 005, India. **Phone:** (+91 542) 230-7148/9, 236-9905.

Fax: (+91 542) 2368-174, 2368-457. **Email:** mercyraman@bhu.ac.in. **URL:** www.bhu.ac.in.

Scientific Fields of Interest: Biological Sciences.

Research and training: Research work is carried out in all the major areas under animal sciences such as: biochemistry and molecular-biology; cytogenetic, molecular genetics, human genetics, population genetics and evolutionary biology; comparative endocrinology; mammalian endocrinology and reproduction biology, chrono biology; fish biology; entomology; behavior ecology; immunology. In addition to Ph.D. programmes, M.Sc students from different universities or research institutions join as trainees in different labs. Medical student and young doctors also join certain labs for dissertation or short training programmes; national level lab training workshops are conducted regularly in different areas. At times international workshops are also arranged; time to time training workshops are also organized for national facility for confocal microscopy.

Achievements: The scientific studies are mostly of basic nature contributing to the developments of modern concepts in the respective areas, and these results are published regularly in refereed international journals in each area. As the nature of work is not of direct application, there is no emphasis on research products.

Facilities: Multiphoton Confocal microscope (Biorad/Zeiss); Automated karyotype workstation (Olympus); HPLC (Shimadzu); FPLC (Biorad); Real-time thermal cycler (Biorad); Ultracentrifuges; Image-analysis systems; Cold rooms; All facilities for molecular, biochemical, tissue and cellular analysis; Tissue-culture, chromosome and genetic diagnostic facilities; Computers with networking and Internet- facility linked with computer center and central library; Departmental Library with over 7000 books including all the latest editions in addition to the central library of the university; Animal house for maintenance of experimental animals.

Future plans: Research: Research activity is continuously advancing and diversifying, adding newer areas, viz., Neurobiology, Human genetic disorders and epidemiology, Stem-cell applications, Cancer genetics, Developmental Genetics, Embryo Physiology, and Molecular Endocrinology. There will be more collaborative works at national and international levels. Teaching: Integrated Masc. and Ph. D. programme are being considered. Radical changes at undergraduate levels with more broad based. Courses having combinations of Biology, Chemistry, Physics and Mathematics are being planned at Faculty level.

Cooperation with developing countries: Presently there is not much cooperation going on with developing countries. It will be good if cooperative programme can be planned in future for both teaching and research. There could be short-term training programme in areas where we have expertise for members from developing countries.

International Organization: International cooperation arrangements are being done for past several years in the form of short and long time visits to leading universities for research work both by faculty members and Ph.D scholars utilizing channels of international fellowships. Also there had been collaborative projects. In recent years, an Indo-UK workshop was organized under India-UK network programme. In coming October, Indo-US Science & Technology Forum (IUSSTF) will be supporting a symposium in which scientists from both the countries will be meeting and discussing on a selected topic. Presently there is no donor agreement, but subsequent to this meeting something positive may emerge.

Banaras Hindu University — Faculty of Science — Department of Physics

Head of Institution: Prof. T.V. Rana Krishnan.

Address: Varanasi 221 005, India. **Phone:** (+91 542) 2307-308. **Fax:** (+91 542) 2368-174.

Email: cpsingh@bhu.ac.in.

URL:

<http://202.141.107.14/science/physics/index.html>.

Scientific Fields of Interest: Physics.

Research and training: Nano materials and hydrogen- storage materials; solid-state ionic and solid-state electronics; physics of soft condensed matters and biological systems; strongly correlated system, superconductivity and colossal magnetoresistance; optical properties of materials; physics of atoms, molecules and biomolecules; high-energy particle physics; atmospheric and plasma physics.

Achievements: Indo-US patent on 'Carbon nano-materials' (US side Prof. P.M. Ajayan RPI, USA, Indian side Prof. O.N. Srivastava); growth of aligned carbon nano-materials and zinc oxide nanocrystals; density functional theory for freezing transitions and its applications in understanding phase transitions in soft condensed matters; folding transitions in biomolecules; theory for strongly correlated system and its application to colossal magnetoresistance; quark gluon plasma; spectroscopic properties of glasses; electronic properties of biomolecules and clusters.

Facilities: Electron microscope CM-12 TEM; TEM; Technai-20 TEM; scanning electron microscope and EDAX attachment; DTA/TGA/DSC facility; Xeon compute nodes (6) and front end node (1); Nd-YAG laser; pumped dye laser; single mode Ti dye ring laser; good library.

Future plans: Statistical theory of ordered and biological systems; synthesis, development and application of nano and hydrogen storage materials; QGP

with special resource to LCH at CERN; high-resolution spectroscopy of glassy materials.

International Organization: Present: Indo-US collaborative research on hydrogen energy research. Future: Indo-Swiss collaboration on hydride research; Indo-US collaboration on Nan-materials research.

Bhabha Atomic Research Centre (BARC)

Head of Institution: Dr. Srikumar Banerjee.

Address: Trombay, Mumbai 400 085, India. **Phone:** (+91 22) 2550-5300. **Fax:** (+91 22) 2550-5151, 2551-9613. **Email:** sbanerji@barc.gov.in. **URL:** www.barc.gov.in/.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences, Chemistry, Earth Sciences, Engineering, Environmental Sciences, Mathematics, Physics.

Research and training: Regular radioisotope production and supply, developments of applications of radiation technology in the fields of industry, agriculture and human healthcare. A number of high-yielding and disease-resistant seeds were produced through radiation induced mutation for the benefit of farmers. A number of diagnostic and therapeutic procedures incorporating appropriate radionuclides are developed and routinely practiced in the management and prevention of cancer and related malignancies. Industrial radiography and non-destructive testing using Co-60 and Ir-192 radionuclides and radioisotope based tracer technology for trouble shooting in large petrochemical and other process columns and pipelines under the land has helped to reduce the industrial production loss by a good magnitude. BARC has made distinct contributions to emerging and fast developing areas of science and technology by way of developing Anupam super computer grids which is used for many different advanced applications including computational sciences for fast data analysis and interpretation. The institutional activities covers physical, chemical, biological, materials, mathematics and computational sciences, as well as all branches of engineering technologies and robotics. A well conceived human resource development policy adopted by the Department of Atomic Energy ensures adequate availability of well trained and qualified stream of scientists and technocrats for the continuation of the programme. Also, custom designed training courses are routinely conducted for the familiarization of the applications of nuclear energy based techniques and technologies in the public domain.

Achievements: BARC has made significant contributions towards uranium minerology, fuel design and fabrication for Pressurized Heavy Water Reactor (PHWR), Fast Breeder Test Reactor (FBTR) and Prototype Fast Breeder Reactor (PFBR), operational and radiation safety of Nuclear Power Plants (NPPs), nuclear spent fuel processing and waste management and in the design, development, installation, commissioning, operation and utilization of research reactors. Significant resources are devoted to design of new reactors

systems including Advanced Heavy Water Reactor (AHWR) and Compact High-temperature Reactor (CHTR). Several spin-off technologies have been transferred to industries for commercial exploitation. Radioisotope production and development of isotope technology for medical and non-medical applications constitute the other important achievements. Excellent and innovative research studies are pursued in BARC in material science and metallurgy, lasers and accelerators, chemistry, nuclear physics, engineering and science and computational mathematics.

Facilities: The major research facilities available in BARC include research reactors, advanced centre for design and manufacture, high speed parallel computational platforms and up-to-date state-of-the-art laboratories for research in wide areas of engineering, physics, chemistry, biology, health and Radiation Safety. Research Reactors are equipped with neutron beam research facilities, special tray rod facilities for neutron activation studies, radioisotope production facility and special arrangements for short duration neutron irradiation. Folded Tandem Ion-accelerator (FOTIA) and pelletron accelerators enable advanced research in Physics and material sciences. Several advanced instruments and equipments are available in the campus for the use of researchers in all branches of science and technology. A large number of high value scientific journals and publications are subscribed by the library for the benefit of the scientists and engineers. Well laid out intranet facilities and a dedicated independent server ensures smooth and uninterrupted flow of information to the scientists located anywhere inside the campus. The concept of e-library is getting implemented in a phased manner.

Future plans: The future activities of BARC are focused towards R&D pertaining to design-verification, operational, radiation safety of the proposed AHWR and the 700 MWe Indian PHWR. The development program for the Compact High-temperature Reactor (CHTR) would be continued and setting up of new high neutron flux research reactor would be taken up. The R&D studies required for the development of thorium fuel cycle and design of ADSS will be pursued further. The program also envisages high end R&D activities in the basic sciences such as physics, chemistry, biology aimed at several diverse applications, such as nano science and technology, nuclear agriculture and biochemistry, advanced instruments development, etc. The applied R&D will be pursued in the areas of industrial applications of radio-isotopes, robotics, manufacturing technologies, tomography, instrumentation, computational mechanics, etc., and in the area of hydrogen as future fuel. The spin-off technologies such as radio-isotope based medical applications, desalination using low-grade heat from NPPs, food irradiation, effective domestic waste utilization etc. will also be worked out for the societal benefits.

Cooperation with developing countries: A number of bilateral agreements with different nations in the Asia Pacific region as well as in the European continent for the peaceful applications of nuclear science and technology are in place and are being executed. Under the existing programmes, exchange of scientists, coordinated research activities and setting up of national laboratories on a turn key basis are carried out. Fellowships/ custom designed training

programme to meet the requirements of the other countries are provided under the aegis of IAEA and other international organizations upon request. As a part of the agreement under the collaborative research programmes with developed nations, scientists and experts visit and work in the national laboratories on mutual exchange basis.

International Organization: BARC actively participates in the IAEA-TC sponsored training programmes by extending its facilities and expertise. The Regional Co-operative Agreement between the 17 member states in the Asia Pacific Region facilitated through IAEA is an important forum in which India contributes significantly. The contributions of the Department of Atomic Energy (DAE) organizations to the CERN kept pace with programmes of building Large Hadron Collider, along with its detectors CMS and ALICE.

Bose Institute

Head of Institution: Prof. Maqsood Siddiqi.

Address: Acharya J.C. Bose Birth Centenary Building, P-1/12, C.I.T. Scheme-VIIM, Kolkata 700054, India. **Phone:** (+91 33) 2334-7434. **Fax:** (+91 33) 2334-3886. **Email:** sibaji@bosemain.boseinst.ac.in. **URL:** www.boseinstitute.org.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences.

Research and training: Improvement of plants; protein science; bio-informatics and computational biology; genomics; drug development: target identification, design and synthesis. Microbes and Microbial producers of medical and industrial importance. Basic and applied problems in physical science.

Achievements: Transgenic Rice with BT gene and transgenic mustard plant with protease inhibitor gene; Molecular understanding of chromosome structures of yeasts. A mycobacterial beta-lactamase has been purified. A new antigenic type of colonization pilus in non-O1 vibrio cholera strains detected.

Facilities: Library. Distributed information center. Regional sophisticated instrumentation centre: 500 MHZ NMR facility; centre for plant and molecular-biology; experimental farm; high-altitude research station; central instrumentation facility; Acharya J. C. Bose Memorial Museum; central workshop.

Future plans: Introgression of salt instill syntheses and lections in rice; testing of active principles of micro-propagated plants; development of drugs against tuberculosis and amoebiosis; developing selective anti cancer drugs; gamma ray spectrometers using superheated liquids.

International Organization: Indo-Swiss collaboration on development of transgenic insect-resistant chickpea. Indo-German collaboration on mald-tof analysis of fructose 1,6 biphosphatase.

Central Glass and Ceramic Research Institute (CG&CRI)

Head of Institution: Dr. Himadri Sekhar Maiti, Director.

Address: 196, Raja S C Mullick Road, Kolkata 700 032, India. **Phone:** (+91 33) 2473-3469/76/77/96, (+91 33) 2483-8079/8082. **Fax:** (+91 33) 2473-0957, 2483-7339/8085.

Email: director@cgcri.res.in.

URL:

www.cmmacs.ernet.in/nal/icast/csir/cgcri.html.

Scientific Fields of Interest: medical Sciences.

Research and training: Optical communication fiber; specialty glass process engineering; glass technology and science; sol-gel science and technology; oxide & bio-ceramics; ceramic membrane; electro-ceramics; refractories; composites; non-oxide ceramics; conventional ceramics.

Achievements: RSW (Radioactive Shielding Window) glass block/slabs; ultra-low expansion transparent glass ceramics; phosphate laser glass; antireflection (AR) coatings on plastic ophthalmic lenses by sol-gel processing; special purpose optical fiber and fiber lasers; hard coatings on plastic ophthalmic lenses and sheets by sol-gel processing; bio-active integrated orbital implants; plasma sprayed hydroxyapatite coated metallic implants for orthopedic application; arsenic treatment unit, using ceramic membrane module; ceramic-membrane module for ultra-filtration of vegetable oils for physical refining; ceramic humidity sensor for the application of the lead-before-break (LBB) concept in nuclear industry.

Facilities: Optical communication fiber-drawing tower (speed 300 m./min., dia - 125micron +/- 5 micron); scanning electron microscope; tape casting machine; chemical analysis and characterization for glass and ceramics; high-temperature furnace upto to 2,000 degrees Celsius; controlled-atmosphere furnace; high-temperature viscosity-measurement for glass; temperature calibration.

Future plans: To create centres of excellence in the following fields: (1. ceramics for healthcare; (2. ceramics for energy and environment; (3. ceramic membrane; and, (4. post-sintering processing of ceramic materials

Cooperation with developing countries: Existing: imparting training of personnel and offering consultancies, whenever to other developing countries. Future: Arsenic Removal from drinking water in collaboration with Bangladesh.

International Organization: Present: Development of low emissivity-coatings on different types of substrates by sol-gel processing (ZAE Bayern, Germany); Microstructural characterization of thermal barrier coating by indentation technique (Forschungszentrum, Jülich, Germany). Future: British Council, Institute for Materials Research, University of Leeds, UK; Indo-French, Institut Européen des Membranes, Montpellier, France; Indo-German, Hermsdorfer Institut für Technische Keramik (HITK), Hermsdorf, Germany; Indo-German-Russian, Bavarian Center for Applied Energy for Research & Institute of Chemistry, SG Petersburg State University.

Centre for Development of Advanced Computing (C-DAC)

Head of Institution: Mr. S. Ramakrishnan, Exe. Director.

Address: Pune University Campus, Ganeshkind Road, Pune 411007, India.

Phone: (+91 20) 256-94000/1/2. **Fax:** (+91 20) 256-94059. **Email:** ramki@cdacindia.com. **URL:** www.cdacindia.com.

Scientific Fields of Interest: Engineering.

Research and training: High-performance Computing (HPC); natural language processing (NLP); artificial intelligence (AI), e-learning, multilingual multimedia computing; geomatics; cyber security; real-time systems and software; data warehousing; data mining; digital/broadband wireless networks; scientific modeling and visualization.

Achievements: PARAM Padma; PARAMNet II; PCI GIST Card (a PC based PCI bus add-on card); GIST Card (a robust solution for Indian languages on DOS); GIST Terminal (the only solution for Indian languages in Unix); Apex Language Processor (ALP) (A character mode based word processor); LISM (Linux based application for Indian languages); LEAP Mail (a versatile solution for email in Indian languages); LEAP Office 2000 (the complete Indian language software).

Facilities: C-DAC's terascale supercomputing facility (CTSF); national PARAM supercomputing facility (NPSF); graphics and intelligence based script technology (GIST) lab; hardware technology development lab; applied artificial intelligence lab; geomatics solutions development lab; medical informatics; networking and Internet software lab; national multimedia resource centre; advance video system lab; ASIC design; PCDB CAD facility; industrial design; pilot production; model shop; network concept lab; technical information centre; technical resource centre for cyber forensics; technical resource centre for Malayalam; microprocessor lab; advanced computer lab; computer lab; multimedia lab; computer-aided drafting (CAD) lab; PC repair and maintenance lab; measurement lab; prototype development lab; PCB lab power lab; computer electronics library; digital communication lab; bio-medical electronics lab; R&D lab; computer networks and Internet engineering division; data and knowledge engineering division; educational technology unit division; graphics and computer-aided design division; knowledge based computer systems division.

Future plans: Garuda, the iGRID project

Cooperation with developing countries: Ghana, Mauritius, Thailand, Brazil

International Organization: Russia, USA, Japan, the UK, Singapore, and Germany

Chennai Mathematical Institute

Head of Institution: C. S. Seshadri.

Address: 92, G.N. Chetty Road T. Nagar, Chennai - 600 017, India. **Phone:** (+91 44) 2815-7854, 2815-7855. **Fax:** (+91 44) 2815-7671. **Email:** css@cmi.ac.in, office@cmi.ac.in. **URL:** www.cmi.ac.in/.

Scientific Fields of Interest: Mathematics.

Research and training: Research: Mathematics: Algebraic geometry; commutative algebra; partial differential equations; algebraic groups; algebra and control theory; differential geometry; topology representation theory; Computer Science: partial order based models and logics for distributed computing; real-time and hybrid systems; controllers for discrete event systems; theory of distributed systems; formal specification and verification; algorithms and complexity theory; automata theory. Training: under-graduate, graduate and Ph.D. programmes.

Achievements: Numerous publications in reputed Indian and International Journals. Collaboration with industry and academic institutions like TCS, TIFR, IMSc., ENS-Paris.

Facilities: Computers; network of 25 Linux based PCs, 64 Mbps Internet connection; 2 laser printers, copier, OHP; Library with books and journals.

Future plans: Planning to move to it's own campus at the SIPCOT IT Park, Siruseri, on the Old Mahabalipuram Road near Chennai, by the end of 2005.

International Organization: ENS, Paris, France.

Cleantech International Foundation

Head of Institution: Dr. Ashok Sharma, President.

Address: 52/1, C.R. Park, New Delhi 110019, India. **Phone:** (+91 98160) 77777. **Fax:** (+91 177) 2622-588. **Email:** ashokaks@hotmail.com, cleantechfoundation@vsnl.net. **URL:** www.cleantechfoundation.org.

Scientific Fields of Interest: Biological Sciences, Chemistry, Earth Sciences, Engineering, Environmental Sciences.

Research and training: The foundation works for global environmental protection through proliferation of clean technologies and practices. Major activities relate to training, research and consulting services in the areas of environmental management, pollution prevention, energy conservation, risk management, cleaner production, recycling, greenhouse effect management, clean development mechanism (CDM), ISO 14000 and total environment management. 'Cleantech' is a strategic enviro-management tool developed by Ashok Sharma, Former Member Secretary, HP State Pollution Control Board, India to reduce the generation of pollutants in a process at source, through minor process modification, material substitution, improved manufacturing practices or low-cost innovation, with a view to achieve low or no discharge,

thereby eliminating the need for treatment. The concept is based on eco-efficiency principles. The concept has been implemented successfully in over 200 industries extending over 25 categories including sugar, paper, textiles, mineral processing, electroplating, leather processing, pharmaceuticals, chemicals and food processing amongst others. The foundation is committed to global dissemination of clean technologies and practices in the form of replicable SHOW_HOW modules with the mission objective of minimizing the global impact of human and industrial activities through its Zero Impact Manufacturing Initiative (ZIMI).

Achievements: Some of the Significant Cleantech Initiatives are listed as follows: Totally chlorine free bleaching of pulp in paper mills; Lignin separation from black liquor for valorization; Chemical free processing of cane juice in sugar mills; Wastepaper de-inking for recycling in paper mills; Microwave heating/drying in food/ textile industry; Computer-aided design, simulation and process control; Bio pulping & bio bleaching of pulp & paper; Freeze concentration of waste stream to recycle concentrate. Alternative technologies have been evolved for cane sugar manufacturing, milk processing, fruit processing, metallurgical industries, surface coating, microwave drying and electron beam forming.

Facilities: Computer facilities with latest configuration and advance software including CAD/CAM and Process Simulators; Elaborate prototype design and fabrication facilities contributed by member industries including non-destructive material testing, forging, casting, welding, machining and erection-commissioning; Elaborate facilities for effluent monitoring and treatability analysis; Field stations at Parwanoo (HP), Shoghi, Yamunanagar, Paonta and NOIDA; Excellent library and computer based data registry on clean technologies with case studies; Excellent training facilities and conference center at Parwanoo and Shoghi.

Future plans: The foundation intends to globalize its activities and disseminate research results and demonstrated technology modules for global replication under its Zero Impact Manufacturing Initiative (ZIMI). A major initiative has also been launched on implementation of clean development mechanism (CDM). Other important initiatives include policy interventions through environmental lobbying and environmental activism through public interest litigation and invocation of human rights doctrine.

Cooperation with developing countries: Keenly exploring opportunities of transplanting knowledge based systems and ZIMI modules to least developed countries like Fiji, Mauritius, Indonesia and countries from African region.

International Organization: Successful cooperation with Kyoto University, Japan likely to culminate into future cooperation with private-sector companies in Japan and Thailand. Other initiative planned under bilateral programs include those with counterparts in Germany, Switzerland, Sweden and United States of America.

Council of Scientific and Industrial Research (CSIR)

Head of Institution: Dr. R.A. Mashelkar, DG.

Address: Anusandhan Bhavan 2 Rafi Marg, New Delhi 110 001, India. **Phone:** (+91 11) 2371-0472, 2371-7053, 2373-1832. **Fax:** (+91 11) 2371-0618, 2332-0932. **Email:** dgcsir@csir.res.in, dg@csir.res.in. **URL:** www.csir.res.in.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences, Chemistry, Earth Sciences, Environmental Sciences, Mathematics, Physics.

Research and training: Aerospace and aeronautics; bio-sciences and biotechnology; chemicals and chemical technology; coal, gas and petroleum; construction technology; drug and pharmaceuticals; earth and ocean resources; ecology and environment; electronics and instrumentation; food processing; information science and technology; leather and leather goods; machinery and equipment; mining and metallurgy; new materials; physical sciences and technology.

Achievements: Induction of precocious flowering in plantlets of bamboo raised in tissue-culture; discovery of one of the smallest protein molecules, seminal plasmin; formulation of a model of crack-tip energy dissipation; first combined genetic and physical map of the whole *V. cholera* genome; development of a salt sensitive expression vector, used successfully to clone and express six divergent genes; elucidation of the mechanisms for delaying the formation of cataract in the human eye; the first study to give an understanding of the outer ionosphere; filing of about 500 patents in India per year; 650 patents abroad; development of more than 3,000 technologies over the years, and licensing of 1,500 of them; first to introduce buffalo milk for baby food (Amul); launching a wholly indigenous tractor Swaraj; developed a cost-effective process for drugs for mass use; initiated the design of building foundations suitable for black cotton soil; first to extract polymetallic nodules from the Indian ocean bed; also many other achievements in the various fields of research mentioned above. The institute publishes 15 scholarly science journals; brings out 10 bulletins on specific science areas such as electro-chemistry, fuel science and technology, mining research, mechanical-engineering, medicinal and aromatic plant sciences, etc.

Facilities: Construction research: low-speed wind-tunnel with computer controlled monitoring system; artificial sky for illumination measurements; heavy-testing laboratory; fire-testing for building components lab; strong motion instrumentation laboratory; pest and mycology lab; 157 types of testing facilities for building materials and components based on BS, BIS and ASTM standards. Cellular and molecular-biology: confocal microscopy facility; automated DNA sequencing facility; flow cytometry facility; protein analysis and peptide and DNA synthesis facilities; laboratory animal facility. Drug research: combinatorial chemistry set-up; high throughput screening; macromolecular x-ray crystallography; electron and confocal microscopes; DNA microarray; proteomics; 600 MHz. NMR spectrometer; computer-aided drug design; biological screening in about 170 in-vitro/in vivo test systems; regulatory

pharmacology, pharmacokinetics; toxicology and clinical trials; fermentation studies; animal house. Electrochemical research: high-performance liquid-chromatography; gas chromatography, gel-permeation chromatography, IR, UV and atomic-absorption spectrophotometers, x-ray powder diffractometer, scanning electron microscope and elemental analyzer; betatron radiographic instrument; battery testing. Electronics Engineering: CAD of ICs; discrete semiconductor devices and microwave tubes; fabrication facility for semiconductor devices and microwave power tubes. Fuel: pilot and test facilities for briquette curing plant; catalyst est unit for conversion of syngas to liquid fuels; CBJ hydraulic press; coal oil stabilized slurry unit; Fischer-Tropsch process development unit; fluid-bed hot-air generator; fluidized-bed combustor; heavy medium and hydrocyclone unites; high-pressure hydrogenation pilot-plant; high-temperature graphitization furnace; hydrogen gas plant; super centrifuge. Food: modern 20 tonnes/day capacity roller flour mills; research-cum-training abattoir with modern equipment; pilot-plant and workshop with an array of equipment and machinery for process scale-up and study of unit operation sand a functional package testing laboratory for assessing packaging materials; Codex Nodal laboratory for quality evaluation.

Cooperation with developing countries: Present: CSIR has been collaborating with S&T community in developing countries through a number of channels viz. Institutional arrangements, Inter-governmental S&T programmes, academic exchange programmes and various international training fellowships tenable in CSIR labs, namely, UN University, TWAS and Indian Governments' Indian Technical Economic Cooperation (ITEC), etc. CSIR also receives candidates sponsored by their respective organizations and UN and other international funding agencies. CSIR labs are helping and cooperating with neighboring developing countries under regional cooperation mechanisms like South-Asian Association for Regional Cooperation (SAARC) and Non-aligned S&T Cooperation (NAM S&T). Future: increase arrangements with institutions in developing nations for the availability of CSIR knowledge database to upgrade the local skills and help transfer the technologies; development of a training programme for foreign nationals from both developing and developed countries to learn the use of the most modern techniques.

Council of Scientific and Industrial Research (CSIR) — Central Building Research Institute (CBRI)

Head of Institution: Dr. V. K. Mathur, Director.

Address: Roorkee - 247 667, U.P., India. **Phone:** (+91 1332) 272-2243, 272-391. **Fax:** (+91 1332) 272-272, 272543. **Email:** director@cbrimail.com. **URL:** www.cbri.org.

Scientific Fields of Interest: Chemistry, Earth Sciences, Environmental Sciences.

Research and training: Providing S&T back-up to the problems of buildings and construction industries in the areas of housing, building materials, geotechnical & structural engineering, building physics and fire research & testing.

Achievements: Under-reamed piles for expansive soils, bored compaction and skirted granular piles; Bricks from inferior soils and high draught kiln for bricks, kiln for lime burning, solar wood seasoning kiln; Low-cost sanitation system and construction technologies of rural and urban areas; Semi-mechanized brick plant, machine for concrete blocks, mini crane, calcinator for gypsum; Activated lime pozzolana mixture from clays, lime kiln rejecters, quarry wastes and fly ash; Precast building components for floors, roofs; Automatic fire sprinklers; Space norms for school building etc.; Door shutters with wood substitute; Earthquake simulation software.

Facilities: Low-speed wind-tunnel with computer controlled monitoring system; artificial sky for illumination measurements; Heavy-testing laboratory; fire-testing for building components laboratory; strong motion instrumentation laboratory; pest & mycology laboratory; 157 different testing facilities for building materials and components based on BS, BIS and ASTM standards.

Future plans: Development of eco-friendly alternate building materials; Hazard estimation in the urban habitat of India and reduction of risk to buildings from natural disasters; Sustainable development through waste recycling; Energy efficiency in buildings; Informatics and industrial marketing and production packaging.

Cooperation with developing countries: Bilateral exchange programme of personnel, exchange of publications, consultancy services are carried out as a part of the governmental policy and bilateral agreements. It is proposed to go beyond the present umbrella and work out effective inter-institutional cooperation at all levels of S&T.

International Organization: Present: None; Future: planned with UNDP and SAARC.

Council of Scientific and Industrial Research (CSIR) — Central Drug Research Institute (CDRI)

Head of Institution: Director.

Address: Chattar Manzil, P.B. No 173, Lucknow 226 001, India. **Phone:** (+91 522) 262-3286, 261-0932. **Fax:** (+91 522) 262-3405, 262-3938. **Email:** drcmg@satyam.net.in, drcmg@rediffmail.com, root@cscdri.ren.nic.in. **URL:** www.cdriindia.org.

Scientific Fields of Interest: Biological Sciences, Chemistry.

Research and training: Research in Drug Discovery & Development: Reproductive Health Research & Development of simple and safe agents for Fertility regulation, Osteoporosis, Cancer breast and Benign prostate hyperplasia; Elucidation of mechanism of action and basic studies for

understanding crucial events to provide new leads. Malaria, Filariasis and Leishmaniasis - Development of novel orally effective chemotherapeutic agents for their control and management. Studies are also being made for reversal of drug resistance, characterization of enzyme markers for drug resistant parasites and genome sequences to identify new drug targets for malaria; define biochemical, immunological functions and pathogenesis of Filariasis; and characterize molecular targets and mechanism of drug resistance in Leishmaniasis. CNS/CVS and other disorders; Design, synthesis and development of new drugs for Cerebral stroke, Diabetes-dyslipidemia-obesity, Dementia & Stress and Gastric ulcers, and studies on their mechanism of action. Microbial infections; Development of new and safe anti-tuberculosis agents in addition to construction of mycobacterial vectors, characterization of novel antigens and drug targets and basic studies on mycobacterial proteins and virulence genes. Natural products - Investigations on natural products based on their actual use in traditional system of medicine or any new use, in addition to screening untapped flora/fauna for lead identification. Newer approaches in drug discovery & design; Characterization of new drug targets using modern biological techniques, namely Genomics, Proteomics and Structural Biology leading to design of potential agonist/antagonist/inhibitors as new drugs. Screening models; Development/establishment of an array of new in-vitro / in-vivo test systems for evaluating potential agents. Regulatory Studies: The institute undertakes pre-clinical regulatory profiling for in-house candidate drugs. This facility is extended to other R&D laboratories and pharma industry. The data is generated following international standards, including Good Laboratory and Clinical Practices. Pharmacology; Regulatory toxicology; Clinical trials; Pharmacokinetics & Metabolism; Pharmaceuticals and drug standardization. Training programmes: training leading to awarding of Ph.D degree; short-term training programmes (3-6 months ad-hoc) for Post-graduate students.

Achievements: Products/Technologies commercialized based on laboratory knowledge base: Arteether, antimalarial; Artemether, antimalarial; Centchroman, non steroidal oral contraceptive; CDRI Bacopa monniera extract, memory & learning; L-Ephedrine hydrochloride; Elubaquin (trade name Aablaquin), antimalarial.

Facilities: Equipment: Combichem Facility; Macromolecule X-Ray Crystallography; High throughput Screening System; DNA Microarray System; Proteomics facility; Automated DNA Sequencer; scanning/Transmission-electron microscopes; Confocal Microscope; FACS Facility; NMR Spectrometers (600, 400, 300 and 270 MHz); Mass Spectrometers (Maldi-TOF, FAB, LC-MSMS, LC-MS). Other facilities: PCR, Ultra-high Centrifuges, Auto-hematology analyzers, Elemental micro-analyzer, Laboratory Animal Facility; Computers (Local Area Network with Internet Facility); Computational and Bio-informatics Centre; Field Station at the Clinical Pharmacology Unit, Seth GS Medical College, Mumbai; Library with over 21,000 books, 334 journals and 3,300 online journals.

Future plans: Natural products and their derivatives have traditionally been the most common source of drugs and could still provide biologically active compounds. To properly utilize this resource and the knowledge of traditional remedies for obtaining new therapeutic agents/herbal drugs, it is required to authenticate the results through modern approaches including chemical markers and biological standardization. The program on development of drugs from natural resources at CDRI has led to the identification of a plant preparation with osteogenic (bone forming) activity and two marine samples exhibiting antihyperglycemic activity. Detailed investigation to isolate pure active compounds from these plants is continuing. A collaborative-cum-licensing agreement has been signed with pharma industry for further development of an anti-ischemic preparation, exhibiting significant protection to cerebral damage caused by ischemic insult. Another plant preparation exhibiting promising ulcer healing activity in chronic ulcer models has been identified. New target discovery is another essential step towards drug discovery. The program on identification and characterization of differentially expressed genes/proteins of selected pathogens (*Plasmodium falciparum*, *Mycobacterium tuberculosis* and *Leishmania donovani*) as drug targets and their development using in-silico biology is continuing at CDRI. This has led to identification of potential inhibitors with antibacterial /antitubercular activities. A meaningful integration of virtual and experimental screening still holds great promise for more rapid and consistent identification of High-quality 'hits'. Pharmacogenomics is a new emerging discipline that provides insight into how drugs are metabolized and affect the response to drugs. The tool carries promise of achieving improved drug safety, earlier attrition rate, decreased drug development costs, a reduced drug development cycle and resuscitation of failed drugs. Deployment of appropriate pharmacogenomic strategy to candidate drugs is, thus, a challenge and opportunity for all drug R&D laboratories. Assessment of pre-clinical safety of a candidate drug is a mandatory requirement before trials on human beings are initiated. These studies fall under two broad categories i) Safety Pharmacology ii) ADME-Tox profiling to be conducted in accordance with the norms of Good Laboratory Practices and regulated by the National GLP Monitoring Authority, Department of Science & Technology, New Delhi. A national facility for regulatory pharmacology and toxicology at CDRI would provide state-of-the art facility/investigational capability under one roof for the public and private-sector for conducting High-quality screening of the safety profile of candidate drugs/products.

Cooperation with developing countries: S&T Cooperation Program with SAARC countries, Egypt, Bulgaria, Israel, South Africa, etc.,

International Organization: Bilateral Exchange Program with overseas Academies/Organizations: Germany, France, Hungary, Poland, Russia, China, Brazil, South Korea, Czech Republic, Nepal, The Netherlands, Philippines, Slovak Republic, Ukraine and the UK.

Council of Scientific and Industrial Research (CSIR) — Central Food Technological Research Institute (CFTRI)

Head of Institution: Dr. V. Prakash, Director.

Address: Mysore 570 013, India. **Phone:** (+91 821) 251-7760, 251-5003. **Fax:** (+91 821) 251-6308, 251-7233. **Email:** director@cftri.com. **URL:** www.cftri.com.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences, Chemistry.

Research and training: Development of food products and processes for optimal utilization of country's agricultural produce; modernization of primary processing industry; development of value-added convenience products; upgrading traditional food technology & development of appropriate technologies for reducing/eliminating post-harvest losses of perishables and durables; basic research related to food additives, preservatives, micronutrients, food toxicity and safety, food microbiology, bioactive substances and food packaging.

Achievements: Spice oil and oleoresins; fruit-juice concentrates; sterilization of black pepper; rice bran stabilizer; integrated process for sunflower seed. Versatile dhal mill; machinery for Indian Traditional food; leaf cup/plate machine; protocols for transportation of fresh produce; process for thermally processed food; CAD for package; food enzymes; minimally processed vegetables; Spirulina Cultivation, Mushroom Processing.

Facilities: Modern 20 tonnes/day capacity roller flour mill; research-cum-training abattoir with modern equipment; pilot-plant and workshop with an array of equipment and machinery for process scale-up and study of unit operations and a functional package testing laboratory for assessing packaging materials; Codex Nodal Laboratory for quality evaluation.

Future plans: Food security, food safety and exploitation of agro-bio resources for sustainable development, in terms of nutrition and resource utilization. Facilities for genetically modified foods and nutrigenomics, for Food irradiation, and digitization of Traditional Knowledge on various aspects of food.

Cooperation with developing countries: Presently with SAARC countries: Bangladesh, Nepal, Bhutan, Pakistan, Sri Lanka, Maldives and Vietnam. Planned with Korea, African countries and Gulf states.

International Organization: Present: Sweden, Norway. Planned with EU and Japan.

**Council of Scientific and Industrial Research (CSIR) —
Central Institute of Medicinal and Aromatic Plants
(CIMAP)**

Head of Institution: Dr. S.P.S. Khanuja, Director.

Address: PO-CIMAP, Near Kukrail Picnic Spot, Lucknow 226 015, India.

Phone: (+91 522) 235-9623, 235-7134. **Fax:** (+91 522) 234-2666. **Email:** director@cimap.res.in, director@cimap.org. **URL:** www.cimap.res.in.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences.

Research and training: Development of agro-technologies and chemical and processing technologies for economically important medicinal and aromatic plants, both indigenous and exotic; basic research in the area of phytochemistry, plant physiology and biochemistry, pathology, genetics, entomology and pharmacognosy.

Achievements: Genetic resources in several medicinal and aromatic plants of interest to India; Agro-processing technologies for about two dozen medicinal and aromatic plants; arteether for drug-resistant malaria; screening of ayurvedic plants for drugs; basic chemical, genetic and molecular-biology research on taxus and periwinkle plants.

Facilities: Atomic-absorption spectrophotometer; infrared spectrophotometer; ultraviolet spectrophotometer; HPLC, FT-NMR; gas-liquid-chromatograph; transmission-electron microscope with scanning attachment; Vickers cytophotometer and GC-MASS spectrometer and a spectrum of instruments for molecular-biology and biotechnology experimentation; research farms for large-scale field trials under various agro climatic conditions; pilot-plants.

Future plans: Conservation and utilization of genetic resources of medicinal and aromatic plants; healthcare products applications; Bio-village approach for mission programme on technology dissemination in geranium, rose, mints, rosemary and cymbopogon grasses; up-scaling of processing technologies for on-demand and value-added products; Plant tissue-culture technology for developing high-regeneration and secondary metabolite production; Basic research in selected medicinal and aromatic plants for future exploitation.

Cooperation with developing countries: Planned agreements with Malaysia and the ASEAN-INDIA collaboration in biotechnology.

Council of Scientific and Industrial Research (CSIR) — Central Leather Research Institute (CLRI)

Head of Institution: Dr. T. Ramasami, Director.

Address: Adyar, Chennai 600020, India. **Phone:** (+91 44) 2491-0897, 2491-0846. **Fax:** (+91 44) 2491-12150, 2491-1589. **Email:** clrim@giasmd01.vsnl.net.in, clrim@vsnl.com. **URL:** www.clri.org.

Scientific Fields of Interest: Biological Sciences, Chemistry, Environmental Sciences.

Research and training: Modernization of tanneries; development of environment-friendly chemicals and technologies, including enzymatic options; CAD for footwear and garments, split leathers and quality upgrading of lower ends; molecular-biology of collagen and metal-collagen interactions; wastewater management; region-specific appropriate technologies; tannery and slaughter house by-products, including carcass utilization and hazard and risk analysis.

Achievements: Implemented cleaner leather processing technologies in about 500 tanneries in the state of Tamil Nadu in India and also in selected tanneries in Bangalore as well as in Nepal and Sri Lanka. CLRI is the consultant to the Government of West Bengal in the development and implementation of Leather Complex, including designing CETP and implementation of cleaner-process technologies.

Facilities: Pilot tannery; footwear pilot-plant; chemical pilot-plant; byproducts pilot-plant; polymer testing and synthesis; design- engineering cell; CAD/CAM; fashion studios; National Information Center on Leather and Allied Industries (NICLAI); testing laboratories for footwear, leather and chemicals.

Future plans: CLRI is the world's biggest R&D institute and aims to reach the global leather industry by developing environment-friendly leather processes.

Cooperation with developing countries: Bilateral arrangements through CSIR, New Delhi.

International Organization: UNIDO; CSIRO (Australia); TNO (The Netherlands).

Council of Scientific and Industrial Research (CSIR) — Central Road Research Institute (CRRI)

Head of Institution: Dr. P.K. Nanda, Acting Director.

Address: PO CRRI, Delhi-Mathura Road, New Delhi - 110 020, India. **Phone:** (+91 11) 2684-8917, 2682-3437. **Fax:** (+91 11) 2684-5943, 2683-0480. **Email:** pksikdar@crriidom.org, root@crriidom.org. **URL:** www.crriidom.org.

Scientific Fields of Interest: Earth Sciences, Environmental Sciences.

Research and training: Pavement design and performance; road condition monitoring; pavement management system; maintenance planning and

management; pavement deterioration modeling; landslide management, hazard mitigation and improved transportation planning for emerging urban needs; applied research on planning and engineering aspects of rural roads; material characterization; pavement evaluation; highway instrumentation; deterioration and rehabilitation of bridges; transportation planning; traffic engineering; road safety and environmental problems.

Achievements: Soil stabilization and low-cost road-construction techniques; Control and correction of landslides in hilly areas; Ground improvement with stone columns, geotextiles, lime piles and lime-slurry injection; Bituminous overlays on concrete pavements; Mastic asphalt technology; Modified binders for paving road surfacing; New pavement-systems for desert areas; Utilization of waste materials in road-construction; Structural adequacy and rating of bridges; Urban transportation planning for mega and medium cities; Road-user costs and highway design; Driver evaluation techniques; Instrumentation to evaluate pavements and geotechnical investigation; Software related to design, construction and maintenance.

Facilities: Heavy-test bed with a 60 ton load-frame for evaluating experimental road-sections, under static and repetitive loading; Mu-meter, portable skid-tester for measurement of skid resistance; testing under simulated field condition, using 40 ton semi-mobile loading frame; Calibration of automatic road unevenness-recorder units; falling weight deflectometer for non-destructive pavement evaluation; abay beam for calibration of response type equipment; dynamic non-destructive testing of pavements for their structural properties; Benkelman beam fitted with LVDT amplifier recorder used for load-deflection measurement; 'Diptstick' auto-read profiler to measure roughness; weigh-in-motion system to measure load and speed of a vehicle; computer-aided triaxial testing facility for soils and other granular materials; concrete block-making machine for production of high-strength, interlocking concrete blocks.

Future plans: R&D in intelligent transportation-systems, Geographical information system (GIS) and Global positioning systems Environmental impact Assessment for road development; disaster mitigation and ground improvement; usage of new and marginal materials for road-construction; structural and functional evaluation of pavement; rural road network planning; expressway planning and design; maintenance management of highway and bridges; feasibility studies and DPR for BOT project.

Cooperation with developing countries: Polish Academy of Science; Malaysia; Norway.

International Organization: Permanent International Association of Roads Congress (PIARC), Asian Development Bank, African Development Bank, World bank, Japan International Cooperation Agency.

Council of Scientific and Industrial Research (CSIR) — Central Salt and Marine Chemicals Research Institute

Head of Institution: Dr. Pushpito K. Ghosh, Director.

Address: Gijubhai Badheka Marg, Bhavnagar 364 002, Gujarat, India. **Phone:** (+91 278) 2569-496. **Fax:** (+91 278) 2567-562, 256-6970. **Email:** pkghosh@csir.res.in. **URL:** www.csmcri.org.

Scientific Fields of Interest: Agricultural Sciences, Chemistry, Earth Sciences.

Research and training: Salt and salt engineering; marine chemicals; desalination of brackish/saline water; ion-exchange resins and polymers; reverse osmosis; marine algae; inorganic chemicals; photoinorganic chemistry and phytosalinity.

Achievements: High-purity magnesia from bittern; Reverse osmosis and electrodialysis technology for desalination of brackish/sea-water; Polysulfone-polyamide TFC membrane; High-purity salt, iodised salt; Organo-clay for high-temperature detergent-grade zeolite, bromine from bittern.

Facilities: A wide range of modern instruments for characterization and structure-determination of chemicals, e.g., equipment for X-ray diffraction (both single crystal and powder); gas chromatographic analysis; atomic-absorption spectrometer; Fourier-transform IR spectrometer; FT-NMR spectrometer; instrumental facilities for surface-area measurements; determination and distribution of particle size.

Future plans: Plans for future development aim at high- impact research in inorganic chemicals, membrane science and technology and biosalinity, including creation/enhancing & supporting facilities. Aim is to develop completely integrated technology for obtaining brine for membrane-cell technology in chlor alkali industry, High-quality caustic calcined magnesia (98%+) from bittern. High-efficiency catalysts, clays as absorbents and specialty inorganic chemicals, RO/ED technology, important bioactive molecules from marine algae.

Cooperation with developing countries: This Institute is one of the national laboratories under the Council of Scientific & Industrial Research (CSIR), New Delhi, and is participant in various protocols of CSIR and the Government of India with various scientific agencies of developing countries.

International Organization: Mainly decided by the parent body, the Council of Scientific & Industrial Research from time to time as mentioned in the previous column.

Council of Scientific and Industrial Research (CSIR) — Centre for Cellular and Molecular Biology (CCMB)

Head of Institution: Dr. Lalji Singh, Director.

Address: Uppal Road Hyderabad 500 007, India. **Phone:** (+91 40) 2716-0789.

Fax: (+91 40) 2716-0252, 2716-0310. **Email:** lalji@ccmb.res.in, lalji@gene.ccmbindia.org. **URL:** www.ccmb.res.in/.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences.

Research and training: Biophysics and biochemistry; molecular-biology; cell biology; genetics & evolution; biomedicines and biotechnology.

Achievements: DNA fingerprinting system, Salt-inducible expression for protein production, selected strains of fish and unisex fish, cost effective fish-feed, synthesis of probes and DNA sequences, RNAase inhibitor from human placenta, custom made peptides; cloning efforts for preservation of endangered animals, psychrotrophic microbes, germplasm characterization and linkage analysis in coffee and mulberry.

Facilities: Confocal microscopy facility; automated DNA sequencing facility; flow cytometry facility; protein analysis and peptide and DNA synthesis facilities; laboratory animal facility.

Future plans: Completion of human genome sequencing programme; embryonic stem-cell technology.

International Organization: Volkswagen Stiftung, Germany; HFSP, Bureaux Europe, France; Indo French centre for the Promotion of Advanced research; Unité de génétique Moléculaire, France; University of California, USA; The Wellcome Trust, UK; TWAS, Trieste, Italy; Onconova Therapeutics, Inc., USA..

Council of Scientific and Industrial Research (CSIR) — Indian Institute of Chemical Biology (IICB)

Head of Institution: Dr. Siddhartha Roy, Director.

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Scientific Fields of Interest: Biological Sciences.

Research and training: Natural products of medicinal, biological and industrial value, and synthetic duplication of products of interest; development of innovative immunoassay techniques; understanding the basis of parasitism and development of biotechnologies, applicable to the diagnosis and chemotherapy of visceral leishmaniasis; investigation of the molecular basis of pathogenicity of *Vibrio cholera* and development of an effective, long-acting oral-vaccine against cholera infection; development of novel approaches towards fertility control and regulation; delineation of the cellular & molecular basis of brain development

and genesis and prevention of movement of disorders; investigation of gastric physiology; development of tissue-targeted drug-delivery systems; investigation of the molecular mechanism of biocatalysis; studies on the biosynthesis and liberation of carbohydrates in higher fungi; development of radiopharmaceuticals for myocardial imaging and renal and hepatobiliary studies; protein-engineering models for self-organizational phenomena in living systems.

Achievements: Developed bacteriophage typing technique for identifying cholera- infection. Commercialized process for making gelatin optical filter. Evolved methods of preparing high-valued lectins from cheap agricultural & marine resources. Identified *Kallstroemia pubescens* as an alternative source of diosgenin. Developed a potentially viable process for the production of an antiarrhythmic drug. Designed single enzyme-immunoassay techniques for estimating testosterone, cortisol thyroxine and triiodothyronine.

Facilities: Fluorescence-activated cell sorter; automatic DNA sequencer; 300MHz NMR; Gc-Ms mass spectrometer; transmission-electron microscope; microfermentor; electronic stimulator; HPLC; liquid-scintillation counter; spectrophotometer; spectrofluorimeter; animal house.

Future plans: Bioactive substances; Biocatalysis, Biosystems modeling; Cell biology; Immunobiology; *Leishmania donovani*; Neurobiology; Plant-molecular biology; Polysaccharides; Protein-engineering; Radiopharmaceuticals; Reproductive biology; *Vibrio cholerae*.

International Organization: UNDP-assisted project on molecular-biology and biotechnology, applied to the study of parasites.

Council of Scientific and Industrial Research (CSIR) — Indian Institute of Chemical Technology (IICT)

Head of Institution: Dr. J.S. Yadav, Director.

Address: Uppal Road, Hyderabad 500 007, Andhra Pradesh, India. **Phone:** (+91 40) 2719-3030, 2179-3234. **Fax:** (+91 40) 2716-0387, 2716-0757. **Email:** yadav@iict.res.in, yadav@iict.ap.nic.in. **URL:** www.iictindia.org.

Scientific Fields of Interest: Agricultural Sciences, Chemistry.

Research and training: Development of technologies for pesticides, drugs, organic intermediates and fine chemicals, catalysts, polymers and organic coatings; utilization of low-grade coals and value-added products from vegetable oils; process design and mechanical-engineering design organic-synthesis catalysis.

Achievements: As of 1998, complete technology package developed for agro-chemicals (40 licenses); life saving drugs (18 processes), castor oil based products, catalysts, adhesives (surgical and structural).

Facilities: General purpose pilot-plant equipment and dedicated pilot-plants for scale-up studies; CAD station; analysis and testing facilities; modern

instruments for characterization and structural determination of chemicals and analysis.

Future plans: R&D on synthesis of biologically active molecules from natural products leading to use as agro-chemicals, drugs, dye and dye intermediates. Additional sophistication in progress under World Bank soft loan.

Cooperation with developing countries: Under negotiation.

International Organization: Existing collaborations with DuPont Agro (Div), USA; DuPont Merck, USA; Cyto Med, USA; Cargill USA; Searle R&D, USA; European Community; CNRS, France in field of agro-chemicals, drugs, chemical intermediates.

Council of Scientific and Industrial Research (CSIR) — Indian Institute of Petroleum (IIP)

Head of Institution: Dr. M.O. Garg, Director.

Address: Mohkampur, Dehradun 248 005, India. **Phone:** (+91 135) 226-0205.

Fax: (+91 135) 2660-098, 266-0202. **Email:** mogarg@iip.res.in. **URL:** www.iip.res.in.

Scientific Fields of Interest: Chemistry.

Research and training: Petroleum refining technology; development of separation processes; conversion processes; petroleum-product applications; development of chemicals and biotechnology; separation process: aromatic extraction, dewaxing/deoiling, lubes bitumens, deasphalting and adsorptive separations; conversion processes: catalytic reforming (SR&CCR), hydrotreating, hydrocracking, fluid catalytic cracking and resid cracking, visbreaking and delayed coking; petroleum-products applications: alternative fuels, vehicular emissions, performance evaluation, conservation of fuels and lubricants, tribology, industrial burners, domestic appliances, waste disposal through incineration; chemical science: process development for additives and intermediates, specialty chemicals, chemicals from bio-mass and electrochemistry/corrosion; biotechnology: microbial enhanced oil-recovery and microbial dewaxing.

Achievements: Processes: Benzene and toluene through solvent extraction of naphtha; Solvent de-aromatization of naphtha; Food-grade hexane through solvent-extraction; Superior kerosene/ATF through solvent extraction; Solvent de-waxing and de-oiling; Visbreaking technology; Delayed coking technology; Catalytic reforming; Pt-Re bimetallic reforming catalyst; Hydrodesulphurization of naphtha, kerosene and gas-oil; Pyrolysis gasoline hydrogenation; Re-refining of used crankcase lube oil; Additives for petroleum industry; Specialty chemicals. Products: Low air pressure film burner; Kerosene wick stove; LPG stove; Hurricane lantern; Smoke meter; Hot rolling oil; Diesel retrofit kit.

Facilities: Pilot-plants/Bench-scale units: dewaxing/deoiling; visbreaking; delayed coking; propane deasphalting; high-pressure equilibrium still; catalytic reforming; hydrocracking; Bench-scale fermentor; micro-reactor for catalyst

screening; Bench-scale units for hydroprocessing; MAT unit for FCC catalysts; desulphurization of fuel-gases; high-pressure Bench-scale unit. Hydrocarbon analysis: gas chromatographs; high-pressure liquid-chromatograph; high-resolution GC-mass spectrometer; UV, IR, FTIR, NMR spectrometer; gel-permeation chromatograph; PIONA analyzer; GC system for RON/MON; refinery/natural gas analyzer; oxygenate analyzer; UV-VIS-NIR-spectrometer.

Future plans: Adsorptive and membrane-separation process; Catalytic conversions for hydrocracking, reforming and fluidized cracking; Engine emissions and use of alternative fuels in engines; Renewable sources of hydrocarbons; Development of lubricants for CFC-substitutes and waxes; Natural-gas to petrochemicals.

Cooperation with developing countries: Regular bilateral exchange programmes with several developing countries, like Egypt, Libya, Syria, Bangladesh, Nigeria, Indonesia, Vietnam, Tanzania, etc.

International Organization: Earlier IIP had 3 major programmes with the United Nations Development Programme (UNDP), the United Nations Industrial Development Organization (UNIDO) and the United Nations Educational, Scientific and Cultural Organization (UNESCO), currently, it has a special agreement with IFP (France) in the area of petroleum-refining.

Council of Scientific and Industrial Research (CSIR) — Industrial Toxicology Research Centre (ITRC)

Head of Institution: Dr. Y.K. Gupta, Director.

Address: Mahatma Gandhi Marg, Post Box No.80, Mahatma Gandhi Marg, Lucknow - 226001, India. **Phone:** (+91 522) 262-1856. **Fax:** (+91 522) 222-8227. **Email:** director@itrc.res.in. **URL:** www.itrcindia.org.

Scientific Fields of Interest: Biological Sciences, Environmental Sciences.

Research and training: Neurotoxicology; environmental health; ecotoxicology; phototoxicology; phytotoxicology; epidemiology; immunotoxicology; developmental toxicology; cardiovascular toxicology; pulmonary toxicology; environmental carcinogenesis; environmental monitoring and environmental biotechnology heavy metals; industrial dusts and fibers; plastics and polymer; hydrocarbons; pesticides; detergents; dyes and food additives.

Achievements: Amrit Kumbh; Mobile Laboratory Van; Water analysis kit; Bact-O-Kill; C.D. Strip.

Facilities: Facilities for evaluation of safety chemicals, materials; animal house; modern instrumentation facilities for analytical toxicology; waste-water analysis laboratory.

Future plans: Establishment of national facility for safety evaluation; Establishment of poison-control centre; Development of biotechnology for environmental decontamination; Development of alternative methods for safety evaluation; Establishment of a National Environmental Monitoring Laboratory.

Cooperation with developing countries: Linkages with national agencies: Indian Council of Medical Research, New Delhi; Department of Science and Technology, New Delhi; Central Pollution Control Board, New Delhi; Ministry of Environment and Forests, New Delhi; Ministry of Urban Development, New Delhi; Department of Biotechnology, New Delhi; Council of Science and Technology, U.P., Lucknow.

International Organization: Linkages with international agencies: World Health Organization; United Nations Development Programme; International Programme on Chemical Safety; International Register of Potentially Toxic Chemicals, Geneva; International Labor Organisation, Geneva; Food and Drug Administration, USA; United States-Environmental Protection Agency.

Council of Scientific and Industrial Research (CSIR) — Institute of Microbial Technology (IMTECH)

Head of Institution: Dr. P.R. Patnaik.

Address: Post Box No.1304, Sector 39-A, Chandigarh 160 036, India. **Phone:** (+91 172) 269-0785, 269-0684. **Fax:** (+91 172) 269-0585, 269-0632. **Email:** director@imtech.res.in. **URL:** www.imtech.res.in/.

Scientific Fields of Interest: Biological Sciences.

Research and training: Molecular-biology & Microbial Genetics, Fermentation Technology, Protein-engineering; Applications: cloning and expression of recombinant proteins and scale-up; molecular microbiology of pathogens with respect to drug resistance and vaccine development, immunology of infectious diseases; yeast genetics; screening of microorganisms of novel enzymatic activities; waste management with microbial means; mathematical modeling of microbial growth and fermentation parameters, Bio-informatics.

Achievements: A new method for enzymatic conversion of rifamycin B to rifamycin S; A simplified process for purification of urokinase from urine, which could be attached to public urinals; A new targeting rationale for selective delivery of drugs to macrophages utilizing endocytosis; identification of two membrane proteins in low alkane-utilizing bacterial (useful in soil samples); Bench-scale technology for the thermostable alpha amylase; Production of natural streptokinase; Microbial process for D-p-Hydroxyphenylglycine; Clot specific streptokinase; Recombinant oral cholera vaccine; others.

Facilities: Scanning & transmission-electron microscopes; ultra and superspeed centrifuges; HPLC/FPLC and gas chromatograph; protein sequencer & protein synthesizer; fermentation pilot-plant (1500 liter) and associated down-stream processing equipment; modern facilities for identification, preservation and maintenance of microorganisms; X-ray crystallography. Biochemical engineering research and process development centre (BERPDC): to help develop microbial process upto industrial scale for useful products, the Centre has several laboratory-scale fermenters, a 150 litre fermenter and a computer-controlled 1500 litre fermentation pilot-plant. The

plant, only one of its kind in India, is integrated upstream with media preparation vessels and downstream with a centrifugal separator and a cell homogenizer. The Centre has sophisticated membrane based down-stream processing equipment. Microbial type culture collection and Gene-bank (MTCC): The centre has five sections, namely, actinomycetes, bacteria, fungi, yeasts and plasmids. Relevant information about the strains held in MTCC is computerized for easy search, analysis and retrieval. Distributed Information Centre (DIC) on protein-engineering: DIC is part of the Biotechnology Information System (BTIS). Its aim is to interlink all the specialized centres through a national bio-information network.

Future plans: Structural functional and environmental genomics; molecular drug targets; Exploration, Exploitation of Microbial Wealth of India for Novel Compounds and Biotransformation Processes.

Cooperation with developing countries: Through International Scientific Collaboration Unit of CSIR the Institute keeps on receiving scientists/technicians from various countries to train them in biotechnology related areas.

International Organization: Two collaborative projects under Indo-Swiss Collaboration in biotechnology (present); One with France is in Pipeline.

Council of Scientific and Industrial Research (CSIR) — National Aerospace Laboratories (NAL)

Head of Institution: Dr. A.R. Upadhyaya, Director.

Address: Post Bag No. 1779, Bangalore 560 037, Indi. **Phone:** (+91 80) 2527-0584, 2526-5579. **Fax:** (+91 80) 2526-0862, 2527-0670. **Email:** director@css.nal.res.in. **URL:** www.nal.res.in.

Scientific Fields of Interest: Engineering, Physics.

Research and training: Aerospace electronics and systems; fluid dynamics; aerodynamics; flight experiments; flight mechanics and control; materials science; propulsion; structural engineering and wind energy; high-density acoustics; sensor technology; modeling of fluid-flows; turbulent and transitional flows; flow structure and management; aircraft and missile aerodynamics; aircraft parameter estimation; flight simulation; wind-tunnel simulation; development of special materials, like fibers and composites; advance structural ceramics; turbomachinery; CAD and machining; composite structures; fatigue and fractures.

Achievements: Testing of Satellites and launch vehicle segments; Design and installation of a parallel-processing computer (Flosover); Full scale fatigue-testing; Automatic Visual- Range Assessor; Digital Flight Data Recorder read out system for transcription of Boeing 747 and Airbus A300 data (installed at Air India); Failure analysis and accident investigations; Advanced Composite Technology Laboratory; Finite Element Software Package (FEPACS) for static, dynamic buckling and thermal analysis of composite/metal structures; Several

spin-off technologies; Production of 2 seater aircraft and 14 seater light-transport aircraft.

Facilities: Nilakantan National Trisomic Aerodynamic Facilities (NTAF) with three (1.2m, 0.6m and 0.3m square) high-speed wind-tunnels and associated model-making and data-acquisition system; Full-scale Fatigue Test facility with 24 actuators and controls to simulate service loading, 96 channels of data acquisition and other associated facilities (facility used to support the structural life extension programmes of the IAF aircraft; Composite Structures Laboratory with all the necessary infrastructure (water-jet cutter, prepreg-cutting machine, C-scan facility, clean room, etc.) chiefly works on the light-combat aircraft (LCA) airframe. The laboratory also includes two large computer-controlled autoclaves. Acoustic Test Facility (ATF) with a reverberation chamber of 1100 cu m., and an achievable overall sound-pressure level of 157dB has been the bedrock of acoustic qualification of all ISRO's satellites and launch vehicles. NAL is recognized as a centre for failure analysis and accident investigation for both the aerospace and general industries.

Future plans: Civil Aviation aspects like special software, communications DFDR, AVRA, life estimation and problems of aging. Design and prototype of small commuter aircrafts (2-20 seater).

Cooperation with developing countries: CSIR/NAL - SSRC, Syria Special Agreement for conducting Lecture; Missions in aeronautical sciences.

International Organization: Indo-Russian integrated long-term programme of cooperation in science and technology (Theoretical & Applied Mechs); CSIR/NAL - German Aerospace Research Organization cooperative programme in aeronautical sciences.

Council of Scientific and Industrial Research (CSIR) — National Botanical Research Institute (NBRI)

Head of Institution: Dr. P. Pushpangandan, Director.

Address: Post Box No. 436, Rana Pratap Marg, Lucknow 226 001, India.

Phone: (+91 522) 220-5839, 220-5848. **Fax:** (+91 522) 220-5839, 220-5836.

Email: pushpangadan@satyam.net.in, directornbri@satyam.net.in. **URL:** www.nbri-lko.org.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences, Chemistry.

Research and training: Plant-biotechnology; floriculture; tree biology; plant-wealth utilization; environmental sciences and taxonomy & ethnobotany; plant molecular-biology.

Achievements: The institute has developed a number of consumer products, such as herbal drinks and integrators, Neem pesticides and fertilizers; several patents have been awarded for technical processes in the fields of biotechnology, molecular-biology and pharmacognosy.

Facilities: A wide range of modern and sophisticated equipment/instruments for carrying out work in photosynthesis, biochemistry, plant-molecular biology and plant tissue-culture; several testing and evaluation facilities, e.g., gamma irradiation of plants and plant-material; identification of plants; estimation and analysis of plant-material for proteins, Amino-acids, oils, fats/active medicinal principles, gums and mucilages; DNA- sequencing centre for nucleotide sequencing; Bio-mass Research Centre at Banthra; scanning and transmission electron microscopy; herbarium; botanic garden.

Future plans: To undertake research work in the major areas of Herbal Technology, Biotechnology and Information Technology and any other areas mandated by the NBRI.

Cooperation with developing countries: NBRI provides technical training and support to scientists from Nepal, Bhutan, Myanmar, Sri Lanka, and Maldives.

International Organization: Major donors are UNESCO, Winrock International, Botanical Garden Conservation International (UK), LMD (France), UNDP and Indian funding agencies.

Council of Scientific and Industrial Research (CSIR) — National Chemical Laboratory (NCL)

Head of Institution: Dr. S. Sivaram, Director.

Address: Dr. Homi Bhabha Road, Pune 411 008, India. **Phone:** (+91 20) 2589-3030. **Fax:** (+91 20) 2589-3355, 2589-3619. **Email:** sivaram@ems.ncl.res.in. **URL:** www.ncl-india.org.

Scientific Fields of Interest: Biological Sciences, Chemistry.

Research and training: Catalysis; biotechnology; organic chemical technology; polymers and other high-performance materials; basic research in chemistry and biochemistry.

Achievements: World-class technologies in the area of catalysis, polymers, organic chemical technology, advanced materials, and biotechnology.

Facilities: A wide range of modern instruments for characterization and structure-determination of chemicals; a sophisticated catalyst- testing unit; facilities for fabrication of polymer-engineering components; gene synthesis facilities; pilot-plant facilities for catalysts, polymers and other chemicals; National Information Centre for Chemistry and Chemical Technology (NICHEM); electronic online/CD-ROM databases.

Future plans: Strengthen basic and industrial research; IPR management and international partnership coupling R&D goals with market needs.

International Organization: Bilateral exchange-programmes with most of the countries under S&T, DST; Rockefeller Foundation, McKnight Foundations, EC, IECPAR, DAAD.

Council of Scientific and Industrial Research (CSIR) — National Environmental Engineering Research Institute (NEERI), Nagpur

Head of Institution: Dr. S. Devotta, Director.

Address: Nehru Marg, Nagpur - 440 020, Maharashtra, India. **Phone:** (+91 712) 224-9999. **Fax:** (+91 712) 224-9990. **Email:** dimeeri@nagpur.dot.net.in, dimeeri_ngp@sancharnet.in. **URL:** www.neeri.nic.in.

Scientific Fields of Interest: Chemistry, Environmental Sciences.

Research and training: National/societal missions on drinking water; Ganga Action Plan; environmental biotechnology; hazardous waste-management; environmental impact and risk-assessment; environmental systems-design; modeling and optimization.

Achievements: As of 1998, improved processes including desulphurization of coal, recovery of elemental sulphur from gases, in-situ biodegradation of crude oil; preparation of biosurfactant useful in emulsifier for recovery of oil.

Facilities: Fourier-transform infrared spectrophotometer; UV-VIS-NIR spectrophotometer; inductively coupled plasma atomic-emission spectrometer (ICP-AES); high-performance liquid-chromatograph; ocean surface current radar (OSCR); advance computer workstations, with necessary software for activities related to geographic information systems (GIS), digital image processing (DIP) and knowledge-based system (KBS).

Future plans: Biotechnological process for environmental protection, restoration, re-use and recovery; sustainable development; environmental impact and risk-assessment for industrial projects; increased cooperation among Southeast Asia through training and collaborative research programmes.

Cooperation with developing countries: MoUs signed with Shama Management and Consultants Private Ltd. Singapore; training programmes at several SARC countries, including Nepal, Bangladesh, Sri Lanka.

International Organization: Cooperation with numerous international organizations, governmental institutions, and private firms.

Council of Scientific and Industrial Research (CSIR) — National Geophysical Research Institute (NGRI)

Head of Institution: Dr. V. P. Dimri, Director.

Address: Uppal Road, Hyderabad 500 007, Andhra Pradesh, India. **Phone:** (+91 40) 2343-4600. **Fax:** (+91 40) 2343-4651, 2717-1564. **Email:** dimvp@rediffmail.com, director@ngri.res.in. **URL:** www.ngri.org.in.

Scientific Fields of Interest: Earth Sciences, Environmental Sciences.

Research and training: Research: Seismology; lithosphere; earth's interior and environment; groundwater; geophysical exploration and geophysical instrumentation.

Achievements: Over 2,000 research publications in reputed journals; about a dozen standard reference/textbooks in various areas of earth sciences printed by international publishing houses; gravity map series of India and adjoining areas; sponsored surveys (land and air) for various organizations in India and abroad for hydrocarbons, minerals, ground water, earthquake hazard assessment and bed rock investigations. Technical reports with recommendations based on in-house and sponsored research programmes.

Facilities: Laboratory facilities for geochemical, geological and geochronological studies; (X-ray fluorescence spectrometer, atomic-absorption spectrometer, electron probe microanalyser, plasma source mass spectrometer, UV-Vis spectrophotometer, thermal ionization mass spectrometer, lead isotope laboratory, x-ray spectrometer, helium sniffer, etc.); stable isotopes, radiocarbon and tritium tracer; palaeomagnetic, high-temperature/pressure and mineral physics laboratories; seismological, magnetic and electrical pulsation observatories at Hyderabad and Etaiyapuram to monitor seismicity and magnetic activity respectively; capability to carry out field investigations using seismic, magnetotelluric, gravity and deep resistivity studies with the latest available equipment; mobile observatories for dam-site investigation.

Future plans: New methods in seismic, gravity, magnetotelluric and deep resistivity; marine magnetotelluric techniques; joint inversion techniques using seismic, gravity and resistivity data; fusion of multiparametric geophysical and geochemical data sets; effective survey methods for urban geophysical application; investigation of gas-hydrates, estimation of platinum and gold mineralization; salinity problems and artificial recharge techniques; earthquake hazard assessment; micro-donation studies of important cities in India; shear-wave splitting for mapping of fluid filled zones.

International Organization: France - groundwater science; Germany - pore pressure studies; GPS/VLBI and in situ stress studies; UK - groundwater science; Italy - Seismic risk evaluation. DAAD; Commonwealth, Indo-US, Indo-Japan; Indo-Bulgaria exchange.

Council of Scientific and Industrial Research (CSIR) — National Institute of Oceanography (NIO)

Head of Institution: Dr. Satish r. Shetye, Director.

Address: Dona Paula, Goa 403 004, India. **Phone:** (+91 832) 245-0201, 245-0501. **Fax:** (+91 832) 245-0602, 245-0603. **Email:** shetye@darya.nio.org. **URL:** www.nio.org.

Scientific Fields of Interest: Earth Sciences, Environmental Sciences.

Research and training: International geosphere-biosphere programme; surveys for polymetallic nodules; oceanographic studies of the Antarctic water;

island development programme; coastal zone management; mapping of resources and parameters of the EEZ of India; air-sea interaction studies; drugs from the sea; marine biotechnology; biofouling and corrosion studies; technologies for rural development; development of marine instruments and development of acoustic and remote-sensing techniques for monitoring the oceans.

Achievements: As of 1998, thorough study of the Northern Indian Ocean; location of ilmenite placers; mapping of the continental margin of India; identification of plants and animals for organic chemicals and drugs; method for extraction, testing and stabilization of TAL, an endotoxin tester.

Facilities: Research vessel Sagar Kanya, well-equipped for round-the-year oceanographic research. It is capable of mapping the sea-bottom and providing the real-time graphic display and bathymetric chart; National Oceanographic Data Centre for the Indian Ocean (RNODC-INDO) for acquiring, processing and disseminating oceanographic data; processing of satellite imageries; central computing facility; Marine Biotechnology Information Centre with a database on marine-life of India; a local Area Network, which is interconnected to 100 PC nodes; an Integrated Data Acquisition System (IDAS) developed and installed onboard FORV Sagar Sampada.

Future plans: Marine biotechnology; Mapping of the sea-floor and development of technology for nodule mining.

Cooperation with developing countries: Bilateral agreements with Sri Lanka, Seychelles, Mauritius, Kenya; International organizations include the Commonwealth Science Council, IOC, United Nations Educational, Scientific and Cultural Organization (UNESCO), Caribbean countries and several other developing countries.

International Organization: Bilateral: Germany, former USSR, USA.

Council of Scientific and Industrial Research (CSIR) — National Institute of Science Communication and Information Resources (NISCAIR)

Head of Institution: Mr. V. K. Gupta.

Address: Dr. K.S. Krishnan Road, New Delhi 110012, India. **Phone:** (+91 11) 2584-6024, 2584-8385, 2651-7059, 2651-5837. **Fax:** (+91 11) 2686-2228, 2584-7062. **Email:** vkg@niscair.res.in. **URL:** www.niscair.res.in.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences, Chemistry, Earth Sciences, Engineering, Environmental Sciences, Physics.

Research and training: NISCAIR is mainly involved in S&T information management. Core competency of NISCAIR lies in the fields of knowledge networking, Science communication, Science popularization, and S&T management system & services. Main lines of activities of the organization are as: Hubs of Knowledge and Learning with publication of: seventeen S&T research journals and two abstracting journals; three popular science

magazines; advanced monographs; popular science books; IT books (10 languages, i.e., english and nine Indian languages); Encyclopedic publications on plant, animal and mineral resources of India (in Hindi & English). Management of Prestigious National and International Projects such as: Traditional Knowledge Digital Library: -- Public domain traditional knowledge (TK) documented and converted into digitized format (in English, German, Spanish, Japanese, French and Hindi), for prevention of misappropriation of Indian TK; National Science Digital Library: -- A national information facility designed to provide Internet access to rural students for digital resources at the same level, as available for students of metro cities throughout the country. Hosts National Science Library containing: A huge collection of S&T publications (holding 225,000 books and monographs, 547 foreign periodicals and all Indian Journals). Management of an e-journal consortium, a CSIR network project aimed at providing access to 4500 world class e-journals to all the CSIR Labs. Management of Raw Materials Herbarium & Museum; Designing and developing databases; Management of SAARC Documentation Centre. Enabling Information Society based on: Medicinal and Aromatic Plants Information Service; Identification Services for plants and crude drug-materials; Consultancy Services. Human Resource Development: NISCAIR organizes HRD programmes in the areas of library science, information management, documentation, and science communication. Training programmes: Associateship in Information Science; Short-term training courses in contemporary areas of Information Science, Computer Applications and Technical Writing. Academic Counseling: Designated Programme Study Centre for IGNOU

Achievements: Creation of the following publications: S&T research journals and abstracting journals; popular science magazines; advanced monographs; popular science books; IT books (10 languages, i.e. English and nine Indian languages); Encyclopedic publications (Wealth of India) on plant, animal and mineral resources of India (in Hindi & English); Other scholarly books/proceedings of workshop in contemporary areas.

Facilities: National Science Library (holding 225,000 books and monographs, 547 foreign periodicals and all Indian Journals); Raw Materials Herbarium & Museum; medicinal and aromatic plants information service; identification services for plants & crude drug-materials; consultancy services; a total of 550 computers with LAN connections; graphic art and print production (DTP, Modern printing facilities, Computer-aided designing, etc.).

Future plans: In addition to the progression of the ongoing projects, few of the planned projects of NISCAIR for future development are mentioned below: Collaborative R&D in Information Technology related Areas; Web hosting of full-text of NISCAIR Journals; Creation of Components of Biodiversity Digital Library; Indian Web of Science: NISCAIR is planning to create Indian Web of Science, which will provide access to current as well as retrospective multidisciplinary information from approximately 3000 journals published from India; establishment of digital library for the marine wealth of India, in particular

on medicinal aspects; launching of new journals in the areas like, bio-fuels and nanotechnology; public-private partnerships in IT areas.

Cooperation with developing countries: Traditional Knowledge Digital Library: Govt. of South Africa, Thailand, Mongolia, African Regional Industrial Property Organization, representing 33 countries of African Sub continent, Nigeria, and SAARC countries are keen to replicate the TKDL created by India, for protecting the traditional knowledge of their own countries. E-journals consortium: Leading international publishers like Elsevier Science, Springer, Blackwell, AIP/APS, ASCE, ACS, John Wiley, Cambridge University Press, Oxford University Press, ASME and Royal Society of Chemistry, have extended their cooperation in providing access to 3300 plus journals to the scientists of all the CSIR labs.

Council of Scientific and Industrial Research (CSIR) — National Institute of Science, Technology and Development Studies, New Delhi

Head of Institution: Dr. P. Banarjee, Acting Director.

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Scientific Fields of Interest: Mathematics.

Research and training: Mathematical modeling for S&T studies, S&T indicators and scientometrics; sociology of science; resource planning & utilization for regional development; information systems & S&T archival resources; technological and social change; history & philosophy of science; R&D management and training; and international policy and S&T.

Facilities: Library: integrated multi-user library management system; INFAC database. Geographical Information System (GIS)/Remote-sensing (RS): Visual interpretation of remotely sensed data: keys for visual interpretation the remote-sensing data, multi-band ground-truth radiometer, aerial photo interpretation instruments like mirror stereoscopes, pocket stereoscopes and parallax bars; Hi-Tech's optical pantograph; Procom-2, digital planimeters, pedometers and rotameters. GIS/RS software: ESRI's ARC/INFO and ARC VIEW; Bentley's micro station, SRI's Themaps and digitize, multi-lingual software, scanning and digitization software. Image processing of remote-sensing data: digitally reading and interpreting the remote-sensing data with the help of digital image processing software such as Isovision & Erdas imagine. In-house developed applications of GIS/RS and software: LIS, MIS, DSS.

Council of Scientific and Industrial Research (CSIR) — National Metallurgical Laboratory (NML)

Head of Institution: Dr. S. P. Mehrotra, Director.

Address: PO Barmamines, Jamshedpur 831 007, Jharkhand, India. **Phone:** (+91 657) 227-0092, 227-1715. **Fax:** (+91 657) 227-0527. **Email:** spm@nmlindia.org. **URL:** www.nmlindia.org.

Scientific Fields of Interest: Environmental Sciences.

Research and training: Research: Ore dressing; mineral beneficiation; material processing and evaluation of ferrous and non-ferrous metals; development processing and evaluation of alloys; and component-integrity evaluation.

Achievements: Developed about 100 technologies for small, medium and large industries with more than 50% commercially utilized, including magnesium metal, sponge iron, V205/ferro vanadium, benefaction of low-grade iron-ore, copper ore, fluorspar; aluminum conductor, electrolytic manganese dioxide, welding flux, graphite crucibles; about 100 research papers published each year; about 15 patents nationally and internationally.

Facilities: Pilot-plants: mineral beneficiation facilities (0.5-5 tonnes/hr); VRDR; 500kVA submerged arc furnace; Material shaping units: rolling mill forging unit; wire drawing unit; extrusion press; Mechanical properties; creep testing (218 points); tensile bending (MTS, INSTRON); fatigue (Vibrophone); impact (instrumented & conventional); Analytical: XRF; DRS; AAS; XRD instruments; Physico-chemical characterization: DTA/DTC; DSC; magnetic, thermal and electrical properties; automatic image analyzer; Furnaces: submerged arc furnace (50kVA),; rotary kiln, other melting units (arc, induction resistance furnace); 60 kg. vacuum induction furnace; Microscopic characterization: optical; SEM; TEM; Non-destructive evaluation: ultrasonic; 8-channel acoustic emission; eddy-current; micro-magnetic Barkhausen emission; Mineral beneficiation: Hydro-cyclone; magnetic separator; Barties Mozley unit; flotation cell; particle size analyzer; mineral microstructure characterization facilities; Refractories Characterization; mechanical behavior; specialized furnaces; Instruments for characterizing corrosion behavior: polarization behavior; stress; corrosion; inhibitor (liquid, vapor and gas).

Future plans: Identify and develop economically viable and environment-friendly technology for exploitation of metallic and non-metallic ores, bio-metallurgy, energy-efficient and clean technologies for metals, such as magnesium, copper, nickel, zinc and precious metals, using indigenous raw material; technology for engineering critical assessment mathematical modeling and computer simulation. Hallmark & NDT center, processing of advanced materials through SHS and biomimetic processes, bulk amorphous materials.

Cooperation with developing countries: The cooperation in the area of mineral benefaction, alloys and materials development, includes countries or

organizations such as UNDP, Egypt, Nepal Burma, Philippines, Malaysia, Syria, Thailand Uganda, South Africa etc.

International Organization: Indo-US; ILTP Programme, Russia; DAAD, Germany; ISE, Ames USA; Slovak Academy of Sciences, Slovakia.

Council of Scientific and Industrial Research (CSIR) — National Physical Laboratory (NPL)

Head of Institution: Dr. Vikram Kumar, Director.

Address: Dr. K.S. Krishnan Road, New Delhi 110 012, India. **Phone:** (+91 11) 2584-6296, 2572-6931. **Fax:** (+91 11) 2572-6938, 2572-6952. **Email:** vkmr@csnpl.ren.nic.in. **URL:** www.nplindia.org.

Scientific Fields of Interest: Earth Sciences.

Research and training: Measurements; standards and calibration; electronic & engineering materials; radio and atmospheric physics; cryogenics and superconductivity; applied projects like thin-films; optical coatings; xeroradiography; high-pressure metal forming & high-powered ultrasonic systems, and underwater acoustic devices; unconventional energy devices and theoretical condensed matter physics.

Achievements: NPL has the important responsibility of creating and maintaining standards of mass, length, time, volume, frequency, etc., match international standards. These are sent periodically to member countries for comparison. Materials research and development of process for industrialization includes, carbon, silicon and devices, display devices, superconducting materials and systems. Research in ionospheric and atmospheric sciences includes pollution, biodiversity, ozone depletion and radio communication aspects. Products: Teleclock for receiving/transmitting time over telephone; low-cost Cd-Te Solar Modules; powder X-ray diffractometer; green-coke-based high-density isotopic graphite.

Facilities: Calibration of co-axial and wave-guide attenuators and co-axial unismathes; testing of various X-band microwave components and instruments, such as VCWR meter, Gunn oscillator and Klystron oscillator power supplies; Apex level calibration of H-sensors, fluxmeter, etc., and measurement on soft magnetic material (facilities being established); a big electromagnet with 25cm. pole diameter and variable air gap for calibration of H-sensor search coils, etc. (being installed); facilities for calibration of 1 ton and 10 ton weighing system; facilities for the calibration of IR-line scanners; thermovision systems and wavenumber standard; computerized facilities with current set-up inter-comparison of two iodine stabilized HE-NE lasers by Matrix measurement technique; frequency calibration of secondary standard HE-NE lasers; variation of beat frequency in a tuned sale; short-term and long-term stability estimation by Allan Variance method (graphic); angle measurement facilities by photo-electric auto-collimator resolution (0.5 sec of arc); facilities for crystal growth by

low thermal gradient Czechoslovak method and growth of bismuth germinate crystals.

Future plans: New low-temperature laboratory, ion-beam processing laboratory, advanced global change and Antarctic studies, solar-phase voltaic using multicrystalline silicon thin-films and sensors of various kinds, including biosensors.

Cooperation with developing countries: Asia-Pacific Metrology Programme (APMP). South-South cooperation planned (with TWAS). CIMET Training Centre.

International Organization: Augmentation of standards at NPL with PTB (Germany). ILTB (Russia). Bilateral programme with Eastern and Western European countries (Poland, Czech Republic, France, the United Kingdom).

Council of Scientific and Industrial Research (CSIR) — Regional Research Laboratory (RRL), Jorhat

Head of Institution: Dr. P. G. Rao, Director.

Address: Jorhat 785006 Assam, India. **Phone:** (+91 376) 237-0012. **Fax:** (+91 376) 237-0011. **Email:** drrijt@csir.res.in. **URL:** www.rrljorhat.org.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences, Chemistry, Earth Sciences, Environmental Sciences.

Research and training: Research: Anti fungal, antibacterial metabolites from plant growth promoting bacteria and their application in biological control of fungal and insect pests; chemical investigation of the medicinal plants of sub-Himalayan region in search for bioactive molecules; development of clean processes for industrially important organic intermediates; drugs and drug-intermediates; value-added products from plant-materials and cellulosic wastes; development of agrotechnology and chemical investigation of medicinal and economic plants; designing plants and animals as bioreactors for proteins and other biomolecules; exploitation of enzymes/secondary metabolites from microbial strains and insects for biotechnology based products; development of specialty polymers for use in petroleum and allied industries; value addition to high sulfur coals and environment management; up gradation and utilization of ores, minerals and waste materials; pollution monitoring and mitigation systems and devices - assessment and management of environmental degradation in and around the coal mines; industrial waste minimization and clean up - bioremediation/phytoremediation; seismic hazards, risk-assessment and geoenvironmental studies; geotectonics and design of foundation. Training: Ph.D. programmes in the relevant disciplines of science; technical manpower development; entrepreneurship development programmes; training for trainers of handicrafts; training programmes for aromatic plants and mushroom cultivation; apprenticeship training; training for graduate and diploma engineers; technical instructors' training; science motivation programmes for school students.

Achievements: Research results: Isolation and structure elucidation of a broad spectrum antibiotic from soil *Streptomyces* endowed with anti-tuberculosic activity; application of Methoprene (MENTHA) to boost silk yield; application of soil microorganism in biotransformation reactions; vegetation protocol for reclamation of crude oil contaminated soil; development of a novel process for preparation of steroidal male sex hormone testosterone; enantioselective total synthesis of biologically important natural products such as verbalactone, cytooxazone, chloramphenicol, taxol side chain, bestatin, boronolide, etc.; development of amino-acids racemate resolution membrane; development of protocol for mass multiplication of bamboo and other economic plants. Synthesis of absolute stereo chemistry and molecular design of the new anti fungal and antibacterial antibiotic produced by *Streptomyces* sp. 201; gainful utilization of high sulfur coals; development of enantio-selective membranes; seismic data generation and monitoring. Products: Agro-chemicals; building materials; drugs and pharmaceuticals; organic chemicals/polymers; inorganic chemicals; oil field chemicals; petroleum-products; stationery and other products.

Facilities: The laboratory has 14 R&D disciplines, one branch lab and one field/sub station. The major equipment available is: 300 MHz NMR, GC-MS, LCMS, FTIR, CHN and sulfur analyzer; thermo mechanical analyzer; surface area analyzer; interfacial tensiometer for liquid-liquid and solid-solid interfacial tension and contact angle; preparative HPLC; atomic-absorption spectrophotometer; refrigerated centrifuge; XRD; universal testing machine for determining engineering parameters of materials; Elrich mixer ROST suitable for micro-pelletization and mixing; high-temperature electrical furnace 1600 degrees C; light-scattering detector; 50 lt. cap; laser diffraction particle size analyzer 0.04-2500 micron; zeta potential analyzer with auto titration; thermal analyzer for DTA, TGA and DSC; atomic-emission spectrophotometer (ICP-AES); petrol-mineralogical microscope; pilot-plant facility; SPD unit and stand alone units for seismic studies. Library facilities: centralized (CSIR) E-journal facilities; patent inspection center; foreign journal subscription (49 different journals); Indian journal subscription (90 different types); current journals (139 different types); bound volumes (close to 24,700 volumes).

Future plans: Development of commercially important product from plant-materials and cellulosic wastes available in the North Eastern region of India; development of chemicals for upgrading and utilizing of ores, minerals and waste materials; development of clean processes for industrially important organic intermediates; development of technology for deriving enhanced value from indigenous resources and traditional knowledge; establishment of a state-of-the-art analytical facility for testing bioactive principles present in herbal and plant resources and for food product analysis; start a master's degree course in natural product chemistry.

Cooperation with developing countries: Present: bilateral exchange programmes for cooperation in science with USA, UK, Germany, Russia, China, Japan, etc. Planned: exchange programmes for technical programmes with above listed countries.

Council of Scientific and Industrial Research (CSIR) — Regional Research Laboratory, Bhopal

Head of Institution: Dr. N. Ramakrishnan, Director.

Address: Hoshangabad Road, Near Habibganj Naka, Bhopal - 462 026, India.

Phone: (+91 755) 258-7105. **Fax:** (+91 755) 258-7042, 248-8985. **Email:** ramkrish@satyam.net.in, ramkrish@rrlbpl.org. **URL:** www.rrlbpl.org.

Scientific Fields of Interest: Chemistry, Earth Sciences, Environmental Sciences.

Research and training: Development of low-cost/alternative building materials/components; development of new materials like metal-matrix and alloy-based composites; tribological studies, e.g., wear-related problems in mining equipment, farm implements; ferrites from blue duest; characterization of natural fibers, fiber-reinforced polymer materials; corrosion & engineering failure studies; quality-upgrading of foundry techniques, especially metal-based industry in tribal and backward sector of M.P.; beneficiation of low-grade ores and coal; utilization of fertilizer minerals of M.P.; utilization of aluminum silicate minerals; natural resources database management; modeling studies on groundwater resource management; modeling studies on Water-quality.

Achievements: Automotive component based on metal matrix composites; alternate/low-cost building materials, such as wood substitutes, flyash bricks and red-mud cementitious binders; RP products for engineering applications, such as gear case for traction motors of locomotives for railways; flyash utilization for land reclamation.

Facilities: Modern equipment and instrumentation for chemical analysis, mineral processing, mechanical testing and metallography, in addition to well-equipped foundry and workshop. The equipments include: scanning electron-microscope; X-ray diffractometer with PC-APD software; TAS Plus image analyzer; atomic-absorption spectrometer; DCP spectraspan; simultaneous thermal analyzer; particle size analyzer; INSTRON universal testing machine; stress rupture testing machine; rubber wheel abrasion tester; gas jet erosion tester; bearing test rig; talysurf apparatus; fatigue testing machine; melt spinner; 150T hydraulic press; high-temperature furnace; plasma spray unit; computerized hysteresisgraph; magnetic particle test equipment; ultrasonic flow detector QFT 2+; ultrasonic thickness gauge DME DL; portable non-contact thermometer; portable hardness tester; vibration meter; leaf-area index meter (ELE international AM 100); UV-spectro photometer (GBC-911); moisture measuring system (6050 x 1 trase-USA); portable soil-analysis kit (Palintest-5000 ELE international); Orion ion analyzer (model 290A); high volume sample; weather monitoring kit; stack monitoring kit; zero head space extractor; portable spectrophotometer (Hasch DR/2000); gas chromatograph mass spectroscope (GCMS); Mozely multi-gravity separator; wilfley table; water-only cyclone; heavy media cyclone; vosyl separator; flotation cells and columns; air-sparged

hydrocyclone; Kelsey jig; time domain reflectometre-soil moisture measuring system; Guelph permeameter; centre for characterization of building materials.

Future plans: The laboratory plans to commercialize products such as, metal matrix composites, wood-substitute materials, bearing alloy components FRP component and such other products developed during the previous years. The laboratory plans to excel in terms of providing customized R&D and technical services in its core competencies and particularly extend such support in the areas of flash utilization, environment management, and water-resources management

International Organization: USA (existing) the Netherlands, the UK, Germany (planned).

Council of Scientific and Industrial Research (CSIR) — Regional Research Laboratory, Thiruvananthapuram

Head of Institution: Dr. T.K. Chandrashekar, Director.

Address: Industrial Estate PO., Thiruvananthapuram 695 019, Kerala, India.

Phone: (+91 471) 549-0324, 251-5220. **Fax:** (+91 471) 549-1712, 249-0186.

Email: tkchandrashekar@rediffmail.com, tkc@csrrltd.ren.nic.in, director@csrrltd.ren.nic.in. **URL:** <http://w3rrlt.csir.res.in>.

Scientific Fields of Interest: Biological Sciences, Chemistry.

Research and training: Chemistry of natural products; agro-processing and specialty agro-chemicals related to spices and plantation crops; materials screening/processing for value addition of clays & non-nuclear beach-sand minerals; oxidic fine ceramics; metal alloys & composites; photochemical systems including solar energy conversion; calibrating/upgrading of procedures for analysis of pollutants; waste-water technology.

Achievements: Technology for palm oil processing; fresh spice oils; beneficiation of clays and clay-catalysts; process for alumina Sol-gel abrasives, technology for production of high-grade synthetic Rutile from Ilmenite; process for super conduction substrates, building ceramics materials; flame-retardant adhesives; development of cast Al composites; technology for coir-polymer composites.

Facilities: A wide range of facilities for characterization and analysis of organic/inorganic/polymer materials; preparation & characterization of alloys and composites, ceramic powders and thin-films; mechanical testing and microscopic facilities; agro-processing facilities; clay and mineral testing & processing facilities.

Future plans: Development of a new generation of environment-friendly processes/technologies in the area of oil seeds and spices; Commercial exploitation of bioactive natural products (phytochemical and antioxidants); Biotechnological approach to processing and modification of phytochemicals; Projects related to development of the NE region (NER) and nutrition supplementation (societal programmes); Technology transfer and project

implementation with creation of technology-incubation center; Human-resources development.

Cooperation with developing countries: Planned: Signing of MOU with the Federal University of Rio Grande, natal Brazil UFRN and RRL-T for collaborative projects and exchange of staff and students; Collaborative projects with the Govt. of Brazil for transfer of technology of CNSL/nature fiber composites.

International Organization: American Cyanamide, USA; TNO Institute of Applied Physics, the Netherlands; Volkswagen Foundation, Germany; Advanced Ceramics Group, TU HH Hamburg, Germany.

Indian Agricultural Research Institute — National Research Centre on Plant Biotechnology

Head of Institution: Dr. K.R. Koundal, Director Research.

Address: New Delhi 110012, India. **Phone:** (+91 11) 2573-3378, 2584-8783.

Fax: (+91 11) 2584-6420, 2584-3984. **Email:** kirparam@rediff.com, jd_research@iari.res.in. **URL:** www.iari.res.in.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences.

Research and training: Productivity enhancement; isolation of genes of promoters; development of transgenic; molecular and functional genomics; plant promoters interaction; development of Human-resources.

Achievements: Developed a new variety of mustard through biotechnological approaches; developed 9systems of CMS for hybrid seed production in mustard; Isolated and characterized half a dozen genes and promoters; complete DNA sequencing of chromosomes of rice in collaboration with Delhi University, South Campus.

Facilities: DNA sequencers; spectrophotometer; PCR; gas chromatograph; centrifuges; gel documentation; incubators; electrophoresis apparatus.

Future plans: Functional genomics; identification of genes and promoters; development of transgenics.

Cooperation with developing countries: Further cooperation with developing countries will be helpful and rewarding.

International Organization: Further cooperation with international organizations will be helpful and rewarding.

Indian Council of Medical Research (ICMR) — National Institute of Malaria Research (NIMR)

Head of Institution: Prof. A. Dash.

Address: 22 Sham Nath Marg, Delhi 110 054, India. **Phone:** (+91 11) 2398-1690. **Fax:** (+91 11) 2394-6150. **Email:** director@mrindia.org. **URL:** www.mrcindia.org.

Scientific Fields of Interest: Biological Sciences.

Research and training: Vector Biology and Control: Mosquito systematics and faunistic survey; Biology of malaria vectors; Species complexes in malaria vectors, their cytological and molecular characterization, development of molecular diagnostic assay for sibling species identification; Control of malaria vectors using insecticides, biocides, biological control, insecticide impregnated bednets; Insecticide and biocide resistance and their mechanism. Parasite Biology: Antigenic and molecular diversity of malaria parasites; Immunology; Chemo- therapy, drug development and drug resistance. Vector-Parasite Interactions: Susceptibility of malaria vectors to malaria infections and factor governing susceptibility; Isolation of plasmodium refractory Anopheles culicifacies and their biochemical and molecular characterization. Evolutionary Biology: Evolutionary biology of malaria parasites and malaria vectors. Epidemiology: GIS and malariometric surveys; Epidemic forecast; Climate and Malaria; Training.

Achievements: The institute has successfully demonstrated Bio-environmental Control of Malaria as multi-centric trial in various parts of India representing various eco-epidemiological zones and malaria paradigms.

Facilities: EQUIPMENTS: ABI Prism 310 DNA Sequencer; ABI DNA Synthesizer; Thermal Cyclers; Spectrophotometers; Kinetic Microplate Readers; Micro-centrifuges and ultra-microcentrifuges; Gel Doc System; Electrophoresis system; Laminar Flow; Ultra-deep freezer, deep freezers and general refrigerators etc. FIELD STATION: We have 10 field stations located in different parts of India representing different malaria paradigms. PARASITE BANK: Maintains characterized human and rodent malaria parasites for research work. INSECTARY: The institute has well established insectaries maintaining different species and strains of mosquitoes from different parts of India and laboratory selected strains. ANIMAL HOUSE: The institute has an animal house which maintains mice, rabbits and pigeon for experimental work. LIBRARY.

Future plans: Currently a big research block is being built which will be ready by mid 2007. In future, after completion of research block, the laboratories will be strengthened by procuring sophisticated and essential equipments especially in the field of bio-informatics and biotechnology and by recruiting scientific staff. Emphasis will be given on the training of national health professionals and workers and training of young graduates through Ph.D programme.

International Organization: United States Agency for International Development (USAID); World Health Organization, Geneva

Indian Institute of Astrophysics (IIA)

Head of Institution: Prof. S.S. Hasan, Director.

Address: Koramangala 2nd Block, Bangalore 560 034, India. **Phone:** (+91 80) 2553-0672/73/74/75/76. **Fax:** (+91 80) 2553-4019. **Email:** diriia@iiap.res.in. **URL:** www.iiap.res.in.

Scientific Fields of Interest: Physics.

Research and training: Research and training: Theoretical astrophysics; Observational astronomy; Instrumentation. Training: graduate studies, programme leading to Ph.D., post-doc and visiting fellowships; summer students' programme; trainee programmes and a visiting students' programme for students of other research institutions and universities.

Achievements: Solar Physics: expeditions by the Institute over the last 4 decades to observe the corona during total solar eclipses have shown the presence of a) neutral hydrogen in the million degree corona, and, b) coronal intensity oscillations with periods around 5 to 50 seconds; observations of bright-fine mottles (in the interior of the chromospheric network) on the sun have established that they obey the Wilson-Bappu relation between Ca K emission width and the absolute magnitude of the sun; the study of coronal line at 530.5, 637.4, 789.2 and 1074.7 nanometers has shown that their width increases with height in the corona for low-temperature lines and decreases for high-temperature lines; new insight has been provided on the dynamics and energy transport in the magnetized chromosphere of the sun. Stellar and galactic astronomy: the 1 meter telescope at the Vainu Bappu Observatory (VBO) at Kavalur detected and atmosphere around Jupiter's satellite Ganymede in 1972 and discovered rings around Uranus in 1977. Studies of the supernova SN 1987a showed enhanced nitrogen abundance in the surface layers; the 45 cm. Schmidt telescope at the VBO discovered an asteroid (Ramanujan) in 1988. A few other planetary objects were also discovered with the 1 meter telescope; the 2 meter Hanle Chandra Telescope (HCT) has been used since 2003 to monitor: a) the low redshift supernova SN 2005bf, which was shown to be a peculiar type Ibc that occurs on a massive star with a trace of a hydrogen envelope; and, b) the optical afterglow of GRB source GRB 021211, which was shown to be an optically dim burst. Brown dwarfs and very low mass-stellar objects, the missing links between stars and gas-rich planets like Jupiter are also being studied. A study of RR Lyrae in the globular cluster NGC 4147 has resulted in a refined periodicity of known variables and detection of a few new variables. Instrumentation: the IIA has developed high-precision optics, which was used to indigenously build the 2.34 meter Vainu Bappu telescope.

Facilities: IIA has facilities spread over the following six centers: Bangalore, Hosakote, Kodaikanal, Hale and Gauribidanur. These include the Kodaikanal Observatory, the Vainu Bappu Observatory (VBO) at Kavalur, the Gauribidanur radio telescope, the photonics and electronics labs, the computer center and library at the main campus in Bangalore, and the Indian Astronomical

Observatory at Hanle, Ladakh in the Himalayas, situate at an altitude of 4240 m, with the 2m Himalayan Chandra Telescope (HCT) having a faint object spectrograph, near infrared and optical imagers, all remotely operated from Bangalore.

Cooperation with developing countries: IIA has collaborations with INPE of Brazil and UNAM of Mexico.

International Organization: IIA has collaborations with Copenhagen University Observatory of Denmark and with the McDonnell Center for Space Sciences, Naval Research Laboratory and the University of Maryland (USA).

Indian Institute of Science (IISc), Bangalore

Head of Institution: Prof. P. Balaram, Director.

Address: Bangalore 560 012 Karnataka, India. **Phone:** (+91 80) 2293-2444.

Fax: (+91 80) 2360-0757. **Email:** regr@admin.iisc.ernet.in, roff@admin.iisc.ernet.in, piyeriisc@yahoo.co.uk. **URL:** www.iisc.ernet.in/.

Scientific Fields of Interest: Biological Sciences, Chemistry, Environmental Sciences, Mathematics, Physics.

Research and training: Research: science, engineering and management; Chemistry: organic, inorganic, physical, structural; Biology including reproductive biology and molecular endocrinology, genetic engineering, microbiology, cell biology, molecular biophysics, developmental biology and genetics; Materials science; Electrical and communications engineering, electronics, computer science and automation, civil, mechanical, aerospace and chemical engineering; Atmospheric sciences; Mathematics; Physics, astronomy and astrophysics, cryogenics, theoretical studies. Training: ME, MTech., Ph.D., MBA degrees.

Achievements: 2001-2002 published 1550 papers (371 Chemistry, 251 Biology, 119 Mathematics and Physics 446 Mechanical Sciences, 194 Electrical sciences, 90 information science, 41 Miscellaneous fields).

Facilities: As the IISc comprises a large number of departments and centres, the list of research facilities is very long. Altogether, IISc is well-equipped with instrumentation and computers.

Future plans: Genomics and Proteomics; nanoscience and nanotechnology; applied mathematics; MEMS.

Cooperation with developing countries: China, India, Korea, Nepal, Singapore, Mauritius, Sri Lanka

International Organization: Universities and Institutes in Australia, Canada, Finland, France, Germany, Japan, the Netherlands, Norway, Sweden and USA.

Indian Institute of Technology (IIT), Bombay

Head of Institution: Prof. Ashok Misra.

Address: Powai, Mumbai 400 076, India. **Phone:** (+91 22) 2576-7025, 2572-3480. **Fax:** (+91 22) 2572-3480, 2572-3546. **Email:** director@iitb.ac.in. **URL:** www.iitb.ac.in.

Scientific Fields of Interest: Biological Sciences, Chemistry, Earth Sciences, Environmental Sciences, Mathematics, Physics.

Research and training: Research: under-graduate and Post-graduate-programmes in all the conventional engineering disciplines from Aerospace Engineering to Metallurgical Engineering; M.Sc. Programmes in Sciences. Additional Post-graduate facilities are available in interdisciplinary areas such as Biomedical Eng., Industrial Engineering & Operations Research, Industrial Management, Materials Science and Reliability Engineering.

Achievements: Excellent academic programmes, world-wide recognition for the quality of students IIT produces. IIT has strong research group and contributes substantially to the national projects.

Facilities: Instructional facilities; laboratories; research centers; R&D facilities; library; computer and Internet facilities; conference facilities.

Future plans: Expand its Distance Learning Programmes; expand international academic linkage with leading institutes for academic and research collaboration; identify new areas for future focused research; major initiative at present in area of nano-technology; encourage and support entrepreneurship in technological areas.

Cooperation with developing countries: Play a greater role in providing training facilities for students from developing countries and help establish similar institutes in those countries.

International Organization: The Institute participates in the programmes under SPAARC and would like to cooperate with other countries in setting up institutes similar to IIT in countries and train necessary manpower for the same. The institute has also initiated collaborations with leading universities in USA, Europe and Asia for research and academic exchanges.

Indian Institute of Technology (IIT), Kharagpur

Head of Institution: Dr. S. K. Dube.

Address: Kharagpur 721 302, India. **Phone:** (+91 3222) 255-221. **Fax:** (+91 3222) 282-700. **Email:** director@iitkgp.ernet.in. **URL:** www.iitkgp.ac.in.

Scientific Fields of Interest: Biological Sciences, Chemistry, Earth Sciences, Environmental Sciences, Mathematics, Physics.

Research and training: Graduate, post-graduate, doctoral and post-doctoral programmes in Aerospace; Agriculture; Architecture; Biotechnology; Chemical engineering; Chemistry; Civil engineering; Computer science engineering;

Cryogenic engineering; Electrical engineering; Electronics engineering; Food engineering; Geology and geophysics; Humanities; Industrial engineering; Information technology; Management; Materials science; Mathematics; Mechanical-engineering; Medical science engineering; Metallurgical engineering; Mining engineering; Naval architecture; Ocean engineering; Physics; Regional planning; Reliability engineering; Rubber technology; Rural development; Social sciences; Telecommunications.

Achievements: Research and training of engineers and scientists in the above-mentioned disciplines; consultancy and sponsored research projects.

Facilities: Well-equipped laboratories and computing facilities in all departments and centers; central research facility; central library, etc.

Future plans: Development of teaching and research in: biotechnology, environmental engineering, information technology, industrial design.

International Organization: The Institute has international faculty exchange-programs with DAAD, Germany; Technische Universitat, Dresden, Germany; Volkswagen Foundation, Germany; Ruhr University, Germany; University of Michigan, Ann Arbor, USA; University of Washington, Seattle, USA; National Centre for Scientific Research, France; Institute of Energy Problems in Chemical Physics, Moscow; Institute of Experimental Physics, Warsaw University, Poland; Department of Mathematics and Physics, Catholic University, Italy; Japanese Society for Promotion of Sciences, Japan; Kyoto Institute of Technology, Japan; University of Illinois at Urbana Champaign, USA; Georgia Institute of Technology, USA; University of Florida, USA; National Semiconductor, USA; Silicon Magic, USA; INTEL, USA; Microsoft Corporation, USA; University of Linköping, Sweden; Cranfield University, U. K., INSA Korea; KIGAM, Korea. Faculty of Engineering, the national University of Singapore, FHD, University of Applied Science, Germany; FAU-Erlangen, Germany, University of Illinois at Urbana, USA; University of Southern California Andrew and Erna Viterbi School of Engineering, USA; USTL, France; Indo-Swiss Academic Alliance (ISAA).

International Centre for Genetic Engineering and Biotechnology (ICGEB)

Head of Institution: V. S. Chauhan.

Address: ICGEB Campus, Aruna Asaf Ali Marg, New Delhi 110 067, India.

Phone: (+91 11) 2618-9358. **Fax:** (+91 11) 2616-2316. **Email:** virander@icgeb.res.in. **URL:** www.icgeb.org.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences.

Research and training: Research: Plant-molecular biology, including stress, insect resistance, and Plant transformation. Human health-related research includes Malaria vaccine and drug research, Virology, Immunology recombinant-gene products and structure, and computational biology. The

centre conducts 3-4 training programmes in a year for scientists and students from the member countries.

Achievements: Developed Hepatitis-C diagnostic kit, Hepatitis-B vaccine and gamma interferon, Biopesticide formulation and transferred to industry in member-countries. Filed patent application in PCT countries and published more than 500 papers in leading scientific journals.

Facilities: Process-development laboratory for vaccine-research, mass spectrophotometer. Biosafety level 3 facility for HIV, research in tuberculosis and other infectious diseases.

Cooperation with developing countries: ICGEB (New Delhi) and ICGEB (Trieste); strong links with 14 affiliated centres in various member countries. Service facilities (computer work, databases, supply of nucleotides, assays and probes and others) are made available to scientists from member countries.

International Organization: The centre receive grants from major funding agencies, like Malaria Vaccine Initiative, WHO, European Union.

Inter-University Accelerator Centre (IUAC)

Head of Institution: Dr. Amit Roy.

Address: Aruna Asaf Ali Marg, PO Box 10502, New Delhi 110 067, India.

Phone: (+91 11) 2689-3045. **Fax:** (+91 11) 2689-3666. **Email:** roy@inac.res.in.

URL: www.inac.res.in.

Scientific Fields of Interest: Physics.

Research and training: Nuclear physics; materials science; atomic physics; radiation biology; Pre-Ph.D graduate course.

Achievements: All research findings are published in international and national journals.

Facilities: 15 UD pelletron accelerator; one Linac booster module; 16 element gamma detector array; 14 element BGO filter; heavy-ion reaction analyzer; XRD and AFM; low-energy ion-beam facility.

Future plans: Two Linac modules under construction; high-current injector under construction.

Cooperation with developing countries: All facilities at IUAC are accessible through exchange programmes of department of S&T, Govt. of India and university grants commission.

Inter-University Centre for Astronomy and Astrophysics (IUCAA)

Head of Institution: Naresh K. Dadhich.

Address: Post Bag 4, Ganeshkhind, Pune 411 007, India. **Phone:** (+91 20) 2560- 4100, 2569-1414. **Fax:** (+91 20) 2560-4699. **Email:** root@iucaa.ernet.in, samuel@iucaa.ernet.in. **URL:** www.iucaa.ernet.in/.

Scientific Fields of Interest: Physics.

Research and training: Fundamental research in Astronomy & Astrophysics (A&A) in Solar and Planetary studies; Galactic Astronomy; Stellar Structure and Evolution; High-energy Astrophysics; Extra Galactic Astronomy; Theoretical Cosmology; the particle physics astrophysics interface; Gravitation and relativity; Observational anomalies and non-standard approaches. Training: Ph.D in astronomy and astrophysics; refresher courses for teachers of A & A; schools for students and teachers of A & A; Conferences and symposia.

Achievements: The Centre has an active group on data analysis from gravity-wave detectors, which is internationally acclaimed for its algorithms and techniques. Work on quantum gravity and the early universe is also being actively carried out, as well as, interpretation of extra-galactic data on quasars and galaxies, of international recognition. The Centre is also carrying out the fabrication of small automated photoelectric telescopes.

Facilities: Library — a collection of over 5000 books on astronomy, astrophysics and related areas, fully computerized. Computers — IUCAA has a network of computers with advanced SUN workstations for numerical computing and image processing. It has a dedicated E-mail link with NCST Bombay, with access to computers and databases all over the world. Astronomical data centre has a collection of astronomical catalogues and data bases with software for efficient retrieval of the data. It is developing an Instrumentation Laboratory for astronomical telescopes and detectors.

Future plans: As of 2003, the Centre is setting up a 2 meter telescope at a nearby site for enhanced exploration by Indian universities.

Cooperation with developing countries: China, Iran, Myanmar, Thailand, Nigeria, Kenya.

International Organization: Indo-French collaboration under Indo-French centre for promotion of advanced research; MoU with the LIGO project in the USA and the AIGO project in Australia.

Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR)

Head of Institution: Prof. M.R.S. Rao.

Address: Jakkur P.O. Bangalore 560 064, India. **Phone:** (+91 80) 2362-2762, 2208-2752, 2365-2762/5057 ext. 2202, 360-0118. **Fax:** (+91 80) 2208-2766, 2360-2468. **Email:** mrsrao@jncasr.ac.in, mrsrao@biochem.iisc.ernet.in. **URL:** www.jncasr.ac.in/.

Scientific Fields of Interest: Biological Sciences, Chemistry.

Research and training: Biology: Circadian rhythms, role of biological clocks in development and ageing, new drug-targets for malaria; molecular genetic basis of neurological and psychiatric disorders in human, chromatin-mediated transcription regulation in humans, construction and evaluation of Tat expressing DNA-vaccines for HIV, Chromatin remodeling, Developmental mechanisms of Angiogenesis. Chemistry: Study of phenomena, structure-property relations and design of new materials, electronic and optical phenomena in organic materials, nanomaterials and clusters, electronic and magnetic properties of oxides, new forms of carbon, thin-films, supramolecular chemistry, semiconductor alloys, porous solids having framework structures and catalysis, structure and dynamics of 'Green' solvents and polymer electrolytes.

Achievements: Numerous publications and patents.

Facilities: Biology: Confocal microscope, Micro-array scanner; High-resolution Microscope (SEM) with EDAX (Leica 4401) Electron Spectrometer with ultra high vacuum (having indigenously designed and developed molecular beam cluster apparatus, with a time-of-flight mass spectrometer; Computational facilities that include, Silicon Graphics Power Challenger with 4 Parallel Processors, a Hewlett-Packard Kclass-II with 4 CPUs and a large number of Silicon Graphics workstations, based on Indy and O₂, Perkin Elmer UV-vis spectrometer; Perkin Elmer Fluorescence spectrometer, Three Chronocubicle complexes with light-tight cubicles, with independent light timer controls for chronobiological work on insects and mammals, Fully computerized Insect Activity Recording Systems with 500 channels to continuously record locomotor activity of insects. A laboratory for microbiological studies with phase contrast microscope, laminar airflow chamber, ice machine, BOD incubator, deep freezer (-20°C), autoclave, balances, centrifuge etc.,. A walk-in controlled environment chamber for maintenance of ant colonies in the laboratory. A full fledged Drosophila laboratory with incubators, media preparation facilities and a manifold CO₂ distribution system for anaesthetizing flies. Extensive Computer facilities for simulation, technical graphics, database management and statistical analysis of data. To culture mouse embryos and generate mouse chimeras to study two novel genes involved in blood vessel formation, both of which have human and Drosophila counterparts. Sophisticated human and insect cell-cultures facilities, transcription factors/nonhistone proteins in transcription regulations. A gel documentation system, an electroporator, an

ultracentrifuge, a scintillation counter, deep freezers, a gene gun, a cytogenetics workstation, an ice machine, a cold room and a radio activity room. A Well-equipped state-of-the-art animal facility. Chemistry: Single Crystal X-ray diffractometer with CCD facility (Siemens). ESCA facility with UVPS, LEED and STM/AFM attachments. Indigenously designed and developed molecular beam cluster apparatus with a time-of-Flight mass spectrometer. Scanning Tunneling and Atomic Force Microscopes (STM/AFM) operating in air for Nanoscience and Technology Initiatives. Variable Temperature STM. Catalyst characterization with Gas chromatograph Quadruple Mass Spectrometer and Residual Gas Analyzer. Carbon arc-discharge unit. Large number of furnaces for making samples in various atmospheres in the range 300oC to 1700oC. A closed cycle cryocooled 15T superconducting magnet with a room temperature bore and an optical window. Floating zone melting crystal growth apparatus. High-resolution Microscope (SEM) with EDAX (Leica 4401) Electron Spectrometer with ultra high vacuum (having indigenously designed and developed molecular beam cluster apparatus with a time-of-flight mass spectrometer. Brillouin Spectrometer. Magnetometer (VSM) and Faraday balance. Mossbauer Spectrometer. Thermal characterization up to 1250K with a Mettler instrument. Surface area measuring apparatus. Quadruple Mass Spectrometer and Residual Gas Analyzer. Large number of furnaces for making samples in various atmospheres in the range RT to 1700oC. Computational facilities that include Silicon Graphics Power Challenger with 4 Parallel Processors, a Hewlett-Packard Kclass-II with 4 CPUs and a large number of Silicon Graphics workstations, based on Indy and O₂. Crystal Polishing Instrument. Physical property measuring system.

Future plans: The centre is presently drawing up programmes in the areas of advanced research in biology and physical sciences. It has plans to focus research in the area of developing diagnostic kits for diverse human disorders.

Cooperation with developing countries: JNCASR Programme with National Academies of Sciences, Kazakhstan and Uzbekistan.

International Organization: The Centre has plans to establish cooperative research training programmes, particularly in terms of South-South Cooperation.

Jawaharlal Nehru University (JNU) — School of Physical Sciences

Head of Institution: H.B. Bohidar, Dean.

Address: New Delhi 110 067, India. **Phone:** (+91 11) 2671-7507. **Fax:** (+91 11) 2671-7537. **Email:** bohi0700@mail.jnu.ac.in. **URL:** www.jnu.ac.in/main.asp?sendval=SchoolOfPhysicalSciences.

Scientific Fields of Interest: Chemistry, Mathematics, Physics.

Research and training: The academic objectives of the School are to teach basic physics and applications interfacing with chemistry; mathematics and

biology, and also to conduct theoretical and experimental research in the areas of condensed matter physics; non-linear dynamics and optics; spectroscopy of biomolecules; complex fluids and non-equilibrium statistical mechanics. Besides, the School imparts training to university college teachers sponsored by Academic Staff College, twice a year.

Achievements: As recognition of the School's excellent record in the fields of teaching and research, the University Grants Commission and Department of Science and Technology have been extending substantial amounts of financial support through various schemes like Departmental Research Support, COSIST and DST-FIST.

Facilities: Scanning-Probe Microscope; non-linear optics; glass transition study; dynamic light-scattering; semiconductor physics; theory and modeling with high speed computers; 10 workstations; 100 PCs; Departmental Library with a collection of 1,500 books.

Future plans: Plans to expand the areas of teaching and research to include subjects like nanomaterials, biomaterials, thin-films and soft materials, scanning techniques (STM & Hall Probe), Magneto-optical imaging, X-rays, neutron scattering and High-energy ion-beams spectroscopy and low-temperature characterization. The theoretical programme would include complex systems, granular materials and electronic structure calculations.

Cooperation with developing countries: The S.P.S. had organized a two-week long course from 3rd-14th December 2001 sponsored by UNESCO on Soft-Condensed Matter Physics which was attended by 35 participants from six developing countries. Cooperation with Nepal; Iran; Iraq; Ethiopia; Bangladesh; Indonesia; Bhutan; Yemen.

International Organization: Faculty members are running collaborative research programmes with participation of academicians/researchers from CNRS; Laboratoire de Photonique et Nano-structures; Marcoussis; France; University of Claude Bernard; Lyon I; France; University of Oldenburg; Germany, etc.

M.S. Swaminathan Research Foundation (MSSRF)

Head of Institution: Prof. M.S. Swaminathan.

Address: Third Cross Street, Taramani Institutional Area, Chennai 600 113, India. **Phone:** (+91 44) 2254-1229, 2254-2698, 2254-2699. **Fax:** (+91 44) 2254-1319. **Email:** chairman@mssrf.res.in, executivedirector@mssrf.res.in. **URL:** www.mssrf.org.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences, Earth Sciences, Environmental Sciences.

Research and training: Following are the major research and training areas: coastal systems research; biotechnology; biodiversity (community based agrobiodiversity conservation and management); ecotechnology; food security; and information, education and communication.

Achievements: The MSSRF Gene-bank is a walk-in cold storage where seed materials of cereals, pulses, and medicinal and endangered plants are preserved to represent the traditional biodiversity of the region as well as new materials accessible to all the farmers. The Genetic Resource Centre at MSSRF is carrying on a scientific program designed to conserve mangrove wetlands in the coastal area, and to transfer genes for sea-water tolerance to rice and other crops. The program has been notably successful, especially with rice plants with genes of salt tolerance transferred from mangrove trees in south India. The Bio-village programme in Pondicherry has been an exemplary model throughout the country for bringing semi-literate young men and women to the forefront of new and dynamic leadership roles in development. The MSSRF Technical Resource Centre, the first of its kind has been successfully implementing the recommendations of the 1992 Rio Convention of Biological Diversity. In 1998, a new dimension 'Village Knowledge Centres' was added to the bio-village program to connect villages through a two-way wireless system for sharing simultaneous information, data and needed experience. Now there are over 100 such VKCs operating with the help of MSSRF in coastal Tamil Nadu. MSSRF also successfully demonstrated Community Food Banks in parts of Orissa to store quantities of grain staple and seeds of food crops to meet the needs of the people.

Facilities: A well-equipped laboratory for High-tech biotechnological research at Chennai station; a good laboratory for microbial research; A Community level Gene-bank and Herbarium; A reasonably good library with over 0.15 million books and 113 journals and periodicals; Training infrastructure at Wayanad, Pondicherry and Jeypore field stations.

Future plans: The future plan is to strengthen networks at local, national and international levels to consolidate the ongoing work by undertaking 'Action Research' in the major areas, like 'food and livelihood security'; 'NRM, poverty reduction and biodiversity conservation, and sustainable and equitable utilization'; 'rural and eco-technologies for sustainable agricultural development'; 'biotechnology and information and communication technologies'. Some of the specific areas of future development will be: National Mission 2007: Every village a Knowledge Centre; National Mission 2007: Hunger Free India; Community Agrobiodiversity Centres in Biodiversity and Agrobiodiversity hotspots of India; Rural Eco-technology Centres in most important agro-ecological zones of India; Participatory Plant-breeding and Technology Development in the priority crops; Bio-prospecting of Medicinal Plants used in Folk Medicinal System in India; Mangrove Genetic Resource Centres in east coast of India; Sustainable Management of Natural Resources.

Cooperation with developing countries: The Foundation has completed a Food Security analysis study with respect to Cambodia funded by UNDP-Cambodia; The Foundation is assisting Sri Lanka in the implementation of the project on 'Strengthening Resilience in Tsunami – affected areas' funded by IDRC and CIDA and being implemented in India and Sri Lanka; The Foundation is assisting the Nepal Agricultural Research Council in implementing IPGRI-

IFAD funded project on 'Enhancing the contribution of nutritious but neglected species to food security and to income of rural poor'.

International Organization: IFPRI-FAO funded project "Using markets to promote the sustainable utilization of crop genetic resources" has been taken up by the Foundation; A Project entitled "Integrated Management of Biodiversity Resources in Partnership with People: Innovative Model to reach the Millennium Development Goal on Elimination of Hunger and Poverty" to be funded by SDC is operating from 1st July 2006; Microsoft and IDRC are supporting the National Virtual Academy for Rural Prosperity in establishing the Village Knowledge Centers and providing computer-aided learning programmes.

National Bureau of Plant Genetic Resources (NBPGR)

Head of Institution: B. S. Dhillon.

Address: Pusa Campus, New Delhi 110 012, India. **Phone:** (+91 11) 2584-3697. **Fax:** (+91 11) 2584-2495. **Email:** bsdhillon@nbpgr.ernet.in, director@nbpgr.ernet.in. **URL:** <http://nbpgr.ernet.in>.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences.

Research and training: Human resource development in plant-genetic resources (PGR) management; Post-graduate teaching (M.Sc and Ph.D) in PGR; Centre of Excellence for regional training course on in-vitro conservation and cryopreservation (IPGRI designated).

Achievements: Long-term ex-situ conservation of seed samples of agri-horticultural crops, standardization of protocols for tissue-culture and cryopreservation for several plant species; development of several quarantine treatments for salvaging infected germplasm; characterization and preliminary evaluation of crop- germplasm and printing of more than 70 crop-catalogues; development of training modules/manuals.

Facilities: Scanning electron microscope, ELISA reader, well-equipped laboratory facilities for DNA fingerprinting, cryopreservation, tissue-culture, orthodox seed conservation, phyto-chemical/biochemical evaluation, plant quarantine clearance and supportive research; 100 acres research farm, 10 regional stations with farms, well-developed computer facilities for database; Transmission-electron microscope; Image analyzer; Gel documentation system.

Future plans: Harmonization of various germplasm conservation-strategies viz. seed storage, cryopreservation and in-vitro conservation; linking ex-situ and in situ conservation of germplasm resources of crop plants and their wild relatives; increased emphasis on biosystematics and molecular genetic diversity analysis of crops of native origin; Centre of Excellence for human resource development on plant genetic resources management; proactive role in germplasm enhancement and utilization.

Cooperation with developing countries: Collaboration under bilateral and multilateral protocols, SAARC and G-15 countries.

International Organization: All collaboration and cooperation under the umbrella of ICAR/DARE; Indo-USAID PGR Project; Indo-UK PGR Project.

National Centre for Medium Range Weather Forecasting (NCMRWF)

Head of Institution: Dr. A.K. Bohra.

Address: A-50, Institutional Area, Sector-62, Noida-201307, India. **Phone:** (+91 120) 240-3900. **Fax:** (+91 120) 240-0062. **Email:** akbohra@ncmrwf.gov.in.

URL: www.ncmrwf.gov.in.

Scientific Fields of Interest: Environmental Sciences, Physics.

Research and training: Research: numerical weather prediction with emphasis on spectral techniques, assimilation of satellite-data, study of physical processes like convection, boundary layer, radiation and land surface processes, crop weather models, mesoscale models (MM5, Eta, RSM), sea state forecast models, training for young researchers in meteorology, ensemble forecasting with 8 members in the T80 model initiated, development of coupled ocean-atmosphere model underway, high-resolution regional data assimilation system implemented, weather forecasts at district level (local scale) started on experimental basis.

Achievements: Custom-tailored forecasts for specialized clients including the farming community, India Meteorological Department, Indian Military, other defense industries, mountaineering, shipping, and tourism companies. Snow and avalanche studies plus catastrophic events forecasting (floods). Many forecasts available on website.

Facilities: Cray SV1 with 24 processors; DEC-Alpha PARAM 10000 Parallel-processing system; 9 work stations; Origin 200 Parallel-processing System with 2 servers; Origin 200 having Single CPU Servers System; 3 servers @ 270 MHz, 1 server @ 180 MHz; 2 SUN Ultra Sparc-II servers.

Future plans: Enhancement of the resolution of global forecast model to 20 Km, oceanic data assimilation and coupled ocean-atmosphere models, Direct satellite radiance assimilation, ensemble forecasting. New applications would include wind energy generation, forecasting of dust storms, fog forecasting, forecasts of spread of forest fire and chemicals in the atmosphere.

Cooperation with developing countries: A BIMST-EC (Bay of Bengal Initiative for Multi-sectoral Technical and Economic Cooperation) Cell has been started at the center. This would coordinate and address all weather related issues affecting countries in this region.

International Organization: A MoU has been signed with NCAR, USA for collaborative research in atmospheric sciences.

National Dairy Research Institute (NDRI)

Head of Institution: Dr. Sushil Kumar, Director.

Address: Deemed University, (ICAR) Karnal 132001, India. **Phone:** (+91 184) 225-2800. **Fax:** (+91 184) 2250-042. **Email:** sushil_5k@rediffmail.com.

Scientific Fields of Interest: Agricultural Sciences.

Research and training: Dairy cattle breeding, nutrition and physiology; animal biotechnology and biochemistry; dairy technology, engineering, chemistry, microbiology, economics, statistics and management and dairy extension.

Achievements: Development of a process for the production of non-conventional baker's yeast from whey; development of a cream separator attachment for mixers and food processors; development of a process for making instant 'Makhana Kheer' mix; development of a simple, quick and sensitive method for staining of proteins on nitrocellulose membranes; development of a process for industrial manufacturing of instant 'Kheer' mix; development of whey mango beverage; development of a process for low-fat tomato-whey soup; development of a simple and efficient micro-dialysis assembly of samples in micro-liter volumes; direct delivery of live and compatible co-cultures of certain probiotic micro-organisms in a specific ratio to the target site; manufacture of butter from ghee/butter oil; development of a mechanized system for continuous production of Chhana balls; development of a novel method to identify and characterize amino-acid transport systems and the discovery of two new amino-acid transporters (BCI-dependent and BCI-independent) in biological membranes (mammary gland); development of a process for non-dairy coffee whitener; development of a novel method to detect sub-clinical mastitis in cattle and buffaloes, based on milk-lysozyme activity; development of a continuous Paneer/Chhana making machine; development of technology for preparation of chelated minerals; development of shellac-based coating of earthen pots used for packing of high-moisture food products like fermented milk products, beverages, frozen desserts to control moisture loss of the product during storage; development of a process for milk gelatinized Ada production; development of 'Whey-Jaljira mix Powder'; development of a column for chromatography; development of a process formulation of Palada Payasam ready-mix and a process for the accelerated development of color and flavor in Palada Payasam; development of a process for instant rasmalai mix; development of a process for the manufacturing of ready-to-reconstitute paneer curry mix; development of a process for low-fat frozen dessert using starch hydrolysate; formulation of ready-to-use cheese poori mix; development of a methodology for simultaneous analysis of pesticides; development of a spectrophotometric method of estimation of tannin acylhydrolase in rumen digesta; HPLC method of analysis of tannin monomers present in animal feed.

Facilities: Elisa reader and accessories; refrigerator centrifuge; PCR machines; spectrophotometer UV/Visual/Double-beam; digital weigh bridge; vertical deep freezers; gamma counter; micro/ultra centrifuge; CO₂ incubators; ultra-pure

water systems; HPLC; muffle furnace; electron microscope; gel documentation system and SO microscopes.

Future plans: Future research on animal genetic resources; livestock improvement (livestock production management, dairy cattle nutrition and physiology, livestock product technology); animal biotechnology (dairy biotech.); network project on indigenous milk products.

Cooperation with developing countries: Master's and Doctoral programmes with students from Sri Lanka, Iran, Nepal, Sudan and Ethiopia.

International Organization: NDRI has strong linkages with other sister ICAR organizations and State agricultural universities besides dairy industry in the country.

National Institute of Hydrology

Head of Institution: Dr. K.D. Sharma, Director.

Address: Jal Vigyan Bhawan, Roorkee 247667, Uttaranchal, India. **Phone:** (+91 1332) 272-106. **Fax:** (+91 1332) 272-123, 273-976. **Email:** root@nih.ernet.in, kdsharma@nih.ernet.in. **URL:** www.nih.ernet.in.

Scientific Fields of Interest: Earth Sciences.

Research and training: Research: Water related disasters, groundwater, water resource planning and management, snow and glacier, prediction in ungauged basins, Water-quality, hydrology of arid and semi-arid zones, reservoir sedimentation and watershed hydrology. Training: short-term courses in the fields of hydrology, water-resources, watershed management, and capacity-building programmes

Achievements: Developed about 25 technologies for water resource development, including hydrological instruments, software packages, procedures and manuals for hydrological analysis. Prepared about 10 books, 850 technical reports and 1200 research papers in reputed journals, pamphlets and brochures on public awareness topics.

Facilities: Latest computers (PCs) and peripherals, liquid scintillation counters, Gamma ray and alpha spectrometers, isotope ratio mass spectrometers, tritium enrichment unit, benzene and CO₂ absorption lines, soil moisture and density probes, atomic-absorption spectrometer, total carbon analyzer, flow injection analyzer, UV-VIS spectrophotometer, ion-analyzer, mastersizer E-system, plant canopy analyzer, pressure plate apparatus, Guelph in-situ permeameters, TDR soil moisture probe, tensiometers, spectroradiometer, GIS and image processing softwares, automated weather stations, rain and snow gauges, water-level recorders and flow meters, tetrameter, and EM conductivity meter.

Future plans: The institute perceives its role in the coming years as a leading research institute in the country for providing sustainable solutions to the water-related problems. To achieve this objective, and to ensure the field adaptability of technologies developed at the institute, it plans to develop linkages with community-based organizations by organizing capacity-building programmes and awareness campaigns.

Cooperation with developing countries: The institute hosts the secretariat of the Indian National Committee on Hydrology (INCOH), which acts as the nodal agency for the IHP of UNESCO. Through INCOH, the Institute has cooperation arrangements with many developing countries, especially in Asia

International Organization: World Bank funded project 'Hydrology Project II'.

National Institute of Immunology (NII)

Head of Institution: Prof. A. Surolia.

Address: NII Campus, Aruna Asaf Ali Marg, New Delhi 110 067, India. **Phone:** (+91 11) 2671-7102/03. **Fax:** (+91 11) 2671-7104. **Email:** surolia@nii.res.in. **URL:** www.nii.res.in.

Scientific Fields of Interest: Biological Sciences, Chemistry, Environmental Sciences.

Research and training: Immunity and infection; gene regulation; reproduction and development; molecular design; systems biology; structural biology; chemical biology.

Achievements: Infection and immunity: studies on immune responses generated by Mycobacterium w. and BCG and on genetic factors associated with diabetes; antigen processing and presentation; biology of T-lymphocytes; Salmonella host-cell interaction; biology of JEV; retro-virus vectors against HIV mucosal immunology. Reproduction and development: spermatogenic cell survival and function; proteomic analysis of Sertollicells; expression of genes and proteins in the testis; molecular characterization of zona pellucida glycoproteins; and development of perfusion bio-reactor for culturing hemtopoietic stem-cells. Molecular design: analysis of the structural principles of molecular recognition and mimicry using structural biology and immunology. Gene regulation: role of polykeptide syntheses in Mycobacterial; role of cytokines and growth factors signaling neuronal apoptosis; studies in Y-chromosome variability in patients with sex chromosome abnormalities; cell signaling in eukaryotic development. Ancillary activities: production of transgenic and knockout animals.

Facilities: Mass spectrometer; crystallography; NMR; -70°C deep freezers; confocal microscope; real-time PCR machines; PCR machines; electron microscope; computers; software for computational biology; library.

Future plans: Introduce systems biology as another major field of activity (using network framework) which should help define physiologic processes and biochemical pathways of the host and pathogen that respond. These in turn will lead to target identification which should be validated using system approaches. This will lead us to increase our intellectual property and products that are useful; increase the number of research scientists and infrastructure like hostel for Ph.D students.

International Organization: Planned: Collaborative research with Queens University, Belfast for translational research in cancer biology.

Panjab University — Centre for Advanced Study in Mathematics — Department of Mathematics

Head of Institution: Prof. Sudesh Kaur Khanduja (Mrs.).

Address: Chandigarh 160 014, India. **Phone:** (+91 172) 254-1132, 253-4501.

Fax: (+91 172) 254-1132. **Email:** casmath@pu.ac.in. **URL:**

<http://maths.puchd.ac.in/>.

Scientific Fields of Interest: Mathematics.

Research and training: Number theory; algebra; applied mathematics.

Achievements: The Department has emerged as a leading centre for research in various branches of number theory, algebra and applied mathematics. Several major fundamental results have been obtained in these areas in the past 3 years. Number theory: significant results have been attained in algebraic coding theory by a group consisting of Prof. V.C. Dumir, Prof. Madhu Raka, Dr. Gurmeet K. Bakshi and Anuradha Sharma. Prof. A.K. Agarwal and his research students have found some new results in Partition theory. Using the lattice path of Agarwal and Bressoud, new combinatorial interpretations of S. Ramanujan's four mock theta functions are given by Prof. A.K. Agarwal. Algebra: Dr. Dinesh Khurana worked with Prof. T.Y. Lam of University of California at Berkeley, USA. They studied in some depth rings with internal cancellation. They have obtained many interesting characterizations of such rings as well as studying the behavior of internal cancellation in related rings. Prof. Sudesh Kaur Khanduja and her research student have proved significant results in the field of valuation theory. Applied Mathematics: Dr. Renu Bajaj and her research student have obtained remarkable results in the field of ferrofluid. They are studying the instability of a viscous incompressible ferrofluid flow in an annular space between two co-axial cylinders of infinite extent axially, rotating in the presence of axial magnetic field. Numerical Analysis and Linear Programming: in the area of numerical analysis, Dr. Kapil Kumar Sharma explored the numerical study of Boundary Value Problems (BVPs) for singularly Perturbed Differential Difference Equations, where he obtained a number of original results that are published in international journals. In the area of Linear Programming, during the last 3 years, Dr. Vanita Verma (with her research student) has been working on integer programming problems with bounded variables, post optimality analysis in bounded variable problems. At present, they are working on non-linear programming problems in particular, convex programming problems with single separable constraint and bounded variables.

Facilities: Two computing labs with network connection (more than 80 PCs and 16 printers); library with 18,500 books and 46 journals; 3 photocopiers.

Future plans: The faculty engaged in various fields of recent research areas is contributing to the results in the form of research publications and they are planning to attempt certain problems that are challenging in the pertinent area of research. The number theory group plans to study weight enumerators and explore the related results for minimal cyclic codes and n -color partitions. The

faculty members working on Algebra are trying to develop and attempt many problems in the field of clean rings and modules in collaboration with ring theory group of Univ. of California (Berkeley, USA), including Prof. T.Y. Lam and his co-workers. The algebra group also likes to prove some generalizations and applications of the classical Dedekind criterion. The Applied Mathematics group intends to study various aspects of the Taylor Couette instability of magnetic fluids in the presence of magnetic fields. The faculty members working in the field of Mechanics of Continuous Media are attempting interesting problems of wave propagation in porous material saturated by more than one fluid. These problems are very useful in the exploration of oils, gases and valuables buried in the earth. The Numerical Analysis group has planned to construct parameter and higher order numerical schemes for such Boundary Value Problems in the case when the solution of these BVPs exhibit turning point behavior and in linear programming, they have plans to solve semi-definite programming problems with bounded variables and duality in such problems. In this way, the faculty members are planning to attempt more realistic and application oriented problems.

Cooperation with developing countries: Pakistan and many other developing countries.

Physical Research Laboratory (PRL)

Head of Institution: Prof. J.N. Goswami.

Address: Navrangpura, Ahmedabad 380 009, India. **Phone:** (+91 79) 2630-2129, 2631-4000. **Fax:** (+91 79) 2630-1502, 2631-4900. **Email:** director@prl.res.in. **URL:** www.prl.res.in.

Scientific Fields of Interest: Earth Sciences, Physics.

Research and training: PRL is engaged in basic research in several areas of experimental and theoretical physics, astronomy, astrophysics and solar physics; quantum optics and quantum information; earth, planetary and atmospheric sciences; development of human resource in these areas. It has strong doctoral and post-doctoral research programmes as well as project training of engineering and diploma students.

Achievements: About 150 research papers per year in peer-reviewed international journals.

Facilities: PRL's campuses: 1) main campus at Navrangpura, Ahmedabad; 2) Thaltej, Ahmedabad Campus having astronomy and astrophysics division and planetary exploration programmes; 3) astronomy observatory at Mt. Abu, Rajasthan; 4) Solar observatory at Udalpur, Rajasthan. Equipment available: 1.2 m. infrared telescope at Mt. Abu with back-end instruments, viz, infrared camera (NICMOS-); 1kx1k pixel thinned back illuminated CCD camera; polarimeter (optical and IR); imaging Fabry-Perot spectrometer and infrared fast photometer; solar telescope; video-magnetograph (being upgraded to full-vector magnetograph) at Udaipur solar observatory; Lidar (also a mobile Lidar); gas chromatographs; Dobson spectrophotometer; digital ionosonde; day-glow

photometer; multi-wavelength daytime photometer; scanning Fabry-Perot interferometer; Doppler imaging spectrometer; all sky-imaging camera; UV photoelectron spectrometer; excimer laser; ion probe; radiation detectors; radiocarbon and luminescence dating systems; atomic-absorption spectrophotometer; ion chromatograph; CHNS analyzer; spinner magnetometer; inductively coupled plasma emission spectrophotometer (ICP-AES); stable isotope mass spectrometer; mass spectrometers (Rb-Sr and TIMS); noble gas mass spectrometer; nuclear track lab and X-ray diffractometers.

Cooperation with developing countries: PRL has collaborative research programs with universities/ institutions both within and outside the country.

International Organization: Indo-French collaborative project for promotion of advanced research between PRL and Laboratoire de Glaciologie et Geophysique de l'Environnement (LGGE), CNRS/UJF, France.

Raman Research Institute

Head of Institution: N. Kumar.

Address: C.V Raman Avenue Sadashivanagar, PO Bangalore, Bangalore 560 080, India. **Phone:** (+91 80) 2361-1012. **Fax:** (+91 80) 2361-0492. **Email:** office@rri.res.in. **URL:** www.rri.res.in/.

Scientific Fields of Interest: Biological Sciences, Chemistry, Physics.

Research and training: Astronomy & Astrophysics: observational radio astronomy; pulsars; interstellar matter and recombination lines; Liquid Crystals: Material synthesis and characterization; phase transition; effects of fields, dynamics; topological defects; LCDs and addressing techniques; Experimental Optics: laser cooling and trapping of neutral atoms; cold- atom physics; light-scattering; geometric phases; non-linear optics; femtosecond pump-probe studies; Theoretical Physics: field-theory and quantum gravity; gravitational waves; stellar dynamics; condensed matter physics- high T-superconductivity, quantum transport in disordered system; soft-condensed matter; statistical physics of semi-flexible polymers; Biophysics: Cell membranes.

Achievements: Origin and evolution of binary and millisecond pulsars; low-frequency recombination lines (simulate emission) from interstellar matter; development/construction of radio telescopes, new types of liquid crystalline phases (discotic TGB and biaxial); chiral-symmetry broken structures with locomotion; solution, monolayer to 3D transition; multi-line addressing systems; random laser action; new results in theoretical physics; new results in cold atoms; random lasers (Lévy laser).

Facilities: 10.4 meter millimeter-wave telescope, 150 MHz synthesis telescope (Mauritius); radio interferometer (34.5 MHz) x-ray image plate, Malvern correlator for light-scattering studies; fs-laser system; fluorescence and polarizing microscopes; AFM, STM, IR, UV, NMR Spectrometers; superconducting magnet. Computers: 25 work stations, 150 PCs in network, LAN and Internet connectivity; e-mail; library (computerized).

Future plans: New studies on lyotropic liquid crystals, continuation of high-electric field and Langmuir monolayer studies on different types of liquid crystals, novel liquid crystal systems; soft-condensed matter including bio-membranes and microfluidics, light-scattering non-linear and Quantum optics; cold atom collisions; BEC; entanglement studies.

Cooperation with developing countries: University of Mauritius: Building and operating radio telescope, manpower development; Visiting programme with Brazil, links with TWAS and ICTP (Fellowship/Staff Associateship).

International Organization: Exchange programme with Italy, US, Ukraine, France and support from ICTP for Optics Laboratory.

S.N. Bose National Centre for Basic Sciences

Head of Institution: Prof. Sushanta K. Dattagupta, Director.

Address: Block JD, Sector III Salt Lake, Kolkata 700098, India. **Phone:** (+91 33) 233-55705/6/7/8/9/10. **Fax:** (+91 33) 233-53477. **Email:** director@bose.res.in, mallick@bose.res.in. **URL:** www.bose.res.in.

Scientific Fields of Interest: Physics.

Research and training: Soft condensed matter physics, statistical physics, electronic structure and physics of materials, astrophysics, High-energy and mathematical physics, optics, mesoscopic phenomena & chemical physics. Nano science and technology. Training: Post-B.Sc. integrated Ph.D. Programme (PBIR) for young graduates to train them in frontier areas of physics for Ph.D. Post-M.Sc; Ph.D. programmes in the above areas, all with suitable fellowship; Networking and pooling of intellectual and other resources with local institutes and universities to run the teaching and Ph.D. programmes.

Achievements: 80 papers in reputed referee journals; 50 visits by renowned scientists for special talks and symposia; Summer training programmes for Post-graduate students

Facilities: Computer center: 4+1 mode diskless Beowuff cluster with Gigabit switch, high-end workstation, file server with 5 hot swappable hard disks of 73.5 GB capacity, HP duplex printer, 150 PCs. Library: 1500 books costing USD 90,000; subscription to 60 scientific journals, 35 online facilities and e-library facility. Laboratory: Well-equipped lab on condensed matter physics, optics and electronics. Guest house: high-standard, on campus

Future plans: The Centre is about to embark on a major initiative in Nanoscience & Technology. The idea is to go into all basic science issues of nanoscience comprising of quantum theory; statistical physics and non-linear phenomena. Theory will be complementary to state-of-the-art laboratories in nano-lithography; cryogenics; atoms fore microscopy; scanning tunneling microscopy and optical spectroscopy.

Cooperation with developing countries: 1. Students are admitted as JRF for doing Ph.D. from countries like Bangladesh, Nepal and other SAARC countries. 2. Visiting Associateship with suitable honorarium of Rs. 400/- per day and subsidized boarding and lodging facilities are provided on request from other

developing countries like Egypt, Iran, etc. In future, 5 fellowships for Ph.D. programme are to be given through TWAS.

International Organization: The Center is expected to be the dominant hub in Indo-US and Indo-French cooperative projects in nanoscience and technology.

Saha Institute of Nuclear Physics

Head of Institution: Bikash Sinha.

Address: Sector 1, Block AF, Bidhannagar Kolkata 700 064, India. **Phone:** (+91 33) 2337-0313. **Fax:** (+91 33) 2337-4637. **Email:** bikashsinha@saha.ac.in. **URL:** www.saha.ac.in.

Scientific Fields of Interest: Biological Sciences, Chemistry, Mathematics, Physics.

Research and training: Physics: Nuclear Physics; Theoretical High-energy Physics; Astroparticle Physics; Condensed Matter Physics; Plasma Physics; Atomic and Molecular Physics; General and Mathematical Physics. Surface Physics; Micro-electronics. Chemistry: Radio Chemistry, Radiation Chemistry, Photochemistry. Bioscience: Liposome and membrane biology; radiobiology; biomolecular spectroscopy; macromolecular crystallography; physical biochemistry; Molecular Modeling; Bio-informatics; Structural Genomics; Disease Biology; Proteomics. Training: Pre-Ph.D diploma courses in physics; biophysical sciences, radiological physics.

Achievements: Pioneering contributions to the development of accelerator technology; cyclotron and Cockroft-Walton generator; beta-ray and mass spectrometers; nuclear instrumentation; electron microscope, and NMR spectrometers. Many important contributions, both theoretical and experimental, in a wide variety of fields: Particle Physics; Plasma Physics; Solid-state Physics; Atomic and Molecular Physics; Crystallography; Biophysics and Nuclear Chemistry and of late, materials science, including surfaces and high-temperature plasma; structural genomics initiated in blood disorder; Gene therapy of haemophilia done in B cells.

Facilities: Equipment: Tokamak machine; multi-detector gamma-ray sum spectrometer; Compton suppressed HPGE spectrometer; spectrometers (NMR, Mössbauer, Laser Raman); SQUID magnetometer; X-ray diffractometers; liquid nitrogen and helium plants; secondary ion mass spectrometer; isotope separator; 300 KV ion-accelerator; electron microscope; ultracentrifuge fluorescence spectrophotometer; gas chromatograph; HPLC system; Laser flash photolysis system; Co60 gamma-chamber, HPGe detector and MCA. Computers: Horizon-III and Magnum- Minicomputers (HCL) AT 386 and AT 486 Personal Computers (Olivetti); Library; Xerox; Fax and E-Mail facilities; Workshop. Microwave instrumentation; VHF/UHF communication; nuclear instrumentation. Image plate; DNA sequencer; Tandem mass spectrometer; flow cytometer.

Future plans: Basic research in front-line areas of various branches of theoretical physics; several new areas have been developed for carrying out

extensive experimental work. High-temperature Tokamak plasma; software development with a micro-processor based computer facility; research on atomic, molecular and surface physics with electron and ion-beams; high-temperature superconductivity; fast reaction kinetics; development of protein-single crystals and structural studies of large molecules; nuclear reaction and structure studies with suitably-developed instrumentation.

Cooperation with developing countries: Federation Agreement with ICTP, Trieste, Italy.

International Organization: India-CERN collaboration on ALICE.

Sugarcane Breeding Institute

Head of Institution: Dr. N. Vijayan Nair.

Address: Coimbatore 641 007 Tamil Nadu, India. **Phone:** (+91 422) 247-6261, 247-2986. **Fax:** (+91 422) 247-2923. **Email:** sugaris@vsnl.com. **URL:** <http://sugarcane-breeding.tn.nic.in/>.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences.

Research and training: Research: breeding of superior sugarcane varieties/genotypes having high sugar productivity as well as sustainability; conduct basic and strategic researches; collection, maintenance, evaluation, documentation and conservation of sugarcane/*Saccharum* spp. genetic resources; effecting technology transfer; consultancy and human resource development.

Achievements: Premier institute chiefly responsible for the development of improved sugarcane cultivars to meet the requirements of sugarcane farmers and sugar industry, evolved many cultivars for commercial cultivation besides feeding a large number of new clones to the varietal evaluation programme. The institute is keeping pace with the emerging needs of sugarcane agriculture and the sugar industry of the country besides providing leadership in crop-improvement.

Facilities: The institute has well-equipped sophisticated laboratory equipment for carrying out research and sufficient farm area for conducting field trails; the institute has a regional center and research centers in both tropical and subtropical areas of the country; library is progressing in the direction of functioning fully e-mode by having established information infrastructure, resources and services; has good auditorium, committee room with modern PAS, multimedia facilities; good boarding and lodging facilities (scientists home/VIP guest house) are also available.

Future plans: Broadening genetic base of the breeding population by utilizing unutilized *Saccharum officinarum*; *S. Spontaneum* and other allied genera to obtain genetic advances; development of varieties with high-sugar content for longer crushing period; high-tonnage; and red rot resistance; development of biocontrol based IPM; research on sustainable sugarcane agriculture including utilization; development and uses of biotechnological tools in varietals improvement.

Cooperation with developing countries: Planned exchange of germ-plasm.
International Organization: Exchange of sugarcane germ-plasm with member countries (ISSCT) and with other countries under bilateral programmes.

Tata Institute of Fundamental Research (TIFR)

Head of Institution: Prof. S. Bhattacharya, Director.

Address: Homi Bhabha Road, Mumbai 400 005, India. **Phone:** (+91 22) 2280-4545. **Fax:** (+91 22) 2280-4610. **Email:** shobo@tifr.res.in. **URL:** www.tifr.res.in/.

Scientific Fields of Interest: Biological Sciences, Chemistry, Mathematics, Physics.

Research and training: Mathematics (including algebra; algebraic geometry; differential geometry and topology; Lie groups; dynamical systems); Physics (theoretical and experimental, including particle, condensed matter, statistical, nuclear, astrophysics, astronomy in the X-ray, gamma ray and infrared, cosmic wave bands, high-energy); Molecular-biology; Computer science, speech research.

Achievements: As of 1998, sandpile models of self-organized criticality; metastable multiplying charged molecular ions by means of ion translational energy spectrometer techniques; dark matter in the universe; superconducting mechanisms in bulk and film forms (123 superconducting films using hollow cathode magnetron developed); cosmic sources of ultra-High-energy gamma rays.

Facilities: Pelletron accelerator facility; NMR national facility; image processing facility for astronomy; balloon facility; radio astronomy centre; cosmic ray field stations; gravitation station at Gauribidnur. Workshops; glass shop; electron microscope and X-ray units; laboratory for chemistry involving radioactive materials; Computers; Library; low-temperature facility.

Future plans: Developmental neurobiology, cell biology and cognitive neuroscience, biomolecular electronics, High-energy gamma rays (astronomy), non-accelerator particle physics, Indian Neutrino Observatory, 800Mhz NMR spectrometer, high current injection for pelletron-linac facility.

Cooperation with developing countries: National University of Singapore at Institute of Cell and Molecular-biology; University of Science and Technology of China, Hefei; UN Educational, Scientific and Cultural Organization (UNESCO) sponsored by Molecular and Cellular Biology Network (MCBN) which helps in collaborative arrangements with developing countries; European countries; USA; China; Korea; Taiwan.

International Organization: Rockefeller Foundation and Human Frontier Science Programme, Indo-USA projects on supernoval and collapsed objects, CERN, Fermi National Accelerator Laboratory (Chicago, USA), High-energy Accelerator Research Foundation (KEK) and Wellcome Foundation.

Tata Institute of Fundamental Research (TIFR) — Department of Biological Sciences

Head of Institution: Prof. V. Rodrigues.

Address: Homi Bhabha Road, Mumbai 400 005, India. **Phone:** (+91 22) 2280-4545. **Fax:** (+91 22) 2280-4610/11. **Email:** veronica@tifr.res.in. **URL:** www.tifr.res.in/dbs.

Scientific Fields of Interest: Biological Sciences.

Research and training: Research: Developmental neurobiology and genetics of *Drosophila*. Cellular neurobiology: cell biology of the synapse, influence of stress on the adult mammalian brain. Molecular-biology: molecular mechanisms that repair genetic instabilities, molecular-biology of the malarial parasite.

Achievements: Results published in peer-reviewed scientific journals, please refer to <http://www.tifr.res.in/dbs> for list of publications.

Facilities: Electron microscope; electrophysiology equipment; ultracentrifuges and refrigerated high speed centrifuges; small equipment for molecular-biology: lyophilizers, electrophorators, PCR blocks; gas chromatography and HPLC equipment; oligosynthesis facility; plant and animal tissue-culture facilities; animal house; mechanical workshop and glass workshop; liquid nitrogen and liquid helium facilities; radioactivity labs; transport; housing and canteen facilities; medical facilities; Library; Computers with Internet access.

Future plans: To improve infrastructure for animal experimentation as well as modern biological and cell biological facilities.

Cooperation with developing countries: To enhance cooperation with South Asian and African countries in the form of training programs for students and scientific visits.

International Organization: Collaboration with Tanasek Life Science Laboratory, Singapore.

The Energy and Resources Institute (TERI)

Head of Institution: Dr. R.K. Pachauri.

Address: Habitat Place, Darbari Seth Block, Lodi Road, New Delhi 110 003, India. **Phone:** (+91 11) 2468-2121/22. **Fax:** (+91 11) 2468-2144/45. **Email:** pachauri@teri.res.in, mailbox@teri.res.in. **URL:** www.teriin.org.

Scientific Fields of Interest: Biological Sciences, Environmental Sciences.

Research and training: Energy: Oil; Gas; Chemical; Biomethanation Technology; Hydrogen; Renewable Energy Technology Applications; Rural and Industrial Energy. Environmental Studies: Forestry/Biodiversity; Sustainability Economics; Technology Applications; Modeling and Economic Analysis. Plant-biotechnology; Plant Tissue-culture; Microbial Biotechnology; Mycorrhizal Research. Telecommunications and Information Technology.

Achievements: TEESE least-cost energy optimization model for India; TEAM treatment of organic solid waste; Technology packages for the small-medium industrial sector; Membrane filtration of sugarcane juice; Solar pond, desalination system; bio-mass gasified hybrid power plant; Wind-PV (photovoltaic); PV-diesel; wind battery charger, and wind pump. Mycorrhizal technology; Bio-degradation of crude oil and sludge. Tissue-culture technology; Until February 2001, over 3.5 million tissue-cultured plants of forest species and 4.1 million plants of horticultural species had been dispatched to users.

Facilities: RETREAT (Resource Efficient TERI Retreat for Environmental Awareness and Training) is TERI's vision of building a sustainable habitat; Library with over 17,000 books, reports, journals (680) and conference proceedings; IT networking infrastructure; WAN connectivity; Access to other facilities, including the Micropropagation Technology Park (annual production of 2 million plants) and laboratories. A 35-acres field station for pilot seed experiments. Regional Centres at Bangalore; Guwahati; Goa; Affiliate Centres in North America and Europe.

Future plans: TERI perceives its role in the coming years as among the world's foremost think-tanks and research institutes, comprehensively underlining the most crucial issues of global sustainability, particularly sustainable development principles in government, industry and individual actions.

Cooperation with developing countries: China; Indonesia; Iran; Jordan; Korea; Kuwait; Malaysia; Philippines; Thailand; Kazakhstan; Brazil; South Africa; Bangladesh; Bhutan; Nepal.

International Organization: European Commission; United Nations Development Programme; United Nations and its agencies; World Bank; Asian Development Bank; Swiss Agency for Development and Cooperation, Canadian International Development Agency; U.S. Agency for International Development and many others; Private Foundations including the Ford Foundation; MacArthur Foundation; Rockefeller Foundation; Joyce Mertz-Gilmore Foundation; Sloan Foundation and various international corporate organizations and universities.

University of Hyderabad — School of Chemistry

Head of Institution: Prof. M. Periasamy.

Address: Hyderabad 500 046, India. **Phone:** (+91 40) 2301-0221. **Fax:** (+91 40) 2301-2460. **Email:** deansc2uohyd.ernet.in, mpssc@uohyd.ernet.in. **URL:** www.uohyd.ernet.in.

Scientific Fields of Interest: Biological Sciences, Chemistry, Mathematics, Physics.

Research and training: Research: organic, inorganic, physical and theoretical chemistry; organic-synthesis; reaction mechanism; photochemistry; bio-organic chemistry; physical organic chemistry; organometallics; solid-state chemistry; inorganic chemistry of main group elements; coordination chemistry and bio-inorganic chemistry; applications of quantum chemistry; statistical mechanics

and theoretical and experimental chemical physics. Training: M.Sc and Ph.D. in Chemistry.

Achievements: Published about 525 papers, 2000-2005.

Facilities: As of 2005, the equipment included: Shimadzu electronic spectrophotometer; PE297 IR spectrophotometer; micropolarimeter; Spekol spectrometer; Shimadzu HPLC automatic CHN analyzer; membrane osmometer and differential refractometer; Padd hydrogenerator; Welsbach ozonator; Computers: MicroVAX 3300, Sun Sparc-I workstation; 400MHz NMR; GCMS; HPLC-MS; X-ray CCD facilities.

Future plans: Add research in new materials, especially superconductivity; ferromagnetism; electro-optical activity; supramolecular chemistry; cluster chemistry; bio-inorganic chemistry; density functionals, coupled cluster models for electron correlation, electronic structures of solids; nanochemistry and nanomaterials.

Cooperation with developing countries: Students from Yemen, Iran, Nigeria in M.Sc. and Ph.D. programmes.

International Organization: Although research collaboration exists at level of individual faculty and research groups, no financial assistance is received from abroad.

University of Hyderabad — School of Life Sciences

Head of Institution: Dr. Kota Harinarayana, Vice Chancellor.

Address: Hyderabad 500 1046, India. **Phone:** (+91 40) 2301-0210. **Fax:** (+91 40) 2301-0120. **Email:** deansl@uohyd.ernet.in. **URL:** www.uohyd.ernet.in.

Scientific Fields of Interest: Biological Sciences.

Research and training: Neurochemistry & molecular-biology; plant physiology; plant molecular-biology and plant-biotechnology; animal physiology; reproductive biology and animal biotechnology.

Achievements: 62 publications in scientific journals per year; 11 Ph.Ds degrees awarded per year; 52 MSc. degrees awarded per year; Two refresher courses for lecturers in Life Science subjects per year; 2 national and/or international conferences conducted per year

Facilities: Plant culture facility; growth rooms; animal house; HPLC systems; DNA sequencer; flow cytometer; fluorescence microscopes with image-analysis systems.

Future plans: Major research initiative in neuro-biology and nano-biotechnology; centre for biotechnology, centre for deccan medicinal plants; drug design and delivery.

Cooperation with developing countries: Memorandum of agreement with Taiwan, Malaysia and SAARC countries.

International Organization: Cooperation with has several laboratories in Europe, North America and South America; strong faculty have active collaboration with scientists around the world at individual levels; Funding for

individual cooperation was obtained from Germany, USA, France, Spain, Portugal and IAEA.

Indonesia

Centre for Research and Development of Nuclear Techniques (CRDNT)

Head of Institution: Nurlaila Zainuddin.

Address: Jalan Tamansari 71, Bandung 40132, Jawa Barat, Indonesia. **Phone:** (+62 22) 250-4898. **Fax:** (+62 22) 250-4081. **Email:** lela@batan-bdg.go.id. **URL:** www.batan-bdg.go.id.

Scientific Fields of Interest: Biological Sciences, Physics.

Research and training: Research and development of new radiopharmaceuticals for diagnosis and therapy; environmental analysis using neutron-activation analysis (NAA).

Achievements: Upgraded TRIGA Mark II 2000 kW research reactor; Radio-isotopes and radio-pharmaceuticals for medical use; agriculture; hydrology and industries. Data on particulates distribution patterns using NAA.

Facilities: TRIGA mark II research reactor: NILO for thermodynamic/thermohydraulic studies; Hot-cells and processing boxes for radio-isotopes and labeled compounds development; XRD, XRF, SEM for basic technological research; Mechanical Electrical and Instrumentation Lab; information services - Library.

Future plans: Improve reactor operation and maintenance capability to meet consumer and public demand for nuclear products and nuclear technology services; develop core competence and partnership enhancement to increase autonomy and budget of institutional projects.

International Organization: IAEA - International Atomic Energy Agency; JAERI - Japanese Atomic Energy Research Institute; NMCP - Netherlands management Cooperation Programme; Australian Nuclear Science and Technology Organisation (ANSTO); Australian Agency for International Development (AusAID); Forum for Nuclear Cooperation in Asia (FNCA).

Indonesian Institute of Sciences (LIPI) — Research Centre for Biology

Head of Institution: Dedy Darnaedi.

Address: Jalan Raya Juanda No. 18, P.O. Box 208, Bogor 16002, Indonesia. **Phone:** (+62 251) 321041. **Fax:** (+62 251) 325854. **Email:** dedyd@indo.net.id. **URL:** www.lipi.go.id/.

Scientific Fields of Interest: Biological Sciences, Chemistry.

Research and training: Research including bio-systematics; ecology; physiology; morphogenetic; basic and applied microbiology; parasitology; phytochemistry; ethnobiology; molecular-biology.

Achievements: Papers on zoology; botany; microbiology and biodiversity.

Facilities: Collections; herbarium and zoological specimens; microbial culture collections; equipment; library; database on biodiversity collections. As a national center, it has the best and the biggest collection on herbariums and zoological specimens in Southeast Asia.

Future plans: Modernize laboratory equipment; computerize data; computerize library; develop biodiversity information network; improve buildings and laboratories; attain international standards for biodiversity collections; database of biodiversity collections and network; modern biology research facilities; strengthen international cooperation in the field of biodiversity, conservation and sustainability.

Cooperation with developing countries: ASEAN countries.

International Organization: We have international cooperation agreements in the field of taxonomy and geology with institutions in Asia, Australia, Singapore and USA. Biological inventories for biodiversity have the top priority.

Indonesian Institute of Sciences (LIPI) — Research Centre for Chemistry (RCChem)

Head of Institution: Dr. L. Broto S. Kardono, Director.

Address: LIPI Campus, Jl. Cisit-Sangkuriang, Building n. 50, Bandung 40135, Indonesia. **Phone:** (+62 22) 250-3051. **Fax:** (+62 22) 250-3240. **Email:** rrchem@bdg.centrin.net.id. **URL:** www.kimia-lipi.net.

Scientific Fields of Interest: Chemistry, Engineering, Environmental Sciences.

Research and training: Analytical chemistry and standard: methodology on chemistry, analysis of food additives, hazardous chemical analysis. Natural products chemistry, food and pharmaceuticals: isolation and identification of bioactive compounds from natural products; development of functional foods, preparation and synthesis of pharmaceuticals; drug discovery (antidiabetic, cardiovascular, hepatitis and antibiotics). Process technology and catalysis: development of surface active agent and fatty acid derivatives; high surface area materials developments, solid acid and supported metal catalysts development; catalysis, catalysts testing and characterization; processing and preparation of essential oil derivatives. Environmental technology: user of endogenic microorganism for environmental monitoring; reuse and recycling of waste to produce high added value products; ambient air and stack gas analysis, sampling techniques and equipment.

Achievements: Database of Indonesian plants containing active compounds for medical and pharmaceutical uses; bioactive compounds and molecular hits for antidiabetes, etc.; Indonesian nodal for: Asia Pacific Centre for Technology Transfer on Traditional Medicine and herbal Technology; Asia Pacific Center for Technology Transfer on Biotechnology Information; member of Asia Pacific Metrology programme on Chemistry; Indonesian focal point of Asean sub-committee on food science and technology; surfactant preparation process;

glycerol monostearate; glycerol monooleate; ester sorbitol; the reuse and recycling of spent catalysts; catalyst testing and characterization; formula of frozen dessert based on tempeh (fermented soybean); formula for mixed food for children based on tempeh; technology transfer and commercialization: *Innocula* for tempeh) commercialized, around 200 tons/month); virgin coconut oil production (by fermentation).

Facilities: Analytical instruments: GC, HPLC, TLC scanner, liquid-chromatography-mass spectrometer, GC MS-MS, NMR 500 MHz, AAS, inductively couple plasma, UV/VIS spectrophotometer, PCR, scanning and transmission-electron microscope (SEM/TEM with CEDAX), X-ray diffractometer, liquid scintillation, particle size analyzer, surface area analyzer, biofilter, field analyzer, IC50, incubator BOD, flow cytometer. Development of preclinical testing facilities, pharmacology lab for testing of drugs, herbal medicines and bioactive compounds. Processing facilities: packed bed distillation columns, vacuum distillation unit, wiped film molecular distillation apparatus, steam distillation units, vacuum evaporators, soxhlet extraction apparatus, percolator, rotary drum flaker, supercritical fluid extraction, fermentor/bioreactor (capacity: 20L, 100L, 1500L). Catalytic test unit: high-pressure and high-temperature, liquid gas reaction and hydro cracking process, catalytic test unit: gas-gas reaction. Pilot-plant facilities: production of surfactant from CPO (5 tones), production of candle nut oil (2.5 tons), production of nutmeg oil (1 ton/batch). Computer lab and library; ISO-17026 accredited lab by the National accreditation committee of Indonesia; accredited research lab by the national standard committee for R&D institution of Indonesia; accredited lab for personnel competency testing.

Future plans: Development of gas metrology lab for standard and calibration gases; development of advance material research based on nanotechnology.

Cooperation with developing countries: India: Shriram Industrial Research Institute on Functional food; China: Zhejiang Univ. on drug development from traditional medicine; Philippines, Thailand and Australia: development of food reference material network in the Australasian region, public-sector linkages program for Asia-AusAID; China: Chinese Academy of Medical Sciences (CAMS).

International Organization: Korean Research Institute for Standard and Science (KRISS) on Metrology programme; Univ. of Illinois (USA); Grain Food CRC-Curtin Univ. of Technology (Australia); Macrocare Inc (Korea); Mimura Tropical Bioassociate (Japan); Delf Univ. of Technology (the Netherlands); Institute of Tech. and dbiosystems Engineering, Fed. Agric. Research Center (Germany); Tokyo Institute of Tech. (Japan); ASEAN food science and technology - COST.

Institut Teknologi Bandung — Biotechnology Centre

Head of Institution: Dr. Debby Soefie Retnoningrum.

Address: Gedung Litbang Integrasi & Aplikasi Lt. 2, Jl. Ganesa 10, Bandung 40132, Indonesia. **Phone:** (+62 22) 253-4116, 250-4987. **Fax:** (+62 22) 250-1612. **URL:** www.itb.ac.id/en/.

Scientific Fields of Interest: Biological Sciences, Environmental Sciences.

Research and training: Microbial pathogenesis; environmental biotechnology; enzyme bio-engineering; molecular evolution; biopesticides development; bioprocess engineering and product development.

Achievements: As of 2005, numerous scientific articles published in scientific journals; numerous papers presented in seminars in Indonesia and abroad.

Facilities: Separation and analytical equipment, including chromatographs; spectrometers; UV/VIS; microchemical facilities; including DNA synthesizer; DNA sequencer; peptide synthesizer; peptide sequencer; PRR Machine; Library; Computers.

Future plans: Increase the opportunity for research staff to pursue master and doctoral degree from overseas, expand national and international collaboration and produce products that can substitute imported products, such as enzymes.

Cooperation with developing countries: ASEAN (six countries) Biotechnology Project.

International Organization: IIB (International Institute of Biotechnology), UK; Cooperation with CSIRO, Australia; Master degree with Univ. of New South Wales, Australia; Cooperation with Univ. of Dresden, Germany; Cooperation with RuG, Univ. of Groningen, Netherlands.

Research Institute for Water Resources (RIWR)

Head of Institution: Mrs. Dyah Rahayu Pangesti, Director.

Address: Jl. Lr. H. Juanda 193 Bandung 40135, Indonesia. **Phone:** (+62 22) 250-4053, 250-1544, 250-0507, 250-0183. **Fax:** (+62 22) 250-0163. **Email:** waterx@bdg.centrin.net.id. **URL:** www.pusair-pu.go.id.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences, Environmental Sciences.

Research and training: Hydrology; river engineering; swamp and coastal engineering; irrigation; hydraulic structures; geohydrology; geotechnic.

Achievements: Appropriate technologies: automatic fiber value gates, peat water treatment plant, micro-hydro turbine, volumetric water measurement devices, water-mills, etc. Applied technologies: watertight sheets, estuary dams, sub-surface reservoirs, piled foundation labyrinth weirs, troll weirs, barrages, gravel effector. System: software of maps, equations, methodologist, charts, simulation models. NSGM: Norms, Standards, Guidelines and Manuals.

Facilities: More than 100 PCs with local area network; laboratory apparatuses; field equipment.

Future plans: Pilot Polder System Management; development of Sustainable solution for flooding problem in Semarang city - Nederland (2003-2005) --> Present: Comprehensive study on coastal protection and management for all of Indonesia (JICA Japan) --> planned.

Iran, Islamic Rep.

Childrens Medical Center — Immunology, Asthma and Allergy Research Institute (IAARI)

Head of Institution: Prof. Mostafa Moin, Director.

Address: Children Medical Center, PO Box 14185-863, n. 62 Garib St., Keshavarz Blv., Tehran, Iran, Islamic Republic. **Phone:** (+98 21) 6691-9587. **Fax:** (+98 21) 6642-8995. **Email:** iaari@hbi.ir. **URL:** www.iaari.hbi.ir.

Scientific Fields of Interest: medical Sciences.

Research and training: Main research topics: Primary immunodeficiency disorders: establishing Iranian primary immunodeficiency disorders registry (IPIDR); IVIG therapy; asthma; Food allergy; and Air allergens. Training activities: Professional training for laboratory instruments, devices and new measurement methods for M.Sc, Bask and general practitioners; Asthma & allergy control workshops for nurses and general practitioners; One-day course for immunology, asthma & allergy for medical students every year; Professional training including laboratory methods and tests for fellows of immunology (4 fellows per year); for Bask and M.Sc students (in hematology, immunology and pathology); for Ph.D students (approximately 4 students per year); workshops for Immunology, asthma and allergy education and control for GPs and specialized medical doctors, patients and their families on 'Asthma congresses or Immunology & Allergy congresses' at national level which are held in different regions of Iran, also international level with CME for medical doctors and nurses.

Achievements: Publications: Cooperation in publishing Iranian journal of Allergy, Asthma & Immunology which is indexed in PubMed, etc., Publishing books, booklets and pamphlets for family and patient education about asthma, allergy & immunodeficiency disorders; Abstracts presented as posters or lectures in different national and international congresses; Full-text articles in national and international peer-reviewed journals; Collaboration with other international scientific organizations and institutions in common fields, performing joint research projects with foreign institutions or researchers; Holding national & international congresses and meetings in related fields; Holding scientific workshops for general reactionaries, specialized medical doctors, patients and their families.

Facilities: A central lab; Molecular & atomic-absorption lab; Cell-culture lab; Measurement lab; Animal house; Library; and a Computer lab.

Future plans: Future research priorities in IAARI: Genetic studies training for researchers; Developing epidemiological projects such as an asthma registry project in Iran; Continuation of Iranian Primary Immunodeficiency Diseases Registry activities; Continuation of the project of case registry and epidemiological evaluation of asthma and allergies; Determining geographical distribution of natural plants and allergen pollens in Iran; Evaluating educational

and research methods in different health system levels and the prevention of immunodeficiency diseases and allergy; Assessment of quality of life in patients affected by asthma, allergy or immunodeficiency; Extraction of allergenic substances in plants and foods; Developing new clinical and laboratory methods for diagnosis and treatment of allergic diseases; Developing new clinical and laboratory methods for prenatal and postnatal diagnosis of immunodeficiency diseases; DNA banking of immunodeficient patients; Studying new therapeutic drugs for asthma, allergy and immunodeficiency diseases; Devising new therapeutic strategies such as bone marrow transplantation and immunotherapy for allergic diseases and immunotherapy for immunodeficiency diseases.

Cooperation with developing countries: Planned: Developing connections with Asia Pacific Association of Allergy, Asthma & Clinical Immunology (APAAACI) Australia.

International Organization: Present: The University of Sheffield, UK; Albert-Ludwigs-University, Freiburg, Germany; Department of Laboratory Medicine, Karolinska Huddinge, Sweden. Planned: Developing connections with WHO's Eastern Mediterranean Regional Office as a WHO collaborating center.

Ferdowsi University of Mashhad — College of Agriculture

Head of Institution: Prof. Reza Valizadeh, Director.

Address: P.O. Box 91775-1163 Mashhad Iran, Islamic Republic. **Phone:** (+98 511) 878-8494. **Fax:** (+98 511) 878-7430. **Email:** rvalizadeh@yahoo.com. **URL:** www.um.ac.ir.

Scientific Fields of Interest: Agricultural Sciences.

Research and training: Training at BS level in 9 Departments: Animal Science, Agronomy, Food Science and Technology, Horticulture, Soil Science, Farm machinery, Irrigation Agricultural Economy and Plant Protection; MS level in all Departments plus Biotechnology Department and 16 disciplines; Ph.D level in 4 Departments of Animal Science; Agronomy; Biotechnology and Food Science and Technology in 10 distinctive disciplines; Research is done in all the mentioned topics.

Achievements: More than 300 under-graduate students, 100 M.Sc. and 20 Ph.D. students have graduated from the college every year. Some of our research findings are applied practically by the farmers and the Ministry of Agriculture.

Facilities: Electron microscope; computers; dairy; sheep and poultry farms; field crop stations; glass houses; growth chambers library; typical orchards; botanical gardens; food technology; pilot-plant; Ag. machinery lab lots of labs (>30) in all disciplines.

Future plans: The Post-graduate studies will be developed and new scientific fields established, more emphasis will be extended to extension services.

Cooperation with developing countries: Our intention is toward collaboration with our neighboring countries including, Pakistan, Afghanistan India Iraq, Turkey and central Asian countries.

International Organization: We have established some informal cooperation with other universities such as University of British Columbia, and Research Centers such as ICARDA.

Institute for Advanced Studies in Basic Sciences (IASBS)

Head of Institution: Prof. Yousef Sobouti.

Address: P.O. Box 45195-1159 Zanjan 45195 Iran, Islamic Republic. **Phone:** (+98 241) 415-2257/59, (+98 21) 6641-2703/5412. **Fax:** (+98 241) 424-9023, (+98 21) 6641-4650. **Email:** sobouti@iasbs.ac.ir, iasbs_z@iasbs.ac.ir. **URL:** www.iasbs.ac.ir.

Scientific Fields of Interest: Chemistry, Earth Sciences, Mathematics, Physics.

Research and training: Physics: Condensed matter, mathematical physics, optics, astrophysics, geophysics. Mathematics: Dynamical systems and ODE, finite group theory, computational algebraic geometry, combinatorics. Chemistry: Electrochemistry and chemometrics, organic-synthesis and bio-organic chemistry. Information Technology: Training only at B.Sc. level.

Achievements: During the past 14 years, since the creation of IASBS, 33 faculty members and about 54 students have managed to publish 485 research papers to this date (April 2006), in internationally reputed journals. In 2000, the Ministry of Science, Research and Technology of Iran announced IASBS as a Center of Excellence for education and research in physics.

Facilities: Library: Mainly books and periodicals in Physics, Chemistry, Mathematics and Earth Sciences. Computer facilities and Internet connections. Dormitories, housing for student and faculty, health assistance. Research labs: Optics lab (non-linear optics, interferometry, fiber-optics, spectroscopy); micro manipulation lab; soft matter lab; lidar lab (cloud monitoring, aerosol monitoring, weather station); electrochemistry and bio electrochemistry lab; spectroscopy and chemometrics lab; organic-synthesis lab; biochemistry and biophysics lab; geophysical lab (geophysical data analysis). Educational labs: general physics lab (mechanics lab, heat and thermodynamics lab, electricity and magnetism, general optics); electronics lab, astronomy lab Workshops: electronics, precision mechanical, instrumentation, photography. Conference: Two halls having 100-seat capacity each, with all audiovisual facilities.

Future plans: IASBS has developed a detailed 10-year plan covering education and research. In education, the aim is to increase the number of faculties to 120 and the number of students to 800. In research, efforts will be made to expand activities in such areas as condensed matter physics, optics,

astrophysics, earth sciences, chemistry, mathematics and computer science and ICTs.

Iranian Research Organization for Science & Technology (IROST)

Head of Institution: S. Hamid Fathi.

Address: No. 71, Shahid Musavi Ex-Forsat St. P.O.Box: 15815-3538 Tehran, Iran, Islamic Republic. **Phone:** (+98 21) 882-8251-7, (+98 21) 882-5099. **Fax:** (+98 21) 882-8341. **Email:** intlscico@irost.org. **URL:** www.irost.com/.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences, Chemistry, Environmental Sciences.

Research and training: Setting up a link between science, research and technology transfer to industry in fields of Metallurgy, Agriculture, Chemistry, Biotechnology, Medical Engineering, Electronics, Computer Science.

Achievements: Production of malaria-controlling bacillus; production gelatin (Halal); pharmaceutical and biofertilizer production; hemodialysis systems; modulating monitoring system; electrocardiograph device.

Facilities: Pilot-plants, laboratories, instrumentation (HPLC GCO). National Laboratory for Technology Development, Digital Library.

Future plans: Expand IT center to provide facilities to neighboring countries; post-doctoral for national, regional, and international benefits; training and education of scholars within the developing countries; expansion in environmental protection, application of biotechnology, nanotechnology, micro-electronics.

Cooperation with developing countries: India, Pakistan, Korea, Thailand, South Africa, Middle-eastern countries, Middle-Asia countries.

International Organization: UNESCO, WIPO, OIC, APCTT, UNDP, COMSTECH, ESCAP, COMSATS.

Kerman University — Faculty of Mathematics and Computer Science

Head of Institution: M. Fadaei.

Address: PO Box 76169-133 Kerman, Iran, Islamic Republic. **Phone:** (+98 341) 3221-078/80. **Fax:** (+98 341) 3221-080. **Email:** mathdept@msil.uk.ac.ir, mr_faidaii@mail.uk.ac.ir. **URL:** www.uk.ac.ir/eng/main/collage/mat/mat.htm.

Scientific Fields of Interest: Mathematics.

Research and training: All branches of mathematics, statistics and computer science, among which include: Fuzzy Mathematics and applications; Analysis: operators and control; Geometry: super-spaces and twistors; Statistics: numerical analysis.

Achievements: As of 2003, published about 200 papers in local and international journals as well as several books.

Facilities: 200 Workstations; library; Internet access; computer labs; statistical labs.

Future plans: Promotion of research activities at a satellite research center called 'Mahani Mathematical research Center'.

National Research Center for Genetic Engineering & Biotechnology (NRCGEB)

Head of Institution: Dr. Mohammad H. Sanati, Director.

Address: Pazhouhesh Blvd. 17th Km of Tehran-Karaj Highway Tehran Iran, Islamic Republic. **Phone:** (+98 21) 458-0396. **Fax:** (+98 21) 458-0399. **Email:** m-sanati@nrcgeb.ac.ir. **URL:** www.nrcgeb.ac.ir/.

Scientific Fields of Interest: Biological Sciences.

Research and training: Molecular characterization and diagnosis of human genetic diseases and cancers, bioproduction of recombinant human growth hormone and GM-CSF, polyclonal and monoclonal antibody production; research in plant-biotechnology, development of virus resistant transgenic plants, herbicide resistant salt-tolerant plants, Fusarium resistance, molecular analysis of phosphate and phosphate starvation inducible genes in plants, expression of biopeptides in plants; molecular basis and characterization of animal viruses, biodesulfurization of petroleum, bio-informatics.

Achievements: Semi-industrial production of recombinant human growth hormone; developed animal disease diagnostic kits, DNA extraction kits, transformation technology for local cutovers of agronomically important crops, transgenic plant lines resistant to biological and non-biological stress, GnRH production for fishes; scientific articles published in international journals.

Facilities: Specialized laboratories for molecular-biology, tissue-culture facilities, ultracentrifuges with rotors, spectrophotometers, microscopes, HPLC, PCR machines, freeze dryer, gel scanning system, DNA synthesizer, manual and automated DNA sequencers protein sequencer, chromatograph systems, incubators, radioisotope facilities, photographic facilities, cold room, warm room, freezers (-20 to -80 Celsius), plant growth chambers, green house, animal house, pilot-plant for human growth hormone with fermentors; Internet and computer facilities; library, seminar room, conference room and genetic consultation clinic; Particle Gun delivery system, real-time PCR, microarray system.

Future plans: NRCGEB has recently shifted to a new campus on a 15 hectare site; the 60,000 sq. m. facilities will allow the center to provide expanded capabilities for research and education, providing Ph.D. programs in molecular genetics, increase research staff and establish links with other international research centers.

Cooperation with developing countries: Center for Cellular and Molecular-biology, Hyderabad, India (collaboration on restoring the generation of Asian Cheetahs existing in Iran); COMSATS, Pakistan (collaboration on promotion of biotechnology in COMSATS member countries); University of Punjab, Pakistan (collaboration on molecular diagnosis of human genetic diseases); Dept. of S&T, India (cooperation in the field of biotechnology).

International Organization: Collaboration with Egyptian scientists on date palm transformation financed by the ICGEB.

Power and Water University of Technology (PWUT)

Head of Institution: Dr. S. Ghorban Beigi.

Address: PO Box 16765-1719 Tehran, Iran, Islamic Republic. **Phone:** (+98 21) 7731-2782. **Fax:** (+98 21) 7731-0426. **Email:** info@pwut.ac.ir. **URL:** www.pwut.ac..

Scientific Fields of Interest: Engineering, Environmental Sciences.

Research and training: Water industries; water and waste-water industries; electrical industries; electronics and instrumentation; management; design, operation and maintenance of power plants. The short training courses are giving at technician and engineering levels in Farsi and/or English (upon request). Course content is considered in such way as to cover technical information and experiences, which are required as the real qualification for industrial jobs. The university offers B.Sc, M.Sc. and Ph.D. degree programs in both Farsi and English. The university has 4 faculties and 15 departments among which: Dept. of control and computer engineering; transmission and distribution engineering; generation engineering; economy; management; accounting; seminary; water resource engineering; hydraulic installation engineering; water and waste-water engineering; environment engineering. The university has 120 staff members.

Achievements: Promotion of high-level professional and performance for trainees of various backgrounds from different regional electric companies, water companies and water and water waste companies.

Facilities: Technical equipment for research in power and water fields; more than 300 PCs available for academic staff and students; a central library with about 30,000 books; 110 labs and workshops.

Cooperation with developing countries: Afghanistan, Iraq, Syria.

International Organization: International short courses in collaboration with UNESCO, Siemens, Kema B.V., IHE (The Netherlands), ABB (Germany), etc.

Sharif University of Technology — Department of Mathematical Sciences

Head of Institution: Mohammad Mahdavi-Hezavehi.

Address: P.O. Box 11365-9415 Tehran, Iran, Islamic Republic. **Phone:** (+98 21) 600-5217. **Fax:** (+98 21) 600-5117. **Email:** mahdavih@sharif.edu. **URL:** <http://mathsci.sharif.ac.ir/>.

Scientific Fields of Interest: Mathematics.

Research and training: Analysis; algebra; geometry; number theory; combinatorics; graph theory; differential equations; numerical computing; optimization; theoretical computer science; logic.

Achievements: Over 30 scientific papers in scientific journals are usually published by the faculty every year.

Facilities: Advanced research laboratories in Geometric Modeling and Design; Scientific Computing; Discrete Mathematics and Combinatorics; Dynamical Systems; Computer laboratories for under-graduate and graduate students.

Future plans: To offer under-graduate and graduate-programmes in Computer Science.

Cooperation with developing countries: Sultan Qabus University in Oman.

International Organization: Individual scholars with the University of Bergamo (Italy), Dalian University of Technology (China), York University (Canada), McMaster University (Canada), University of Calgary (Canada).

Shiraz University — Department of Chemistry

Head of Institution: Dr. Mohammad H. Ghatee, Chairman.

Address: Shiraz 71454 Iran, Islamic Republic. **Phone:** (+98 711) 2284-4822. **Fax:** (+98 711) 228-6008. **Email:** ghatee@sun01.susc.ir. **URL:** <http://research.shirazu.ac.ir/Eindex.html>.

Scientific Fields of Interest: Chemistry.

Research and training: Analytical chemistry: environmental analysis, trace analysis, spectroscopy, electrochemistry, chemometrics, sensors, optodes. Organic chemistry: synthesis, catalysis, methodology. Inorganic chemistry: synthesis, properties, catalysis. Physical chemistry: thermodynamic, condensed matter, statistical mechanics of liquids, chemical kinetics, transport properties, quantum chemistry. Polymer: heat resistance polymers, synthesis of polymer reagents, catalysis. A research activity in agreement with the Ministry of Higher-education as the center is excellent for chemical research.

Achievements: Publication of results in peer-reviewed, well-established international journals. As the number of publications and their versatility are concerned, the department is the first in the nation.

Facilities: Mass spectrometer, NMR (250 MHz), ICP, AA, FTIR, UV-Vis, XRD (in physics), liquid nitrogen refrigerator, electroanalyzer, plenty of computers, library.

Future plans: A building is under construction (18000 sq. m.). After moving to this building, the institute plans to accept post-docs from the south and extend international relations with these institutions.

Cooperation with developing countries: Agreement with Qatar University for development of joint research.

International Organization: Agreement for cooperation and developing joint project in environment analysis with University Royal Holloway, England.

Tarbiat Modares University (TMU) — School of Medical Sciences

Head of Institution: Dr. M. J. Rasaei.

Address: P.O. Box 14155-4838 Tehran, Iran, Islamic Republic. **Phone:** (+98 21) 801-3030. **Fax:** (+98 21) 800-3030. **Email:** Rasaei_m@modares.ac.ir. **URL:** www.modares.ac.ir.

Scientific Fields of Interest: Biological Sciences.

Research and training: Antibody engineering; recombinant technology; hybridoma technology; control detection, viral and bacterial infections; vaccine research; cancer detection, treatment.

Achievements: Publishing about 60 international papers annually; attending many national and international meetings.

Facilities: 200 computers; 10 culture rooms along with all equipment required; microinjection and 2 sets with related equipment; PCR and all related equipments for molecular-biology 10 set; ELISA, animal house.

Future plans: Plans to work more on cancer detection and drug targeting. Extend activity of work in molecular detection; Publishing 100 international papers by the year 2007.

Cooperation with developing countries: Agreements with South Africa, Syria and Afghanistan, but none are very active.

Tehran University of Medical Sciences — Faculty of Pharmacy

Head of Institution: A. Shafiei.

Address: P.O. Box 14155/6451 16 Azar Street Enghelab Ave. Tehran, Iran, Islamic Republic. **Phone:** (+98 21) 6640-6757. **Fax:** (+98 21) 6646-1178. **Email:** ashafiei@ams.ac.ir. **URL:** www.ams.ac.ir.

Scientific Fields of Interest: medical Sciences.

Research and training: Development of new, effective and safe drugs, and study of their physicochemical and biological effects; development of new systems of drug administration, in particular nanotechnology; improvement of quality of pharmaceutical raw materials and products (natural and synthetic) and modern techniques of their analysis in pharmaceutical and biological products; paying attention to biotechnology, medicinal herbs, and traditional and additional medicine; industrial production of pharmaceutical raw materials with collaboration of pharmaceutical industries; improvement of pharmaceutical monitoring and rational drug prescription and consumption; training research staff in pharmaceutical sciences, and encouraging and employing the researchers; cooperating with other domestic and foreign research and executive centers; offering scientific, technical and consultation services to academic and research institutes and pharmaceutical, sanitary and food industries, inline with the faculty's objectives, and helping to solve the problems of industries in relation to analysis of pharmaceutical and natural products, synthesis of required products, control methods, bioequivalency and bio-availability, and experimental and clinical pharmacology and toxicology.

Achievements: Production of more than 200 peer-reviewed papers during 2.5 year activity; first ranked research faculty among all university faculties in 2004; reaching to industrial production of 15 pharmaceuticals including synthetic products: parabens, codein phosphate, nifedipine, naloxone, morphine sulfate; natural herbal products: VitaGnus (Agnus castus), persica (Salvadora persica), Urtan (Urtica dioica), Hypiran (Hypericum perforatum), Carmint (mixture of Menhta, Messiab and Coriander), menthol (mentha pipperatia); biotechnological products: Alpha interferon, GCSF, Eritropoietin, PEG-interferon.

Facilities: 45 Laboratories; 6 pilot-plants; 3 conference/training facilities.

Future plans: The activities of the faculty are aimed at meeting the pharmaceutical requirement, both at home and abroad, in such aspects as innovation, production and transfer of technological know-how and at promoting the community health by supporting the applied researchers and providing the research institutes, pharmaceutical, sanitary and food industries with scientific services.

Cooperation with developing countries: India, Thailand and China.

International Organization: Universities in Canada (Alberta, BC), Spain, France, UK and USA

Tehran University of Medical Sciences (TUMS) — Pharmaceutical Sciences Research Center (PSRC)

Head of Institution: Prof. Abbas Shafiee.

Address: 16 Azar Street Enghelab Ave. Tehran, Iran, Islamic Republic. **Phone:** (+98 21) 6695-9104. **Fax:** (+98 21) 6695-9104. **Email:** ashafiee@ams.ac.ir.

URL: <http://psrc.tums.ac.ir>.

Scientific Fields of Interest: Biological Sciences.

Research and training: Development of new, effective and safe drugs, and study of their physicochemical and biological effects; development of new systems of drug administration, in particular nanotechnology; improvement of quality of pharmaceutical raw materials and products (natural and synthetic) and modern techniques of their analysis in pharmaceutical and biological products; paying attention to biotechnology, medicinal herbs, and traditional and additional medicine; industrial production of pharmaceutical raw materials with collaboration of pharmaceutical industries; improvement of pharmaceutical monitoring and rational drug prescription and consumption; training research staff in pharmaceutical sciences, and encouraging and employing the researchers; cooperating with other domestic and foreign research and executive centers; offering scientific, technical and consultation services to academic and research institutes and pharmaceutical, sanitary and food industries, in line with the PSRC's objectives, and helping to solve the problems of industries in relation to analysis of pharmaceutical and natural products, synthesis of required products, control methods, bioequivalency and bio-availability, and experimental and clinical pharmacology and toxicology.

Achievements: Production of more than 120 peer-reviewed papers during 2.5 year activity; first ranked research center nationwide; first-ranked research center among 35 country-wide independent centers in 2004; first-ranked research center in the 11th Razi Festival on medical sciences in 2005; reaching to industrial production of 15 pharmaceuticals including synthetic products: parabens, codein phosphate, nifedipine, naloxone, morphine sulfate; natural herbal products: VitaGnus (*Agnus castus*), persica (*Salvadora persica*), Urtan (*Urtica dioica*), Hypiran (*Hypericum perforatum*), Carmint (mixture of Menhta, Messiab and Coriander), menthol (*mentha pipperatia*); biotechnological products: Alpha interferon, GCSF, Eritropoietin, PEG-interferon.

Facilities: 30 Laboratories; 40 workshops; 6 pilot-plants; 3 conference/training facilities.

Future plans: The activities of the PSRC are aimed at meeting the pharmaceutical requirement, both at home and abroad, in such aspects as innovation, production and transfer of technological know-how and at promoting the community health by supporting the applied researchers and providing the research institutes, pharmaceutical, sanitary and food industries with scientific services.

Cooperation with developing countries: India, Thailand and China.

International Organization: Universities in Spain and USA.

University of Tehran — Institute of Biochemistry and Biophysics (IBB)

Head of Institution: A. A. Moosavi-Movahedi, Director.

Address: P.O. Box 13145-1365 Tehran Iran, Islamic Republic. **Phone:** (+98 21) 640-9517. **Fax:** (+98 21) 640-4680. **Email:** moosavi@ibb.ut.ac.ir. **URL:** www.ibb.ut.ac.ir.

Scientific Fields of Interest: Biological Sciences, Chemistry.

Research and training: Protein denaturation; Enzyme immobilization; Protein purification; Plant biochemistry; Genetic engineering; Biosensors; Cell-cultures; Electrophysiology; Behavioral physiology; Industrial enzymology; Membrane biochemistry/biophysics; Nutritional sciences.

Achievements: M.Sc. and Ph.D. programmes; Publications; Textbooks; Training for research.

Facilities: Tissue-culture rooms; Electron microscope; Various spectrophotometers; Micro-calorimetry; HPLC; GC; Various ultracentrifuges; Set ups for electrophysiological recording of neural activities; Scintillation counter; Analytic equipment; Spectrophotometer UV-Vis; Infra Red (IR); Freeze Dryer; Circular Dichroism Spectrometer (CD); Concentrator; Electrophoretic equipment; Computer network; Library.

Future plans: Scholarships for foreign students and more extension for foreign students, post-doc students, increase cooperation with scientists from the North and South.

Cooperation with developing countries: Active collaboration with countries such as Pakistan, Nigeria, India, China and Taiwan.

International Organization: England, USA, Italy, Switzerland, Japan and Canada.

Jamaica, W.I.

University of the West Indies (UWI) — Biotechnology Center

Head of Institution: M.H. Ahmad.

Address: Mona Campus Kingston, 7 Jamaica, West Indies. **Phone:** (+876) 977-1828. **Fax:** (+876) 977-3331. **Email:** karen.levy@uwimona.edu.jm, sylvia.mitchell@uwimona.edu.jm. **URL:** www.uwimona.edu.jm/.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences.

Research and training: Research: Agricultural and plant-biotechnology: Neem (*Azadirachta indica*) and other medicinal plants such as Yam (*Dioscorea* sp.), Cowpeas (*Vigna unguiculata*) Beans (*Phaseolus vulgaris*), Tomato (*L. esculentum*), and Papaya (*Carica papaya*). Training: Under-graduate and Post-graduate courses in Biotechnology, Biochemistry and Molecular-biology. Regional and local training through workshops, symposia and lectures.

Achievements: Establishment of medicinal plant germplasm collection; Tissue-cultured Neem plantlets; Identification of Azadirachtin in Neem oil by HPLC; New micropropagation method established for rapid multiplication of Yam plantlets (*Dioscorea* sp.); Field trials of first transgenic plant in Jamaica - the Solo - Papaya - successfully accomplished. Identification and characterization of tomato yellow leaf curl virus in Jamaica. CD Book: A compilation of Caribbean Medicinal Plants by Morrison, Mitchell, Lowe.

Facilities: Library; computers; gel documentation system; ELISA reader; laminar flows; DNA sequencer; microscopes; spectrophotometers; vertical and horizontal gel stem; autoclaves; ultracentrifuges; power supplies; PCR; cold room; pulverizer; -70 degrees Celsius refrigerator.

Future plans: Centre will seek to excel in molecular-biology and plant-biotechnology with special emphasis on such export crops as yams and sweet potatoes. Plans to develop programmes in environmental biotechnology focusing on biodegradation and recycling of industrial and agricultural waste. To disseminate biotechnology education and training through R&D, under-graduate and Post-graduate teaching and supervision. Enhance the international level of collaboration with more emphasis on South-South linkage.

Cooperation with developing countries: Nigeria: IITA, Ibadan. Benin University, Benin City. India: JNU Delhi and PAU Ludhiana, Punjab. Pakistan: University of Karachi. UNAM, Mexico, Department of Agriculture.

International Organization: NY State Agricultural Experimental Station, Cornell University, USA. Faculty of Agriculture, Hebrew University of Jerusalem. Biozentrum, Frankfurt University, Germany. Wye College, University of London, UK. Dept. of Agriculture, Chicago State University. European Development Foundation, Virology Dept., John Innes Research Centre, Norwich (UK).

University of the West Indies (UWI) — International Centre for Environmental and Nuclear Sciences (ICENS)

Head of Institution: Gerald C. Lalor.

Address: Mona, Kingston 7 Jamaica, West Indies. **Phone:** (+876) 927-1777.

Fax: (+876) 977-0768. **Email:** gerald.lalor@uwimona.edu.jm, icens@uwimona.edu.jm. **URL:** www.uwimona.edu.jm/.

Scientific Fields of Interest: Agricultural Sciences, Earth Sciences, Environmental Sciences.

Research and training: Environmental geochemistry with emphasis on agriculture, health and nutrition and environmental monitoring. Computer-readable regional geochemical databases, for use with image-analysis systems. The Centre operates an excellent geographical information system based on the US Army's Geographical Resources and Assessment Programme (GRASS).

Achievements: (1. Development of: (a) appropriate and analytical methodologies for multi-element geochemical studies in Jamaica; (b) computer-readable geochemical databases with geographically referenced data for soils, sediments, water, air particulates, food and human tissues including the concentrations of 40 elements and gamma radiation levels; (c) methods of lowering detection limits in neutron activation analysis. (2. Identification, definition and amelioration of environmental lead hazards. (3. Determination of heavy metals in soils and foods for policy-makers in land-use planning and agricultural practices.

Facilities: 1. Excellent analytical facilities including a SLOWPOKE 2 nuclear reactor, energy dispersive and total reflection X-ray fluorescence spectrometers, AAS, etc. 2. Powerful computer equipment and software with access to a super computer. 3. Specialized sample preparation equipment. 4. Geographic Information Systems (GIS).

Future plans: Investigation of: (1. Elemental relationships for soil-plant-food-animal systems. (2. Health effects of heavy metals in Jamaican soils and foods; (3. Environmental lead pollution and mitigation.

Cooperation with developing countries: Cooperation exists with Mexico, Argentina, Brazil, Cuba and Colombia.

International Organization: British Geological Surveys, SLOWPOKE Centres in Canada and Clemson University. Numerous international collaborations.

Jordan

Ministry of Water & Irrigation — Water Authority of Jordan (WAJ)

Head of Institution: Eng. Basemzaal Al Zawaideh, Dir of Training and Dev. Unit.

Address: P.O. Box 2412, Amman 11183, Jordan. **Phone:** (+962 6) 568-0100, xt. 1330, 568-0870. **Fax:** (+962 6) 567-9143, 566-5871. **Email:** basem_zawaideh@mwi.gov.jo. **URL:** www.waj.gov.jo/English/index.htm.

Scientific Fields of Interest: Engineering.

Research and training: Act as major training center related to water and waste-water issue in Jordan and the region.

Achievements: Raising the technical capacity to benefit the water bodies in the countries in the region.

Facilities: training center of 4 rooms; 50 computers.

Cooperation with developing countries: Agreements made with Palestine, Iraq and Yemen.

International Organization: JICA, USAID, GTZ.

National Center for Agricultural Research and Technology Transfer (NCARTT)

Head of Institution: A.Fardous.

Address: Ministry of Agriculture P.O. Box 639 Baqa'a 19381, Amman, Jordan. **Phone:** (+962 6) 472-6680, 472-5411. **Fax:** (+962 6) 472-6099. **Email:** director@ncartt.gov.jo. **URL:** www.ncartt.gov.jo/.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences, Environmental Sciences.

Research and training: Fertigation and soil-less cultivation; agro-biodiversity; integrated pest management (IPM); promotion of herbal and medicinal plants; animal feed; improve olive production; management and use of conventional and non-conventional water.

Achievements: Improve the concept of fertigation, IPM and irrigation management information system; produce certified varieties of different crops; improve different farming systems; improve nutrition & breeding of small ruminant livestock; conservation of medicinal and herbal plants; ex-situ conservation of local and wild relatives of cereals, legumes, forages, etc.; gene-bank storage (4000 accessions); equipped biotechnology lab

Facilities: Equipped laboratories; 12 research stations; National Agriculture library; computer-lab, Internet facility.

Future plans: Five-year plan was started in 2000 to conduct projects dealing with improving water and fertilizer consumption, IPM, biodiversity concepts, olive production and animal feed.

Cooperation with developing countries: Syria: Agro-biodiversity, fertigation, improving corn and sorghum; Palestine: Agro-biodiversity and genetic resource exchange; Lebanon: Agro-biodiversity, fertigation; Egypt: Training on irrigation management information system.

International Organization: GEF, GTZ, World Bank, ICRDA, and Montreal Fund.

Royal Scientific Society (RSS)

Head of Institution: Prof. Sa'ad Hijazi, President.

Address: P.O. Box 1438 Al-Jubaiha 11941, Jordan. **Phone:** (+962 6) 534-4701. **Fax:** (+962 6) 534-4806. **Email:** hijazi@rss.gov.jo. **URL:** www.rss.gov.jo.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences, Chemistry, Engineering, Environmental Sciences.

Research and training: Research and Training activities are carried out in the following centers; Environment Research Centre; Building research center; Information Technology Center; Mechanical Design and Technology Center; Electronic services and training center; Industrial chemistry center; Socio-economic studies. Training activities: RSS offers highly-specialized training in the above-mentioned areas; RSS is designated by Japan International Cooperation Agency (JICA) as a regional Center of Excellence for training in IT and electronic and biomedical engineering.

Achievements: Environment-friendly and useful, energy-saving, sustainable and useful practices have been introduced at the practical as well as pedagogic levels by the various centers, namely the Environmental Research Center; Building research center; Information Technology Center; Mechanical design ante Technology center; Electronic services and Training Center; and the Industrial Chemistry center as well as a series of socio-economic studies of relevance to Jordan.

Facilities: Specialized library. Information Technology Center: excellent IT infrastructure; adequate access to Internet; sophisticated IT labs with one video conferencing room. RSS carries out its activities through 38 labs and technical units, some of which have earned national and/or international accreditation.

Future plans: Environmental Research Center: utilization of IT and CT in environmental management; expand scope of international accreditation to cover all test and measurements conducted by ERC labs. Building Research Center: establishment of a virtual center for the conservation and rehabilitation of cultural heritage buildings and for earthquake engineering. Industrial Chemistry Center: international accreditation of labs; upgrading of technical facilities; become a partner in EC project in various fields. Information Technology Center: more emphasis on IT and E-commerce in Jordan. Electronic Services and training Center: widening ESTC services to become the

national calibration lab through new calibration testing and quality control equipment; in addition to establishing the national verification labs. Mechanical Design and Technology Center: establishing a packing design and testing center; expand scope of international accreditation to cover all labs; expand the corrosion engineering lab; planned cooperation with UAE in various fields of interest.

Cooperation with developing countries: RSS cooperates with many organizations within and outside Jordan, one sixth of all new projects involved international partners. A good number of experts and researchers mostly coming from Japan work jointly with their RSS counterparts. Environmental Research Center: training for employees from the Gulf countries in many aspects regarding environmental issues; cooperation with Egypt companies in conducting environmental impact assessments; extending our services in consultations and training to cover a wide range of developing countries. Building Research center: planned cooperation with Algeria and Morocco in the field of cultural heritage building restoration through an EU funded project; planned cooperation with Pakistan in the field of construction materials (use of natural fibers); planned cooperation with Turkey and Iran in the field of earthquake engineering; existing cooperation with Syria in the field of preservation of archaeological sites; planned cooperation with Iraq in the field of preservation of archaeological sites of training. Industrial Chemistry Center: World Association of Industrial and Technological Research Organization (WAITRO), Denmark; JICA, Japan. Electronics Services and training Center: Palestinian Standards and metrology institute; Palestinian biomedical sector. Mechanical Design and technology center: IAEA - proficiency tests, technical cooperation projects and certification of NDT personnel; SAEC - training courses and calibration of radiation survey and equipment; National center for NDT - training course in NDT; West-East consultancy Company, Dubai (UAE).

International Organization: RSS is connected with agreements and protocols with 61 regional and international S&T organizations; RSS is a member in 10 Arab, international and UN organizations.

The Hashemite University

Head of Institution: Omar Shdeifat.

Address: P.O. Box 330127, Zarqa 13133, Jordan. **Phone:** (+962) 5390-3333.

Fax: (+962) 5382-6612/13. **Email:** huniv@hu.edu.jo. **URL:** www.hu.edu.jo.

Scientific Fields of Interest: Biological Sciences, Chemistry, Earth Sciences, Environmental Sciences, Mathematics, Physics.

Research and training: Research in basic sciences, research in all disciplines of engineering and technology, education, medical sciences, environmental sciences, economics, business administration.

Achievements: In 2003, about 200 papers were published by the university staff members. Significant proportion of these is in reputable international journals. In addition, few patents were registered.

Facilities: Computers, Internet service, Library with various services, Technical equipments for different purposes, Field stations, Technical labs, Research Centers, Sport Utilities.

Future plans: The Hashemite University is in the process of establishing a college of medicine in the very near future. The proposal for this has been submitted to the Ministry of Higher-education and an agreement with the Royal Medical Service has been signed to share with HU the teaching and training of medical students.

Cooperation with developing countries: Agreements with different universities, projects, joint research.

International Organization: International cooperation with different international organizations, institutions and universities for joint scientific research and projects; Agreements with different universities (USA, UK, Canada) for academic purposes.

University of Jordan — Water and Environment Research and Study Center (WERSC)

Head of Institution: Manar Fayyad.

Address: Queen Rania Street, Amman, Jordan. **Phone:** (+962 6) 535-5000 ext. 2332. **Fax:** (+962 6) 535-5560. **Email:** water1@ju.edu.jo. **URL:** www.ju.edu.jo/wersc.

Scientific Fields of Interest: Environmental Sciences.

Research and training: The center directs its activities to water conservation in arid areas, water hydrology, Water-quality, waste-water treatment and re-use, irrigation management, and water harvesting and artificial recharge.

Achievements: Publishing of a Bulletin including: Manual for Water-quality analysis, 1990; Precipitation Water-quality in Jordan, 1991; Irrigation Water-quality guidelines, 1994; Minimizing environmental problems with use of treated waste-water for irrigation in Jordan - phase I, 1994; Water budget and hydrology of the Azraq basin, 1996; Quality of irrigation water in the middle Jordan Valley, 1996; Crop water requirements in Jordan, 1999; Jordan's experience in treated waste-water re-use in irrigation, 1998; scientific publications in specialized journals 2000, 2001, 2002, 2003, 2004.

Facilities: Well-equipped water and environmental labs with scientific equipment for physical, chemical and biological analysis, as well as on-site measurement of water discharge, salinity of water and soil, water hardness and other parameters. Computer facilities. Library containing scientific journals related to water and environment and at the same time is served by the main University library.

Future plans: To grant degrees in graduate studies and become a regional training center in the area of water and environment. To obtain certification for its labs.

Cooperation with developing countries: Egypt, Palestine, Lebanon, Syria, Turkey.

International Organization: Wageningen University, Netherlands; National University of Ireland, Institute of hydraulics, hydrology and water-resources Management; University of Catania, Italy; water development department, Cyprus; Purdue University and Washington State University, USA; Montpellier, BRGM Institute, France.

Yarmouk University — Center for Theoretical and Applied Physics (CTAPS)

Head of Institution: Nabil Laham.

Address: 211-63 Irbid, Jordan. **Phone:** (+962 2) 721-1111. **Fax:** (+962 2) 721-1117. **Email:** ctaps@yu.edu.jo. **URL:** <http://ctaps.yu.edu.jo>.

Scientific Fields of Interest: Physics.

Research and training: Magnetism; Nuclear techniques; Plasma Physics; Condensed Matter Physics; Computational Physics.

Achievements: 15 research papers a year; proceedings of the conferences that we organize regularly.

Facilities: Computational Physics Lab; Material Science Labs; Magnetism Lab; Mossbauer Lab; X-ray Diffraction lab

Future plans: To develop existing Labs: To seek financial support to appoint more researchers in the center.

Cooperation with developing countries: We support scientific visits to the center from neighboring countries and organize several conferences a year.

International Organization: With the Abdus Salam ICTP.

Kenya

International Livestock Research Institute (ILRI), Kenya

Head of Institution: Carlos Sere, DG.

Address: P.O. Box 30709, Nairobi, Kenya. **Phone:** (+254 20) 422-3000. **Fax:** (+254 20) 422-3001. **Email:** t.muindi@cgiar.org. **URL:** www.cgiar.org/ilri.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences.

Research and training: Biochemistry, cell biology, electron microscopy, epidemiology, immunology, molecular-biology, pathology, parasitology and socio-economics of animal disease control; training of staff from national organizations for research on theileriosis, trypanosomiasis and other veterinary problems.

Achievements: As of 1998, improved accuracy of diagnostic and epidemiological work; identification of parasites in tissues of infected livestock and salivary glands of infected ticks; vaccines to protect livestock from trypanosomiasis and East-Coast fever.

Facilities: Research campus on 70 hectare site at Kabete (Nairobi) and ranch with breeding herd of Boran cattle; electron microscopy; radioisotope and irradiation units; breeding units for animals; tsetse flies and ticks; biostatistics; training; graphic arts; photography and publications; administrative offices, conference rooms, and library.

Cooperation with developing countries: Memorandum of agreement with Sokoine University, Tanzania. — ILRI-Kenya, formerly the International Laboratory for Research on Animal Diseases (ILRAD), merged with the former International Livestock Centre for Africa (ILCA) in Ethiopia to become ILRI; the Kenyan site is the headquarters.

International Plant Genetic Resources Institute (IPGRI)

Head of Institution: Dr. Kwesi Atta-Krah, Regional Director.

Address: Sub-Saharan Africa Group, c/o ICRAF, P.O. Box 30677, Nairobi, Kenya. **Phone:** (+254 20) 524-500. **Fax:** (+254 20) 524-501. **Email:** ipgri-kenya@cgiar.org. **URL:** www.ipgri.cgiar.org.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences, Environmental Sciences.

Research and training: National programme development through institution building in Plant Genetic Resource (PGR); supporting and building the capacity of regional PGR networks; research and methodology development for the conservation and use of PGR; forest genetic resources; genetic resources policy and legislation; capacity-building and institutional strengthening of universities and other educational institutions in pgr; supporting the

development of document and information management systems on pgr to improve their use and also decision-making.

Achievements: In-situ conservation research and development with farmers and stakeholders; community level processes such as seed diversity fairs, farmer field fora and community gene-banks as alternatives to formal seed supply systems; collaborative work with partners on neglected and under-utilized crops such as leafy vegetables, neglected grain legumes, cucurbits and forest genetic resources; linking genetic resources to nutrition and health.

Facilities: Library

Future plans: Partnerships and joint programme on agricultural biodiversity to facilitate interdisciplinary approaches needed to develop agricultural biodiversity at global, national, local and community levels.

Cooperation with developing countries: Kenya, Benin

International Organization: Institute of Biodiversity Conservation and Research, Ethiopia; National Agricultural Centre for Genetic Resources and Biotechnology, Nigeria; National Gene-bank of Kenya, Kenya.

Jomo Kenyatta University of Agriculture and Technology (JKUAT)

Head of Institution: Prof. N.G. Wanjohi, Vice Chancellor.

Address: P.O. Box 62000 Nairobi, Kenya. **Phone:** (+254 67) 52711. **Fax:** (+254 67) 52164. **Email:** jku-vc@nbnet.co.ke. **URL:** www.juat.ac.ke.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences, Environmental Sciences.

Research and training: Research: technologies; agronomy and soil science; pathology and entomology; engineering; natural and applied sciences; tropical medicine; environment and water. Training: under-graduate and Post-graduate students in different disciplines.

Achievements: Tissue-culture bananas; walking tractor; food products; detergents and cosmetics; science kit; solar panels/heaters; computer assembling.

Facilities: Computers; laboratories; farm (field); library; workshops; studios; hospital; field stations.

Future plans: Develop the institution to become a Centre of Excellence in research and innovative technology.

Cooperation with developing countries: Currently collaborating with institutions of higher-learning locally and internationally.

International Organization: DAAD, ICAID, Ford Foundation, JICA.

Kenya Agricultural Research Institute (KARI)

Head of Institution: Dr Romano M Kiome.

Address: P.O. Box 57811-00200 Nairobi, Kenya. **Phone:** (+254 20) 583-301.

Fax: (+254 20) 583-344. **Email:** director@kari.org. **URL:** www.kari.org.

Scientific Fields of Interest: Agricultural Sciences.

Research and training: Soil and water-resources management research; livestock research; range management research; horticulture and industrial crops research; crops research; socio-economics and biometrics; adaptive research; information and documentation services.

Achievements: Research reports; annual reports; scientific conference proceedings; technical note issues; The East African Agricultural and Forestry Journal; audio-visual tapes on agricultural technologies; brochures; newsletters; posters and associated thesis.

Facilities: 36 research centers with varying levels of capacity and laboratories, field stations, computers, libraries.

Future plans: Creating and enhancing partnerships and collaborations with key-players in agricultural research.

Cooperation with developing countries: CGIAR, ASARECA, Latin America, Indian research and technology institutions.

International Organization: World Bank, European Union, USAID (Agri-business Development Support Project (ADSP), GEF, SIDA.

National Museum of Kenya — Phytochemistry Department — Centre for Biodiversity

Head of Institution: Prof. Ali A. Ali, Head of Department.

Address: PO Box 40658-00/00, Nairobi, Kenya. **Phone:** (+254 20) 374-2161-4, 374-2131-4. **Fax:** (+254 20) 374-1424. **Email:** nmk@museums.or.ke. **URL:** www.museums.or.ke.

Scientific Fields of Interest: Biological Sciences, Chemistry, Environmental Sciences.

Research and training: Documentation of ethnomedicinal knowledge of Kenya flora/fauna; natural product chemistry research of medicinal, aromatic food and fodder plants; training in phytochemical techniques of medicinal and other analysis; research on dryland environmental degradation and conservation projects at community level.

Achievements: Indigenous knowledge systems of Kenya medicinal documentation and preservation; publications and practical training facilities; establishment of several community-based conservation networks.

Facilities: computers; freeze dryer; UV cabinet; vofa vapor; sample crusher; laboratory equipment; department resources for backed-up information.

Future plans: Training of research scientists for Ph.D; strengthen the field of phytochemistry, ethnobotany, bioactivity; venture into areas like resource management and environmental protection, socio-economic studies & policy research of dryland community biodiversity development.

Cooperation with developing countries: Collaboration with University of Nairobi (Chemistry Dept.); Kenyatta University, Moi University (Botany/Chemistry Dept.); Gallman Foundation.

International Organization: The institute intends to network with all major international organizations, such as FAO, UNDP, UNEP, UNESCO, UNIDO, EU etc.

Regional Centre for Mapping of Resources for Development (RCMRD)

Head of Institution: Dr. Wilber K. Ottichilo.

Address: P.O. Box 632 00618 Ruaraka Nairobi, Kenya. **Phone:** (+254 20) 860-654, 803-320/2/9. **Fax:** (+254 20) 861-673, 802-767. **Email:** rcmrd@rcmr.org, ottichilo@rcmr.org. **URL:** www.rcmr.org/.

Scientific Fields of Interest: Earth Sciences, Environmental Sciences.

Research and training: Remote-sensing (RS), Geographic Information System (GIS), Global Positioning System (GPS), Digital Mapping (DM), Data Base Development (DBD), Information Technology (IT), Natural Resources Assessment and Management and Environmental Management Assessment (EIA).

Achievements: Trained over 3000 professionals in the fields of geo-information and information technology from all over Africa; have also published numerous articles and reports on geo-information in Africa as well as undertaking projects in resource mapping, assessment and management.

Facilities: Well-equipped computer labs (over 120 computers with diverse soft wares); lecture rooms and halls; surveying and mapping instruments; Internet; and Library.

Future plans: Build further capacity and capability in geo-information with the main objective of becoming the leading Post-graduate training institution in geo-information applications and promotions in Africa.

Cooperation with developing countries: Currently cooperating with countries of Eastern and Southern African countries.

International Organization: Currently cooperating with International Institute of Geo-information and Earth Observation (ITC) in the Netherlands, USGS (EROS Data Center), USAID (FEWSNET) Texas A & M University, Colorado State University and SERI.

Tea Research Foundation of Kenya (TRFK)

Head of Institution: Dr. Wilson K. Ronno, Director.

Address: P.O. Box 820, Kericho 20200, Kenya. **Phone:** (+254 52) 20598, 20599. **Fax:** (+254 52) 20575. **Email:** tearfk@insightkenya.com. **URL:** www.tearesearchkenya.org.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences.

Research and training: Problems related to tea and such other crops, and systems of husbandry as are associated with tea throughout Kenya, including the productivity and suitability of land in relation to tea planting.

Achievements: Technologies for tea production including improved tea plant germplasm; optimal crop husbandry technologies with enhanced plant nutrition and efficient nutrient resource use for sustainable tea production; environmental management technologies including effective technologies for control of major pests and diseases of tea; appropriate and efficient technologies for the manufacture of quality black tea and diversified tea products; marketing and utilization of finished products; technology transfer.

Facilities: Appropriate facilities for tea production including crop improvement; analytical facilities for assessing plant tissue and soils for nutrient levels physiological studies; facilities for diseases and pests diagnosis and application of control measures for major; facilities for miniature manufacture of black tea and biochemical analysis; capacity for marketing analyses and utilization of finished products. Over 32 computers with diverse software, Internet, and library.

Future plans: (1. Tea research factory: plans are being made to put up a small commercial-size factory to be used for research purposes a) manufacture technology b) diversification of tea products and c) training of factory personnel. (2. Wood-fuel for factory use: introduction of studies on woodfuel (for factory), particularly Eucalyptus trees. (3. Economic studies: economics of tea production

Cooperation with developing countries: All tea-growing countries. Memoranda of understanding with local universities: Egerton University; Jomo Kenyatta University of Agriculture and Technology; Moi University and Eldoret Polytechnic.

International Organization: China, Japan and various tea councils.

University of Nairobi — Reproductive Biology Unit (RBU)

Head of Institution: Jemimah Achieng Oduma.

Address: Dept. of Animal Physiology, P.O. Box 30197, Nairobi, Kenya. **Phone:** (+254 20) 444-2919. **Fax:** (+254 20) 444-1049. **Email:** joduma@unobi.ac.ke.

Scientific Fields of Interest: Biological Sciences.

Research and training: Research: placental biology, mammalian reproductive physiology, parasites and reproduction, natural products and their possible application in reproduction, reproductive toxicology. Training: M.Sc. Ph.D. in reproductive biology; Diploma for technology students, cancer research (breast cancer).

Achievements: Showed possible pathways of progesterone metabolism primate and ruminant placentae. Defined the effects of heptachlor in reproduction. Developed a rabbit model for study of schistosomiasis. Effects of embelin and khat on reproduction.

Facilities: Equipment for radio-immunoassays and enzyme-immunoassays, lamima flow cabinets, incubators, freeze drier, fraction collector, electrophoresis equipment and centrifuges, PCR and Gel Analyzer.

Cooperation with developing countries: Tanzania, Uganda, South Africa, Zambia.

International Organization: WHO, International Atomic Energy Agency, DAAD, Uppsala University, Baylor College of Medicine.

World Agroforestry Centre (WAC)

Head of Institution: Dr. Dennis G. Garrity, Director General.

Address: PO Box 30677-00100, Nairobi, Kenya. **Phone:** (+254 20) 722-4000, (+1 650) 833-6645. **Fax:** (+254 20) 722-4001, (+1 650) 833-6646. **Email:** icraf@cgiar.org. **URL:** www.worldagroforestry.org.

Scientific Fields of Interest: Agricultural Sciences.

Research and training: Trees & Markets: assuring with a large set of partners that sustainability, biodiversity conservation, and improved land management are integrated into tree domestication, as well as market and farmer enterprise strategies. Our three focal areas are: Agro-forestry Germplasm; Tree Domestication, and Marketing of Agro-forestry Tree Products. Environmental Services: provide a critical means of balancing concerns for environment and welfare of the world's poorest populations. ICRAF's activities on environmental services concentrate on the potential role of Agro-forestry systems and landscape mosaics to generate environmental services and the ways that institutions and incentive systems shape the streams of benefits and costs from alternative land-uses. Our three focal areas are: Landscape interactions; Climate Change; and Environment-policy. Land and People: seeking to understand the basis for sound land management and quantifying the long-term consequences of management practices on small-scale agriculture in order to devise locally relevant land management options. Our three focal areas are: Land and soil health; Small-holder production systems; and Institutional innovations and incentives. Strengthening Institutions: We strengthen the capacity of institutions - local, national and regional - to participate effectively in generating and applying innovations in Agro-forestry, INRM, and environments for improved livelihoods. Our two focal areas: Strengthening the capacity for Agro-forestry and NRM science at national institutions and systems; and

enhancing capacity for sharing Agro-forestry and NRM innovations to leverage scaling up.

Achievements: Adoption of fodder shrubs by dairy farmers in East Africa; influencing the strategic options for forest assistance in Indonesia; widespread uptake of landcare in the Philippines; mainstreaming integrated natural-resource management perspectives into Ugandan level development processes and extension system (NAADS).

Facilities: Seed laboratory: Seed-testing facilities, e.g., one Seed-testing germination chamber, auto-oven, heat sealer, manual seed-extractor and cold storage facilities for orthodox seeds; One computer; Germplasm testing site in Meru Kenya, KEFRI/ICRAF field station seed collection stands at Muguga Kenya; ICRAF/KEFRI/KARI libraries. Molecular laboratory: Autoclave, 2 PCR machine, centrifuge, water bath, Analytical weighing balance, pH meter, Horizontal gel electrophoresis apparatus, two fridges, Camera and UV apparatus; Three computers; ICRAF/KEFRI/ILRI/K.U libraries.

Future plans: The World Agro-forestry Centre is undergoing a strategic planning process to be implemented by the end of 2007. This will result in a focused agenda for a number of key livelihood and environmental outputs and outcomes for Agro-forestry to contribute to the millennium development goals and objectives of the multilateral environmental agreements such as the UNFCCC, UNCBD and the UNCCD. ICRAF will be hosting the 2nd World Agro-forestry Congress in 2009.

Cooperation with developing countries: ICRAF works in the tropical regions of the World and has more than two hundred agreements in developing countries with various types of organizations such as Universities, Advanced Research Institutes, National Agricultural Research Institutes, sub-regional bodies such as the Association for Strengthening Agricultural Research in East and Central Africa (ASARECA), non-governmental organizations, Inter-governmental bodies and the private-sector. ICRAF has facilitated the formation and strengthening of Agro-forestry networks and consortia: Two networks, ANAFE and SEANAFE, have become major players in the transformation of education in Africa and Southeast Asia, respectively.

International Organization: ICRAF has a large number of partnerships spanning organizations from the private-sector, to universities, national research institutions, and regional bodies. For example our work funded by the European Union involves several longstanding partnerships with universities and private-sector institutions in Europe. We work with non-governmental organizations such as WWF and Conservation International, universities such as Yale and Cornell University, and have partnerships arrangements with at least 50 different organizations globally. We work with international organizations such as the United Nations Environment Programme and the World Bank. ICRAF participates in the Amazon initiative. ICRAF hosts the CGIAR system wide initiative, ASB Partnership for the Tropical Forests Margins (www.asb.cgiar.org).

Korea, Rep.

Korea University — College of Science

Head of Institution: Keon Kim.

Address: Anam-dong, Songbuk-ku, Seoul 136-701, Korea, Rep.. **Phone:** (+82 2) 329-4040. **Fax:** (+82 2) 923-8151. **Email:** shinbh@korea.ac.kr. **URL:** www.korea.ac.kr/~eng/.

Scientific Fields of Interest: Chemistry, Environmental Sciences, Mathematics, Physics.

Research and training: Basic research in mathematics, physics and chemistry.

Achievements: High-quality basic research; producing about 150 B.Sc., 70 M.Sc., and 15 Ph.Ds.

Facilities: Laser system (dye laser, Ti-sapphire laser, ion laser); spectrometers (visible IR, NMR, laser, Raman); supercomputer; electron microscope; X-diffractometer; ICP-atomic-emission spectrometer; FTIR; PL; Auto Hall measurement system, and NMR.

Future plans: Research-oriented university; emphasis on graduate-programmes; double-major programme for under-graduates.

Seoul National University (SNU) — Center for Theoretical Physics (CTP)

Head of Institution: Choonkyu Lee.

Address: Seoul 151-742 Korea, Rep.. **Phone:** (+82 2) 880-6523. **Fax:** (+82 2) 884-7167. **Email:** ctp@ctp.snu.ac.kr. **URL:** http://ctp.snu.ac.kr/.

Scientific Fields of Interest: Physics.

Research and training: Particles and fields; gravitation and cosmology; nuclear theory; condensed-matter theory; solid-state physics.

Achievements: Over 100 research papers published annually; several symposia/workshops.

Facilities: Computers; library.

Lebanon

American University of Beirut — Faculty of Agricultural and Food Sciences

Head of Institution: Dr. Nuhad J. Dagher, Dean.

Address: P.O. Box 11-0236, Riad El-Solh Str. Beirut 1107-2020, Lebanon.

Phone: (+961 1) 343-002. **Fax:** (+961 1) 744-460. **Email:** fafs@aub.edu.lb.

URL: www.aub.edu.lb.

Scientific Fields of Interest: Agricultural Sciences, Environmental Sciences.

Research and training: Nutrition and disease prevention, aims at understanding the mechanism by which nutrients can manage prevention and treatment of diet-related disease; assessment of nutritional status of Lebanese population; community nutrition; diet and kidney disease; processing and assessing nutritional value of food products; diagnostic and control of major livestock and poultry diseases; improvement of crop production, irrigation, fertilization, and environmental protection in Lebanon and neighboring countries; characterization, collection, conservation and documentation of genetic resources; entomology, pesticide toxicology and residue analysis, plant pathology and weed science.

Achievements: Surveying and monitoring of major diseases and providing recommendations to private and public-sector accordingly; analysis of small ruminant production systems and extension work with farmers; surveying environmental contaminants in Lebanon (heavy metal and residual pesticides); recommendations for best fertilization, irrigation and management practices for crop production in Lebanon; graduates are trained to successfully contribute to the research, business and education sector of the region.

Facilities: Human nutrition laboratory housing dual energy X-ray absorptiometry (DEXA) unit; body-composition analyzer; human metabolic unit room; research laboratory housing sophisticated equipment such as HPLC; gas chromatography; UV-VIS spectrophotometer; dietary fiber determination unit; and Bomb calorimeter; mixograph; refrigerated centrifuge; deep freezer; animal room for nutrition research; food processing pilot-plant; experimental kitchen and organoleptic room; central research science laboratory and hospital laboratories; automated milking-stations, automated slaughter-house; atomic-absorption spectrophotometer; X-ray diffraction; gas chromatography; controlled-environment chamber; DNA-extractor.

Future plans: Establishment of a Nutrition Research Center, which can act as an ultimate referential body for the local community and market. This Center of Excellence on which people in Lebanon and the region will rely on, will use the latest technology and international standards to assess local products, and provide information to the public; development of B.Sc. in veterinary science programmes; establishment of soil and water center at AREC; an evaluation of the current and future problems of agriculture in Lebanon and the region and a

specific plan of solution to these problems; increase the number of enrolled graduate students; change the existing structure of the department to increase its scope; increase the number of internationally-funded projects.

Cooperation with developing countries: Egypt; Kuwait; Syria; Jordan; Saudi Arabia; Gulf States and Sudan; cooperation with US universities in projects related to viral plant diseases.

International Organization: FAO, UNDP-GEF, UNEP-GEP, USAID; YMCA; Greenline Associates Inc.; University of Wisconsin; Lebanese National Council for Scientific Research; private companies

The National Council for Scientific Research (CNRS) — The National Center for Remote Sensing

Head of Institution: Dr. Mohamad Khawlie, Director.

Address: PO Box 11-8281, Riad El-Solh 1107 2260 Beirut, Lebanon. **Phone:** (+961 4) 409-845, 409-846. **Fax:** (+961 4) 409-847. **Email:** rsensing@cnrs.edu.lb, mkhawlie@cnrs.edu.lb. **URL:** www.cnrs.edu.lb.

Scientific Fields of Interest: Agricultural Sciences, Environmental Sciences.

Research and training: Water; soil; agriculture; land degradation; geology; natural hazards; desertification; land-use; climate change and monitoring; environmental management and EIA; coastal management; eco-systems; application of remote-sensing and GIS.

Achievements: Publishing of scientific papers; specific reports; maps, atlases; guidelines.

Facilities: Computers and all related productionlines; RS & GIS software; field computers and GPS; building up library.

Future plans: Enhance sectoral projects; diversify services to public and private-sectors; capacity-building; strengthen international cooperation.

Cooperation with developing countries: Ongoing cooperation with many different Arab countries.

International Organization: Ongoing cooperation with some, but it is necessary to diversify and expand.

Madagascar

Centre National d'Application des Recherches Pharmaceutiques (CNARP)

Address: BP 702 101 Antananarivo V, Madagascar. **Phone:** (+261 20) 224-2801. **Fax:** (+261 20) 225-3478. **Email:** dircnarp@wanadoo.mg.

Scientific Fields of Interest: Biological Sciences, Chemistry, Environmental Sciences.

Research and training: Main lines of research are botany and ethnobotany; extraction and chemistry; pharmacodynamics; galenic pharmacy and; clinical assays and experimentation. Main training activities are: botanical and ethnobotanical studies of plants, especially medicinal plants and traditional medicine; bioguided fractionation of active extracts from medicinal plants; development of phytomedicines and clinical trial; quality control of essential oils produced by CNARP and local firms; supervision of students from universities and institutes.

Achievements: CNARP specialties are phytomedicines based upon plants' extracts. 3 products are already exploited through trade; 6 preparations are ready to be submitted to commercial permit. Some scientific papers are available.

Facilities: Each department is equipped well-enough with updated material including computers, specific documentation and a common library for the whole of CNARP.

Future plans: Supporting WHO initiatives as a collaborative center; developing local phytomedicines with partnership; changing pilot-scale of production into an industrial one; using ICT especially for biotechnology toward conservation of biodiversity.

Cooperation with developing countries: Mainly with USA academic and private donors through the ICBG (International Corporative Bioprospecting Group) programme.

International Organization: Major donors are in the US; going through the 2nd phase of the ICBG Programme of Drug Discovery and Conservation of Biodiversity in Madagascar.

Centre National de Recherches Appliquées au Développement Rural

Head of Institution: François Rasolo.

Address: BP 1690, Ampandrianomby Antananarivo 101, Madagascar. **Phone:** (+261 20) 224-0130. **Fax:** (+261 20) 224-0270. **Email:** fofifamada@wanadoo.mg.

Scientific Fields of Interest: Agricultural Sciences, Environmental Sciences.

Research and training: Agricultural production; Animal breeding and Pisciculture; Forestry and natural resources management; Technology of conservation and transformation post-harvest; Socio-economy.

Achievements: New technologies of agricultural production; New vegetal varieties.

Facilities: Laboratories; Equipment for crop; Field Stations; livestock farming; Library.

International Organization: French Cooperation Service; French Research; Africa and Indian Ocean Regional Cooperation; Consultative Group on International Agricultural Research (CGIAR).

Centre National de Recherches Industrielles et Technologique (CNRIT)

Head of Institution: Claude Randriamanarina.

Address: B.P. 3330, Antananarivo, Madagascar. **Phone:** (+261 20) 226-3520.

Fax: (+261 20) 222-3876. **Email:** cnrit@wanadoo.mg. **URL:** www.refer.mg/madag_ct/rec/cnrit/cnrit.htm.

Scientific Fields of Interest: Agricultural Sciences, Chemistry, Earth Sciences, Environmental Sciences, Physics.

Research and training: Lime, pouzzolane-lime; Activated carbon; Refractory bricks; Mineral pigments; Chemicals from local raw materials; Treatment of waste-water; New and renewable energy: biogas, carbonization, solar energy.

Achievements: 22 patents in the fields of chemistry and renewable energy.

Facilities: 7 computers; 4 laboratories; 1 documentation center.

Future plans: Creation of a new department of organic chemistry and the network of the center towards the whole country.

International Organization: Currently: CIRAD FRANCE; In future: USA and Germany.

Centre National de Recherches sur l'Environnement (CNRE)

Head of Institution: Pierre Nervé Ravelonandro.

Address: B.P. 1739 101 Fiadanana, Antananarivo, Madagascar. **Phone:** (+261 20) 222-6469. **Fax:** (+261 20) 222-6469. **Email:** dircar@dts.mg.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences, Earth Sciences, Environmental Sciences.

Research and training: Plant ecology, food quality, medical entomology, environmental impact assessment, environmental microbiology, tissue-culture, pollution monitoring, pesticide residue, valorization of biodiversity, area and environment management, chemistry and engineering techniques.

Achievements: Maps of natural resources in Madagascar; database of biodiversity; papers and reports.

Facilities: Laboratory of environmental microbiology and tissue-culture; food chemistry lab; hydrology lab; a set of satellite images of Madagascar. Library and computers.

Future plans: Extension of the research themes to include climatic change, valorization of results, consultancy and expertise; Means to develop cooperation with tropical institutions in the South; Cooperation for strain identification in bacteriology.

Cooperation with developing countries: Mauritius, USA, France, and Japan.

International Organization: IRD, CIRAD, WWF, CARE International, BAYER, UNICEF, PNUD, and ICGB.

Institut Malgache de Recherches Appliquées (IMRA)

Head of Institution: Prof. Suzanne Ratsimamanga, Chairman.

Address: Avarabohitra Itaosy Antananarivo 101, Madagascar. **Phone:** (+261 20) 223-8188. **Fax:** (+261 20) 2540-917. **Email:** r_christian@wanadoo.mg.

URL: www.refer.mg/madag_ct/rec/imra.

Scientific Fields of Interest: Biological Sciences, Environmental Sciences, Medical Sciences.

Research and training: Researching and developing drugs from both traditional medicine and medicinal plants. Endemic plants of Madagascar for treating diabetes, malaria, cardiovascular (hypertension), gastrointestinal ulcers, asthma, nephrolithiasis, wounds, leprosy, and diuretic agents. Safeguarding of Biodiversity. Training of Ph.D. students and post-doctors.

Achievements: Discoveries include: anti-diabetic drug (Madeglucyl[™]); wound healing using triterpens (leprosy, gastrointestinal ulcers, severe burns) and commercialization (Madecassol[™]); malagashanine for the reversion of malarial treatment chemioresistance; antinephrolithiasic drug; an antitoxin agent with potent activity in hepatitis, alcoholic and drug intoxication (Madetoxyl[™]); adreno-

cortical drug (Cortine™); adenoma antiprostatic drug (Tadenan™); forty phytodrugs covering daily pathologies and economically available for the Malagasy population. About three hundred main publications in international journals.

Facilities: Well-equipped departments and laboratories of: ethnobotany, phytochemistry, malaria, cancer, pharmacodynamics, diabetes and metabolism, analysis and standardization of drugs and essential oils, biodiversity and microbiology. Drug production unit. Four field stations for cultivation of endemic medicinal and endangered species. Important scientific library 'Albert Rakoto-Ratsimamanga Museum' and botanical garden.

Future plans: Extend quality control in drugs and essential oils; cooperation with universities and research centers in France (Lille, Clermont-Ferrand); Belgium (Louvain Catholic Univ., Free University of Brussels); African universities; Muséum National d'Histoire Naturelle, Paris; Private labs: Sanofi-Aventis; Agri-business development.

Cooperation with developing countries: African universities and research institutes in Benin, Mauritius, La Réunion Island.

International Organization: Cooperation with TWAS, Malagasy Academy, and Malagasy University.

Institut National des Sciences et Techniques Nucléaires (INSTN)

Head of Institution: Prof. Raelina Andriambololona, DG.

Address: Boîte Postale 4279, 101 Antananarivo, Madagascar. **Phone:** (+261 20) 226-1181. **Fax:** (+261 20) 223-5583. **Email:** instn@wanadoo.mg. **URL:** www.geocities.com/mada_instn/.

Scientific Fields of Interest: Chemistry, Earth Sciences, Mathematics, Physics.

Research and training: Interfacing in nuclear experiments.

Achievements: Set-up of a laboratory for the radioactive foodstuff monitoring; industrial and urban pollution measurement in the capital of Madagascar by X-Ray Fluorescence technique; set up of a Secondary Standard Dosimetry Laboratory (SSDL); heavy elements detection, abnormal alpha radioactivity in Malagasy ores; study of building material radioactivity; radon measurement in air and water; isotope tracers applied to the determination of groundwater replenishment and the origin of salinity and the vulnerability of aquifers to contamination.

Facilities: Gamma and alpha spectrometers; Liquid Scintillation Counter; X-Ray Fluorescence technique; Secondary Standard Dosimetry Laboratory; TLD Dosimeter; Maintenance and Nuclear instrumentation facilities; ion chromatography.

Future plans: Extend quality control in radiation protection; keep monitoring the environmental pollution. cooperation with universities and research centers in Senegal, Tunisia, Morocco, Cadarache (France).

Cooperation with developing countries: CNSTEN (Centre National des Sciences et Technologies de l'Energie Nucléaire) of Tunisia and Morocco; Schonland Research Institute, Johannesburg (S. Africa).

International Organization: Technical cooperation with AIEA; Agence Universitaire de la Francophonie; Paris VI and Paris VII Universities; Aix-Marseilles and INSTN-Saclay (France); ITC/FZK Karlsruhe (Germany).

Institut Pasteur de Madagascar (IPM)

Head of Institution: Antoine Talarmin.

Address: P.O. Box 1274, Antananarivo 101, Madagascar. **Phone:** (+261 20) 224-0164, 224-1272. **Fax:** (+261 20) 224-1534. **Email:** atalarmin@pasteur.mg. **URL:** www.pasteur.mg/.

Scientific Fields of Interest: Biological Sciences, Medical Sciences.

Research and training: Research: Arboviruses and viral diseases, malaria, medical entomology, tuberculosis, plague, schistosomiasis, cysticercosis, all with a full-time epidemiologist. Diagnosis and analysis laboratories: clinical diagnosis, food microbiology and water survey. Training of technical and medical assistants.

Achievements: Epidemiological data on malaria, tuberculosis, plague, cysticercosis, schistosomiasis and various virological diseases. Elaboration of tests for serological diagnosis in cysticercosis and plague. Results of therapeutic assays on schistosomiasis.

Facilities: Laboratories and equipment for biological studies; 80 computers and items, Internet connection; Field stations (around 10); Library (subscription to 60 periodicals; 3,500 books, CDROM Medline Life-Sciences).

Future plans: National and regional network for drug resistance of malaria, improvement of plague, schistosomiasis and tuberculosis and viral diseases programmes in collaboration of the Health Ministry; Improvement of training and teaching in collaboration of the Education Ministry.

Cooperation with developing countries: Research scientists training is negotiated with the Pasteur Institutes International Network and numerous public-health services of the Indian Ocean countries.

International Organization: Institut Pasteur, French Cooperation Service, EU, Republic of South Africa and World Bank.

Malawi

Forestry Research Institute of Malawi (FRIM)

Head of Institution: Christopher Masamba.

Address: P.O. Box 270 Zomba, Malawi. **Phone:** (+265 1) 524-866. **Fax:** (+265 1) 524-548. **Email:** frim@frim.clcom.net. **URL:** www.sdnf.frim.org.

Scientific Fields of Interest: Agricultural Sciences, Environmental Sciences.

Research and training: Plantation strategy for large-scale tree planters, estates and small-holders in drier zones; monitor health of existing plantations and integrated pest management; Trees on farm strategy, propagation, establishment and regeneration of trees, tree management techniques; Indigenous woodland strategy for sustainable management of indigenous woodlands; Seed and tree improvement strategy.

Achievements: Screening and selection of all the timber and some Agro-forestry trees currently being used locally; Development of silvicultural operations; Zoning of the country into silvicultural zones; Development of management guidelines for forestry resources with rural communities; Development of seed pre-treatment techniques for indigenous trees; Understanding the institutional arrangement for natural-resource management.

Facilities: 17 old computers, soil laboratory, pathology laboratory, seed-testing laboratory, cold room, ovens, entomology laboratories, 2 field stations, weather station, 1 library.

Future plans: To develop research proposals that can attract donor funding; To continue providing quality research results and tree seed of High-quality; To coordinate forestry research in the SADC region; To expand the current level of staffing to meet the research demands of the nation and region.

Cooperation with developing countries: FRIM through organizations like ICRAF, FSCTCU, AND AFRONET and donor organizations is linked with other developing countries.

International Organization: EU, DFID, AFRONET, Canadian CIDA, and Miombo Network.

Malaysia

Asian Institute of Medicine Science and Technology (AIMST) — School of Medicine

Head of Institution: Dr. V. G. Kumar Das, Vice Chancellor.

Address: 2 Persiaran Cempaka, Amanjaya, 08000 Sungai Petani, Kedah Darul Aman, Malaysia. **Phone:** (+60 4) 4422-884. **Fax:** (+60 4) 442-2887. **Email:** sethuraman@aimst.edu.my. **URL:** www.aimst.edu.my.

Scientific Fields of Interest: medical Sciences.

Research and training: Under-graduate medical courses leading to MBBS, after 5 years of study; under-graduate courses in dentistry, pharmacy and allied health sciences.

Achievements: The first batch of medical students who joined in 2002 is expected to pass out in 2007 (clinical, educational and field research is on-going. It is too early to comment on the results).

Facilities: Multi-disciplinary lab; anatomy dissection hall and museum; clinical skills lab including human patient simulators; general support services of the university: library, computer lab, etc.; well stocked library with books, journals and several online resources.

Future plans: Planning graduate studies by course work and research in non-clinical specialties like physiology, microbiology, etc.

Cooperation with developing countries: Human resource for training and education is predominantly from the developing countries like India, Myanmar, and Sri Lanka.

International Organization: AIMST has an international panel of specialists, especially from the UK who visit its facilities on brief training assignments.

Asian Institute of Medicine, Science and Technology (AIMST) — Department of Biotechnology

Head of Institution: Dr. Helen Nair.

Address: 2 Persiaran Cempaka, Amanjaya 08000 Sungai Petani, Kedah Darul Aman, Malaysia. **Phone:** (+60 4) 4422-884. **Fax:** (+60 4) 4422-887. **Email:** helen_nair@aimst.edu.my. **URL:** www.aimst.edu.my.

Scientific Fields of Interest: Biological Sciences.

Research and training: Orchid biotechnology; biodiversity and in-vitro conservation; immunology and microbial pathology; tissue and cell-culture; functional genomics and proteomics; post-harvest physiology and biotechnology; signal transduction pathway in animals and plants; solid-state fermentation; bioreactors and modeling; bio-informatics and systems biology; crystallography of functional proteins; plant genetic transformation

;bioprospecting with medicinal plants; bio-remediation. gene regulation during fruit ripening and flower senescence; plant stress physiology; molecular interaction of allergens in asthma; fetal lung development; food biotechnology; plant-breeding; aqua culture of fresh water fishes.

Achievements: Understanding of orchid biology and flower longevity; technology to increase shelf-life in bananas; genetic engineering of orchids; gene regulation during fruit ripening and flower senescence; isolation of microbes capable of producing industrial enzymes; isolation of crude oil degrading *Pseudomonas* spp.; tissue-culture of rare and endemic medicinal plants; development of breeding techniques for edible freshwater fishes.

Facilities: Lab facilities: biotechnology; molecular-biology; instrument room; tissue-culture room; student project lab; research lab; green house. Major instruments: atomic-absorption spectrometer; Beckman high-performance refrigerated centrifuge (J25); gas chromatography (FID & TCD) with GC chemstation; scanning UV/VIS spectrophotometer; HPLC 7 FTIR; fluorescence microscope with fluorescence imaging workstation; deep freezer and cryostorage vessels; ELISA reader; PCR machines; CO₂ incubator; gel documentation system; laminar air flow and biohazard cabinets; electrophoresis equipment and UV transilluminator. Advanced molecular-biology lab equipment (on tender): microarray laser scanner; microarray hybridization station; rotary hybridization oven; multifunctional microplate reader; real-time PCR robotic workstation for extraction ; advanced analysis software ; flow cytometer with cell sorter; high-end imaging system; in-vivo imaging system; MALDI-TOFF; complete 2D electrophoresis system with blotting assemblies; iso-electric focusing system; automate staining system; fraction collector; spectrophotometer (UVI/VIS) high range; spot picker and cutter; protein digest system; cryostat fully automated rotary microtome; automate microgrinder; biolistic gun; electroporator; freeze dryer (chamber type) deep freezers; carbon dioxide incubator; microbiology incubator; low temp. incubator; laminar flow; class II safety cabinet; cryogenic freezer; ultra pure water system; autoclaves; dry heat sterilizer; ultracentrifuge; high-seed centrifuges; micro centrifuge; bioreactors (3L and 5L); scintillation counter; radiation protection facility; cell harvester. Library: well-stocked with books, journals and several online resources.

Future plans: Setting up an advanced molecular-biology lab at the Semiling campus in Kedah, Malaysia. This will have state-of-the art equipment required to carry out cutting-edge research in modern biotechnology.

Cooperation with developing countries: Academic staff continues to maintain active research links with their previous institutions both within Malaysia and abroad. The current staffs are mainly from Malaysia, India, Singapore and Australia.

International Organization: The department of biotechnology has established teaching and research linkages with several Australian and UK universities such as: Queensland University of Technology; Flinders University and University of Darby. It also has an honorary research advisor from Lilly research labs, Indianapolis, USA and two adjunct professors are from Sime Darby Technology,

Centre, Malaysia and the other from Technology Transfer International, Australia.

Forest Research Institute of Malaysia (FRIM)

Head of Institution: Abdul Razak Mohd Ali.

Address: Kepong 52109 Selangor Darul Ehsan, Malaysia. **Phone:** (+60 3) 6279-7000, 634-2633. **Fax:** (+603) 6280-4624. **Email:** razak@frim.gov.my. **URL:** www.frim.gov.my/.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences, Environmental Sciences.

Research and training: Sustainable management of natural forests; quantification and sustenance of ecological functions and services of forests; conservation and management of forest biodiversity; urban forestry and forest recreation management; forest plantations for sustainable development of forest industries; natural product discovery and herbal processing technology; biotechnology in forestry for knowledge and wealth creation; search of promising lead compounds for the development of phytopharmaceuticals; protection and development of wood-based products; quality and market enhancement of wood-based products via technology development; utilization of wood and non-wood fiber for value-added products. A majority of training activities include technical attachment, technical training conducted for the private-sector, especially those from the forest-based industries, academic training and others.

Achievements: Weaning chamber for tissue-cultured plants; seed designer machine; fight obesity with asam gelugor (*Garcinia atroviridis*); ARBOR tracker for trees in FRIM; finger printing of plant pathogenic fungi; development of phenol formaldehyde (PF); wood composite pilot-plant; non-structural laminate veer lumber (LVL) from oil palm stem; useful wood-based products from construction wastes; autecology and genetics of *Shorea lumutensis*; advance in breeding fireflies in captivity. 2004 achievements: 111 IRPA projects; 588 publications; 72 seminars and workshops; 38 small and medium industry factories that benefited from R&D; 8 factories that used FRIM's equipment or technology; 727 kg. of forest tree seed collected; 40 technical training sessions organized; 18 patents; 35 research projects with external agencies; 14 exhibitions. 2005 achievements: 130 IRPA projects; 700 publications; 75 seminars and workshops; 45 small and medium industry factories that benefited from R&D; 12 factories that used FRIM's equipment or technology; 900 kg. of forest tree seed collected; 45 technical training sessions organized; 20 patents; 45 research projects with external agencies; 20 exhibitions.

Facilities: FRIM has established seven Centers of Excellence: Timber Technology Centre (TTC); Centre for Wood Composite; Herbal Technology Centre; Centre for Sustainable Forest Management (CSFM); Centre of Forest Plantation Technology; National Botanic Conservation Centre (NBCC); now known as Tropical Forest Biodiversity Centre (TFBC); and Centre of Excellence

for Forest Biotechnology. These centers were established as and when they were needed. For instance, TTC was established back in 1996, whereas NBCC was renamed TFBC in 2005 to take into account the new interest in conservation of biodiversity. Besides Centers of Excellence, FRIM also provides facilities for testing services. To date there are 18 labs providing research facilities to various clients. Examples of such labs are Fire Door Performance, Furniture Testing, and Tissue-culture. FRIM also has seven research sub-stations all over the Peninsula to cater for its R&D needs.

Future plans: Improve FRIM's scientific knowledge; maintain the status of FRIM as the Centre of Excellence in tropical forestry and forest product research; strengthen the institutional framework for R&D and applications; adopt a holistic approach to research program; enhance skill, capabilities, and competence for R&D; enhance greater participation by the private-sector; enhance public and institutional awareness of forestry; promote active national and international cooperation and collaboration; emphasize on R&D commercialization and marketing. Future development in training for researchers include: enhancing the knowledge and competency level of all FRIM's staff through a structured and well-planned long-term strategic training program; setting up a fully-equipped training centre with accommodation facilities; becoming a professional training management centre for internal and external clients.

Cooperation with developing countries: Some collaborations are since 1986: UPM, Malaysia; Forest Science Institute (FSI), Vietnam; Forestry Research Support Programme for Asia and the Pacific (FORSPA), Bangkok, Thailand. Since 2005: Twin Integrated Design and Development Sdn. Bhd. (TIDD); Malaysian Centre for Remote-sensing (MACRES); Rimba Aktif Plantation Sdn. Bhd.; Borax Malaysia Sdn Bhd; International Tropical Timber Organization (ITTO).

International Organization: Since 1986: University of Aberdeen, Scotland; University College of North Wales, Bangor; Auburn University (USA); Dept. of Forestry, School of Resource and Environment Management, The Australian National University, Canberra, Australia; Faculty of Forestry, University of British Columbia, Vancouver, Canada; College of Forestry, Oregon State University (USA).

Malaysian Agricultural Research and Development Institute (MARDI)

Head of Institution: Saharan Hj. Anang.

Address: P.O. Box 12301 50774 Kuala Lumpur, Malaysia. **Phone:** (+60 3) 8943-7111. **Fax:** (+60 3) 8948-3664. **Email:** saharan@mardi.my. **URL:** www.mardi.my/.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences, Chemistry, Environmental Sciences.

Research and training: Rice and other economic crops (except palm oil, rubber and cocoa), horticulture, livestock, biotechnology, food technology, mechanization and automation, natural resources and environment, socio-economy and technology management, entrepreneurship.

Achievements: Release of new varieties of rice, papaya, pineapples, tapioca, orchids and livestock; productivity improvement (cultural practices, pest and disease management, mechanization); technology on post-harvest handling; food processing and product development.

Facilities: 32 research stations and locations, computer-servers and inter-and intranet facilities with several hundred PCs and softwares, Well-equipped biotechnology laboratories and transgenic glasshouse; RSO certified agriculture and food analytical laboratories; main library; farm implements and research laboratories; netted and train-shelter facilities.

Future plans: Research thrusts: Productivity and efficiency improvements; competitive advantage improvements of agricultural products; sustainability in agricultural production; production of high-quality food products; exploitation of new and emerging sciences in agricultural production; economic and social forces in agricultural production.

Cooperation with developing countries: Arrangements with 35 organizations, including International Centre for Improvement of Maize (CIMMYT), International Centre of Tropical Agriculture (CIAT), Kesersart University (KU) in Thailand and Council for Agriculture and Resource Development (PCARRD) in Philippines; bilateral cooperation with developing countries including Pakistan, Bangladesh, Indonesia and Thailand.

International Organization: Australian Centre for International Agricultural Research (ACIAR); Food and Agriculture Organization (FAO); United Nations Development Programme (UNDP); Japan International Cooperation Agency (JICA); United Nations Development Programme (UNDP); United Nations Educational, Scientific and Cultural Organization (UNESCO); Wageningen University and Research (WUR) Holland; Islamic Development Bank (IDB); Government-government cooperation with Japan, China, Taiwan, Cuba, Australia, New Zealand and India.

Standards and Industrial Research Institute of Malaysia (SIRIM)

Head of Institution: Mohd. Ariffin Hj. Aton.

Address: Persiaran Dato Menteri, Section 2, P.O. Box 7035, 40911 Shah Alam, Selangor, Kuala Lumpur, Malaysia. **Phone:** (+60 3) 5544-6501. **Fax:** (+60 3) 5519-0677. **Email:** mohd.ariffin_aton@sirim.my, aini.suzana_ariffin@sirim.my. **URL:** www.sirim.my.

Scientific Fields of Interest: Environmental Sciences.

Research and training: Advanced Manufacturing, Advanced Materials, Electronics & Information Technology, Environment and Bioprocess, Standards

Development, SME Development and Incubator Services, Technical Information and Intellectual Property Services, Certification and testing.

Achievements: E-Jari (fingerprint access control system), smart-card time attendance system, bone-china technology, lightweight building materials, catalyzed support from local clays and silica from oil refining industry, industrial cleaners, inserts for Industrial burner for reduced NOX emissions, computer integrated manufacturing system (CIM) for machining prismatic components, development of microbial processes for industrial waste treatment, industrial waste management, airborne fire fighting system, automated glove packaging machine, Mykad reader, handicraft machines, Synthetic bone graft material, Fabrication of bonded magnet, Asbestos-free brake pad for automotive application, Carbon brush for automotive application, Brazing material for joining of metal and ceramic, High-Speed Steel (HSS) cutting tool insert, Metal Injection Molding (MIM) component development.

Facilities: R&D Laboratories: Assembly Technology, Automation, Computer Integrated Manufacturing (CIM), Embedded System, PCB Design & Fabrication, Chemical Technology, Fermentation Pilot-plant, Environmental Technology, Bioprocess, Industrial Automation, Metal Performance, Energy Technology, Ceramics Technology, Metallurgy, Water and Effluent; Metals and Building Materials, Surface Coating, Materials Sciences, Electronic Appliances and Accessory, Lighting And Accessory, Presswork, Fabrication & Welding, Model Making, Prototype Development, Prototyping Services, Graphics And Prototyping, Vehicle and Component Testing, Physical and Dynamic Testing, Time & Frequency, Electromagnetism, Acoustic/Vibration, Mechanical, Meter Calibration, Thermophysical, Primary Gas Flow; Acoustics, Vehicle Emission Devices, High-Pressure Calibrator, Magnetic, Photometry, Mass Calibration, Humidity, Photometry, Power/Energy, Radiation Thermometry, Hygrometry, Viscosity, Resistance Thermometry. Testing Laboratories: Chemical, Fire Engineering, Electrotechnical, Construction and Building Material, Communication Equipment, Electromagnetic Compatibility (EMC), Mechanical Product.

Future plans: Photonics; Nanotechnology; Bio-cosmetics; Industrial and Aquaculture Waste-water Treatment; IP Registration Services for Domain Name, Integrated Circuit Design, Plant varieties and geographical indication; Calibration Services Defense and Health- Sectors; Radio Frequency Identification (RFID) Applications.

Cooperation with developing countries: Research and development projects with institutes in Hungary, India, Indonesia, Kyrgyz Republic, Republic of China, Mauritius, Russia, Thailand, Uganda, South Africa and ASEAN countries.

International Organization: Cooperation programmes in field of standards, quality, technical information, inspection, joint research projects, experts services with international organizations from Australia, Brunei, Canada, Denmark, France, Germany, Japan, Korea, New Zealand, Taiwan and UK.

Universiti Malaysia Sarawak (UNIMAS) — Faculty of Computer Science and Information Technology (FCSIT)

Head of Institution: Ass. Prof. Narayanan.

Address: 94300 Kota Samarahan Sarawak, Malaysia. **Phone:** (+60 82) 672-279. **Fax:** (+60 82) 672-301. **Email:** nora@fit.unima.my. **URL:** www.unimas.my.

Scientific Fields of Interest: Mathematics.

Research and training: Machine learning, ICT and society, knowledge-based systems, human computer interaction and modeling; GIS, image processing, digital watermarking, visualization, content-based image retrieval; performance study of WLAN and ATM-LAN integration, voice communications over WLAN, grid computing, network messaging protocols, cooperative broadband wireless network (OFDM).

Achievements: Publications at workshops, conferences and symposia, testbed for WLAN and ATM-LAN integration, e-bands.

Facilities: PC workstations, WLAN 802.11b equipment (access points, wireless bridges, external antenna modules, video servers, wireless client workstations, wireless portable computers, ATM switches, high-speed Ethernet switches), MATLAB, library with full-time access to electronic collection of e-journals, intranet.

Future plans: Research lab in the area of knowledge systems, center for rural ICT, flood mitigation studies, application of decision tool in environmental decision-making, more comprehensive wireless test bed, next-generation wireless system research, publication in internationally refereed journals.

International Organization: Dept. of mathematics, Imperial College; University of Waikatu, New Zealand; Waseda University, Japan.

Universiti Malaysia Sarawak (UNIMAS) — Faculty of Engineering

Head of Institution: Dr. Azhaili Baharun, Dean.

Address: 94300 Kota Samarahan Sarawak, Malaysia. **Phone:** (+60 82) 583-325. **Fax:** (+60 82) 583-409. **Email:** bazhaili@feng.unimas.my. **URL:** www.unimas.my.

Scientific Fields of Interest: Engineering.

Research and training: Geo-environmental and soft soil engineering; concrete and light-weight structures; construction and contract management; hydrology; environmental engineering; building services and housing technology; computer simulation and modeling; mechanical and manufacturing systems; energy; telecommunications; micro-electronics and artificial intelligence.

Achievements: Papers published in journals and conferences.

Facilities: Triaxial test; direct shear test apparatus; compaction and vane shear apparatus; flow channels; universal testing machine; concrete labs; ultrasonic flow detector; testometric; metallurgical microscopes; CNC machines; comm. lathe machine; milling; CATIA and CFO laboratory; electrical power engineering; electronics; electromagnetic; power design; microprocessing; data communication; satellite.

Future plans: Increase the number of research papers, Post-graduate students, staff with Ph.Ds and PEs and laboratory facilities. Also establish a research institution with respect to the needs of Sarawak and Malaysia.

Cooperation with developing countries: Nagoya, Japan

International Organization: Osaka Gas, Japan; University of Leeds, UK; Manchester University, UK.

Universiti Putra Malaysia

Head of Institution: Prof. Dato' Dr. Nik M. R. Abdullah, Vice Chancellor.

Address: 43400 UPM Serdang Selangor, Malaysia. **Phone:** (+60 3) 8946-6001. **Fax:** (+60 3) 8948-3244. **Email:** nc@putra.upm.edu.my. **URL:** www.upm.edu.my/.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences, Chemistry, Engineering, Environmental Sciences.

Research and training: Research: Drug discovery; phytochemistry; metabolite engineering; nutrigenomics; molecular biotechnology; vaccine and immunotherapeutic; bioprocess engineering; microbial technology; marine biotechnology; marine ecology and biodiversity; pollution and environmental; aquaculture; pathology molecule; pre-clinical oncology; diagnostic and therapeutic. Training: practical training at laboratories, microscopy unit, fermentation technology unit, biodiversity unit.

Achievements: Technologies / Products commercialized: Newcastle disease vaccine, V4-UPM Heat-Resistant strain; Fowl pox vaccine-tissue-culture adapted; Fast Target TM white spot syndrome virus detection kit; probiotic for poultry disease; bacteriocin UL4, antimicrobial compounds. Patents granted: a process for treatment of palm oil mill effluent and conversion of the palm oil mill effluent into biodegradable plastics; an improved method for the detecting of white spot syndrome virus (WSSV) by single-tube nested deoxyribonucleic acid amplification and a detection kit; nucleotide sequences of the nucleocapsid (NP) and phosphotein (P).

Facilities: All laboratories (Marine science and aquaculture, natural products, cancer research UPM-MAKNA, Molecular and cell biology, molecular biomedicine, industrial biotechnology) are very Well-equipped with the necessary lab equipment to carry out research in the specific fields.

Future plans: MS ISO 17025 and 9001:2000 certification; increased network and linkages with international institutions and industry; provide excellent research facilities to attract trained researchers.

Cooperation with developing countries: Bio Perak (M) Sdn. Bhd, Perak SEDC, Asia Aquaculture (M) Sdn. Bhd; Pertubuhan Peladang Negeri Pahang; Borneo Plantation Technology, Sarawak; Cancer Research Initiative Foundation (CARIF, Malaysia); Stella Gen Sdn. Bhd; Malaysian Agri Hi-Tech; Sime Darby Sdn. Bhd.; Malaysian Vaccine and Pharmaceutical Sdn. Bhd; Majlis Amanah Kanser Nasional Malaysia (MAKNA); Bio Perak (M) Sdn. Bhd, Perak; SEDC, Asia Aquaculture (M) Sdn. Bhd; Pelantar Cergas Sdn. Bhd.; Perak State Economic Development Corporation; Malaysian Palm Oil Board Berhad; Bernas Sdn. Bhd.

International Organization: HEJ Institute of Chemistry, Karachi; University of Tokyo, Japan; Yunnan Agriculture University; National Pingtung University of Science & Technology, Taiwan; Japanese Society for Promotion of Science (JSPS); Asian Fisheries Society; National Energy Development Organisation (NEDO) Japan.

University Malaysia Sabah — Borneo Marine Research Institute

Head of Institution: Prof. Dr. Saleem Mustafa.

Address: Beg Berkunci 2073, 88999 Kota Kinabalu, Sabah, Malaysia. **Phone:** (+60 88) 320-266. **Fax:** (+60 88) 320-261. **Email:** bmr@ums.edu.my, saleem@ums.edu.my. **URL:** www.ums.edu.my/ipmb.

Scientific Fields of Interest: Agricultural Sciences, Environmental Sciences.

Research and training: Marine aquaculture; marine biodiversity; coastal oceanography.

Achievements: Books; research papers; international awards and recognitions; trained Human-resources.

Facilities: Research vessel and 4 motor boats for marine surveys; laboratory equipment with facilities for specific research in physical, chemical and biological oceanography, biotechnology; marine fish hatchery; for breeding and larval rearing of fish, and related aspects of marine aquaculture; sea cages for grow out; resource library; computer room; marine aquarium.

Future plans: Expansion of existing hatchery; development of a modern shrimp hatchery; expansion of Post-graduate building block; acquisition of more equipment; additional technical and academic staff.

Cooperation with developing countries: We have arrangements with networks, mainly for exchange of visits and organizing workshops.

International Organization: Kinki university, Japan, for student exchange and annual industrial training in aquaculture; Inter-Islamic Science and Technology Network on Oceanography for jointly organizing conferences/workshops, etc.; Charles Darwin Univ., Australia for scholar exchange; NGOs such as WWF for marine conservation projects; arrangements for other international organizations are at discussion stage.

University of Kebangsaan — Faculty of Engineering

Head of Institution: Prof. Dr. Mohd. Marzuki Mustafa.

Address: 43600 UKM Bangi, Selangor DE, Malaysia. **Phone:** (+60 3) 8921-6100. **Fax:** (+603) 8925-2546. **Email:** engdean@eng.ukm.my, marzuki@eng.ukm.my. **URL:**

<http://pkukmweb.ukm.my/~jurutera/english/index.html>.

Scientific Fields of Interest: Engineering.

Research and training: Civil engineering, chemical and biochemical engineering; environmental engineering; electrical, electronic and system engineering; mechanical, manufacturing and materials engineering; architecture.

Achievements: In all areas above.

Facilities: Fuel cell lab; automotive lab; MEMS lab; and other labs related to the above fields of research.

Future plans: Research and development will be consolidated with increased participation from industry.

Cooperation with developing countries: Mostly with Indonesia.

International Organization: Exchange Programme with university of Duisburg, Germany; R&D collaboration with many other institutions.

University of Kebangsaan — Institut Biologi Sistem (INBIOSIS)

Head of Institution: Prof. Dr. Normah Mohd. Noor, Director.

Address: 43600 UKM, Bangi Selangor DE, Malaysia. **Phone:** (+60 3) 8921-4461. **Fax:** (+603) 8921-3398. **Email:** pghinbio@pkriscc.ukm.my. **URL:** <http://pkukmweb.ukm.my/~inbiosis/home.html>.

Scientific Fields of Interest: Biological Sciences.

Research and training: Molecular exploration of tropical biodiversity and sustainability for discovery of new genes and biomolecules; application of transgenic technologies for crop improvement and production of new biomolecules.

Achievements: No new product as the institute was only established in July 2005.

Facilities: Automated DNA sequencer ABI377; oligonucleotide synthesizer; DNA engine (thermocycler); ultracentrifuge (Beckman); ultralow freezer (-80° Celsius); HPLC; refrigerated high-speed centrifuge; refrigerated centrifuge, tabletop; spectrophotometer, UV visible; orbital incubator shaker; Syngene 2; refrigerated high-speed centrifuge, benchtop; thermocycler, gradient; agar filling system; biolistic gun (Biorad); biohazard cabinet (Gelman); freeze dryer (North Star); freezer, cryosystem (Cryomed); ultralow freezer, (-70° Celsius); growth chambers; inverted microscope (CZ Jena); stereomicroscope (Nikon);

microtome (Medin); thermocycler (Eppendorf); photographic system (Polaroid); orbital incubator shaker (Hotech).

Future plans: More human resource and funding need to be secured for research.

International Organization: Collaborative research with the International Plant Genetic Resources Institute (IPGRI).

University of Kebangsaan — Institute of Space Science

Head of Institution: Prof. Dato Dr. Baharudin Din Yatim.

Address: 43600 UKM, Bangi, Selangor DE, Malaysia. **Phone:** (+60 3) 8921-6853. **Fax:** (+603) 8921-6856. **Email:** angkasa@pkriscc.cc.ukm.my. **URL:** <http://pkukmweb.ukm.my/~angkasa>.

Scientific Fields of Interest: Earth Sciences, Engineering, Physics.

Research and training: Computation of electronics' properties of semiconductor nano structures; cosmic rays and UV detection; smart antenna system; ionospheric research(bipolar equatorial); atmospheric precipitable water vapor study (polar-equatorial); aircraft collision warning and avoidance systems; earthquake precursor based on seismo-ionospheric coupling; web-based weather advisory system for rural areas.

Achievements: 3G smart antenna testbed; low-cost aircraft collision warning and avoidance system; ionospheric TEC variations during solar eclipse; technique for determination of storm vector using single GPS receiver; coupling of solar event on PWV.

Facilities: High-performance dual-frequency GPS receiver; network analyzer (up to 9 GHz); signal generator (up to 20 GHz); spectrum analyzer (up to 20 GHz); power meter (up to 3 GHz); programmable beacon receiver (own developed); EM software (sonnet, IE3D).

Future plans: Sun-earth connection and tele connections between upper and lower levels of the atmosphere; aircraft guidance and navigation systems based on nature signatures; aircraft collision warning system; web-based weather advisory system for rural areas.

Cooperation with developing countries: Earthquake precursor sensing using GPS and Digisonde with Indonesia; Ionospheric studies on Saudi Arabia with King Abdul Aziz University, S. Arabia.

International Organization: Hanscom air force research laboratory, USA (SCINDA equipment); space environment research center, Kyushu University, Japan (MAGDAS System); University of Stanford, USA (AWESOME equipment).

University of Malaya — Faculty of Engineering

Head of Institution: Prof. Rom Tamjis.

Address: 59100 Kuala Lumpur, Malaysia. **Phone:** (+60 3) 7967-5200. **Fax:** (+603) 7956-1378. **Email:** zahari@fk.um.edu.my. **URL:** www.um.edu.my/um_life/academics/faculties/fac_of_engineering.php?intPrefLangID=1&.

Scientific Fields of Interest: Biological Sciences, Chemistry.

Research and training: Research: Power electronics and drives; separation science and technology; construction technology; transportation; energy sciences; automation control and communication; product design and manufacturing; civil, electric, chemical, mechanical and biomedical engineering. Under-graduate training: B.Eng. in civil engineering; environmental; electrical; telecommunication; mechanical, materials; CAD/manufacturing; chemical; biomedical. Post-graduate training: M. Eng. in electrical energy and power systems; telecommunications; manufacturing; material engineering and technology; engineering science.

Achievements: Papers published in journals and conferences.

Facilities: Numerous equipped laboratories including Chemistry (biochemical engineering, pilot-plant, fluids, thermodynamics, mass transfer, polymer processing), civil (heavy structures, concrete technology, soil mechanics, highway engineering, hydraulics), Electrical (power electronics, electromagnetic, power design, microprocessing, data communications, satellite), Mechanical (Applied mechanics, ceramics, combustion, Composites materials, control engineering corrosion, solar energy lab, x-ray diffraction).

Future plans: Increase number of Post-graduate students, funding and number of staff with Ph.Ds. Establish an institute of advanced engineering research.

Cooperation with developing countries: AUN/SEED-Net - ASEAN university Network/ South East Asia Engineering Education Development Network; AESEAP Association for Engineering Education in South East Asia and the Pacific; RUNAP - Regional Universities Network Asia/Pacific.

University of Malaya (MU) — Department of Chemistry

Address: Jabatan Kimia Universiti Malaya 50693 Kuala Lumpur, Malaysia. **Phone:** (+60 3) 7967-4204. **Fax:** (+60 3) 7967-4193. **Email:** ketua_kimia@um.edu.my. **URL:** www.kimia.um.edu.my.

Scientific Fields of Interest: Biological Sciences, Chemistry, Environmental Sciences.

Research and training: Training: Under-graduate - education programs; Post-graduate - M.Sc. analytical and instrumental; M.Sc by research and Ph.D by research. Research: advanced materials; computational chemistry; drug discovery and design; environmental and analytical chemistry; nanomaterials;

natural product research; polymer and polymer technology; kinetics of organic reactions; metal complexes and applications.

Achievements: In 2004, at least 5 patents were filed for research arising from the projects by the member of the department in the areas of drug discovery (dengue virus inhibitor activity), nanomaterials (colloid and surfactants), polymer technology and catalysis. More than 200 papers have been published in refereed, international journals and more than 100 papers have been presented at international and local seminars and conferences.

Facilities: Currently, the departmental resources include, the NMR Spectrometer (JEOL 400MHz), liquid-chromatography-mass spectrometer(LCMS), FT/IR spectrometer(Perkin-Elmer 1600 and ATI Mattson) and computational facilities. Other instruments include, several UV-visible spectrophotometers, gas chromatography-mass spectrometer (GC-MS), gas-chromatographs, high-performance liquid-chromatographs (HPLC), AAS/ES, DSC and TGA. More specialized equipments are also available but associated with each section or research group. The department also maintains an electronics and machine shop for the rapid on-site repair and maintenance of laboratory equipment. It also houses a glass-blowing shop for the creation of custom-designed apparatus and repair of glassware.

Future plans: The departments' immediate plan is to increase the number of research and graduate students which is in line with the plans of the University of Malaya and the Ministry of Education of Malaysia to make the Univ. a research university.

Cooperation with developing countries: Some cooperation has been set up by the university with some developing nations around the Southeast Asia region. There are currently, informal research collaborations amongst various research groups in the department with other research groups around the South Pacific region. The department is currently looking into some formal research collaborations with the developing countries around the regions, in particular, Indonesia, Thailand, the Philippines, Vietnam, India and China.

International Organization: Present: Fritz Haber Institute of the Max Planck Society (FHI, Germany); University of Hamburg, Univ. of Manchester, Univ. of Southampton, UK; Oregon State Univ. Corvallis, USA; Institut de Chimie des Substances Naturelles (ICSN), France. Planned: Univ. of Bordeaux, France; Pukyong Univ., Korea; Mahidol Univ., Thailand.

Mauritius

Mauritius Sugar Industry Research Institute (MSIRI)

Head of Institution: Dr. Jean Claude Autrey.

Address: 1 Moka Road Reduit, Mauritius. **Phone:** (+230) 454-1061. **Fax:** (+230) 454-1971. **Email:** jcautrey@msiri.intnet.mu, m.s.i.r.i.@msiri.intnet.mu.

URL: www.webmsiri.intnet.mu.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences, Engineering, Environmental Sciences.

Research and training: Research in sugarcane and food crops; crop improvement; biotechnology; crop protection; crop management; crop diversification; environment and natural-resource management; sugar technology; sugar engineering; co-products; bio-mass valorization; economics; technology transfer. Training is customized to suit the needs of requestors (see annexed extract from International Sugar Journal).

Achievements: Publications: annual reports; recommendation sheets; advisory bulletins; scientific and technical papers; research reports. Customized databases, e.g. MECABASE, GISCANE; Crop varieties: sugarcane, maize, tomato, groundnut, bean, palm; Maps; Decision support systems, e.g. SIRITELL..

Facilities: Four experimental stations; library with over 30,900 volumes; 100 computers (LAN with 3 servers); laboratory and analytical equipment; state-of-the-art in many areas including biotechnology with DNA analysis, real-time PCR, biolistic gun.

Future plans: The sugar industry is transforming itself into one of renewable bio-mass. In that respect areas of priority in R&D in the coming years will be: Genetics and crop improvement (high-quality cane, high-fiber cane, energy cane); biotechnology (genome mapping, marker assisted selection, molecular diagnostics); co-products (value addition to bagasse for electricity, molasses for ethanol, etc.); bio-mass valorization (use of sugarcane as a biofactory to produce vaccines, bio-polymers, etc.).

Cooperation with developing countries: Collaborative pilot project with Instituto de Pesquisas Technologicas (IPT), Brazil for bagasse utilization; Global Taxonomy Initiative (GTI) with Mauritius Herbarium; Flora of the Mascarenes (MSIRI, IRD and the Royal Botanical Gardens, Kew).

International Organization: SUCRETTE project (CIRAD, MSIRI); Biotechnology (International Consortium for Sugarcane Biotechnology); Mendel Biotechnology, Calif. USA; SUCEST Project, Brazil.

University of Mauritius

Head of Institution: Prof. I. Fagoonee, Vice-Chancellor and Chairman of Senate.

Address: Réduit, Mauritius. **Phone:** (+230) 454-1041-49. **Fax:** (+230) 454-9642. **Email:** centraladmin@uom.ac.mu. **URL:** www.uom.ac.mu.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences, Chemistry, Earth Sciences, Environmental Sciences, Mathematics, Physics.

Research and training: Research work in the field of ICT, Communications, astrophysics, biodiversity, environmental science and engineering, health and medical sciences, linguistics, science and technology, social development, etc. Students are encouraged to engage themselves in M.Phil and Ph.D projects.

Achievements: Fieldwork analysis on smoking, drinking and illicit drug use among secondary school students in Mauritius; integration of the elderly in the family; experiences of violence and squatting; working time in Mauritius. Workshops, seminars and international conferences were organized whereby the university personnel participated actively and the creativity of students was highlighted (ICool 2003; Lifelong Learning Cluster); Executive Development Programmes and Training Programmes (CISCO Network Academy Programme); CARENSA (Cane resources network for Southern Africa); Enviropak International project); Several Consultancy and contract research projects in various fields.

Facilities: University library: a collection of books and periodicals for loan or reference consultation; access to databases, online or on CD-ROM; computerized information searches; inter-library loans from local libraries or from abroad; retrieval and photocopy facilities. Well-equipped research laboratories and extensive computer facilities for the state-of-the-art research provided to both students and staff. The faculty of agriculture runs a University Farm for training and research. The Engineering Tower, attached to the Faculty of Engineering, has reached its final stage of construction. Various centres at the University conduct research work and provide key support services.

Future plans: Increase access to the University; internationalize the University by increasing overseas students' enrollment; ensure relevance of programmes offered and quality of teaching and learning by improving infrastructure and learning environment; strengthen management and improve efficiency of the university's administration; expand and diversify the University's fund base; strengthen the University's research capacity and develop innovative niches within the context of globalization and making Mauritius a cyber island.

Cooperation with developing countries: The University has signed several Memorandum of Understanding with universities in Africa and Asia.

International Organization: Some programmes are offered by the University of Mauritius through joint collaboration with other foreign universities (e.g. Charles Stuart University, Université de Bordeaux, etc.)

Mexico

Centro de Investigación Científica de Yucatán (CICY)

Head of Institution: Dr. Alfonso Larqué Saavedra, GD.

Address: Calle 43 No. 130, Colonia Chuburná De Hidalgo, CP 97200, Mérida, Yucatán, Mexico. **Phone:** (+52 999) 981-3966. **Fax:** (+52 999) 9813-900.

Email: larque@cicy.mx, webmas@cicy.mx. **URL:** www.cicy.mx.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences, Environmental Sciences.

Research and training: Biochemistry, plant molecular-biology, biotechnology, materials and polymer sciences, methodologies for multiplication in large-scale of economically important species, plant genetics, cellular and molecular-biology and physiology, somatic embryogenesis of coffee, coconut, chilies and other native species; identification and isolation of active principles in medicinal plants; hydrology of Yucatán peninsula; ecological and taxonomic studies of plant species from the Yucatán peninsula; composite materials applicable in human prosthesis (biomaterials); polymer composites reinforce with natural and synthetic fibers; gas permeable membranes

Achievements: Continuous maize production techniques; technology for massive reproduction of agaves; coconut, coffee, papaya, chilies and other species improved cultivars; technology development for alcoholic beverages derived from agaves; creation of the most important herbarium in Mexico's Southeast; creation of a botanical garden presenting Yucatán' peninsula main species; laboratory for large-scale plant micropropagation; germoplasma bank for important native species; hydrocarbon separation membranes; environmental education programs for children; calibration and verification of instruments for industry.

Facilities: 330 personal computers; library with more than 8,000 books and subscriptions to 200 reviews; 2 auditoriums; 5 classrooms; 16 laboratories; herbarium; botanical gardens; greenhouses; plantation fields

Future plans: Opening new masters and doctorate curricula.

Cooperation with developing countries: Costa Rica; Cuba; Israel; El Salvador

International Organization: France, Germany, The Netherlands and UK.

Centro de Investigación Científicas y Educación Superior de Ensenada (CICESE)

Head of Institution: Dr. Federico Graef Ziehl.

Address: Km. 107 carretera Tijuana-ensenada, 22860 Ensenada, Baja California, Mexico. **Phone:** (+1 646) 175-0500, xt 22000. **Fax:** (+1 646) 174-4729. **Email:** dgeneral@cicese.mx, fgraef@cicese.mx. **URL:** www.cicese.mx.

Scientific Fields of Interest: Biological Sciences, Earth Sciences, Engineering, Environmental Sciences, Physics.

Research and training: Geophysics; geology; seismology; computer sciences; electronics; telecommunications; optics; aquaculture; ecology; biological oceanography; physical oceanography; conservation biology; marine biotechnology; microbiology.

Achievements: Please visit <http://productividad.cicese.mx>

Facilities: 2 supercomputers; 1 high-performance cluster; connection to Internet; facilities a La Paz, Sur and Monterrey; specialized library; oceanographic vessel; 113 specialized labs; 2 electronic microscopes; 6 seismographic nets; a sea-level network.

Future plans: Strengthen priority research areas, focus on multidisciplinary, high-impact strategic projects; promote the consecution of resources via projects from CONACYT and other institutions; shorten time of graduation for doctoral degrees; elaborate, with students and researchers, an entrepreneur program which relates to the productive sector; establish a training program for technical, administrative and support personnel.

Cooperation with developing countries: Comité Oceanográfico Nacional de Chile; Instituto Antártico Argentino; Instituto del Mar del Perú; Instituto Politécnico Superior 'José Antonio Echeverría', Cuba; Inter-American Institute for Global Change Research; LAESO (Latin America Europe School of Oceanography); Agencia Interamericana para la Cooperación y el Desarrollo de la OEA; Rand Afrikaans University; Servicio Hidrográfico y Oceanográfico de la Armada de Chile; Universidad de Concepción, Chile; Universidad de Costa Rica; Universidad Federal de Santa Catarina, Brasil; Universidad de Hong Kong; University of Manitoba, Canada.

International Organization: We have agreements and academic collaborations with more than 50 universities and research institutions, government agencies, civic associations, museums and other international organizations, among them are: British Council; Centre National de la Recherche Scientifique (CNRS), France; European Union; European Space Agency; Japan International Cooperation Agency (JICA); Harvard University; NASA - Jet propulsion lab; Massachusetts Institute of Technology (MIT); National Science Foundation; Scripps Institution of Oceanography; UNESCO; Woods Hole Oceanographic Institute; World Wildlife Fund, Inc.

Centro de Investigación en Matemáticas A.C. (CIMAT)

Head of Institution: Dr. José Carlos Gómez Larra-aga.

Address: Jalisco s/n, Col. Mineral de Valenciana, 36240 Guanajuato, Mexico.

Phone: (+52 473) 732-7155. **Fax:** (+52 473) 732-5749. **Email:** jcarlos@ciamat.mx, ciamat@ciamat.mx. **URL:** www.cimat.mx/.

Scientific Fields of Interest: Mathematics.

Research and training: Functional analysis; algebraic geometry; differential geometry; applied mathematics; dynamic systems; topology and combinatory geometry; applied statistics; inferential statistics; stochastic modeling; mathematical computation; software engineering.

Achievements: 64 publications per year; 160 lectures in average per year in international and national conferences; 70 visitors per year for academic work; 60 visits per year by invitation to academic institutions.

Facilities: Computer lab; electronic lab; library with 21,000 books, 240 journal titles, 6 databases; 270 personal computers; eight servers; Internet service; seven classrooms; one auditorium with 100 seats.

International Organization: Collaboration agreement with University of Texas, Dallas and International Center for Numerical Methods for Engineering, Spain.

Centro de Investigación y de Estudios Avanzados (CINVESTAV-IPN) — Departamento de Física

Head of Institution: Gerardo Herrera Corral.

Address: Av. IPN 2508, Col San Pedro Zacatenco, 07360 Mexico, D.F., Apartado Postal 14-740, 07000 Mexico, D.F., Mexico. **Phone:** (+52 55) 5061-3842. **Fax:** (+52 55) 5061-3388. **Email:** gherrera@fis.cinvestav.mx.

Scientific Fields of Interest: Mathematics, Physics.

Research and training: Theoretical and experimental physics of High-energy, Solid-state, Statistical, Medical, and Mathematical and gravitational physics.

Achievements: 156 publications in international journals, 87 conference proceedings, technical reports.

Facilities: 40 labs for experimental High-energy and solid-state physics; 2 labs for statistical physics; 4 labs with 150 computers; 3 central libraries with over 9,000 physics books and 15,000 mathematics books.

Instituto de Investigaciones Eléctricas (IIE)

Head of Institution: Oswaldo Gangoiti Ru'z, Exe. Dir..

Address: Av. Reforma #113, 62490 Cuernavaca, Morelos, Mexico. **Phone:** (+52 777) 362-3842. **Fax:** (+52 777) 362 3843. **Email:** fkhors@iie.org.mx. **URL:** www.iie.org.mx.

Scientific Fields of Interest: Engineering.

Research and training: Alternative energy sources; control systems; electric systems; mechanical systems

Achievements: Alternative energy sources: hybrid systems, solar-wind, solar-photovoltaic; engineering and consulting services on hybrid power plants (solar-wind-diesel), autonomous and grid-connected PV systems (development of technical specifications, laboratory tests for systems and components, strategic studies for mass application), isolated wind systems for specific applications; consulting services for development of ISO9000:2000 quality systems and ISO 14000 environmental protection systems; environmental impact technological developments; application of dispersion models for atmospheric contaminants. Control systems: advanced control; measurement of electric energy; full-range fiber-optics networks; communication protocol; development of information systems based on web multimedia technology; administrative portals; intelligent distance training systems; supervisory control systems for electrical substations; data acquisition systems, alarms and event recording for thermoelectric power plants; real-time analysis and evaluation systems to optimize operation of inventory of energy resources (boundary measurement) and the vigilance of the thermal region (thermodynamic efficiency); development and updating of full, partial range or basic principle simulators to facilitate personnel training in plant operation and industrial processes. Electrical Systems: Development of models and systems for planning of operation and dispatch of electric energy; development of models and systems for implementation of competitive markets; developments in energy efficiency; reliability studies in industrial electric systems; insulation selection under pollution conditions; design of transmissionlines and high voltage power and distribution substations; planning and operation of distribution networks; development of monitoring systems for electrical equipment diagnosis; development of software for measuring, control, maintenance and diagnosis of electric equipment; analysis of electric network transients on the operation of electric power equipment. Mechanical Systems: Structural design and analysis; analysis of structural foundation setting; analysis of stresses in hydrocarbon pipelines; development of compound polymeric materials; systems for Sox control; non-destructive ultrasound tests; analysis of the steam cycle; failure analysis; energy diagnosis; evaluation of steam and gas turbine efficiency; analysis of thermal stresses and thermofluence; characterization of dynamic behavior of turbo-groups.

Instituto Nacional de Ciencias Médicas y Nutrición "Salvador Zubiran" (INNSZ)

Head of Institution: Dr. Fernando Gabilondo Navarro.

Address: Vasco de Quiroga No. 15, Col. Sección XVI, Tlalpan, Mexico, D.F. C.P. 14000, Mexico. **Phone:** (+52 55) 5573-1127, 5573-1193, 5487-0900 ext. 2101. **Fax:** (+52 55) 5513-2926. **Email:** fgab@quetzal.innsz.mx, director@quetzal.innsz.mx. **URL:** www.innsz.mx.

Scientific Fields of Interest: Biological Sciences.

Research and training: We perform clinical, basic and epidemiological research in addition to technological development. Some examples of clinical research are phase 2 and 3 pharmacological studies in the treatment of diabetes mellitus, hypertension, HIV and osteoporosis. Basic research includes the identification of disease genes, regulation of the expression of liver genes and a proteomics laboratory involved in cancer research. Epidemiological studies include nutritional surveys and a national registry of congenital malformations.

Achievements: Development of an international database of patients with the anti-phospholipid syndrome, permanent epidemiological vigilance of congenital malformations at the national level, immunopathology of tuberculosis, integral medical attention to marginalized communities, rotavirus and diarrheas, *Helicobacter pylori* in relation to gastric cancer; development of rotavirus vaccine.

Facilities: 40 research laboratories; excellent biomedical library; Internet access, including the US National Library of Medicine; email server; modern research equipment including real-time PCR, and many computers. We are about to inaugurate a center for the development of medical and surgical skills.

Future plans: The establishment of a proteomics laboratory.

Cooperation with developing countries: None is planned.

International Organization: EU, The Wellcome Trust and the US NIH.

International Maize and Wheat Improvement Center (CIMMYT)

Head of Institution: Dr. Masaru Iwanaga, Director.

Address: Apartado Postal 6-641 06600 Mexico City, D.F. Mexico. **Phone:** (+52 55) 5804-2004. **Fax:** (+52 55) 5804-7558. **Email:** m.iwanaga@cgiar.org, cimmyt@cgiar.org. **URL:** www.cimmyt.cgiar.org/.

Scientific Fields of Interest: Agricultural Sciences.

Research and training: The primary objective is to produce maize and wheat breeding materials and lines that developing country partners - whether engaged in publicly or privately supported research - can use to increase farm-

level productivity while protecting the environment. Solutions for small holder farmers are emphasized with the aim of contributing to poverty alleviation. CIMMYT distributes breeding varieties and lines to more than 100 countries through its international testing and distribution networks. CIMMYT also conducts research on technologies related to crop and farm management and soil fertility. Collaborative research with dozens of advanced research institutes (ARI) leverages its efforts on behalf of the developing world's poor. In addition, CIMMYT generates new scientific knowledge and more effective research procedures and protocols. CIMMYT maintains two of the world's largest germplasm collections of maize and wheat, and is active in the fields of genetic diversity and genetic conversation. The center supports national agricultural research programs through training, information services and consulting.

Achievements: The main products are improved varieties of maize and wheat developed in collaboration with scientists from around the world. The varieties are improved for yield- potential, consumer traits, nutritional composition, stress tolerance, and disease and pest resistance. An estimated half (53%) of all publicly bred maize varieties released from 1966 to 1998 in developing countries contained CIMMYT germplasm. 64% of all spring bread wheat in the least- developed countries contained CIMMYT germplasm. CIMMYT activities are also responsible for the adoption of zero tillage and conservation technology rising from 12,000 hectares in 1999-2000 to more than 150,000 hectares in 2000-2001 in the western Indo-Gangetic Plains, India, alone - and the trend has continued. Since its inception, approx. 10,000 people have been trained at CIMMYT through various forms of capacity-building activities - courses, workshops, study stay, etc. Close to 800 scientists finished their theses (B.Sc., M.Sc., Ph.D.) with support from CIMMYT.

Facilities: The headquarters at El Batán, Mexico includes an extensive office complex; various labs and greenhouses (including biotechnology labs and bio-safety greenhouses); seed processing facilities; a state-of-the-art gene-bank with short and long-term storage capabilities, and crop trial and seed multiplication fields with the equipment to prepare and maintain them. The center's facilities also include four additional experimental stations located in diverse agro-ecoenvironments in Mexico.

Future plans: CIMMYT will continue to improve genetic stocks of maize and wheat, with particular emphasis on drought tolerance. Use of molecular breeding techniques will play a large role in the future, in tandem with allele and gene mining to acquire target traits, in part through better exploitation of the Center's extensive germplasm collection. Continued emphasis will be given to global crop-related biodiversity, resource conservation technologies for maize and wheat cropping systems, biofortified grains, improved research methodologies and tools for genetic improvement, knowledge management/knowledge-sharing and capacity-building of partners.

Cooperation with developing countries: Staffs are stationed in 16 countries and - Afghanistan, Bangladesh, China, Colombia, Ethiopia, Georgia, India, Iran, Kazakhstan, Kenya, Mexico, Nepal, Pakistan, Turkey and Zimbabwe. Research

collaboration takes place in approx. 80 countries. In most cases, formal agreements have been signed.

International Organization: CIMMYT is part of the Consultative Group on International Agricultural Research (CGIAR includes 15 other centers) and receives funding from many technical-aid agencies. Major donors to CGIAR and CIMMYT include the World Bank, USAID, the EU, Japan and the Rockefeller Foundation.

National Institute for Forestry, Agricultural and Livestock Research (INIFAP)

Head of Institution: Heriberto Roman Ponce, Dir. Regional.

Address: Centro de Investigacion Regional del Golfo Centro, Ocampo 234 Desp. 322, Piso 3, Colonia Centro, 91700 Veracruz, Ver., Mexico. **Phone:** (+52 229) 931-7104. **Fax:** (+52 229) 932-7495. **Email:** roman.heriberto@inifap.gob.mx. **URL:** www.inifap.gob.mx.

Scientific Fields of Interest: Agricultural Sciences.

Research and training: Tropical agricultural problems associated with grain, vegetable, fruits and industrial crop production and transformation; dairy and beef production systems; pig and egg production on rural communities; tropical forestry wood production and Agro-forestry systems.

Achievements: New technology for agricultural and livestock system; new varieties of different crops (maize, beans, rice); developed bovine genotypes adapted to tropical environment for dairy and beef production on dual-purpose system.

Facilities: 9 field research stations with facilities for field trials; different laboratory facilities.

Future plans: Improve infrastructure of principal research stations, like La Posta, El Parmar and Huimanguillo.

International Organization: Different government agencies; private companies (Nestlé and others).

Unidad de Laboratorios de Ingeniería y Expresión Genéticas (ULIEG)

Head of Institution: Hugo A. Barrera-Salda-a.

Address: Departamento de BioQuímica, Facultad de Medicina de la U.A.N.L., Apartado Postal 3-4125, Monterrey, N.L. 64460, Mexico. **Phone:** (+52 81) 8329-4174 ext.2816. **Fax:** (+52 81) 8333-7747. **Email:** hbarrera@fm.uanl.mx. **URL:** www.medicina.uanl.mx/medicina/dep/ulieg/principal.htm.

Scientific Fields of Interest: Biological Sciences.

Research and training: Diagnosis and epidemiology of malignant infectious and inherited diseases; comparative genomics of growth hormones; gene therapy in cancer; biomedical biotechnology.

Achievements: Mutation profiles for several inherited diseases; Diagnostic tests for several inherited diseases; new yeast strains over-producers of human and animal growth hormones; Gene therapy clinical trials; description of phylogenomics of growth hormone locus in primates.

Facilities: Cell-culture; bio-informatics; DNA cloning and sequencing; fermentation, microarrays; quantitative PCR; protein purification and characterization; expression technologies.

Future plans: To transform our current unit of biomedical research into an Institute for Molecular Medicine; hiring more scientists; acquiring equipment and technology for genomics and interacting more closely with physicians; contracting research with industry, and collaborating more extensively and effectively with leading laboratories on the country and from abroad.

Cooperation with developing countries: Collaboration in the study of inherited diseases with colleagues in Colombia, Venezuela and Peru. Collaboration in human papilloma virus and cervical cancer with colleagues from Brazil and USA.

International Organization: Cooperation with American Universities of Texas and California as well as with European Universities in Madrid and Strasbourg.

Universidad Autónoma de Puebla — Instituto de Física “Ing. Luis Rivera Terrazas” (IFUAP)

Head of Institution: Gregorio Hernández Cocoltzi.

Address: Apdo. Postal J-48 Puebla, Puebla 72570, Mexico. **Phone:** (+52 222) 245-7545, 229-5610. **Fax:** (+52 222) 229-5611. **Email:** cocoletz@sirio.ifuap.buap.mx, rosy@sirio.ifuap.buap.mx. **URL:** www.ifuap.buap.mx.

Scientific Fields of Interest: Physics.

Research and training: Atomic and molecular physics; physics of interfaces and superlattices; superconductivity and magnetism; mathematical physics; complex systems; material chemistry; optical and electronical properties of materials of surfaces and interfaces; complex and intelligent materials; nanoparticles and nanocomposites.

Achievements: Articles published in international and national journals.

Facilities: Computing Center: WS: 1 HP9000 J2240, 1 Microway, 2 SGI 02, 2SGI Octane, 2SGI 2200, 1HP9000/700 735, 1 HP9000/ Visualize J5600, 1 Gigacluster Alpha Beowulf, 1 HP 700/712, 1 HP 700 700xc, 2 DEC Alpha XL266, 1 DEC 3000 SQ.M00LX, 2 DEC 3000 M400, 1 DEC 3000 M700, 1 DEC personal WS PWS600AU, printers, 1 scanner, local network, 25x terminals, Internet service. Library: 4,042 monographs, 116 specialized journals and subscriptions to 54 journals as well as inter-library agreements with other

universities. Laboratories: Raman spectroscopy, spectroellipsometry, modulated reflectance, electretos and semiconductors, liquid phase epitaxy, X-ray diffraction, photoluminescence and optical absorption, SEM, AES and XPX, general chemistry, nanoparticles and nanocomposites, training, intermetallic materials, crystallographic studies, artificial material structures, non-linear optics, solid-state chemistry, DC-magnetron sputtering.

Future plans: The institute is an academic unit of the autonomous university of Puebla whose main objectives are the conduction of theoretical and experimental research in physics and in materials science and the formation of Human-resources at the graduate level. The institute is home to University Masters and Ph.D. programs in physics and in materials science. Plans for future development include the strengthening of the materials science programs and research, the construction of a new building to house the library, classrooms and student and faculty offices and a general increase in the quality of research, efficiency of graduate teaching, extension of inter-institutional collaborative efforts and faculty qualification to try and reach a classification of International Level for our programs with the New Mexican Graduate Programs Scheme.

International Organization: ICTP-IFUAP, National Science Foundation (USA)-IFUAP.

Universidad Nacional Autonoma de Mexico (UNAM)

Head of Institution: Dr. Juan Ramón de la Fuente, Rector.

Address: Torre de Rectoría 6 piso, Ciudad Universitaria, México D.F. 04510, Mexico., **Phone:** (+52 55) 5622-1280/81/82. **Fax:** (+52 55) 5622-1280. **Email:** rectoria@servidor.unam.mx. **URL:** www.unam.mx.

Scientific Fields of Interest: Biological Sciences, Chemistry, Earth Sciences, Engineering, Environmental Sciences, Mathematics, Physics.

Research and training: Research is being pursued in the following institutes of UNAM: Astronomy; biology; biotechnology; ocean sciences and limnology; nuclear sciences; ecology; physics; cell physiology; geophysical; geography; geology; engineering; biomedical research; investigations in mathematics applied in systems; material research; mathematics; neurobiology; chemistry.

Achievements: UNAM was named in 2005 as among the best 100 of the world. It is ranked number 93 in sciences, and as the best University in Mexico and Latin America. The subsystem of the scientific (SIC) Investigation at the moment has 10 centers and 18 institutes, of which 16 institutes and 2 centers are in the campus and the rest in the states of Morelos, Querétaro, Morelia and Baja California Norte. SIC has 1,497 investigators and 1,103 academic technicians, and over 33% are women. 30% of the academics work outside the University City campus. They conducted 2,700 projects in science and technology, published over 2,200 articles in international magazines. During 2005, 42 patents were granted and 62 are in the process of being granted.

Facilities: SIC counts with around 30 libraries, with an important and great variety of equipment, laboratories, stations and academic units. The most important are: The Astronomy Institute: located in Tonantzintla, Puebla; San Pedro Mártir, Baja California Norte telescopes and a Unit in Ensenada, Baja California Norte; Biology Institute: the Botanical Garden is the oldest and leader in Latin American Environment, and 2 biological stations at the state of Veracruz (Tuxtla) and another in Jalisco (Chamela). Institute for Ocean Sciences and Limnology: 4 investigation stations at Campeche, Sinaloa, two in Quintana Roo; a buoy oceanográfica. Ecology Institute: a unit on arid areas in the Sonora Parque Nacional Isla Isabel, Nayarit). Geophysics Institute: has 11 seismological stations. Geology Institute stores the National Paleontological Collection. Engineering Institute: has a Vibrant Table used to simulate earthquakes. Radioastronomy and Astrophysics Center: has an Observatory of Interplanetary Twinkling, one of the three in the world.

Future plans: Build a unit for collection of data on the biodiversity of Mexico; promote the formation of specific thematic groups of investigation in such as nanosciences, medical physical, physics of biological and social networks, physical computing, astroparticles; constitute new departments of planetary solar sciences and seismology and vulcanology; create a paleogeophysical and climatic and environmental lab and the earth science distance education center; promote institutional project; national atlas of Mexico; select subject in geography; Medio ambiente; create a virtual center of complex systems; and increase the academic interchange with universities and international research centers, as well as with the organizations worldwide leaders in the different areas, to approach high-priority projects for the country.

Cooperation with developing countries: SIC has maintained a narrow relationship with different countries of five continents, the main ones are for Academic Exchange, agreements, cooperation, etc. In particular with El Salvador, Nicaragua, Honduras, Panama, Guatemala and Costa Rica. And with Russia on the preparation and launching of Russian-Mexican micro satellite for the monitored of the atmosphere of the earth, with the purpose of predicting earthquakes. Collaboration is also with Consejo Superior de Investigaciones Científicas, Spain; Universidad Complutense de Madrid; Spain, and Ministerio de Ciencia, Tecnología y Medio Ambiente, Cuba.

Universidad Nacional Autónoma de México (UNAM) — Centro de Ciencias de la Atmósfera (CCA)

Head of Institution: Dr. Carlos Gay García, Chairman.

Address: Ciudad Universitaria, Circuito Exterior 04510, Del. Coyoacán CP 04510, Mexico. **Phone:** (+52 55) 5622-4061. **Fax:** (+52 55) 5616-0789. **Email:** cgay@servidor.unam.mx. **URL:** www.atmosfera.unam.mx.

Scientific Fields of Interest: Biological Sciences, Chemistry, Earth Sciences, Environmental Sciences, Mathematics, Physics.

Research and training: Aerobiology; Atmospheric Aerosols; Atmospheric Chemistry; Atmospheric Physicochemistry; Bio-climatology; Climate Change and Radiation; Climate Models; Clouds Physics; Environmental Cytogenetics; Environmental Mutagenesis; Environmental Pollution; Mathematical Modeling of Atmospheric Processes; Micro and Meso-scale Interactions; Numerical Methods; Ocean-Atmosphere Interactions; Physical Climatology; Tropical Meteorology; Urban Meteorology.

Achievements: Continuous collaborations between CCA and social and governmental sectors illustrate the pertinence achieved by this multidisciplinary approach. Since 1990, the Center has advised the Mexican government on the subject of climate change, being the first institution establishing permanent research on this topic. Furthermore, the Center has coordinated the most significant studies to assess national and regional vulnerability of different sectors in the face of variability and climate changes, it produced the national inventories of emissions, coordinated multinational projects about adaptation strategies and participated with 6 lead authors (and one chapter coordinator) for the IPCC's Fourth Assessment Report. At the national level the CCA collaborates with more than 20 states developing local and regional knowledge. The Center edits two specialized scientific magazines: *Atmosphere*, which is indexed in the Science Citation Index, and *Revista Internacional de Contaminación*, which is one of the most reputed journals on pollution in Mexico and Latin America. During 2004 the institution carried out 92 projects of investigation, most of them supported by national and international private and public funds. The Center has continued increasing its institutional and scientific capacities and has created two interdisciplinary Programs: Variability and Climate Change, and Environment and Air-quality.

Facilities: 9 laboratories equipped for atmospheric physics, chemistry and biology and a greenhouse for mutagenetics and cytogenetics; Several stations for different types of environmental monitoring; A network of more than 20 meteorological stations; 4 computer rooms equipped with clusters and several workstations and PC's; 2 class rooms, an auditorium and a video-conference room; 1 library.

Future plans: To increase the number of research scientists and post-doctoral positions in the lines of research mentioned above and in areas such as radiation, oceanography, climate and environmental modeling, stratospheric physico-chemistry, turbulence, carbon cycles, remote-sensing. To continue promoting the Earth Sciences Post-graduate program offered by our institution. To build a third floor devoted to laboratories on our main building.

Cooperation with developing countries: UNAM has cooperation agreements with all major educational and research institutions in Latin America and the Caribbean.

International Organization: IPCC; AIACC; IAI; GEF; UNDP; WMO; NCAR; EPA.

Universidad Nacional Autónoma de México (UNAM) — Centro de Ciencias Genómicas (CCG)

Head of Institution: Dr. Pedro Julio Collado Vides.

Address: Apdo. Postal 565-A, Cuernavaca, Morelos, Mexico. **Phone:** (+52 77) 7313-9877, (+52 55) 5622-7695. **Fax:** (+52 77) 731-1670. **Email:** collado@ccg.unam.mx. **URL:** www.cifn.unam.mx/.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences.

Research and training: Research: Structure, dynamics and manipulation of the genome; Integration of carbon and nitrogen metabolism; Evolution and ecology of the symbiotic genome; Evolution and ecology of the chemical communication signals between bacteria and plants; Genetic Engineering of legumes. Training: Bachelor's Degree Thesis; Graduate-programme (M.Sc and Ph.D.) in Molecular-biology.

Achievements: 70 papers in international journals, 4 books, 40 chapters in scientific books. Major achievements: the characterization of a metabolic cycle, the glutamine cycle, which participates in the integration of carbon and nitrogen metabolism in microorganisms; demonstration that the Rhizobium genome is a complex structure containing a large amount of reiterated DNA sequences and subjected to frequent rearrangements; and the discovery of R. tropici, a new Rhizobium species.

Facilities: Five laboratories with facilities for 20 scientists each; PC's, Mac and Vax computers; Library; Greenhouse; Laboratory for plant-cell tissue-culture work; administrative staff; major equipment: Electronic microscope; DNA sequencer; HPLC, Liquid and gas chromatography; Ultra centrifuges; Centrifuges; Liquid- scintillation counters; Cold rooms; Dark room.

Cooperation with developing countries: Academic collaboration with the group of Johanna Döbereiner from EMBRAPA-CNPBS, Rio de Janeiro, Brazil.

International Organization: Rockefeller Foundation; AID and UNIDO.

Universidad Nacional Autónoma de México (UNAM) — Instituto de Astronomía

Head of Institution: Dr. Jose Franco.

Address: Apartado Postal 70-264, Ciudad Universitaria, 04510 Mexico, D.F., Mexico. **Phone:** (+52 55) 5616-1412, 5622-4389. **Fax:** (+52 55) 5622-3903. **Email:** direc@astroscu.unam.mx (Dir), BM@astroscu.unam.mx (Secr. Acad.). **URL:** http://www.astroscu.unam.mx/.

Scientific Fields of Interest: Physics.

Research and training: Interstellar medium: planetary nebulae, HII regions; Herbig-haro objects; SN remnants; molecular clouds and star formation; accretion disks and stellar winds. Stellar and planetary astronomy: WR stars T

Tauri stars and binaries, planetary dynamics, variable stars, compact objects. Galactic and extragalactic astronomy: chemical composition and evolution structure of galaxies, galactic dynamics, and active galaxies. Cosmology. Astronomical instrumentation.

Achievements: More than 85 articles per year in refereed journals.

Facilities: telescopes: 2.2m, 1.5m and 0.84cm; numerical computing: cluster of 18 XEON processors (2.4 GHz) with 4000 Mbytes Ram per node.

Future plans: Develop the observatory site of San Pedro Martir in Baja California (Mexico) in order to build 6 meter class telescopes. Define an international consortium to carry out construction of the new telescopes.

Cooperation with developing countries: Individual projects with astronomers in Chile, Venezuela, Brazil, India, Philippines, and Argentina.

International Organization: Initiating cooperation with Universities in the US to install a larger telescope in San Pedro Martir (Baja California).

Universidad Nacional Autónoma de México (UNAM) — Instituto de Biotecnología

Head of Institution: Carlos Federico Arias Ortiz.

Address: Av. Universidad 2001, Cuernavaca, Morelos 62210, Mexico. **Phone:** (+52 777) 317-2399, 329-1671. **Fax:** (+52 777) 317-2388. **Email:** arias@ibt.unam.mx. **URL:** www.ibt.unam.mx.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences, Environmental Sciences.

Research and training: Molecular-biology of parasites, viruses, and bacteria; Molecular-biology and biotechnology of plants; Genetics and molecular-biology of plant-mico-organism interactions; Molecular and cellular biology of animals; Activation and regulation of the immune response; Cellular and molecular neurobiology; Genomics and proteomics of microorganisms and their interaction with animal and plant-cells; Structure, function, and manipulation of peptides and proteins; Development and consolidation of methodology for molecular-biology; Industrial microbiology; Cellular engineering; Engineering and technology of fermentations and cell-culture; Enzyme technology and engineering; Bio-informatics; Optimization and integration of bio-processes; Developmental genetics and molecular physiology; Molecular medicine. Training: M.Sc and Ph.D in Biochemical Sciences, B.Sc. in Genomic Sciences.

Achievements: Since 1982, published 2350 articles (1400 in International journals), made 376 contributions to books, international symposia and congress proceedings, prepared more than 600 technical reports and signed more than 80 agreements with private firms and permanent agencies. Awarded 25 patents (four in USA) and filed 26 more; supervised 754 theses.

Facilities: About 8,500 square meters comprising 40 research laboratories; pilot-plant, animal-care facility, oligonucleotide synthesis core facility, greenhouse, microscopy and computer services; proteomics core facility;

equipment includes X-ray diffractometer, fermentor and air-lift, basket centrifuges, homogenizer, vacuum evaporator, aspersion dryer, distillation column, incubators and ultracentrifuges; microcomputers, optic fiber communication system (Teiner, Bitnet).

Future plans: Graduate 25 B.Sc., 25 M.Sc. and 15 Ph.D. students annually; publish 100 to 120 articles; participate in 150 congresses; develop 200 specific projects and conclude more than 45 collaborative agreements.

Cooperation with developing countries: Training and exchange activities with Chile, Colombia, Brazil, and Honduras; collaboration with the Instituto Venezolano de Investigaciones Científicas (IVIC).

International Organization: European Community; US-Mexico Foundation for Science; International Centre for Genetic Engineering and Biotechnology (ICGEB); Third World Academy of Sciences; World Health Organization. Grants from Howard International Research Scholars Programme; and US National Institutes for Health (NIH).

Universidad Nacional Autónoma de México (UNAM) — Instituto de Ciencias Nucleares (ICN)

Head of Institution: Dr. Alejandro Frank Hoefflich.

Address: Circuito Exterior C.U., A.Postal 70-543, 0510, México D.F.. **Phone:** (+52 55) 5622-4670. **Fax:** (+52 55) 5616-2233. **Email:** frank@nucleares.unam.mx, scriacad@nucleares.unam.mx. **URL:** www.nucleares.unam.mx.

Scientific Fields of Interest: Chemistry, Physics.

Research and training: Fundamental constituents of matter: molecules, atoms, nuclei, hadrons; mathematical models associated with the description of these systems; comparison between models and experimental information; Gauge theories; quantization methods, string theory; astroparticle physics; ultra energetic cosmic rays; neutrino physics; relativistic heavy-ion collisions; electroweak baryogenesis; thermal field theory; quark-gluon plasma; equilibrium, stability and transport in magnetically confined plasmas at high-densities and temperature; controlled nuclear fusion; molecular spectroscopy using laser magnetic resonance in the infrared region; magneto-optic atom traps; atomic spectroscopic properties; experimental investigation of geophysical plasmas and planetary atmospheres; experimental detection of life in Mars; field theories in gravitation, classical mechanics, statistical mechanics and complex systems; cosmological models and general relativity; classical and quantum aspects of black holes and extended objects; quantum gravity; radiation chemistry; macromolecules; chemical evolution, radiolysis, high-temperature reactions, dosimetry.

Achievements: In 2005, the institute published 190 original scientific articles, of which 110 in international magazines; 80 in national publications; 42 articles

published in proceedings; 6 chapters; 3 books; theses advised: 18 Bachelor theses; 11 Masters theses; 6 Ph.D theses. 21 Articles for the general public.

Facilities: 4 buildings; rooms for researchers and students, classes, computers and meeting; 2 auditoriums; glass and electro-mechanical workshops. Labs: electronics; detectors; molecular spectroscopy; chemical evolution; dosimetry; macromolecules; radiolysis; nanomaterials. Library; Irradiator Gamma-beam 651-PT.

Future plans: Extended participation in the Pierre Auger and ALICE experiments and its future upgrades; participation in the NASA mission looking at life on Mars; quantum computation and quantum optics; continuation of the present research lines.

Cooperation with developing countries: Collaboration with Argentina, China, Brazil and Chile.

Universidad Nacional Autonoma de Mexico (UNAM) — Instituto de Física (IF)

Head of Institution: Dr. Arturo Menchaca-Rocha, Director.

Address: Apdo. Postal 20-364, 01000 Mexico, D.F., Mexico. **Phone:** (+52 55) 5622-5032. **Fax:** (+52 55) 5616-1535. **Email:** direccion-if@fisica.unam.mx.

URL: www.fisica.unam.mx.

Scientific Fields of Interest: Physics.

Research and training: Research and education physics, from particles and fields to cosmology. A good fraction of the research (40%) is centered on condensed matter issues (especially nano-sciences), other noteworthy research lines are medical and biological physics and optical particle manipulation. One example of an applied physics is archeometry. Mexico is rich on ancient history, and the use of sophisticated physics techniques is a subject of growing importance. These projects range from elemental analyses of ancient pottery, to the use of muon attenuation measurements to search for hidden cavities in ancient pyramids.

Achievements: Our main products are scientific publications (about 150-200 per year) and about 50-70 student theses per year.

Facilities: 4 electrostatic particle accelerators; 7 electron microscopes of various types + 2 atomic force microscopes; 5 X-ray diffractors; 7 power lasers; 6 computer clusters; largest physics library in Mexico.

Future plans: While continuing to promote the broad variety of existing research lines, we have defined 3 priority development areas: a) nanosciences and nanotechnology b) biological and medical (physics) applications c) quantum optics.

Cooperation with developing countries: UNAM has cooperation agreements with most major Latin American universities. We receive students from Central and South America as well as the Caribbean region.

Universidad Nacional Autónoma de México (UNAM) — Instituto de Fisiología Celular (IFC)

Head of Institution: Jesus Adolfo Garc'a Sáinz.

Address: Apdo. Postal 70-600, Ciudad Universitaria, 04510 Mexico, D.F., Mexico. **Phone:** (+52 55) 5622-5603/04. **Fax:** (+52 55) 5616-2282. **Email:** agarcia@ifc.una.mx, secdir@ifc.unam.mx. **URL:** www.ifc.unam.mx.

Scientific Fields of Interest: Biological Sciences.

Research and training: Research: Basic research in biological and biomedical sciences within the departments of biochemistry, biophysics, cell biology, molecular genetics and neurosciences. Training: Ph.D and post-doctoral in biomedical sciences.

Facilities: Centrifuges, ultracentrifuges, HPLC and FPLC machines; circular dichroism; EM; infrared spectrometer; fluorimeters; confocal microscope; double-beam spectrophotometers; calorimeter; French press; scintillation counters.

Cooperation with developing countries: Cooperation with Argentina, Uruguay and Chile.

International Organization: Cooperation with US universities; major donors are HHMI, NIH and Harvard University.

Universidad Nacional Autónoma de México (UNAM) — Instituto de Geofísica (IGeoF)

Head of Institution: Dr. José Francisco Valdés Galicia.

Address: Circuito Exterior S/No., Ciudad Universitaria del Coyoacán, 04510 Mexico, D.F., Mexico. **Phone:** (+52 55) 5616-2344. **Fax:** (+52 55) 5550-2486. **Email:** jfvaldes@geofisica.unam.mx. **URL:** www.geofisica.unam.mx/.

Scientific Fields of Interest: Earth Sciences, Environmental Sciences.

Research and training: Natural disaster prevention (seismic and volcanic); natural resource exploration; underground water studies and planetary sciences.

Achievements: Scientific articles; technical reports; data bulletins; seismic, geomagnetic, solar radiation; geochemical sample analysis; editor's Geofisica Internacional Journal; Graduate school division.

Facilities: PC and workstation network; portable digital seismographs; gravimeters and magnetometers; portable GPS; largest earth sciences library.

Future plans: Increase the scientific compatibility of our geophysical observatories and laboratories; increase the number of seismic permanent stations; increase the number and quality of our scientific personnel.

Cooperation with developing countries: Cooperation with Nicaragua; Peru; El Salvador; Panama; Ecuador and Caribbean countries.

Mexico

International Organization: Research cooperation agreements with most universities of the world.

Mongolia

Mongolian Academy of Sciences — Institute of Botany

Head of Institution: Dr. Ch. Dugarjav, Director.

Address: Jucov Avenue 77 Ulaanbaatar - 51, Mongolia. **Phone:** (+976 11) 451-014. **Fax:** (+976 11) 451-837. **Email:** ibot@mongol.net, botany@mas.ac.mn.

URL: www.mas.ac.mn/botany/en.

Scientific Fields of Interest: Biological Sciences, Environmental Sciences.

Research and training: Plant anatomy; plant cytoembryology; plant physiology; plant systematic and taxonomy; vegetation cover of the forest steppe, semi-desert, desert and high mountain belts and zones; Bio-resource and distribution of the economic plants; acclimatization and introduction of the medical, ornamental and other rare and endangered economical plants.

Achievements: In the results of the research activities more than 5400 species of the higher and lower plants in Mongolia were registered and became part of the world collection herbarium. The structure, composition, bioproductivity of the main vegetation types of Mongolia were studied, including the distribution in the main natural belts and zones, ecology and biology of eco-systems. As a result of such investigation, 20 vegetation maps were produced. The maps revealed 1600 species of economical plants, 440 species of weed plants and more than 300 foreign species had acclimatized to the Mongolian temperatures. Anatomical and ecophysiological characteristics of the dominant plant species were also revealed. The main results of the above-mentioned investigation were published in 47 monographs, 72 books and over 2100 scientific articles.

Facilities: 5 field stations; 1 library; 11 computers; 6 printers; 3 scanners; 3 JPS; 4 digital cameras.

Future plans: Establishment of the long-term studies on succession development of vegetation cover; studies on anatomical and physiological mechanisms of plant regeneration of dominant plants of forests and pasture land; determination of the disturbance area and Bio-resources of economical plants, application of cell and tissue-culture to cultivation of the rare, endangered and endemic plants, application of cell and tissue-culture to cultivation of rare, endangered and endemic plants and establishment of those gene-banks.

International Organization: Collaboration with institutes and universities of Russia, USA, Japan, Germany, China, Israel and 10 other countries.

Mongolian Academy of Sciences — Institute of Chemistry and Chemical Technology

Head of Institution: Prof. B. Purevsuren, Director.

Address: Ulaanbaatar 51, Mongolia. **Phone:** (+976 11) 453-133. **Fax:** (+976 11) 453-133. **Email:** purevsuren@icct.mas.ac.mn.

Scientific Fields of Interest: Chemistry, Engineering.

Research and training: Molecular structure and biological activity of medicinal plants; investigation on organic substance in medicinal mud, chemical and technological investigation of heavy fraction of Mongolia oil; chemical structure and physiological activity of the complex polysaccharides from wild plants; food additives with biological activity; solid reactivity and its improvement by a mechanochemical method; rational utilization of natural minerals such as phosphorite, iron-ore, clay minerals; physical and chemical study on dissolving, extracting and adsorbing of precious and rare metals; physicochemical and technological investigation of copper-molybdenum ore and its byproducts; investigation on hydrominerals in Mongolia.

Achievements: More than 600 secondary metabolites from medicinal plants of Mongolian flora have been isolated and structurally elucidated at the lab. Among them 119 had been determined as a naturally new substance and it made a significant contribution of our scientists to the development of natural sciences. General results of investigators have been published over 150 scientific articles and the worldwide professional international journals. Have isolated free and linked bitums, humic acids, carbohydrates and lipids from the medicinal mud in Mongolia and determined their composition. Jurassic Petroleum of Tamsagbulag is characterized with high content of paraffins, lower content of sulfur and resins; pectines and hemicellulose type compounds of the wild plants have isolated and determined the chemical properties, structures of macromolecules and immuno-chemical effects of the isolated compounds. Technologies for obtaining and isolating the food additional products in which dominated polysaccharides, glucones, microcrystal cellulose and compounds of starch derivatives have elaborated; technologies for production of humid fertilizers, humid mud, which is preparation for treatment of certain skin diseases of human. on-hydrogenation catalysts have been found, which are able to completely dissolve coal macromolecules at relative mild conditions; technology and patents for production of mechanically assisted phosphorite fertilizer from natural phosphate ore; technology and patents for recovery of precious and rare metals from its ore and concentrates; chemical and mineralogical compositions of copper-molybdenum ore, its concentrates and waste from mining factory 'Erdenet' have been determined. The waste of mining factory tested as raw material to produce some building material and obtained an assured result; have investigated hydrothermal and cold mineral springs and created the national map of mineral waters M 1: 2500000 and the national standard for mineral waters.

Facilities: Atomic-absorption spectrophotometer; NMR spectrometer 'Bruker'; X-ray diffractometer; IR spectrometer; vacuum evaporator; vacuum drier; UV spectrometer; spectrophotometer; different balances, centrifuges, drying oven, milling equipment (vibratory mill); Internet connected PCs.

Future plans: The institute plans to create the technical basis for producing new medicines and nutritional additives from Mongolian raw materials, especially from plant; planning to create an advanced technology center for utilization of natural minerals; to investigate the chemical structure and immunochemical effects of the physiological active polysaccharides and to elaborate the technologies for obtaining the bioactive preparations and food additional products.

Cooperation with developing countries: At present the institute has scientific agreements with Russian Academy of Sciences and Bulgarian Institute of Organo Chemistry.

International Organization: The institute is realizing joint scientific projects with Korean institute of science and technology (KIST); the title of the joint project is 'Investigation of antioxidative biologically active compounds from Mongolian medicinal plants'; the institute is planning to collaborate with the academies of sciences of Germany and USA; The scientists of the institute have a cooperation with scientists from different countries such as Russia, Japan, Korea, China, Germany, Australia, Bulgaria and New Zealand.

Mongolian Academy of Sciences — Institute of Geoecology

Head of Institution: Dr. J. Tsogtbaatar, Director.

Address: Baruun Selbe 15 Ulaanbaatar 211238, Mongolia. **Phone:** (+967 11) 325-487. **Fax:** (+967 11) 321-862. **Email:** geoeco@magicnet.mn.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences, Chemistry, Environmental Sciences.

Research and training: Long-term ecological research for negative impact assessment on degraded eco-systems after human activities; planning and designing for restoration of degraded eco-systems in selected river basins of Mongolia and ground and underground Water-quality analysis in industrial and mining areas of Mongolia and development of database; desertification study in arid zones of Mongolia and monitoring of land degradation after grazing in selected areas of the country; applied studies for water well rehabilitation ; irrigation of crop land; restoration of abandoned cropland in selected areas and development of forest nursery and reforestation ways after forest fires and logging.

Achievements: Integrated plan of water resource use and their protection in Selenge river basin; mapping and inventory of cropland quality of central region of Mongolia; underground Water-quality map of Gobi region of Mongolia;

desertification map of Mongolia; guidelines for forest rehabilitation and nursery establishment in Mongolia.

Facilities: Internet and internal computer networking system; scientific and technical library; lab for Water-quality analysis; lab for soil-analysis; water well drilling facility; measuring tools for tree ring analysis; field station for water irrigation in Darkhan Uul aimag; forest nurseries in Ulaabaatar and Selenge aimag; field monitoring sites of sand movement in central and south Gobi region.

Future plans: Develop and establish long-term ecological research stations in each natural zone of Mongolia; planning and demonstration of eco-system restoration work in degraded eco-systems of Mongolia; establish field based ecological research and training center.

Cooperation with developing countries: Scientific-cooperation with scientists from China, Russia and Korea will be developed in the future.

Mongolian Academy of Sciences — Institute of Geology and Mineral Resources (IGMR)

Head of Institution: Dr. Tomurhuu, Director.

Address: Peace Avenue 63, Bayanzurkh District, Ulaanbataar 210351, Mongolia. **Phone:** (+967 11) 457-858. **Fax:** (+967 11) 457-858. **Email:** igmr@magicnet.mn, igmr@mas.ac.mn.

Scientific Fields of Interest: Earth Sciences, Environmental Sciences.

Research and training: Stratigraphy and sedimentology; petrology and geochemistry; tectonics and geodynamics; paleogeodynamics of the organic belt; structural geology and neotectonics; paleoclimatology; metallogeny; geological mapping; geology and mineral resources of sedimentary basins.

Achievements: Technocis of Mongolia (1974); Upper Paleozoic of Mongolia (1976); Geology of western Mongolia (1980); map of geologic formations of MPR (1: 1,500,000) (1989); hydrogeologic map of Mongolia (scale 1:1,000,000) (1996); metallogenic map of Mongolia (scale 1:1,000,000) (1999); about 140 papers and abstracts; 9 monographs and transactions; 5 maps, 4 CD and 9 scientific reports published since 2001

Facilities: Library (more than 600 professional books and magazines); computers and printers (about 30); petrological and sedimentological lab; archives of topographic maps; Hovsgol Lake research station (near the Lake Hovsgol).

Future plans: The main aims of the institute are to undertake fundamental research on geology of Mongolia; to investigate and evaluate the mineral resources of the country; and to produce a modern detailed geological framework of Mongolia, in relation to that of surrounding central Asia. Future research areas: continental rifting; regional geophysics and exploration geochemistry; petrology and geochemistry of metamorphic rocks; evaluation of

the economic potential of mineral deposits; geographic information system and remote-sensing; environmental geology.

Cooperation with developing countries: Russia: institute geology and mineralogy of SB RAS; institute of geochemistry of SB RUS and others. China: Institute Geology and geophysics of CAS, Beijing SHRIMP center, CAGS and others. Japan: JICA; Nagoya University; Kanazawa University and others. Korea: Korea Institute of Geo-sciences and mineral resources; Korea ocean and development institute and others. USA: US geological survey; Stanford Univ.; Univ. of Montana Florida, Saint Thomas and others. UK: Univ. of Leicester. Germany: Mainz University. France: University of Strasbourg.

International Organization: Hovsgol drilling project (Japan, Russia, Korea, Mongolia); Global mineral resources assessment project (USA, Mongolia); Terrane analysis and accretion tectonics in the central Asian mobile belt of Mongolia (Germany, UK, Mongolia); Mineral exploration on Au-Ag/nonferrous mineral belts in the central Mongolia (Korea, Mongolia); petrology and geochemistry of Mesozoic magnetism of Mongolia (China, Mongolia).

Mongolian Academy of Sciences — Institute of Meteorology and Hydrology

Head of Institution: Dr. D. Azzaya, Director.

Address: Juulchny gudamj 5, Ulaanbaatar 210646, Mongolia. **Phone:** (+976 11) 326-614, (+976 51) 264-953. **Fax:** (+976 11) 326-614, (+976 51) 264-953.

Email: azzaya23@yahoo.com. **URL:** <http://env.pmis.gov.mn/Meteoins>.

Scientific Fields of Interest: Agricultural Sciences, Earth Sciences, Environmental Sciences, Mathematics, Physics.

Research and training: To provide a past and real-time information, hydrometeorological forecasts and environmental information to government and non-governmental organizations, economic branches and public; to coordinate research activities and studies related to hydrology, meteorology and environment and to utilize their results in daily operational work; to assess climate and its change in Mongolia and study its impacts and vulnerability on environment, eco-system, economy and adaptation, etc.

Achievements: Monthly and annual reference books of climate, solar radiation and upper air data; climate standards, norm and references for applied meteorology and climatology; short, medium and long-range weather forecasts; alarm, alert and warning of severe weather phenomena; weather prediction technique, technology and methods; weather forecasts needed to users; agro-meteorological information, recommendation and forecasts; hydrological review and forecasts; greenhouse gas monitoring, inventory and database; books, proceeding and papers in meteorology and hydrology.

Facilities: PC cluster system; work stations; personal computers; intranet network; library.

Future plans: Issue weather forecasts and warning using advanced technologies and techniques; monitor dust/sand storms and measure aerosol concentrations; assess pasture land and soil degradation, de-certification and drought; establish a watering norm for agriculture; study of physical, chemical and biological processes in surface water and under ground water; monitor glaciers; assess further climate change impacts on geographical zones, glaciers, agriculture, pasture land, human health, etc.

Cooperation with developing countries: Present cooperations with Japan, Russia, Korea and China. Planned with USA.

International Organization: START, GAME (GEWEX), TPN-5, Japases RAISE, FRONTIER, AMPEX. In the future to cooperate with NEESPI, GEWEX and MAHASRI projects.

Mongolian Academy of Sciences — Paleontological Center

Head of Institution: Dr. Youngshiebu Rinchen Barsbold.

Address: Bayanzurh dstr., Enhtaivny Ugen Chuloo 63, Ulaanbaatar 210351, Mongolia. **Phone:** (+967 11) 458-935. **Fax:** (+967 11) 458-935. **Email:** barsgeodin@magicnet.mn.

Scientific Fields of Interest: Environmental Sciences.

Research and training: Marine invertebrates and biostratigraphy of the Paleozoic of Mongolia and Central Asia; skeletal organisms and stratigraphy of the Upper Precambrian of Mongolia and their remote correlation in the world; floras of the late Paleozoic of Mongolia and Central Asia and their stratigraphical significance; non-marine ostracods of the late Mesozoic and Cenozoic of Mongolia, and their stratigraphical significance; late Mesozoic Palynology of Mongolia; non-marine sedimentology of the Upper Cretaceous and Paleocene of Mongolia; dinosaurs of Mongolia and Central Asia, their systematic and evolution.

Achievements: Description of the new and revision of the known original material. As a rule, there are tens and hundreds of species and genera, also including some more high units; comparative morphology of the main groups of ancient animals and plants, their distribution, development of the main communities and comparison with the similar ones over Mongolia, Central Asia and the world as a whole. Evolution of the main groups, also their Taphonomy, Paleoecology and Paleogeography. Bio-stratigraphy of the marine and non-marine deposits; preservation and composition of the original collections of the main ancient groups, especially dinosaurs, which is one of the biggest and scientifically important in the world. Protection of the main fossils and their localities on the territory of the country.

Facilities: Laboratory of fossil vertebrates, with all necessary equipments for preparation and cleaning; all research staff supplied with computers; library with

the main material on the Mongolian paleontology and geology; lab for invertebrates and flora is in the first stage of preparation.

Future plans: Further advancement of laboratory base in the centre, also have the plans and programmes for student training especially during field practical research, advancement of equipments and original collections necessary for training.

Cooperation with developing countries: Cooperation in the field of research and training with China.

International Organization: Stable cooperation in the study of dinosaurs with Japan and USA; also with Russia in the research of Paleozoic invertebrates and other groups of vertebrates from Mesozoic and Cenozoic, then with Austria in the study of non-marine stratigraphy of Upper Mesozoic and Cenozoic; with USA in the study of Paleogene stratigraphy. Planned: International team to study dinosaurs. Main participant Mongolia and South Korea.

Mongolian Academy of Sciences — Research Centre for Astronomy and Geophysics (RCAG)

Head of Institution: Dr. Bazariin Bekhtur.

Address: PO Box 152 Ulaanbaatar 51, Mongolia. **Phone:** (+976 11) 458-849.

Fax: (+976 11) 455-204. **Email:** demberel@rcag.url.mn. **URL:** www.rcag.url.mn.

Scientific Fields of Interest: Physics.

Research and training: Astronomy and astrophysics: research of physical properties of main-belt and near Earth asteroids by means of their photometric CCD observations; research of Earth rotation parameters by the artificial satellite-data; H-alpha observation of the sun's atmosphere; calculation of profiles of the spectral lines formed in the solar atmospheres. Seismology and geomagnetism: monitoring seismic activity of Mongolia and neighbor areas; operative notification of government and regional authorities and interested institutions on current and anticipated earthquakes; estimation of seismic hazard assessments of major cities of the Mongolia and special industrial areas; complex seismological and geophysical studies of geodynamical processes in the seismic active zones of Mongolia; seismological studies of deep structure of Mongolia; research into propagation seismic waves and source modeling of large earthquakes; study of active deformation and faults in Mongolia; main magnetic field of the Earth; spatial and temporal variation of the geomagnetic field; various disturbances in the solar-terrestrial space involving the magnetosphere and ionosphere, and their effects on the geomagnetic field.

Achievements: Astronomy and astrophysics: photometric CCD observation of selected asteroids; determination of their rotation parameters, shape and other physical properties by means of observation data; estimation of mineral compositions and surface light-scattering property of asteroids by their light curve amplitude; the artificial satellite-data, in particular, GPS and

interferometric data, analyze regularity of displacement of Earth pole; definitions of physical parameters of active regions of the sun and the mechanism of formation of spectral lines. Seismology and geomagnetic: seismological bulletins; catalogues and macro-seismic reports about earthquakes felt on the territory of Mongolia; one century seismicity map of Mongolia and seismological and geological reports of different seismic-active zones; different reports of estimation, seismic hazard assessments of major cities and industrial, mining areas; the anisotropic structure of the Earth's crust and upper mantle across Baikal-Mongolian transaction; magnetic maps of Mongolia; scientific papers in domestic and foreign scientific periodicals.

Facilities: Astronomy and astrophysics: Telescope Meade 16' LX 200 with CCD ST-6; Permanent GPS stations; other telescopes; computers and accessories; telescope coronagraph with H-alpha filter; computer with CCD camera. Seismology and geomagnetic: permanent seismic stations; portable broadband seismic station (3 complex); different desktop PC and Sun computers; laptops; library of scientific journals and reports; geomagnetic observatory; repeat-station network survey; field station for magnetotelluric sounding.

Future plans: Astronomy and astrophysics: The study of physical properties of asteroids extending from near-Earth to main belt; light curve observations of the asteroids during one opposition (i.e. under different phase angles); light curve observation of the asteroids in the different oppositions and determination on this base of their shape and rotation parameters; photometric and polarimetric observations of asteroids, their sizes and shapes, optical properties and structure of a surface, rotation parameter, albedo and classification of asteroids on different types, absolute brightness and color, etc. GPS data application for Earth study; interpretation of the received data and construction of model of some solar active phenomena. Seismology and geomagnetic: to increase the number of permanent seismic stations in Mongolia; to establish National Geophysical Data Center of Mongolia; to participate in international collaborative programs; to be involved in the INTERMAGNET program.

Cooperation with developing countries: Main astronomical observatory of NAS, Ukraine; asteroid research group of Institute of astronomy, Kharkov Univ. Ukraine.

International Organization: In the frame project of monitoring nuclear tests in the world, the institute collaborates with Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO).

Morocco

Centre National pour la Recherche Scientifique et Technique (CNRST)

Head of Institution: Prof. Said Belcadi, Director.

Address: 52 Avenue Omar Ibn Al Khattab, BP 8027, Rabat Agdal, Morocco.

Phone: (+212) 377-72803. **Fax:** (+212) 377-71288. **Email:** cnrst@cnrst.ma.

URL: <http://www.cnr.ac.ma>.

Scientific Fields of Interest: Biological Sciences, Earth Sciences, Environmental Sciences, Mathematics, Physics.

Research and training: Biological Sciences; chemical sciences; environmental sciences; mathematical sciences; earth sciences; engineering science & technologies; physics and astronomy.

Achievements: National Network of Coordinated collections of Microorganisms (CCMM); Seismotectonics and active fault maps: contribution to SAFE project in the framework FP5 RDT; regional seismic risk-assessment studies; seismic site investigations (nuclear plants, dams, bridges); Publication of workshops proceedings of meetings organized by the Euro-Mediterranean Center for the assessments and prevention of seismic risk (CEPRIS). Creation of a series of national networks and units to promote research and provide necessary means to the national community: MARWAN (Morocco Wide Area Network); Industrial Engineering Network (RGI); Technological Diffusion Network (RDT); Innovative Enterprises Incubators Network (RMIE); Moroccan Institute of Scientific and Technological Information (IMIST); Technological and Scientific Research Support Units (UATRS).

Facilities: According to the new assignments defined to the CNRST, new buildings are being constructed and equipped with suitable and heavy equipment which will serve all the concerned communities in the country.

Future plans: Creation of a new specialized institute in priority fields; putting in place other research and technological development programs in accordance with the priorities established by the government; reinforcing the national research infrastructure; involving Moroccan researchers residing abroad.

Cooperation with developing countries: The CNRST doesn't have any special agreement with developing countries but a representative from the Centre is sometimes a member of bilateral committees (example: with Tunisia). It is interesting to point out that the Ministry of Scientific Research is now the coordinator of various cooperations. The CNRST still has the capacity to sign agreements with foreign organizations pursuing the same objectives.

International Organization: The main scientific and technical agreements signed with other countries are: CNRS, INSERM (France); DFB (Germany); CNR (Italy); CSIC (Spain); GRICES (Portugal); IRD (France); CGRI-FNRS (Belgium) KOSEF (South Korea); CERN (Switzerland). The CNRST represents

Morocco in some international organizations and unions like ICSU, IFS, TWAS, and TWNSO.

Institut Agronomique et Veterinaire Hassan II

Head of Institution: Fouad GUESSOUS.

Address: BP 6202, Rabat Instituts, Rabat, Morocco. **Phone:** (+212) 3777-1758, 3777-1759. **Fax:** (+212) 3777-8135. **Email:** dg@iav.ac.ma, guessous@mtds.com. **URL:** <http://www.iav.ac.ma>.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences, Chemistry, Earth Sciences, Environmental Sciences, Mathematics.

Research and training: B.Sc. - Engineering (Agronomy, Agricultural Food Technology, Topography, Rural equipment) - Veterinary, Medicine, Specialized technician. Innovative research in the fields of Natural resources and Environment, Agronomy and Horticulture, Veterinary Medicine, Agricultural and food Technology, Topography, Rural equipment. Active participation in development actions; continuous education, analyses, diagnostics, trials, R&D, consultancy, information dissemination.

Achievements: Publication of research results (over 300/year); Publication of 4 - 6 scientific books annually; Registration of 30 patents.

Facilities: 2 campuses (Rabat and Agadir); 36 departments; 70 laboratories; 1 agricultural documentation center; 1 Pilot-plant; 1 Veterinary health center; 1 Plant clinic; 1 Training center for agricultural mechanization; computer centers

Future plans: Reinforce cooperation with foreign institutions (North-South and South-South) in the fields of agriculture, veterinary medicine, food science & technology, topography, horticulture & rural equipment

Cooperation with developing countries: Asia, Africa and the Middle East

International Organization: Institutions from the USA, Canada, Europe and Japan as well as FAO, WHO, UNESCO, USAID, EU, FIS, AUPELF-UREF, ACCT, GTZ, AGCD, ACDI, CRDI, CIHEAM.

Institut National de Recherche Agronomique (INRA)

Head of Institution: Prof. Hamid Narjisse, General Director.

Address: Avenue Ennasr, BP 415 RP, Rabat, Morocco. **Phone:** (+212) 3777-2642. **Fax:** (+212) 3777-0049. **Email:** narjisse@inra.org.ma, narjisse@yahoo.com. **URL:** <http://www.inra.org.ma/>.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences, Environmental Sciences.

Research and training: Genetic enhancement of crops to improve productivity; Crop protection; Animal Breeding and production; Eco-systems; Natural Resources Conservation.

Achievements: Annual crops : Cereals (Bread and durum wheat, Barley, Oats , Triticale, Secalis, Maize, Sugar beet, Rice); Fodder crops (Lucerne, Vetch, Forage peas, Carthamum, annual lucerne); Vegetable crops; Food legumes (Lentils, Faba beans, Chickpea and Peas); Fruit Trees: date palm, olive trees, prune trees, almonds; Oil crops: Sunflower.

Facilities: 23 Experimental stations; Laboratories in the 10 research regional centers; Over 400 desktop computers are currently in use, most of which are Pentium 4 based but some are of old generations (Intel Pentium I/II/III- based); Servers are mostly based in central sites; Libraries in all 10 regional centers provided with access to information resources in electronic media through CD-ROMs and Internet.

Future plans: Developing strategic alliances in the field of biotechnology, water-use efficiency and genetic resources conservation and management; strengthening of research areas such as climate change and desertification control; put in place a functional information management system to improve research performance and results delivery; seek partnership within global and regional agricultural research fora.

Cooperation with developing countries: Maghreb Sub regions: collaboration with research institutions in Algeria, Tunisia, Libya and Mauritania on projects initiated by regional and international organizations. Middle East and Gulf sub region: mainly with Egypt, Jordan, Syria, Lebanon and Arab Gulf countries in the area of wheat, food legumes and date palms. South America: with Argentina, Brazil, Peru and Chili involving projects on biotechnology, fruit trees, date palm and potatoes.

International Organization: European Countries: France, Spain, Belgium, Italy, Switzerland, Germany, Bulgaria, Hungary, Turkey, Romania, England involving projects on citrus crops, fruit trees, water management, quality of agricultural products, and scientific and technical information, resource management, livestock, food legumes, land suitability. North America: USA on dry land farming and Canada through IDRC on waste-water-use in agriculture. Asia and Australia: with Japan involving assistance on Crop and animal protection in addition to research projects related to R&D and Training on Desertification control. Australia on Crop germplasm exchange. Regional and international organizations: Arab organizations (ACSAD) on rain-fed agriculture and technology transfer and AOAD on date palm mainly in-vitro multiplication techniques and bayoud control. Regional fora: (AARINENA and FARA) on regional Agricultural information system and thematic network. United nation organizations: IAEA, FAO and UNDP. CGIAR: ICARDA, CIMMYT, IFPRI, BIODIVERSITY, IWMI, ICRISAT and CIP.

Université Mohammad V — Faculté des Sciences — Laboratoire de Physique Théorique (LPT)

Head of Institution: Yassine Hassouni, Director.

Address: Av. Ibn Battouta 4, PO Box 1014, Agdal, Rabat, Morocco. **Phone:** (+212) 3777-8973. **Fax:** (+212) 3777-8973. **Email:** y_hassou@fsr.ac.ma. **URL:** <http://www.fsr.ac.ma/LPT>.

Scientific Fields of Interest: Physics.

Research and training: Cosmology and gravitation; mathematical physics with application in the condensed matter; mathematical and numerical modelization in non-linear fluids mechanics and in environmental physics.

Achievements: Approximately 10 works per year are published in international journals (please see web page for more information).

Facilities: Equipments: 10 computers, 3 printers, 2 Scanners, library with approximately 5,000 books.

Future plans: The Laboratory intends to increase its collaboration in the domain of environment basing on some mathematical notions (partial differential equation). This area of research allows it to have more overlapping with the private-sector as well as finding concrete applications in a domain that interests a large part of our society.

Cooperation with developing countries: With Tunisia we are promoting a cooperation in a domain of Mathematical Physics. This will be based on an agreement signed by governments of both sides.

Namibia

Desert Research Foundation of Namibia (DRFN)

Head of Institution: Dr. Detlof von Oertzen, Director.

Address: PO Box 20232 Windhoek, Namibia. **Phone:** (+264 61) 229-855, 377-500. **Fax:** (+264 61) 230-172. **Email:** drfn@drfn.org.na. **URL:** www.drfn.org.na.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences, Earth Sciences, Environmental Sciences.

Research and training: Integrated resource management in the land, water and energy-sectors; environment management practices; sustainable development; community-centered decision-making.

Achievements: Publications in peer-reviewed journals as well as local media; environmental education publications for extension services and schools.

Facilities: Numerous project and programme activities that students can participate in; various consultancy projects with opportunities to participate in; association with a unique desert field station with training and research facilities; numerous programme activity sites with communities in communal farming areas; library; computers and IT infrastructure; basic field equipment; vehicles.

Future plans: Being the premier sustainability organization in Namibia serving Namibia and the SADC region in the fields of integrated resource and environmental management, focusing on the land, water and energy-sectors and promoting our existing research, training and consultancy services.

Cooperation with developing countries: Variety of programmes and agreements with surrounding SADC countries.

International Organization: Hybrid-energy systems and mini-grid applications for remote rural settlements (EU); Land reform studies (Spanish cooperation) and numerous others.

Nepal

Asia Network for Sustainable Agriculture and Bioresources (ANSAB)

Head of Institution: Dr. Bhishma P. Subedi, Exe. Dir..

Address: PO Box 11035 Khatmandu, Nepal. **Phone:** (+977 1) 449-7547. **Fax:** (+977 1) 447-6586. **Email:** BhishmaSubedi@ansab.org, ansab@ansab.org. **URL:** www.ansab.org.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences, Environmental Sciences.

Research and training: Natural products-based enterprise development and value chain growth; sustainable forest management and biodiversity conservation; enabling policy environment in the forestry and natural-resource management sector; business development services and capacity-building.

Achievements: Value chain study on Jatamansi and Wintergreen; assessing the linkages between conservation, market forces and governance in natural-resource management groups; influencing policy and good governance in NRM sector: focusing on community forestry and NTFP sub-sectors in Nepal; market information for rural workers in Nepal; eco-system services for conservation; Nepal micro-finance case study; MIS overview study; biological monitoring guidelines; production and harvesting guidelines; linking plant-based enterprises and local communities to biodiversity conservation in Nepal Himalayas; enterprise development for natural products manual; community-based forest enterprises in Nepal: case studies, lessons and implications; global conservation program (GCP) mid-term evaluation report; assisting local people to improve their livelihood systems by identifying socially and environmentally viable products.

Facilities: Library, computers, field offices and stations, forestry research equipment, projectors.

Future plans: Enterprise development approaches for rural poverty reduction, equity and biodiversity conservation; commodity chain and value chain analysis of potential natural products (e.g. handmade paper); biodiversity monitoring guidelines; policy- development processes and improvement of implementation practices; forest certification and organic certification scale-up; develop eco-system services-model/mechanism.

Cooperation with developing countries: Eco-system services study with India; marketing information system with Lao PDR; community-based forest management and non-timber forest products in Nepal, India and Bhutan.

International Organization: Value chain analysis (International Resource Group-IRG); Marketing Information System (MIS) (Interchurch Organization for Development Cooperation - ICCO); Commodity Chain Analysis (World Resource Institute - WRI); Advancing Community Forestry (The Ford

Foundation); Various development research (International Development Research Center - Canada).

Environment & Public Health Organization (ENPHO)

Head of Institution: Dr. Roshan Raj Shrestha, Chairman.

Address: 110/25 Adarsh Marg-Thapagaon, New Baneshwor P.O. Box 4102 Katmandu, Nepal. **Phone:** (+977 1) 449-3188, 446-8641. **Fax:** (+977 1) 449-1376. **Email:** enpho@mail.com.np, rshrestha@mos.com.np, chairman@enpho.org. **URL:** www.enpho.org.

Scientific Fields of Interest: Chemistry, Environmental Sciences.

Research and training: Arsenic investigation and mitigation; environmental monitoring; research and technology development; Water-quality testing kits; wastewater treatment technique; drinking water improvement technique; water management technique; community development programmes; ecological sanitation; water treatment and air-quality assessment; environmental impact assessments. Training on: water/air-quality analysis; arsenic mitigation; technology transfer and implementation and dissemination of information; water and wastewater management; simple techniques on household drinking water treatment technologies (SODIS, Biosand filter, chlorination); value based water education.

Achievements: Developed Kanchan Bio-sand filter for removal of arsenic and pathogens; production of Water-quality testing kits, solar water disinfection technique for drinking water treatment; wetland for wastewater treatment; publication of scientific papers in local and international journals.

Facilities: Equipped laboratory; 20 PCs; water and sanitation library; reference center on arsenic bio-sand filter and SODIS dissemination; ENPHO demonstration site; research based field site; eco-home (sustainable water management practices).

Future plans: Well-equipped library to carry out all environmental monitoring and analysis; research and development of low-cost technologies for water and sanitation; food quality; efficient resource center; inter/intra collaboration with different organization in the development and dissemination of resources.

Cooperation with developing countries: Training in Bangladesh, Pakistan, and India for strengthening of the organization and Human-resources.

International Organization: Transfer of technology and provide technology support for implementation to MIT (USA); EAWAG/SANDEC (CH); Cooperative Monitoring Center (CMC) USA; Univ. of Boku, Austria; International Resource Center (IRC), Netherlands; UNESCO IHE Delft Netherlands; Asian Institute of Technology (AIT), Thailand.

International Centre for Integrated Mountain Development (ICIMOD)

Head of Institution: J. Gabriel Campbell.

Address: POB 3226 Katmandu, Nepal. **Phone:** (+977 1) 552-5313. **Fax:** (+977 1) 552-4509, 553-6747. **Email:** icimod@icimod.org.np. **URL:** www.icimod.np.

Scientific Fields of Interest: Agricultural Sciences, Environmental Sciences.

Research and training: Sustainable mountain development: Watershed Management, Rangeland, Pasture and Livestock Management, Transboundary Biodiversity Management; High Value Products and Sustainable Agriculture, Rural Enterprises and Mountain Tourism, Decentralized Renewable Energy Options; Water and Floods, Climate Change and Responses, Environmental Services; Gender Mainstreaming, Equity and Rights, Community Institutions, Decentralization and Local Governance, Programme Development and Monitoring and Evaluation, Policy Development and Advocacy Support, Partnership Development; Information Management, Communications and Outreach, Mountain Environment and Natural Resources Information Systems.

Achievements: Some of the major outputs have been: Mountain perspective framework; Appropriate technologies for soil conserving farming systems; Mountain risk engineering principles and application; Sustainable renewable energy techniques; Rehabilitation approaches for degraded lands; Participatory management of natural resources; Preservation of specific resources; Protection of the Himalayan honeybee; GLOFs; GIS and RS; Mountain Tourism.

Facilities: A well-equipped library with a 28,000 volume collection and CD-ROMS; 441 publications and a mailing list of 3,600; 16 fields demonstration sites; GIS application centre; Audio-visual collection of slides, photographs, video films and CD-ROMs.

Future plans: The Centre has developed and is now implementing its Strategic Plan, 'Partnerships in Sustainable Mountain Development: Securing the Future of the Hindukush-Himalayas, from 2003-2007. It focuses simultaneously on twin concerns of natural resources conservation and human development through its three integrated programme areas: Natural Resources Management (NRM); Agricultural and Rural Income Diversification (ARID); and Water, Hazards and Environmental Management (WHEM), which are supplemented and complemented by three strategically cross-cutting integrated programmes: Culture, Equity, Gender and Governance (CEGG); Policy and Partnership Development (PPD); and Information and Knowledge Management (IKM).

Cooperation with developing countries: Within the overall framework for cooperation with regional member countries, ICIMOD enters into long-term partnership agreements with academic and research institutions, government development programmes, NGOs and international organizations with a major mandate or concern in sustainable mountain development. It will work as a facilitator for access to knowledge and advice using a decentralized approach

and will ensure continuing exchange of information and staff. Internships of junior professionals and in some cases even supply equipment.

International Organization: Regional Member countries: Afghanistan, Bangladesh, Bhutan, China, India, Myanmar, Nepal and Pakistan. Other Supporting Countries: Austria, Denmark, Germany (Restricted Core), the Netherlands, Norway, Switzerland. Co-Financing Project Donors and Partners: APN-Japan; ADB; AMICC/IDRC; DFID UK through the CEH, UK; FAO, Ford Foundation; BMZ and GTZ; ICCO; IDRC; IFAD; ITC/Netherlands; ILRI; CIP; DGCS; MacArthur Foundation; SNV; Netherlands Ministry of Development Cooperation; Sandia National Laboratories, University of Twente; SDC; TMI; UNESCO; UNEP; USAID; US Dept. of State/Reg. Env. Office for South Asia, IUCN, WWF.

Niger

Centre Regional AGRHYMET

Head of Institution: Mr. Alhassane Adama Diallo, D.G..

Address: B.P. 11011 Niamey, Niger. **Phone:** (+227) 733-116. **Fax:** (+227) 732-435. **Email:** admin@agrhyment.ne. **URL:** www.agrhyment.ne.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences, Earth Sciences, Environmental Sciences.

Research and training: Training in the fields of agrometeorology, hydrology, crop-protection and instrument- maintenance and micro-computing; research in crop- protection (entomology, phytopathology), crop modeling, water retention capacity of soils, climate research.

Achievements: Crop pest-inventories; extension brochures in crop-protection, training materials on gender as it applies to crop protection; crop monitoring bulletins; NAVI maps; thematic databanks (phytosanitary, hydrological, climate, socio-economic; GIS and remote-sensing); bibliographic bulletins; student yearbooks; training catalogues; food security and natural-resource management atlases, etc.

Facilities: 71 hectare domain of which 4 hectares are irrigated; 2 field workshops for hydrology and agrometeorology; a hydrology lab; an agrometeorology lab; an agricultural zoology lab; a physiopathology lab; a phytopharmacy lab; one electronics lab; insect rearing facilities; a GIS and remote-sensing lab; a telecommunications centre with receiving stations for NOAA and MSG satellites; 3 computer science labs; a library with over 31,000 references; two automatic weather stations.

Future plans: The development of early warning systems for disaster prevention; the reinforcement of climate change research and development, particularly adaptation strategies for rural populations; masters training programmes in agrometeorology and climate NS/C management and in the management of shared natural resources.

Cooperation with developing countries: Cooperation with member countries of our mother organization, CILSS (the permanent Inter-state Committee for Drought Control in the Sahel), Universities in Niger, Burkina Faso, Nigeria, Senegal.

International Organization: USGS (USA); IBIMET (Italy); DMI, DIAS (Denmark); University of Reading (UK); ISTC (Portugal); ICRISAT, IITA, Environment Canada; IRD (France); University of Liege (Belgium); USAID; DANIDA; BADEA.

International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) — Niger

Head of Institution: S. Koala.

Address: B.P. 12404 Niamey, Niger. **Phone:** (+227) 722-529, 722-626. **Fax:** (+227) 734-329. **Email:** icrisat@cgiar.org. **URL:** www.icrisat.org.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences.

Research and training: Pearl millet, groundnut, pigeonpea, animal nutrition, natural-resource management, socio-economics, gene-bank, date palm, sorghum, crop diversification, livestock, breeding.

Achievements: Publications and reports on crops and other areas relevant to our mandate.

Facilities: Field station, laboratories, gene-bank, seed store, GIS station, equipment. Computers. Library with subscription to many scientific and agricultural journals.

Cooperation with developing countries: Collaboration with IARCs, NARS, NGOs and farmers organizations working in our areas of activity.

International Organization: CGIAR Centres, many international organizations.

Nigeria

Federal Institute of Industrial Research, Oshodi (FIIRO)

Head of Institution: Dr. Oluwole Olantunji, Director Gen..

Address: Private Mail Bag 21023, Ikeja, Lagos State, Nigeria. **Phone:** (+234 1) 894-7094. **Fax:** (+234 1) 452-5880. **Email:** info@fiiro-ng.org, fiiro_oshodi@yahoo.com. **URL:** www.fiiro-ng.org.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences, Chemistry, Engineering, Environmental Sciences.

Research and training: Research & development up to pilot-plant stage; Improvement of traditional techniques and nutritional qualities of Nigerian foods; Design & fabrication of machinery & equipment, development of foundry processes & materials; Processing of ceramic materials & other solid based minerals for industrial use; Processing of local wood for pulp & paper making; Technical, analytical and consultancy services for existing and planned industries; Technological transfer to the public through licensing, training courses and capital goods acquisition; Preparation, publication and dissemination of useful technical information to researchers and industries.

Achievements: Cassava-wheat flour composite production; Mechanized production of gari, fufu, lafun and starch production; Mechanized production of cassava flour; Soy-ogi production from local cereals fortified with soy bean (weaning food); Bottling & preservation of palm wine; Production of edible mushroom; Fruit juice production; Instant pounded yam flour production; Laundry & toilet soap production; Body & hair pomade production; Bone glue production; Dawadawa production from soybean.

Facilities: Spectrophotometer, Gas chromatograph, High-performance Liquid-chromatograph (HPLC), Spray dryer, Caning facilities, Drum drier, Extruder, Computer-aided design facility, Steam boiler, Apex mill, Homogenizer, Fabrication, Machine and Electroplating shops, Printing press, Foundry, Library and Documentation centre.

Future plans: Build a biotechnology pilot-plant, build and equip a centre for commercial production/demonstration of developed technologies (e.g. cassava projects centre), establish a well-equipped information and communication technologies centre and Networking of the Institute.

Cooperation with developing countries: Transfer of technology for cassava processing under contract with UNIDO to Togo, Cameroon, Ghana, Zaire and Sierra Leone. Collaborative proposal on the promotion of FIIRO technologies to African countries.

International Organization: Research equipment donated by FAO, EEC and UNIDO in food processing, ceramic materials, foundry, textile testing and documentation. The Institute's staff has benefited from overseas training program in Malaysia being sponsored by the Malaysian Training and Cooperation Programme (MTCP) and Indian Technical Economic

Cooperation/Special Commonwealth Assistance for Africa Program (ITEC/SCAAP).

Federal Ministry of Science and Technology (Enugu) — Projects Development Institute (PRODA)

Head of Institution: Dr. Goddy Nkem Onuoha, DG, CEO.

Address: 5 PRODA Road, PM Box 01609, Off Enugu Abakaliki Express Road, Emene Industrial Layout, Emene, Enugu, Nigeria. **Phone:** (+234 42) 301-306.

Fax: (+234 42) 457-691. **Email:** info@proda.enugu.org, ceo@proda.enugu.org.

URL: www.prodaenugu.org.

Scientific Fields of Interest: Agricultural Sciences, Environmental Sciences.

Research and training: Research: Engineering, design and fabrication of ceramic products, electrical and electronic products; research and development of reinforced POP mould; development of industrial portable automatic battery charger; development of internal combustion IC petrol engine by adaptation technology; development of industrial distillation plant; design/fabrication of a Cassava chipping, drying and pelleting plants; development of 3.5 HP single cylinder IC diesel engine by adaptation; design and production of metal die molds of casting automobile spare parts (engine PISTONS); development of coal carbonization briquetting plant; development of PRODA integrated maize-milling plant; palm kernel oil (PKO) extracting plant; development of NST databank; development and production of biological pesticides from *Azadiachta India* (NEEM); research and production of industries chemicals from rice husks
Training: (1. Proficiency training programmes (with certificates) in different areas such as: foundry workshop practice, engineering draughtmanship, electrical machines, repairs, machining of parts, brick and pottery production, glass blowing technology, welding technology, industrial adhesive technology, mechanics auto electrical (2. Industrial/practical works experience attachments program (IT) for graduates and students. (SIWES) (3. Remedial training programmes (4. Primary school (proposed) (5. Graduate training for mechanical/electrical engineering graduates (proposed).

Achievements: Water-filter candles/elements; alcohol distillation plant; foundry tilting furnace and crucible pot; multipurpose grinders; coal fired cookers and ovens; palm product processing plants including boiler, digester, press, kernel cracker, kernel shell separator, kernel oil extractor; low-cost motor vehicle; industrial adhesive plant; Garri processing plants (mechanized and communal types); maize-milling plants (including hammer mills); grain-dryers (solar and fuel heated); fish-feed pelleting machine; traffic control systems (including discriminating type); building bricks and fired clay blocks; industrial kiln bricks; ceramic colors and glazes; electric switch gear and consumer units; ceramic kilns/furnaces; anodizing plant for aluminum products; Cassava pelleting machine; industrial steam cookers and laundry equipment; single cylinder diesel engine; single phase electric motor; porcelain electrical insulator and pilot

production plant; coal carbonization and briquetting plant; miscellaneous mixers; heavy duty (industrial) welding plant; waste paper ceiling boards and egg cartons, etc.

Facilities: Analytical lab; glassblowing lab; foundry quality control lab; engineering design office; special technical library with Internet facilities; electronics lab; engineering workshop; electrical engineering workshop; ceramics lab; coal lab; chemistry lab; engineering workshops; ceramics workshop; graphics studio, etc.

Future plans: (1. Development, adaptation and investment promotion of research and innovated prototypes/equipment/products/technologies for Small and Medium Enterprises (SME). (2. Further collaborative activities with contemporary science, engineering and technological establishments. (3. Provision of the necessary infrastructure to aid research and development work. (4. Rehabilitation and modernizing of existing workshops and laboratories. (5. Rendering assistance to SMEs and technological organizations, including the training of their personnel and technical-skill development. (6. Graduate training programme for young mechanical and electrical engineers. (7. Establishment of 6 demonstration units of PRODA R&D products in six geo-political zones of the country. (8. Development of PRODA permanent site.

Cooperation with developing countries: ECOWAS and several Third World Countries.

International Organization: UNESCO, FAO, Technical Association of Paper and Pulp Industries (TAPPI), the British Council, UNDP, UNIDO, and WAITRO.

International Institute of Tropical Agriculture (IITA)

Head of Institution: Peter Hartman, Director General.

Address: P.M.B. 5320 Ibadan, Oyo State, Nigeria. **Phone:** (+234 2) 241-2626.

Fax: (+234 2) 241-2221. **Email:** iita@cgiar.org. **URL:** www.iita.org, www.cgiar.org.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences.

Research and training: Research agenda addresses crop improvement, plant health, and resource and crop management within a food system framework, targeted at the identified needs of four major Agro-ecological zones: the dry savanna, the moist savanna, the humid forests, and the mid- altitude savanna. Research focuses on small-holder cropping, post-harvest systems and on the following food crops: cassava, cow pea, maize, plantain and banana, soy bean and yam. IITA training activities have been guided by the overall goal to strengthen the capability of scientists and technicians of national agricultural research systems (NARS) to conduct the research and training necessary for agricultural development in their own countries. Further, IITA training activities facilitate research collaboration between IITA and NARS. Its comprehensive strategy for training comprises graduate research, individual attachments, and development and distribution of group training course materials.

Achievements: Scientific breakthroughs in all major research activities of the institute.

Facilities: Library, offices, and labs equipped at international standards available at: Ibadan, Nigeria: Headquarters. Kano, Nigeria: dry savanna station; focus on cowpea research. Onne, Nigeria: high- rainfall station; focus on banana/plantain research. Yaoundé, Cameroon: humid forest eco-regional center; focus on resource and crop management. Cotonou, Benin: biological control center; focus on plant health management. Namulonge, Uganda: eastern and southern Africa regional center; focus on mid-altitude agro-ecozone, and cassava and banana/plantain research

Cooperation with developing countries: Cooperation agreements exist with many countries in Africa, especially in those where our stations are located.

International Organization: IITA is a member of CGIAR and is funded by various donors (governments, foundations, private-sector, etc.)

National Center for Energy Research and Development (NCERD)

Head of Institution: O.U Oparaku.

Address: University of Nigeria Nsukka, Nigeria. **Phone:** (+234 42) 771853.

Fax: (+234 42) 771-855. **Email:** ncerdunn@yahoo.com.

Scientific Fields of Interest: Environmental Sciences.

Research and training: Renewable energy and in particular Solar thermal; Photovoltaic; Wind energy; Bio-mass and biotechnology; Environmental monitoring; energy management and policy. Training: under-graduate and graduate; workshops and conferences.

Achievements: As of 2004, solid absorption on solar refrigerator; design model (computer based) for refrigeration; solar rice dryer (commercial-scale); solar chicken brooder; solar manure dryer; coal Briquette stoves; improved fuelwood stove; characterization of FeS thin film deposits on glass by spray pyrolysis; development of photovoltaic systems for village electrification office use and pipeline corrosion control.

Facilities: Multipurpose laboratory; mechanical and electrical workshops; conference and seminar rooms; pilot solar rice dryer plant; Computers; Library.

Future plans: Development of international cooperation and collaboration; acquisition of additional equipment for laboratories; acquisition of books and journals; employment of additional research staff; extension of activities to other NRSE areas not presently active; construction of new laboratory building; development/improvement of the library system, extension services to end-users.

Cooperation with developing countries: Centre runs international conference on NRSE every two years and solar drying workshop annually, to which scientists from the African region are invited; offers research positions to

scientists from developing countries; cooperates with China under Technical Cooperation among Developing Countries programme.

International Organization: Center is Federated Institute of ICTP; has done collaborative research with Cranfield Institute of Tech., UK; Center also has linkage with Nottingham University (UK).

National Mathematical Centre (NMC)

Head of Institution: Prof. Samuel Ale.

Address: Lokoja Road, Sheda, Kwali Area Council Private Mail Bag 118, Garki (GPO) Abuja, Nigeria. **Phone:** (+234 9) 288-162. **Email:** samalenmc@yahoo.com.

Scientific Fields of Interest: Mathematics.

Research and training: Computer software design and development; mathematical modeling of disease; development of teaching modules for primary, secondary JSS 1-3 & SS 1-3; inculcating mathematics culture into the Nigerian child; development of Post-graduate mathematical science teachers in tertiary universities through research lecture series, Post-graduate workshops and seminars; designing and production of appropriate improved mathematical sciences instructional materials for schools at all levels; propagation of mathematics and high-level research through mathematical sciences conferences and publication of proceedings therefrom.

Achievements: Publication of NMC research lecture series; provision of a standard mathematical sciences library; establishment of a computer laboratory for scientific research; production of NMC lecture notes series on various mathematical sciences topics; production of mathematical teaching modules for primary, junior and senior secondary schools; establishment of incentives and partial scholarship for primary, secondary and tertiary institutions; designing and production of other appropriate improved instructional materials for schools; design and production of mathematical games for schools in the form of books and cards.

Facilities: Accommodation facilities, class rooms, conference halls, library, computer lab, field stations.

Future plans: Conducting international and national workshops, seminars and conferences; development of a bigger mathematical sciences library; building a bigger computer lab; securing Internet connectivity with NMC State centers; mass production of instructional material for schools; building a computer village for training students in computer science at lower levels; establishment of a printing press; research support for visiting scientists; cooperation and linkage with other African countries.

Cooperation with developing countries: Nigeria (Nigeria National Petroleum Corporation - NNPC)

International Organization: TWAS, TWNSO, ICTP, UNESCO, UNICEF, PTDF (Petroleum Trust Development Fund), RMRDC (Raw Material Research Development Council), MSI (Millennium Science Initiative).

National Veterinary Research Institute (NVRI)

Head of Institution: Lami H. Lombin.

Address: P.M.B. 1, Vom Plateau State, Nigeria. **Phone:** (+234 73) 281452.

Fax: (+234 73) 281-452. **Email:** nvri924@yahoo.com. **URL:** www.nvrinigeria.org.

Scientific Fields of Interest: Agricultural Sciences.

Research and training: Bacteria, dermatophilosis, viruses, parasites, molecular-biology, veterinary epidemiology and disease diagnostic, agric. extension.

Achievements: Bacterial vaccines, viral vaccines, Ethnopharmaceuticals, biological (sera, antigens); lamstreptocide A&B for Kirchi, DeMacur soap for skin infections in man (dermatitis, eczema, scabies, etc.). Scabicur", Tickcur" (soap, powder and lotion) for treatment and control of ectoparasites infections in man and animal.

Facilities: ELISA reading facilities; 17 outstation labs; PCR machine (thermocycular); Protein electrophoresis; Computers; Library with limited facilities; Internet facility (cybercafe); 20 outstation laboratories (5 zonal and 15 laboratories in state).

Future plans: Manpower development in modern laboratory techniques; establishment of a biotechnology laboratory; improvement of existing research laboratories.

Cooperation with developing countries: Planned cooperation with Brazil and South Africa.

International Organization: Planned cooperation with USA and EU.

Nigerian Institute of Medical Research (NIMR)

Head of Institution: Dr. Emmanule Oni Idigbe, DG.

Address: PMB 2013, Yaba, Lagos, Nigeria. **Phone:** (+254 1) 774-4723. **Fax:** (+254 1) 342-5171. **Email:** info-nime@yahoo.com. **URL:** www.nimr.ng.org.

Scientific Fields of Interest: Biological Sciences, Medical Sciences.

Research and training: Research into infectious diseases such as malaria, TB, diarrhea, sexually transmitted infections including HIV/AIDS and its opportunistic infections, onchocerciasis, schistosomiasis; genetic studies of microbes; search for anti-microbial agents in local medicinal plants; training programmes for research proposal or protocol development; management of HIV/AIDS including laboratory diagnosis and monitoring response to ARV drugs.

Achievements: Several epidemiological data and other scientific findings published in many peer-reviewed journals at international and national level;

several paper presentations at scientific conferences and seminars, locally and world-wide.

Facilities: One medical library (poorly funded); 20 computers; 2 outstation laboratories at Maiduguri and Kainji; 1 PCR machine; 2 cyflon machines; 1 spectrophotometer.

Future plans: An 8-year plan has been put in place to create a conducive environment for effective health research. This plan is now half-way through and has resulted in the establishment of HIV/AIDS and TB national reference laboratories, enhancement of facilities in microbiology, biochemistry, molecular-biology and public-health. The next four years will witness the development of a 30-bed clinical research centre.

Cooperation with developing countries: The institute has collaborations with the following institutions in: MRC, Gambia; CDC, Abijan; Howard Laboratory, Dakar, Senegal; KEMIRI, Nairobi, Kenya. etc.

International Organization: Cooperation with Harvard School of Public-health, FHI, USAID, UNICEF, Northwestern University, Chicago, USA; UNAIDS, WHO, Ford Foundation, MacArthur Foundation, Packard Foundation, etc.

Obafemi Awolowo University — Centre for Energy Research and Development (CERD)

Head of Institution: Prof. G.A. Osinkolu, Director.

Address: Ile Ife, Osun State, Nigeria. **Phone:** (+234 803) 353-7304. **Fax:** (+234 36) 232-975. **Email:** cerd@oauife.edu.ng, osinkolu@yahoo.com.

Scientific Fields of Interest: Environmental Sciences, Mathematics, Medical Sciences.

Research and training: Computational techniques of complex energy systems; Nuclear and atomic analytical technique in solid mineral development/environment; Development of radiation detectors for medical and environmental applications; Development of materials for renewable energy systems; Sectorial energy efficiency studies; non-linear materials preparation and characterization; Barium titanate (BaTiO₃)-based solid-state transducers; surface treatment for biomedical applications.

Achievements: 180 publications in reputable journals; Participated in 120 conferences.

Facilities: Gas chromatograph-mass spectrometer (GCMS); UV-Visible spectrophotometer (200-1100 nm); X-ray fluorescence (XRF); X-ray diffraction (XRD); Instron machines; Thermoluminescence (TL); Gamma irradiator; Atomic-absorption spectroscopy (AAS); Differential thermal/ scanning calorimetry.

Future plans: Commissioning of the 1.7 MV Tandem accelerator by the end of this year; Training and retraining of academic staff in relevant areas of our given mandate; Increase the level of cooperation arrangement to include TWAS and TWOWS for retraining of academic staff; Extend the level of equipment and

consumable acquisitions to cover all areas of result-oriented scientific research meant to solve problems in biomedical, energy, agriculture and oil and gas sectors.

Cooperation with developing countries: Have a memorandum of understanding with iThema Labs in Cape Town, South Africa; African Laser Centre, Pretoria, South Africa.

International Organization: Hope College, Michigan State, USA; International Atomic Energy Agency (IAEA); International Centre for Theoretical Physics (ICTP).

Obafemi Awolowo University — Department of Microbiology

Address: Ile-Ife, Ogun State 230001, Nigeria. **Phone:** (+234 36) 230292.

Email: microdept@yahoo.com.

Scientific Fields of Interest: Biological Sciences, Environmental Sciences.

Research and training: Physiology and Biochemistry; clinical microbiology; biotechnology; environmental microbiology; immunology; immunochemistry; rhizobium inoculations; mycology, food and industrial microbiology; marine bacteriology, aquatic microbiology; pharmaceutical microbiology; petroleum microbiology; microbial ecology and soil microbiology.

Achievements: Publications of papers at home and international scientific journals of repute.

Facilities: Digital library for students and members of staff with access to the Internet. Large and portable autoclaves, table centrifuge; ultracentrifuge, UV-Visible spectrophotometer and other common gadgets like microscopes, incubators and water baths.

Future plans: Programmes are being revised to develop our courses that will meet the need of paramedical and clinical sciences. Post-graduate-programmes are being revised to meet the specific needs of the Industry. There is an intense research on molecular-biology for gene manipulation for bio-remediation.

Cooperation with developing countries: The Department is highly interested in developing collaborative arrangements with Biological/Biotechnology/Microbiology Departments in developing countries. Some academic members of staff are on Post-graduate and Post Doctoral training in some institutions in South Africa and Europe. Cooperation is being planned on exchange of staff/conferences/seminars and publications.

International Organization: At present, there are no international cooperative arrangements, but it is envisaged that the Department will get in touch with institutions in Europe, America and Canada. This is necessary in the exploit of our rich laboratory cultures for the production of enzymes for food, medical and bio-remediation materials.

Obafemi Awolowo University — Institute of Ecology & Environmental Studies (IEES)

Head of Institution: Prof. Ayobami T. Salami, Director.

Address: Ile-Ife, Osun State, Nigeria. **Phone:** (+234 803) 376-1041. **Fax:** (+234 36) 232-401. **Email:** ayobasalami@yahoo.com, asalami@oauife.edu.ng.

URL: www.oauife.edu.ng/research/ecology/index.html

www.spaeloauife.org.

Scientific Fields of Interest: Agricultural Sciences, Environmental Sciences.

Research and training: Research: Survey impacts of resource utilization on the environment and the regional impacts of natural resources on the environment; Provide data on the diversity and the functioning of living organisms in our eco-system; Provide guidelines based on research work for resource conservation policy and environmental management in general; carry out research to guide policies related to waste management, quality control, and consideration of economic possibilities of cycling of waste materials; Tackle ecological problems of development. This involves gathering ecological environmental data in different eco-systems. Such activities will include regular chemical and biological surveys of lakes and rivers' soils, rainwater as well as radioactivity, solar radiation and long-term biological recording in carefully selected sites to measure productivity, decomposition, eco-system structure diversity and stability. Training: ecologists; provide extension services and courses of instruction at first degree and Post-graduate levels for such diploma and higher degrees. The institute is currently collaborating with the National Space Research Agency (NARSDA), the International Institute for Geo-Information Science and Earth Observation (ITC); Enschede, Netherlands and two other regional institutions in Nigeria to execute a Federal Government sponsored initiative on monitoring deforestation and implications for biodiversity loss in Nigeria using Data from NigeriaSat-1 and other Satellites. The Institute is also collaborating with the Office of the Surveyor General of the Federation and NASRDA to execute the Global Mapping Project in Nigeria under the Auspices of International Steering Committee for Global Mapping (ISCGM), Japan.

Achievements: Production of vegetation maps of Nigeria at scales ranging from 1:100000 to 1:250000; Derivation of empirical rates of deforestation in Nigeria based on satellite-data in 2006.

Facilities: ArcView GiS 3.3a; ILWIS 3.3 Academic; SPSS 11.0 for windows; Computer equipment (A3 HP color printer scanners and photocopier, etc); Multimedia facility; 10 PC-based GIS Work Stations; Limnology water sampler Kit LM5861; Stereoscopes; Stereo microscope model SQ.M6B10; pH conductivity salinity Temp.meter; Forester Geologist and surveyor's compass. The University Central Science Laboratory provides facilities for other chemical analysis.

Future plans: Establishment of an Environmental data collection and monitoring center to serve as a source of data and reference to Nigerian and

foreign students and experts; Provision of facilities to stock data concerning Nigeria and global environment; Upgrading and maintenance of standard laboratory for advanced training in environmental control and management.

International Organization: Third World Academy of Science; International Institute for Geo-Information Science and Earth Observations (ITC), Enschede, The Netherlands; UNESCO Inter-governmental Oceanographic Committee; The Queen's University of Belfast, Northern Ireland, U.K. The Institute is collaborating with the office of the Surveyor General of the Federation to execute the Global Mapping Project in Nigeria under the Auspices of the International Steering Committee for Global Mapping (ISCGM), Japan.

Solid Earth and Space Physics Research Laboratory (SESP)

Head of Institution: Ebun Oni.

Address: Department of Physics, P.O. Box 4092, University of Ibadan Post Office, Ibadan, Nigeria. **Phone:** (+234 2) 810-4376.

Scientific Fields of Interest: Earth Sciences, Physics.

Research and training: 1. 3D modeling of the earth's ionosphere; wave-guide propagation in low-latitudes with applications to satellite and space communication system in Africa. 2. 3D mapping of the earth's lithosphere and asthenosphere in Africa. 3. Experimental work in the characteristics of broadband seismic wave-forms in rock samples.

Achievements: Theoretical modeling in 1D, 2D and 3D earth models in low-latitudes; 3D earth ionosphere wave-guide in low-latitudes; 3D seismic wave-guide theory in seismology; remote-sensing in low-latitudes; computations of seismic tomography; interpretation of satellite gravity data.

Facilities: Many PCs; Internet link to the Solid Earth and Space Physics Research Laboratory; experimental equipment for studying the characteristics of seismic wave-forms in some rock samples in Nigeria.

Future plans: Increase research cooperation with institutes in the US and Canada, as well as ICTP. With Nigeria Sat One in place and preparations on Nigeria Sat Two on ground, SESP needs to create links with IUGG, URSI, SCOSTEP and UNESCO.

Cooperation with developing countries: Establish cooperation with research laboratories in Asia and South America.

Oman, Sultanate Of

Sultan Qaboos University — Centre for Environmental Studies and Research (CESAR)

Head of Institution: Prof. Reginald Victor.

Address: PO Box 17, Al-Khod PC 123, Muscat, Oman, Sultanate of. **Phone:** (+968) 2414-1442. **Fax:** (+968) 2441-4012. **Email:** rvictor@squ.edu.om, cesar@squ.edu.om.

Scientific Fields of Interest: Environmental Sciences.

Research and training: The Center for Environmental Studies and Research (CESAR) at Sultan Qaboos University is the coordinating hub of environmental initiatives and research in the Sultanate. It works with over 75 environmental researchers and almost an equal number of technical staff academically affiliated to the Colleges of Science, Agriculture and Marine Sciences, Engineering, Medicine, Education, Commerce and Economics and Arts. Mission of CESAR is to encourage, organize and co-ordinate environmental studies and research, to coordinate with Government Ministries, international agencies and the private-sector to collate and disseminate information on environmental research relating to Oman and the region, to serve as a liaison- promoting research collaboration and interaction between the University, Government, international agencies and the private-sector, to contribute to the evaluation of environmental policy issues and assist the Government agencies when requested and finally to promote awareness of major environmental issues among the public and contribute to sustainable development in the Sultanate.

Achievements: CESAR hosted the combined workshops for Africa, North Africa and Middle East under the auspices of GEF/ UNEP funded TWNSO's project on 'Promoting Best Practices for Conservation and Sustainable Development of Biodiversity of Global Significance in Arid and Semi-Arid Zones' in 2002. CESAR was awarded HM's Strategic Research Grants for a multidisciplinary research project 'Jebal Akhdar Initiative Conservation and Sustainable Development in an Arid Mountain Eco-system'. CESAR is the first center in SQU to receive this honor. An Environmental Research Database in MS has been developed. Access with over 1000 entries has been established; CESAR coordinated the establishment of a Marine Science Forum at the College of Agriculture and Marine Sciences; Completed an Environmental Awareness Research in the Muscat area in 2005 and the results currently analyzed will serve as basis for a nation-wide survey; An Environmental Seminar Series was organized on 30 and 31 January 2005 at SQU. Over 80 participants attended this series where 30 research presentations were made by University researchers and students.

Facilities: Computing equipment and software; Major research equipment and technical support is available through the cooperation with other colleges mainly Science, Agriculture and Marine Science and Engineering; none of these are

free of cost and have to be paid from research grants for use and technical support.

Future plans: CESAR has so far been fulfilling its mandate approved by the University Council in 2000 as a coordinating agency. Its achievements and activities despite being a small establishment with limited funds clearly suggest the need for a move to its next phase of development. It should become a primary Research Centre as stated in the previous section. Organizational structure of CESAR should be expanded under a full-time Director.

Cooperation with developing countries: None at present; several MoUs with foreign Universities and SQU exist, but direct involvement of CESAR is still needed.

International Organization: Limited to finding research funding from international agencies.

Sultan Qaboos University — Remote Sensing and GIS Center

Head of Institution: Dr. Andy Kwarteng.

Address: PO Box 33, Al-Khod 123, Muscat, Oman, Sultanate of. **Phone:** (+968) 2414-2545. **Fax:** (+968) 2441-4110. **Email:** rsgis@squ.edu.om, kwarteng@squ.edu.om.

Scientific Fields of Interest: Agricultural Sciences, Earth Sciences, Environmental Sciences.

Research and training: Develop and teach under-graduate and graduate remote-sensing and GIS courses in colleges of agriculture and marine science, engineering and science; enhance the awareness and improve the use of geospatial information systems within the University, ministries and private industry; promote interdisciplinary research and projects using remote-sensing and GIS in the University; seek and execute remote-sensing and GIS projects from national and international funding agencies; organize thematic short courses in remote-sensing and GIS for the ministries and private organizations; and organize seminar, symposia, workshops and conferences on remote-sensing and GIS. WMO Center of Excellence for training in satellite meteorology for the Arab and southwest Asian countries.

Achievements: "Current Research Projects: Assessment and modeling of the oil spill fate in the coastal region of Sultanate of Oman. Sultan Qaboos University, Oman. Duration: 2002-2005; Client: His Majesty (HM) project, Sultan Qaboos University. Budget: \$ 203, 890. The use of GIS and remote-sensing to monitor and analyze urban growth in the Greater Muscat. Sultan Qaboos University, Oman. Duration:2003-2006; Client: His Majesty (HM) project, Sultan Qaboos University. Budget: \$ 120,000. Coastal erosion along the Al Batinah coastline. Sultan Qaboos University. Duration: 2004-2007; Client: His Majesty (HM) project, Sultan Qaboos University. Budget: \$ 180,000. Jebel Akhdar initiative-conservation and sustainable development in a fragile arid mountain

eco-system. Sultan Qaboos University. Duration:2004-2007. Client: HM project, Sultan Qaboos University. Budget: \$ 172,000. Bar Al Hikman Pleistocene to modern carbonate system. Sultan Qaboos University. Duration:2004-2006. Client: Joint Virtual Reality Center for Carbonate Studies, Sultan Qaboos University. Budget: \$ 330,000.

Facilities: 25 Pentium 4s for teaching, short courses and research; ERDAS IMAGINE, and PCI Geomatica, for image processing terrain analysis, radar analysis, digital photogrammetry, data visualization and image analysis; ARC/INFO and ArcGIS, for GIS analysis; Other complimentary equipment includes a digitizer, a color scanner and color printers, and Analytical Spectral Device Inc. (ASD) FieldSpec Pro spectroradiometer (3-2.5 μm) for spectral analyses in remote-sensing, minerals and soils, vegetation, marine and water, and more; Sokkia Electronic Total Station Set1030R3.

Future plans: Set up of EUMETcast receiver; Establish more training programs as WMO Center of Excellence in satellite meteorology; Hire more manpower and expand research.

Cooperation with developing countries: As WMO Center of Excellence for training in satellite meteorology, the center works closely with the countries in Regional Association II (Arab and southwest Asia).

International Organization: Collaborating with UN OOSA on a project on the Use of space technology for disaster management in western Asia and north Africa

Pakistan

Aga Khan University (AKU)

Head of Institution: Dr. Shamsh Kassim-Lakha, from 1/05: Mr. Firoz Rasul, President.

Address: P.O. Box 3500 Stadium Road, Karachi 74800, Pakistan. **Phone:** (+92 21) 493-0051. **Fax:** (+92 21) 493-4294, 493-0051. **Email:** president@aku.edu. **URL:** www.aku.edu.

Scientific Fields of Interest: Biological Sciences.

Research and training: Ph.D level courses in health sciences including basic health sciences, molecular and cell biology; M.Sc in health-policy and management, epidemiology, biostatistics; M.Sc in nursing by School of Nursing; M.Sc programme in clinical research (for AKU PGME trainees only) has begun to promote an academic research culture at AKU, particularly amongst clinical residents, fellows and faculty; certificate course in research ethics in collaboration with WHO-EMRO region (11.11.05-07.01.06); courses and seminars on clinical research methods, biostatistics, data management and related areas; short courses in basic and advanced epidemiology and biostatistics, including conduct of clinical trials, and basic computer skills required for using statistical software for data analysis; clinical scholar's programme which awards Diploma in clinical epidemiology. AKU organizes conferences and scientific meetings to provide researchers, healthcare providers, program managers and policy-makers a unique forum to share their ideas; workshop on ROTA VIRUS in collaboration with WHO and Pakistan Medical and Research Committee (8-10 March 2006); faculty research forum (monthly); child health research dissemination seminar. In addition, the following courses are also being offered on departmental requests: grant searching and research proposal-writing workshops; manuscript-writing workshops; literature search and reference citing; budget evaluation; use of COS database in finding research grants.

Achievements: Total publications in journals indexed in PubMed (2002-2005): 1242; Out of these, 29 publications have impact factor of value 10 and above.

Facilities: Avanti J301 Hi speed centrifuge; cell porator electroporation; Chameleon II plate reader; DNA sequencer; DU 650UV Vis spectrophotometer; Dyna II centrifuge; Eagle series 3000 steam sterilizer dou door; fluorescence detector; fluorescent microscope; GeneAmp PCR system 7901; quaternary gradient HPLC system; System 2S sterilizer; TD 20/20 luminometer; vortex maxi mixer plus; walk-in cold room; water jacketed CO₂ incubator; atomic-absorption spectrophotometer; flow cytometer; real-time PCR.

Future plans: Future development is aimed to acquire more knowledge on the epidemiological aspects, disease pattern and to investigate the causes including the genetic association within the local population. Main aim is to prepare enough trained competent scholars in the field of clinical epidemiology; nursing and basic sciences who could participate in solving the health-related

problems of the region. Additionally, the university is enhancing its research capacity by creating more research facilities and increasing participation by securing extramural funding to address health-related issues for this purpose more Masters and Ph.D. programmes will be developed.

Cooperation with developing countries: East Africa; Afghanistan; and Syria.

International Organization: Indoor air pollution seminar in collaboration with WHO; Health science research symposium on health sciences education, trends, opportunities and challenges; workshop on scientific writing and critical appraisal skills for health professionals organized by the Dept. of Community health sciences, AKU in collaboration of School of public, Health, Univ. of Alabama, USA; 2nd international family medicine conference of dept. of family medicine, AKU in collaboration with World Organization of Family Doctors (WONCA), Royal college of general practitioners (RCGP-UK) and the college of family medicine, Pakistan; south Asia cardiovascular research methodology workshop in collaboration with Pakistan Cardiac Society, SAARC cardiac society and WHO collaborating center, Pittsburgh, USA; Annual workshop on molecular and cellular techniques in collaboration with Karolinska Institute, Sweden; Wellcome Trust; NIH, Bethesda, USA; Higher Edu. Commission, Pakistan; USAID, UNICEF, and WHO.

Arid Zone Research Centre

Head of Institution: Dr. Naseer Alam Khan.

Address: Brewery Road, P.O. Box 63, Quetta 87300, Pakistan. **Phone:** (+92 81) 853-620. **Fax:** (+92 81) 853-616. **Email:** naseer_alam2001@yahoo.com.

Scientific Fields of Interest: Agricultural Sciences.

Research and training: Research: Animal Sciences, Range and Forestry, Land & Water-resources, Crop Sciences - including small ruminant productivity, dryland cropping in arid and semi-arid zones; sustainability of the biological systems. Public dissemination of information.

Achievements: Strategic supplemental feeding for improved sheep/goats production; fertility of moderately-thin ewes improved to above 90%; health cover package provision, i.e. vaccination, drenching and dipping reduces mortality to almost one third; Enhanced forage production by planting four wing saltbush. High-yielding Wheat (AZRI-96), Barley (Sanobar-96), Lentil: (Masoor-96), Vetch (Kohak-96); Catchment Basin Water Harvesting increases wheat production up to 32-50%.

Facilities: Soil Chemistry lab; Range and Livestock research station in Tomagh; Shade for Range nursery propagation. Library with CD-ROM references and multidisciplinary books & journals on agricultural research.

Future plans: To develop technological package for farmers engaged in dryland agriculture. To establish strong linkages between federal, provincial and international agencies, so that Pakistan can develop an integrated research effort to tackle the problems in these zones.

Cooperation with developing countries: ICARDA; CIMMYT, and others.

International Organization: ICARDA.

Ministry of Science and Technology — Pakistan Council of Research in Water Resources (PCRWR)

Head of Institution: Ch. Muhammad Akram Kaholwn.

Address: Kyaban-e-Johar, H-8/1, Islamabad, Pakistan. **Phone:** (+92 51) 925-8247, 925-8248. **Fax:** (+92 51) 925-8963. **Email:** pcwr@isb.comsats.net.pk. **URL:** www.pcrwr.gov.pk.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences, Chemistry, Earth Sciences, Engineering, Environmental Sciences.

Research and training: Water-quality monitoring and management; water-resources management; irrigation and drainage; de-certification control and mitigation; groundwater investigation and management; groundwater recharge; watershed management; snow and glacier hydrology; wastewater management; instrumentation; any other allied field.

Achievements: Developed low-cost technologies for drinking water analysis and treatment; modified and introduced low-cost high-efficiency irrigation system; pioneer in introducing tile- drainage system in Pakistan; developed high-efficiency irrigation methods; developed rainwater harvesting techniques; evaluated artificial groundwater recharge techniques; developed soil and water instruments locally.

Facilities: The PCRWR has its headquarters at Islamabad along with five regional centers located at Lahore, Bahawalpur, Tandojam, Quetta and Peshawar. All the Centers are equipped with state-of-the-art equipment and facilities to undertake advance research on emerging issues. The important equipment includes are: Water-quality labs at Islamabad and sub-offices; lysimeter stations in different agro-climatic zones; research stations in different zones; groundwater investigation cell; tile-drainage machinery; GIS and modeling lab; water management machinery such as laser land leveling, tractors, zero tillage drill, bed and furrow shaper, etc., PCRWR has a well-established library at Islamabad and at all its centers.

Future plans: Water-quality and quantity management; wastewater management; sustainable management of available land and water-resources; exploring irrigation techniques and methods to increase water productivity.

Cooperation with developing countries: There are various ongoing joint programmes with several countries including: Jordan, Bangladesh, Iran, Sri Lanka etc. especially in the areas of water-resources development and management. Joint programmes are also being undertaken with JICA, UNDIO, UNICEF, UNESCO, INWARDAM, USAID, ICIMOD, HKH, etc. More joint ventures are under process in the areas of water-resources assessment and quality management; GIS application; watershed management.

International Organization: Most of the international cooperation includes joint research programmes being supported by various international agencies such as JICA, EU, UNICEF, UNESCO, USGS, ARS, etc.

National Institute for Biotechnology and Genetic Engineering (NIBGE)

Head of Institution: Dr. Yosuf Zafar, Director.

Address: PO Box 577, Jhang Road, Faisalabad, Pakistan. **Phone:** (+92 41) 265-1471. **Fax:** (+92 41) 265-1472. **Email:** yzafar@nibge.org. **URL:** www.nibge.org.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences, Environmental Sciences.

Research and training: In the plant research sector, the relationship of Gemini viruses with cotton leaf curl disease has been understood at the molecular level. Development of GM crops by genetic engineering is a routine. Insect resistant cotton is ready to be released. A biofertilizer with a trade name 'BioPower' has been launched for various crops, use of which not only reduces the inputs of chemical fertilizers but also enhances the yields to significant levels. Industrial progression has a direct link with country's economy. We have developed strains and enzymes/endogene compounds for various industrial processes. Upgradation of fossil fuels is a multifaceted endeavor that may play its role in enhancing the economic feasibility of various processes linked to various industries viz., chemical industry, cement industry, power generation industry etc. Recently, a 300 tonnes coal heap has been bio-desulphurised using extremophilic microbial consortia at Askari cement factory, Nowshera. Gene mining of extreme habitats for useful genes is also one of the research focuses of this institute. Similarly, efforts have been put to design processes to combat environmental pollution for various industries (textile, leather, etc.) as well as for urban environment in general.

Achievements: A national premier research centre which acquired ISO 9001-2000. A unique blend of R&D and academic activities: Molecular understanding of viral disease complexes on cotton and other crops; Discovery of satellite molecules and their role in symptom development; Development of RNAi based resistance against Cotton leaf curl and Tomato leaf curl viruses; Development of male sterile plants by silencing of anther specific genes through RNAi; Identification of DNA markers linked to economic traits in cotton; Development of insect and virus resistant lines/varieties; Establishment of transformation and regeneration system in cotton, rice, wheat, potato, sugarcane and tobacco; Patents on novel insecticidal genes; Provision of GMO testing and basmati rice required for export; A very simple, sensitive, accurate and more informative assay for determining the number of modified carboxyl groups during the course of modification reaction has been developed native enzyme mobility shift assay, NEMSA; Growth and non-growth- associated citric acid/xylanase production by

Aspergillus niger reported first time in Pakistan; Developed depressed mutant of *Humicola lanuginosa* which produced cellulase-less xylanases and enzyme preparation was tested for bio-bleaching of Kraft pulp in Century Paper Mills, Phool Nagar, Lahore, Pakistan; Developed mutant strain of *Chaetomium thermophile* and used for large-scale production of cellulases and xylanases at National Feeds, Sheikhpura, Pakistan; Mutant developed for mass production of alpha-amylase and tested at pilot-scale; Mutant developed for industrial production of citric acid. The best mutant supported 100% theoretical yield of product; Pilot-plants fabricated for effluent treatment; facilities for Molecular diagnosis of animal viruses established; A battery of toxicity tests have been established at Environmental toxicology lab; A range of bacterial strains capable of coal desulphurization has been isolated from coal mine sites and various process parameters have been optimized in laboratory-scale bioreactors; About 50 to 68% of total sulfur has been removed through bio-desulfurization of a 20 and 300 tons coal heap respectively, using locally isolated bacteria; Established biotechnological process for recovery of copper from Saindak copper ore; Serological assay has been devised for the identification and enumeration of chemolithotrophic bacteria bio-leaching systems; Different fungal strains capable of producing stations have been isolated from local environment; Eight strains of *Streptomyces* giving tylosin production were screened from local environment and mutants were developed giving about 7-fold increase in tylosin yield; More than 100 microbial strains have been isolated from varied extreme environments of Pakistan, and two strains of *Acidithiobacillus ferrooxidans* have been deposited to NCIMB, United Kingdom; Sixty genes of extremophiles have been deposited to Gene-bank as a Public Resource Domain; Adapted the well-known PCR technology in combination with other biochemical and molecular techniques (DNA hybridization, sequencing & western blotting) to detect a variety of infectious and genetic diseases; Cytovision (CV) Chromoscan is used for Karyotyping, Fluorescent In Situ Hybridization (FISH) and Comparative Genomic Hybridization (CGH); Developed customized Institutional Quality Assurance Manual, Standard Operating Procedures for infectious diseases; Human Resource Development: 263 students (M.Phil & Ph.D in Biotechnology) have completed/in progress their research work in the institution since its inception; Development and commercialization of biofertilizers for cereals, cottons, fodder and grain legumes under the trade name of BioPower; Internationally recognized laboratory for the training of students and scholars of South Asia and Islamic countries in biofertilizer technology; Development of various crop varieties, some of which are pending government approval.

Facilities: NIBGE is Well-equipped with modern scientific equipments i.e., DNA sequencers ABI-310 and ABI-3100, Electron Microscopy, Ultracentrifuges, Fermentors, Cold Cabinets, Laser Scanning Densitometers, FPLC, HPLC, FTIR, Atomic-absorption spectrophotometer Varion, spectrophotometers, Electrophoresis Systems horizontal/vertical, Chromatographic Columns, UV/VIS Photo documentation system, Thermal Cycler Perkin Elemer, Double-beam Spectrophotometer and many other varieties of scientific equipments.

Future plans: Biotechnology is a rapidly moving science and in order to keep up with the modern developments in this field, the following plans have been incepted: (a) Strengthening of area of Bio-informatics and development of Dry Lab; (b) Strengthening of a Nano-biotechnology group; (c) Development of Drug design and Edible pharmaceuticals research groups; (d) Strengthening of Biochemical Engineering; (e) Development of National Culture Collection and a Bio-resource Centre; (f) Establishment of a National University of Biotechnology (NUB) for awarding M. Phil and Ph.D. research degree in Biotechnology.

Cooperation with developing countries: NIBGE has developed strong collaboration with Bangladesh on Biofertilizers. Similarly we developed collaboration with Mongolia, Indonesia and Tanzania.

International Organization: We have bilateral (Pak-US, Pak-China, etc.) and competitive international grants from TWAS, IFS, USNSF, etc

Nuclear Institute for Agriculture and Biology (NIAB)

Head of Institution: Dr. M. Ahsanul Haq, Director.

Address: PO Box 128, Jhang Road, Faisalabad, Pakistan. **Phone:** (+92 41) 2654-210. **Fax:** (+92 41) 2654-213. **Email:** niabmail@niab.org.pk, niab@fsd.paknet.com.pk. **URL:** <http://www.niab.org.pk>.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences.

Research and training: To deal with the outstanding problems in agriculture especially where radiation may be advantageously used compared to conventional techniques; Evolution of high-yielding crop varieties/germplasm having resistance to various biotic and abiotic stresses through mutation breeding and other advanced techniques; Crop-yield enhancement through efficient and balanced fertilizer management/ technologies; Economic utilization of salt-affected wastelands through saline agriculture; Enhancement of livestock health and control of diseases through commercial production of vaccines and feed supplements; Fate of agro-chemicals in the eco-system; Institutional/Human resource development.

Achievements: High-yielding and disease-resistant varieties of cotton (6), rice (2) and pulses; chickpea (4), mungbean (10) and lentil (2) have been developed at NIAB. Quality seed has been supplied to the farmers resulting in the increased production of these crops, thus contributing an additional income to the farmers; A biological approach has been developed for the management of salt-affected soils.; The use of balanced fertilizers with respects to micronutrient Zn and B along with improved technologies (fertigation, soil placement, split application) is not only resulting in substantial increases in Crop-yields but also in improved fertilizer-use efficiency; Vaccines/feed supplements have been prepared/commercialized, which are resulting in better health and efficiency of livestock; A Well-equipped agrochemical-testing lab is in operation for determination of their quality and fate in the eco-system.

Facilities: Nuclear Institute for Agri. & Biology (NIAB) is Well-equipped for carrying out various kinds of agricultural and biological research work. The

scientific equipment includes; Radiation source Mark IV, UV infra-red and atomic-absorption, HPLC Systems, GCS equipped with different detectors, Liquid scintillation counter, Freeze dryer, Kjeldhal apparatus, Fluorescent/phase contrast microscope, Centrifuge, PCR, Flame photometer, Neutron moisture probe, Fiber blender, Fibrograph, ELISA Reader, Gamma counter, Electrophoresis apparatus, Thermocycler, Spectrophotometer, Gel documentation system, Boom Sprayer, Multimedia Projector, Computers, Printers (black & white/colored), Leaf area meter and incubators etc. An experimental area of about 80 hectares having 24 hours excellent irrigation facilities is attached to the Institute for conducting field experiments. NIAB has two sub-stations; Biosaline Research Station, Lahore on 150 acres and Biosaline Research Station, Pcca Anna, Faisalabad on 1000 acres. NIAB has been pursuing research to develop some biological methods to deal with salinity problem. The emphasis has been to economically utilize the waste saline lands and brackish ground water for growing salt-tolerant plants. At these sub-stations this biological approach was demonstrated at a larger-scale and under more adverse conditions. These stations provides an ideal environment for biosaline agriculture research. Library on 5,000 Sq Feet area with no. of national and international books, journals etc. 24 hour Internet facility available at NIAB.

Future plans: Quality seed production on commercial basis; Commercialization of IPM techniques; Strengthening of agro-chemical testing lab; Molecular studies in chickpea, tomato and wheat crop.

International Organization: International Atomic Energy Agency, (IAEA) Vienna, Austria; International Center for Agricultural Research in the Dry Areas (ICARDA), Syria; International Crops Research Institute for Semi Arid Tropics (ICRISAT), India; International Rice Research Institute (IRRI), Philippines; US department of Agriculture, Peoria, USA; Asian Vegetable Research and Development Centre, Thailand.

Pakistan Council of Scientific and Industrial Research Laboratories Complex — Fuel Research Centre (FRC, PCSIR)

Head of Institution: Dr. Mrs. Tahira B. Sarfaraz, Director.

Address: Off University Road, Karachi 75280, Pakistan. **Phone:** (+92 21) 464-1754, 464-1738. **Fax:** (+92 21) 464-1937. **Email:** frc_pcsir@hotmail.com, frc_pcsir@yahoo.com. **URL:** www.pcsir.gov.pk.

Scientific Fields of Interest: Chemistry, Environmental Sciences.

Research and training: Development of physical and chemical coal-cleaning technology; studies on coal gasification; humic acids and trace elements production from lignite coals for using as bio-fertilizers; coal and coke briquetting renewable energy by utilizing biological waste; environmental monitoring of gaseous emissions, CO, CO₂, NOX, HC particulate matters from the stacks of generators, incinerators and boilers; environmental studies of

emission of vehicles; analysis of coal samples from various resources; analysis of water for hazardous metals like Arsenic, Lead and Chromium.

Achievements: Coal and coke analysis, which includes Proximate Analysis, Sulfur content, Calorific value, Hard Grove Index, etc.; environmental monitoring of gaseous emission; environmental assessment of ambient air-quality; environmental studies of emissions from vehicles; water testing/analysis for hazardous trace metals like Arsenic, Chromium, Lead and Mercury; supply of Humic acid and coke and coal briquettes.

Facilities: HPLC, Atomic-absorption spectrometer, Proximate analyzer, Sulfur determinator, bomb calorimeter, inductive coupled plasma, computers, and library.

Future plans: Coal, is widely available in Pakistan and estimated at 185 billion tones. Efforts will be made to evaluate the indigenous coal for power generation. Coal cleaning, coal gasification and combustion techniques will be developed. Pollution problems associated with coal combustion will be solved by monitoring and combating these pollutants to minimize their effects.

Cooperation with developing countries: Efforts are being made to get our scientists trained to utilize indigenous coal for power generation.

Pakistan Council of Scientific and Industrial Research Laboratories Complex — Leather Research Centre (LRC, PCSIR)

Head of Institution: Dr. Ghulam Abbas.

Address: Off University Road, Karachi 75280, Pakistan. **Phone:** (+92 21) 258-8720, 257-0765. **Fax:** (+92 21) 257-8748. **Email:** lrpcpsirkar@hotmail.com, lrpcpsirkar@yahoo.com.

Scientific Fields of Interest: Engineering.

Research and training: Development of process of leather chemicals, e.g. fat liquors, syntans and dyes; development of processes and chemicals to increase the exhaustion of chrome in leather and decrease the pollution load; development of degreasing agent from indigenous enzyme sources in Pakistan; development of chemicals and technology of heat resistance leather; upgrading of low-quality leather, quality leather from aquatic animals; low effluent tanning technology and utilization of tannery waste; 3 and 6 month training courses on leather processing.

Achievements: The following lab-scale process have been developed: process for the preparation of fatliquor from cotton seed oil; fatliquor from raw blended animal oil; aluminum tanning compound; turkey red oil; preparation of synthetic tanning compound for leather industry; the chrome processed in our lab has been used in tannery processes for goat, sheep and cow skins parallel to the commercial basic chromium sulfate. Very significant results have been found such as: our chrome complex showed best exhaustion 97% than those of the BCS (basic chromium sulfate) 73-80%; our chrome complex is cheaper as

compared to the conventional chrome tanning material; the leather made from our chrome complex showed better physical and chemical properties as compared to BCS. Label leather for Jean tangs, washable novelty leather from the internal membranes of bovine stomach, water resistant suede garment leather from goat skins, fancy leather from the internal membranes of bovine stomachs; quality upholstery leather from cow and buffalo hides; washable shoe upper leather from small pieces of shark skins, exotic leather form chicken paws, garment and upper leather fro subzero temperature

Facilities: DR-2000 spectrophotometer; UV spectrophotometer; FT-IR spectrophotometer; HPLC; tensile strength machine; tensile tester; rub fastness tester; flexometer; Bally penetrometer; lastometer; orbital shaker; microscope; motor-driven wooden and plastic drums; tannery machines such as fleshing, shaving, splitting, toggle drier, vacuum drier, vibration staking machine, hydraulic press, glazing, buffing, polishing, stonning machine and spray plant for finishing; computers; books, journals, periodicals and current literature in the leather field is available in the library, besides Internet facilities; physical and chemical testing facilities of leather and leather auxiliaries are available. Both labs are accredited as per ISO-17025.

Future plans: LRC is trying to establish methods for quantitative analysis according to ISO and WTO requirement; to develop new articles, effective utilization raw material for leather processing utilization of fish skins into quality leather and developing process of leather which are economically viable and developing new techniques to reduce the tannery effluent load; strengthening of LRC's R&D, analytical and physical testing as well as tannery facilities; working to enhance the scope of accreditation.

Cooperation with developing countries: Future: develop cooperation to exchange experience and manpower skills.

International Organization: In connection with some international labs to train our scientific staff in the area of modern instrumental analysis; this is however linked to funding problems.

Pakistan Council of Scientific and Industrial Research Labs. Complex (PCSIR), Lahore

Head of Institution: Dr. Shahnaz Hameed.

Address: Ferozepur Road, Lahore 54600, Pakistan. **Phone:** (+92 42) 923-0688, 923-0695. **Fax:** (+92 42) 923-0705. **Email:** pcsir@brain.net.pk.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences, Chemistry, Engineering, Environmental Sciences, Physics.

Research and training: Chemistry (analytical, organic); oils, fats and allied chemicals; industrial chemicals; textiles and leather. Plastic and polymers; dyes and dyestuff; pharmaceuticals; essential oils, perfumes and cosmetics. Food; biochemistry; glass and ceramics; minerals and metallurgical. Nutritional; toxic metals; microbial; tissue-culture. Applied physics: computers; electronics;

environmental Development of products and technologies: designing, fabrication, installation and commissioning of plants as well as machinery; analytical and material evaluation services to industry and other organizations; preparation of techno-economic feasibility reports for entrepreneurs. Standardization and calibration of instruments, weights and measures; repair and maintenance of equipment and instruments.

Achievements: Production of strategy chemicals; production of lab equipment; processes leased out; technical, analytical and advisory services to different industries.

Facilities: Computers, infrared, FT-IR spectrometer, flame photometer; GC-MS; emission spectrometer; atomic-absorption spectrophotometer; XRD, XRF; combine cyclic corrosion testing instrument; surface profile meter; dilatometer; universal testing machine impact and fatigue testing machines; DTA; TGA; ICP spectrometer; electron microscope; ion-chromatograph; UV visible spectrophotometer; BOD incubator; COD reactor; stock emission analyzer; SEM (Hitachi), TGA Thermogravimetric analyzer, etc.

Future plans: Globalization of trade has necessitated WTO regime. Major industries of the country need scientific and technical support to meet these requirements. Very strong industrial linkage is being developed as a major R&D thrust in this organization.

Cooperation with developing countries: Such cooperation is going on at all levels under bilateral, multilateral or regional programmes like SAARC, etc.

International Organization: Occasional cooperation is received from some UN/international organizations.

Quaid-i-Azam University — Department of Physics

Head of Institution: Dr. M. Zafar Iqbal.

Address: Islamabad, Pakistan. **Phone:** (+92 51) 282-9537. **Fax:** (+92 51) 921-0256. **Email:** mziqbal@qau.edu.pk. **URL:** www.qau.edu.pk.

Scientific Fields of Interest: Physics.

Research and training: Experimental physics: semiconductor physics; atomic and molecular physics; magnetism and magnetic materials including nanoparticles; plasma physics; thermal physics; high-temperature superconductors. Theoretical physics: High-energy physics; condensed matter physics; quantum optics.

Achievements: Since 1967, 752 M.Sc graduates; 496 M.Phil. graduates; 83 Ph.D graduates; research publications in international journals/conferences.

Facilities: Semiconductor materials characterization facilities, such as deep-level transient spectroscopy (DLTS), Photoluminescence Spectroscopy, Fourier-Transform Infrared (FTIR) Absorption Spectroscopy etc.; Laser Spectroscopy of atoms and molecules setup and allied facilities; Vibrating Sample Magnetometer and allied equipment; X-ray Diffractometer; Electron Beam Vacuum Evaporation unit; Plasma Focus Device; RF/Pulse DC Generated Plasma Facility; Computer Lab for research students.

Future plans: Introduction of 4-years Bachelor's degree program; Upgrading of M. Sc. Teaching laboratories; Strengthening of research laboratories through increased manpower and facilities.

Cooperation with developing countries: Malaysia; Singapore; and Iran.

International Organization: Various members of the faculty have collaborative linkages with some laboratories and research groups in the developed countries, such as Sweden, Germany, U.S.A., U. K., Japan through agencies including Pakistani and host countries' agencies.

University of Agriculture, Faisalabad (UAF)

Head of Institution: Dr. Bashir Ahmad, Vice Chancellor.

Address: 2 km NE of Faisalabad International Airport, Faisalabad 38040, Pakistan. **Phone:** (+92 41) 9200-16170, ext. 2000. **Fax:** (+92 41) 920-0764.

Email: uaf@fsd.paknet.com.pk. **URL:** www.uaf.edu.pk.

Scientific Fields of Interest: Biological Sciences, Chemistry, Mathematics.

Research and training: Research in Agriculture and its allied disciplines, Department of Plant Pathology, Plant-breeding & Genetics, Crop Physiology, Agri. Entomology, Horticulture, Soil Science and Agri. Extension. Faculty of Animal Husbandry, Department of Poultry Husbandry, Animal Nutrition & Feed Technology, Animal Breeding & Genetics, Livestock Management under Faculty of Veterinary Sciences, Department of Vet. Anatomy, Animal Reproduction, Physiology & Pharmacology, Clinical Medicine & Surgery, Microbiology, Parasitology under Faculty of Agri. Engineering, Department of Irrigation & Drainage, Structures & Environmental Engineering, Farm Machinery & Power, Fiber Technology and Food Science & Technology under Economics & Rural Sociology, Department of Economics, Development Economics, Marketing and Agri. Business, Resource and Environmental Economics and Rural Sociology. The related departments of Basic Sciences are Department of Botany, Zoology & Fisheries, Physics, Chemistry, Biochemistry, Math and Stat, Computer Science, Humanities and Islamic Studies. Agricultural Biochemistry and Biotechnology (CABB), Technology Transfer Centres is being carried out.

Achievements: Upto December, 2004, 387 Ph.D, 455 M.Phil, 15736 M.Sc. and 18614 B.Sc. (Hons.) (HRD activities), developed wheat variety LU-26, Potato Variety PARS-70, identified salt-tolerant varieties/lines of wheat; embryo-transfer technology in indigenous cows and buffaloes; synthesized crossbreed of cows for high milk production and resistance to disease; Lyallpur Silver Black poultry for rural areas; high-lysine single-cell proteins. Allelopathy: A new technology for controlling weeds, Technology for essential oil extraction of rosa. Tunnel Technology, Nitrogel: A water saving Technology, Augorhale Technology for colonization of salt stress lands. Use of Brackish water for crop production and reclamation of salt-affected soils, Technology for prevention of mastitis through post-milking dipping, Biotechnology for bioconservation of organic waste, Heavy metal hazards for soils and vegetable crops and their amelioration.

Facilities: Well-equipped Hi-Tech Lab with its sister laboratories including spectrophotometers, Scanning Electron Microscope (SEM), X-Ray Diffractometer (XRD), Ultracentrifuge, Transmission-electron microscope (TEM), flame photometers, pH meters, Atomic-absorption spectrophotometers (AAS), High-performance Liquid-chromatograph (HPLC), Amino-acid analyzer, Gas Chromatograph (GC). Two experimental stations for field work, Water Purification System. Computers, Internet facility throughout the university; Digital Library with Audio-Visual and Multimedia facility.

Future plans: Centre for Advanced Study in Applied Genetics and Saline Agriculture, Animal Health Biotechnology Research Centre; Rural Women Development Centre., Technology Transfer Centres at Selected District Level, Establishment of National Technology Incubators, Establishment of Business Incubator, Enhancement in HRD by doubling the enrollment, centres for standardization of Swab Test on Animal Food. Collaborative Research at National/International Levels. Master/Doctorate degree programme in Agri. Biotechnology. Establishment of Plant Disease Diagnostic Centre and Youth development Research Centre; Centre for Land Reclamation and Water-quality research, Post-harvest Engineering Centre for fruits, vegetables and grains. Centre for climatic changes and crop productivity. Establishment of Agri. Policy Research Institute. Technology of groundwater hydrology engineering and Center for Allelopathy.

Cooperation with developing countries: Training and visits to SAARC countries, Egypt. Collaborative Research with Sultan Qaboos University College of Agriculture, Muscat (Oman).

International Organization: Australian Centre for International Agricultural Research (ACIAR); Overseas Development Authority (ODA); Japan International Cooperation Agency (JICA); Asian Development Bank (CLCV), Higher-education Link between New Castle University U.K., Centre of Arid Zone Study, University Wales Banger U.K. and Humboldt University Berlin Germany. LOA between UAF and FAO (UNO), MOU between UAF and Institute of Geodesy and Geo-informatics, University of Rostock, Germany, MoU between UAF and College of Agriculture/Marine Sciences, MoU between UAF and School of Biological Sciences, Liverpool, U.K. Collaboration between UAF and CBNU (Korea).

University of Karachi — Department of Botany

Head of Institution: Dr. Zafar Iqbal, Chairman.

Address: Karachi 75270, Pakistan. **Phone:** (+92 21) 924-3131/2, xt. 2288.

Fax: (+92 21) 924-3203. **Email:** mziqbalbotuokpk@yahoo.com.

Scientific Fields of Interest: Biological Sciences, Earth Sciences.

Research and training: The department has developed a large and productive research and teaching group in plant sciences. Members of the faculty are working in many specialized fields of plant sciences and are endeavoring to advance our knowledge of the plant world. Applied botany: the main topics of

research in this section are plant tissue-culture, plant embryology, and biological nitrogen fixation. Mycology and plant pathology: research includes seed pathology of economically important crops. Parasites and predators of plant parasitic nematodes have been isolated and identified and various biological agents have been used for the control of root infecting fungi and nematodes. Phycology and marine botany: the seaweed flora in the coastal areas of Karachi has been studied taxonomically. Survey of phytoplankton and seasonal variation of the algal population in lakes and in the North Arabian Sea has been studied from the nutritional and ecological viewpoints. Work on phycochemistry of marine benthic growing along the coast of Karachi has also been carried out. Studies are also being conducted on the Mangrove ecosystem of Pakistan. Plant ecology: the ecological section deals with the methods and problems associated with sampling, ordination and classification of plant communities; ecophysiology and population ecology of xerophytes and halophytes; plant and soil relationships; and the effect of the air, water and soil pollutants on the local species. Plant Physiology: physiology and biochemistry have been investigated to find out the mechanism of salt-tolerance in halophytic to find out the mechanism of salt-tolerance. Systematic botany: the dept. has earned an international recognition for working upon the flora of Pakistan edited by Profs. S. I. Ali and M. Qaiser. Taxonomic accounts of 230 plant families have been published. The Karachi University Botanical herbarium has a collection of over 125, 000 plant specimens.

Achievements: Publications: more than 1700 research papers published in international journals. Publication of taxonomic accounts of 214 plant families, Over 70 Ph.Ds produced.

Facilities: Growth chambers; atomic-absorption spectrometer; HPLC; GC Photosynthesis equipment; High-speed centrifuge; vapor pressure osmometer; dew-point pycrometer; photomicroscope; scanning microscope; transmission microscope; UV spectrometer; rotary evaporator.

Future plans: The department has a very strong base in conventional plant science and has already made a move to introduce research at cellular, molecular and genetic levels. We also hope to establish sections doing genomics research.

Cooperation with developing countries: China.

International Organization: Collaboration with USA, Germany; EU; CAS; NSF, USA; and British council, UK.

University of Karachi — International Center for Chemical and Biological Sciences (ICCBS)

Head of Institution: Dr. M.Iqbal Choudhary, Act. Director.

Address: Karachi 75270, Sindh, Pakistan. **Phone:** (+92 21) 924-3224, 924-3211, 482-4934, 482-4924/5, 481-9010. **Fax:** (+92 21) 481-9018/9. **Email:** hejric@digicom.net.pk, hej@cyber.net.pk, pcmd@cyber.net.pk, info@iccs.edu. **URL:** www.iccs.edu.

Scientific Fields of Interest: Biological Sciences, Environmental Sciences.

Research and training: The ICCBS is offering M.Phil. and Ph.D programs in the fields of chemical, biochemical and biomedical sciences. The ICCBS is also providing much needed training, instrumental and consultancy services to a range of research institutions of Pakistan through collaborative arrangements. This includes free of cost or HEC-sponsored spectroscopic analysis, bioassay and pharmacological screenings, etc.

Achievements: Products and processes that have already been commercialized include: Neem-based pesticides: a range of neem-based pesticides developed at ICCBS have now been produced commercially at a large pilot-plant of a capacity of 200 lt. per day. These products are now marketed both in domestic and international markets. Phytopesticides: The field trials on two new botanical insecticides formulations based on Annona and Acorus species have been completed and large-scale production trials are currently under way. Virus-free banana species: The plant-biotechnology unit of the ICCBS in producing a large number of virus/disease-free banana varieties, which are marketed commercially is Sindh and other banana growing areas of Pakistan. Industrial analytical center: The Industrial Analytical Center based on available analytical and spectrometric facilities of ICCBS institutions. This center is already generating an income of Rs. 8 million annually for the ICCBS and serving over 250 major industries in Pakistan.

Facilities: Super-conducting NMR spectrometers, high-resolution mass spectrometers, gas-phase Amino-acid sequencer, single crystal X-ray diffractometer, ICP, LC-MS, FT-IR, CD equipment, GC-MS, gas chromatographs, HPLCs, recycling HPLCs, etc. It includes a well-equipped pharmacology section (with animal houses), plant-biotechnology unit and a pilot-plant building for work on industrial levels. Mass spectroscopic database, ISI Current Contents, Dictionary of natural products and chemical abstracts on CDs have also been acquired. The well-subscribed subject-special library of the institute subscribes to over 130 periodicals and journals and houses over 8,000 books on various aspects of chemical and related sciences. A 4 MB bandwidth caters to the communication needs of the institute, which includes access to ISI online databases and HEC digital library. Several laboratories such as enzyme inhibition, tissue-culture and plant micro propagation, anti tumor and radio-labeling laboratories have been established in collaboration with NCI (USA), Abbott Laboratories and other international partners.

Future plans: To grow into a world-class multidisciplinary institute: ICCBS is currently establishing a biotechnology park; Latif Ebrahim Jamal National Science Center and the Diagnostic Center and Clinical Research Unit (PCMD). In the near future it plans to create a Food chemistry institute and a nanochemistry center. Greater access: Increase its M.Phil/ Ph.D. student enrollment from 220 to 800 in the next 10 years based on increasing demand highly-qualified professionals in development sectors of Pakistan and the muslim world. These students will be trained in various constituents' institutions of the ICCBS system in frontier and emerging technologies and will have access to state-of-the-art scientific equipment, information sources and other facilities. Introduction of new disciplines: Laboratory for Nano-chemistry; industrial biotechnology laboratory; virology lab; bio-informatics Lab; petroleum chemistry unit; supra-molecular chemistry Lab; nutraceutical development lab; genomics lab; tropical disease and experimental pharmacology; combinatorial chemistry; industrial catalysts laboratory. World-class quality: Emphasis has been placed and will continue to be placed on enhancing the quality of scholars graduating from the ICCBS system. In this regard, a number of teaching and skill developmental modules will be introduced to bring the graduates of this institute at par with major universities of the world. Inter-Islamic and international linkages: The scientific collaboration and institutional linkages with top-class R&D institutions of the Islamic world and other advanced countries will be further strengthened This will include exchange of scientists, scholars, students and technicians and work on collaborative research projects in key frontier areas of science and technology. Support to industries and other R&D institutions: Various institutions of the ICCBS system will develop mechanisms to support the industries by providing consultancy and analytical services as well as by developing new products and processes based on indigenous raw material and local knowledge.

Cooperation with developing countries: Research collaboration MoU with Univ. of Putra Malaysia, Kuala Lumpur, Malaysia; Univ. of Tübingen, Germany; Univ. of Mississippi, Ole Miss, USA; Dhaka and Jahangirnagar Univ. Bangladesh; Bangladesh Council for scientific and industrial research; Al-Farabi International Univ., Almaty, Kazakhstan; Shaheed Baheshti Univ. Tehran, Iran; Medicinal and aromatic research institute, Khartoum, Sudan.

University of Karachi — National Nematological Research Centre (NNRC)

Head of Institution: Dr. Shahina Fayyaz, Director.

Address: Karachi 75270, Pakistan. **Phone:** (+92 21) 924-3202. **Fax:** (+92 21) 924-3190, 924-3191. **Email:** shahinaku@yahoo.com, shahina@yahoo.com.

URL: www.nnrc.ku.edu.pk.

Scientific Fields of Interest: Agricultural Sciences.

Research and training: Survey, morphology and taxonomy of plant parasites, free-living soils, free-living marine and entomopathogenic nematodes; further identification of nematodes by molecular techniques; culturing of nematodes for experimental purposes; studies on the genetic diversity of nematodes at the molecular level; nematode control studies (chemical, biological pesticides and culturing practice); mass-rearing of insects used as bait; production of entomopathogenic nematodes on mass-scale; organizing short and long-term training courses at the national and international level; organizing workshops/seminars/ conferences at national and international level.

Achievements: As a result of taxonomical research, the total nematode fauna identified so far consists of more than 550 nematode species pertaining to plant, soil, marine and entomopathogenic nematodes which include new species described from Pakistan; published more than 500 research papers in refereed journals of international reputation, 12 booklets, 10 books and 6 proceedings; so far produced 7 Ph.Ds, 4 Post-graduate students at present doing research work for their M.Phil. or Ph.D degree; use of entomopathogenic nematodes as bio-pesticides against pests of important agricultural crops; publishing a biannual 'Pakistan Journal of Nematology' since 1983 and a biannual PSN Newsletter which has completed 3 years of its publication.

Facilities: NNRC has the basic equipment for research work, teaching and training on fundamental and applied nature in all fields of plant nematology. NNRC has four well-equipped laboratories with modern facilities and an insect-rearing laboratory with computers in each lab NNRC has also developed its own library having more than 500 books up-to-date, journals of international reputation and the latest literature on nematology.

Future plans: To further explore the biodiversity of nematode fauna in Pakistan; implementation of integrated pest management strategies in the field of nematology; produce more Ph.Ds to increase the professional manpower in nematology; establish cooperative relations with centres/institutions of research in Pakistan and abroad for joint research and exchange of information/expertise; obtain a patent for entomopathogenic nematodes of Pakistan.

International Organization: USA, UK, Finland, and India.

University of the Punjab — Centre for High Energy Physics

Head of Institution: Dr. Fazal-e-Aleem, Director.

Address: Quaid-e-Azam Campus, Lahore 54590, Pakistan. **Phone:** (+92 42) 923-1137, 923-1138. **Fax:** (+92 42) 923-1253. **Email:** info@chep.pu.edu.pk.

URL: <http://www.pu.edu.pk/chep>.

Scientific Fields of Interest: Physics.

Research and training: Elastic and deep inelastic scattering; multiplicity distributions; CP violation; gauge theories; neutrino physics; parallel-processing;

projectile fragments in heavy-ions interaction at relativistic energies; computational physics; medical physics.

Achievements: More than 250 research papers in foreign research journals and conferences over the past two decades; faculty books published by renowned American and British publishers.

Facilities: Library including books, journals and pre-prints or research papers from various international research centers such as CER, DESY SLAC, FERMILAB, SERPUKHOV; Audio-visual facilities with lectures reproduced on videotapes. This center has established laboratories for its post-graduate and under-graduate students. In addition we have established a Beowulf-style super computer for modeling and simulations used in High-energy physics and material sciences.

Future plans: The center has established collaboration with High-energy physics lab, univ. of Albany, USA, and is currently extending this collaboration to join BaBar experiment at SLAC, USA.

Cooperation with developing countries: The center is in the process of collaborative linkage with developing countries.

International Organization: Two faculty members/Ph.D scholars have been trained (High-energy physics and parallel-processing techniques) at the Univ. of Albany (USA) under a collaborative program.

University of the Punjab — Centre of Excellence in Molecular Biology (CEMB)

Head of Institution: S. Riazuddin, Director.

Address: 87 West Canal Bank Road, Thokar Niaz Baig, Lahore, 53700, Pakistan. **Phone:** (+92 42) 542-1235, 542-1350. **Fax:** (+92-42) 516-4155, 542-1316. **Email:** camb1@wol.net.pk, riaz@lhr.comsats.net.pk. **URL:** <http://www.pu.edu.pk/f-science/centre-excellence-molecular-biology>.

Scientific Fields of Interest: Biological Sciences.

Research and training: Teaching and training in molecular-biology and recombinant DNA technology. Molecular biological research on specific problems in health and medicine, agriculture, industry & environment sectors, to create a repository of DNA enzymes, cloning vehicles, novel bacterial strains and other such molecular tools.

Achievements: As of 2004, 177 M.Phil/Ph.D. students have graduated; More than 2000 microbial strains have been identified, characterized and supplied to different labs. 14 restriction endonucleases have been purified and supplied to different labs in the Centre. *Bacillus thuringiensis* (Bt) strains have been identified and used to produce Bt bioinsecticide. Field trials to assess the field performance of locally developed Bt biopesticide on cotton, cauliflower, okra, tomato, potato, rice have demonstrated its effectiveness at par with chemical insecticides. Discovered five new deafness loci and 56 mutations involved in hearing impairment. Two new genes, three new mutations and five locus linked

to Retinitis pigmentosa/cataract have also been discovered. Recent research efforts are focused to exploit the regeneration potential of stem-cells in cellular therapy of diseased organs.

Facilities: Ultracentrifuges; liquid scintillation counter; computers (IBM compatible); medium speed centrifuges; cold cabinets (4°C); fermentors (14 litres); benchtop centrifuges; ultra cold cabinets (85°C); oligonucleotide synthesizer; eppendroff centrifuges; spectrophotometers; amino-acid analyzer; controlled environmental safety cabinets; orbital shakers; CO₂ incubators; TPLC; HPLC; DNA sequencer; electrophoresis; library with 1115 books and 26 journals.

Future plans: Animal house; green house; expansion in material production laboratory; establish virus and stem-cell research laboratories.

Cooperation with developing countries: Training/research with scientists from Bangladesh, Egypt, Turkey, Jordan, Sri Lanka, Malaysia, Philippines, Indonesia, Nepal, and Sudan.

International Organization: University of Washington, Seattle, University of Cincinnati, USA; University of Ottawa, Canada, National Institute of Deafness and other Communication Disorders (NIDCD)/NIH, Rockville, Maryland, USA and National Eye Institute (NEI), Bethesda Maryland, USA.

Ziauddin Medical University (ZMU)

Head of Institution: Dr. Asim Hussain, Chancellor.

Address: Shahrah-E-Ghalib Block 6, Clifton, Karachi 75600, Pakistan. **Phone:** (+92 21) 586-2939. **Fax:** (+92 21) 586-2940. **Email:** zmu@khi.compol.com.

URL: www.zmu.edu.pk.

Scientific Fields of Interest: medical Sciences.

Research and training: Ph.D, M.Phil. Basic Health Sciences in: anatomy, biochemistry, physiology, pharmacology and pathology. M.D./MS in medicine, surgery, nuclear medicine, oncology and radiology. FCPS Training in: medicine, surgery, gynae/obs., pediatrics, comm. health sciences, family medicine.

Achievements: Over 100 publications from research carried out at Ziauddin Medical University; international presentations at many international conferences; awarded best paper and poster award at Japan and Kenya.

Facilities: 3 libraries; 20 computers; spectrophotometer; water bath; centrifuge; polygraph, etc.

Future plans: Approx. 21 students are enrolled for Ph.D. and M.Phil; a number of research projects are in the specialties of anatomy, physiology, biochemistry and pharmacology; a number of research projects have been submitted for funding.

Cooperation with developing countries: none at present

International Organization: Cooperative research projects have been initiated with Manchester Metropolitan University.

Panama

Centro del Agua del Tropico Humedo para America Latina y el Caribe (CATHALAC)

Head of Institution: Emilio Sempris.

Address: PO Box 0823-0397, Panama city, Panama. **Phone:** (+507) 317-1640/42. **Fax:** (+507) 317-0127. **Email:** emilio.sempris@cathalac.org, cathalac@cathalac.org. **URL:** www.cathatlac.org.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences, Earth Sciences, Engineering, Environmental Sciences.

Research and training: Operating under the auspices of UNESCO, CATHALAC inspires, informs and facilitates the Member States and Associated States of UNESCO through the implementation of cooperative programmes and projects in the areas of research, capacity-building, training and education, and development and transfer of technologies. Currently, CATHALAC is implementing a number of environmental management, research, and training initiatives (at the regional and national levels): The United Nations Development Programme / Global Environmental Facility (UNDP-GEF)-funded Adaptation to Climate Change Phase II Project operates in Mexico, Guatemala, Honduras, El Salvador, Nicaragua, Costa Rica, Panama, and Cuba. Its main objective is the strengthening of the systemic, institutional and individual capacity of stakeholders to develop strategies and to implement policies and measures to prepare for adaptation at the regional, national and local levels. Training activities have been conducted in the area of regional climate change modeling.

Achievements: Regional-level training activities have been conducted (or are being planned) by CATHALAC in the past few years, and have largely been conducted in partnership with other partner institutions. Over its 14-years of existence, CATHALAC has realized a number of scientific results and products, in collaboration with its partners, and particularly in the area of technology transfer.

Facilities: CATHALAC is home to a regional research and training facility in the form of the Regional Visualization & Monitoring System (SERVIR) laboratory and training center. The backbone of the SERVIR laboratory are the two double-processor PowerEdge servers, which store and deliver satellite and geospatial data archive. The Center also has 10-node sever cluster that runs short-term weather and climate models on a daily basis, and which also serves geospatial data storage, and web-hosting. The laboratory is equipped with modern day computing and tele-conferencing facilities.

Future plans: Overall plans for development include ensuring, as time rolls on, that the Center continues to respond to the needs of the broader region. Plans are in place to ensure that a wide variety of thematic areas including human health and energy are addressed by the facility's intensive observation and modeling capacities. Under the framework of a recent decision by UNEP's

Forum of Environmental Ministers of Latin America and the Caribbean, there are also plans to expand the application of the Regional Visualization & Monitoring System to the broader Latin America & Caribbean region.

Cooperation with developing countries: CATHALAC serves the Member States and the Associate States of UNESCO in Latin America and the Caribbean. The Center also serves as the headquarters for the Regional Visualization & Monitoring System, which serves as a Mesoamerica-scale implementation of the Global Earth Observation System of Systems (GEOSS). Under the framework of a recent decision by UNEP's Forum of Environmental Ministers of Latin America and the Caribbean, there are also plans to expand the application of the Regional Visualization & Monitoring System to the broader Latin America & Caribbean region. CATHALAC also has a relationship with the Caribbean Community (CARICOM) through a Memorandum of Understanding with CARICOM's Climate Change Centre (CCCCC), for cooperation in regional climate change adaptation issues.

International Organization: National Aeronautics and Space Administration (NASA); National Oceanographic and Atmospheric Administration (NOAA); United Nations Development Programme / Global Environmental Facility (UNDP-GEF); United Nations Educational, Cultural and Scientific Organization (UNESCO); United Nations Environmental Programme (UNEP); United States Agency for International Development (USAID); United States Department of State - White Water to Blue Water (WW2BW) initiative World Bank.

Paraguay

Universidad Nacional de Asunción — Facultad de Ciencias Exactas y Naturales — Laboratorio de Investigación de la Atmósfera y Problemas Ambientales (LIAPA)

Head of Institution: Mr. Genaro Coronel, Coordinator.

Address: Genaro Coronel, LIAPA-FaCEN, Campus Universitario, San Lorenzo, Paraguay. **Phone:** (+592 21) 585-600. **Fax:** (+592 21) 585-600. **Email:** liapa@facen.una.py. **URL:** <http://liapa.facen.una.py>.

Scientific Fields of Interest: Earth Sciences, Environmental Sciences.

Research and training: Variability and climate change; hydrology and agriculture; ozone surface and UV-B.

Achievements: Three major discharge events in the Paraguay River; trends in total and extreme South American rainfall (1960-2000) and link with sea-surface temperature; observation of trends in indices of daily temperature extremes in South America from 1960 to 2000.

Facilities: Computers; field stations (ozone, UV-B); agreements with other institutions; Internet facilities.

Future plans: Land-use change; linking biophysical and human factors to predict trends, assess impacts and support viable strategies for the future; climate models; capacity-building (development of a coordinated network of scientists from other institutions with expertise in global change issues with substantial impact on the academic, educational, agricultural and political sector).

Cooperation with developing countries: IAI (CRN); FONTAGRO.

Peru

International Potato Center (CIP)

Head of Institution: Pamela K. Anderson.

Address: Apartado Postal 1558, Lima 12, Peru. **Phone:** (+51 1) 349-6017/5619. **Fax:** (+51 1) 317-5326. **Email:** cip@cgiar.org. **URL:** www.cipotato.org

Scientific Fields of Interest: Agricultural Sciences, Earth Sciences.

Research and training: Production systems (potato and sweet potato); genetic resource conservation and utilization; integrated disease management; integrated insect and nematode management; seed production systems; post-harvest management.

Achievements: Achievements included the world potato and sweet potato collection; improved potato cultivars for developing countries; true potato seed; advances in integrated pest management, late blight resistance, genetic resources of bacterial wilt resistance, virus-detection, Vitamin A rich sweet potato for Africa and South Asia and diffused light storage technology.

Facilities: 40-hectare in two research farms; laboratories in virology, entomology, pathology, bacteriology, biosafety, physiology, molecular markers, processing, nutrition quality; greenhouses, gene-bank (cold storage for tubers and seed, in-vitro); Computers; Library.

Future plans: The Centre recently agreed to conduct research on eight lesser-known Andean root and tuber crops and to survey and study the Andean ecosystem; Also initiated work on agriculture and human health.

Cooperation with developing countries: With some 20 developing countries with over a hundred institutions.

Universidad Peruana Cayetano Heredia — Instituto de Investigaciones de la Altura (IIA)

Head of Institution: Gustavo F. Gonzales.

Address: Faculty of Sciences and Philosophy, Av. Honorio Delgado 430, Urb. Ingenieria, San Martin de Porres, 4314 Lima 100, Peru. **Phone:** (+51 1) 319-000. **Fax:** (+51 1) 382-1762. **Email:** iiad@upch.edu.pe, fcs1@upch.edu.pe.

Scientific Fields of Interest: Biological Sciences, Environmental Sciences.

Research and training: Research: comparative studies in humans at high-altitude and at sea-level; reproductive aging; adrenopause; endocrine function and metabolism in high-altitude natives; environmental health and reproductive function; medicinal plants and reproduction; oxygen transport; physiological studies on cardiovascular system of humans and animals; epidemiology;

andrology. Training in human reproduction; masters degree program; doctorate degree program.

Achievements: About 500 publications in major international journals; 50 training activities for young scientists; research and training of staff abroad; edition of 'Acta Andina' a scientific regional journal.

Facilities: Laboratories for radioimmunoassay, andrology, endocrinology and metabolism, oxygen tolerance, hematological research and tissue-culture (situated at an altitude of 4340m); Library with papers and books about reproductive science, pulmonary diseases and high-altitude research. 3 computers with statistical programs, 2 inverted microscopes, fluorescent microscope.

Cooperation with developing countries: PLACIRH (Latin American program of training and research in Human Reproduction).

International Organization: WHO Human Reproduction programme; Oxford university through the Wellcome Trust; Latrobe university, Australia, and the Bill Gates Foundation.

Philippines

International Rice Research Institute (IRRI)

Head of Institution: Prof. Keijiro Otsuka, Chairman.

Address: DAPO Box 7777, Metro Manila, Philippines. **Phone:** (+63 2) 580-5600, 845-0563, 844-3351 to 53. **Fax:** (+63 2) 580-5699, 845-0606. **Email:** irri@cgiar.org. **URL:** www.irri.org

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences, Environmental Sciences.

Research and training: Research: Genetic resources conservation, evaluation and gene discovery; enhancing productivity and sustainability of favorable environments; improving productivity and livelihood for fragile environments; strengthening linkages between research and development; plant-breeding, genetics and biotechnology; natural resources management (crop, soil and water); climate change and its impact on agriculture; weed science; entomology; plant pathology; grain-quality and nutrition; post-harvest; social sciences; agricultural economics; conservation biology and ecology; genetic resources conservation; biometrics and bio-informatics; agricultural engineering. Training: degree (M.Sc and Ph.D) and non-degree scholarships; skills development (English for rice scientists, scientific writing and presentation, modular public speaking); proficiency courses (basic experimental designs, quality assurance); internships; leadership course for Asian women; on-the-job training.

Achievements: Rice genetic resources (varieties, elite germplasm); technology packages for optimum fertilizer application, water saving technologies, etc. See www.irri.org and the directors general's report for more information.

Facilities: Laboratories: grain-quality and nutrition research; analytical services; crop physiology; soil and water analysis; gene array and molecular marker applications; biometrics and bio-informatics; molecular genetics/molecular-biology; entomology and plant pathology; nematology; virology; plant-biotechnology; genome mapping; seed climate change; training lab (recording studio, speech lab); rice knowledge bank; post-harvest, etc.; computers (HP desktops and laptops); lab equipment: gene array; inductively coupled argon plasma; spectrophotometers; DNA analyzer; experiment station; greenhouses and screenhouses; phytotron; library; gene-bank long-term storage for rice germplasm.

Future plans: Implementation of new project structure, newly installed OUs and budget criteria; implementation of new strategic and business plans in 2007; drafting of new medium-term plan for 2007-2015.

Cooperation with developing countries: All rice-producing developing countries in Asia, Africa, Latin America and the Caribbean.

International Organization: MoUs and MoAs.

Philippine Rice Research Institute (PhilRice)

Head of Institution: Leocadio S. Sebastian.

Address: Maligaya, Science City of Muñoz, 3119 Nueva Ecija, Philippines.

Phone: (+63 44) 456-0354, 456-0277. **Fax:** (+63 44) 456-0112. **Email:** lsebastian@philrice.gov.ph. **URL:** www.philrice.gov.ph.

Scientific Fields of Interest: Agricultural Sciences.

Research and training: Research: technologies for transplanted irrigated low-land rice; direct-seeded irrigated low-land rice; hybrid rice; rice-based farming systems; adverse rice eco-systems (rainfed, upland, cool-elevated and saline-prone); development of rice and rice-based food products; policy research and advocacy; promotion of technologies through training, technology demonstration and communication media. Training: courses on inbred and hybrid rice seed production and cultivation; hands-on demonstration of PhilRice developed rice food products, farm machineries and other engineering technologies for manufacturers/entrepreneurs.

Achievements: Spearheaded the national testing of elite breeding lines resulting in the release of 80 commercial high-yielding varieties for different eco-systems (from 1990 to 2004), 25 of which were developed by PhilRice; Rice by-products such as cultured milk, wine, cookies, cream puffs, cakes, waffles, noodles and spaghetti; Affordable farm devices such as micromill, flourmill, rototiller, rice hull stove, flatbed dryer, seed cleaner, drumseeder, floating tiller; Nutrient management technologies: leaf color chart, minus-one element technique; Conduct of regular and requested training courses on rice production nationwide; ISO 1400 certification; Development and testing of various models and strategies to improve technology promotion and delivery; Several titles of knowledge products in various formats.

Facilities: DNA Mapping and Fingerprinting Lab, Tissue-culture and Genetic Transformation Lab, Chemistry Lab, Rice Food Products Lab, Plant & Soil Analyses Lab, Plant Pathology Lab, Entomology Lab, Analytical Lab, Internet Servers & Networks, Machine Shop, Training & Conference facilities, Printing, Seed processing and storage facilities, Dormitories, Cafeteria, Analytical Service Lab, Seed Lab, Fenced Field for Testing of Transgenic Crops, Greenhouses and Screenhouse, Experiment Fields, Rice Museum.

Future plans: Pursue integrated R&D toward sustainable agriculture; Enhance quality of services, outputs & quality; Enhance capacity in biotechnology & IT, capacity for IT-based extension.

International Organization: Japan International Cooperation Agency; Rockefeller Foundation, USA; Germany Agency for Technical Cooperation; International Rice Research Institute, Virginia Polytechnic Institute and State University, USA; University of Hawaii; International Foundation for Science (Sweden); Devtech Canada; People's Republic of China. Kansai Corp., Yunnan Agricultural University, Jiangxi Academy of Agricultural Sciences, Fujian Academy of Agricultural Sciences, Danforth, Cornell University, University of California-Davis, Virginia Tech, Rutgers University, University of Adelaide,

United States Agency for International Development (USAID), International Food Policy Research Institute (IFPRI), International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), Food and Agriculture Organization (FAO), Australian Centre for International Agricultural Research (ACIAR), ISSHI Brain-System, Nippon Telegraph and Telephone-Asia Pacific Telecommunities (NTT-APT).

University of the Philippines — Institute of Plant Breeding (IPB)

Head of Institution: Dr. Desiree M. Hautea, Director.

Address: College of Agriculture, Los Baños UPLB, College, Laguna 4031, Philippines. **Phone:** (+63 49) 536-2512, 536-2298. **Fax:** (+63 49) 536-3438.

Email: rah@mudspring.uplb.edu.ph. **URL:** www.ipb-uplb.org.ph.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences, Earth Sciences.

Research and training: Research: crop improvement; germplasm collection, conservation and maintenance; crop biotechnology; seed multiplication and technology dissemination. Training: crop/seed production, management and marketing of economically important crops; micropropagation techniques; laboratory techniques; protected cultivation; germplasm collection and conservation; organic cultivation of selected crops.

Achievements: (1. Germplasm: maintains over 43,000 accessions of about 500 species. (2. Improved crop varieties: developed over 100 varieties approved by the National Seed Industry Council and the IPB-Germplasm Registration and Release Office. (3. Genetically modified crops in the pipeline. (4. Technologies and information.

Facilities: Crop biotechnology research facilities; germplasm conservation and maintenance facilities; plant pathology, plant physiology, entomology, biochem-genetics, biochemistry and analytical service laboratories; seed production facilities; tissue-culture facilities; IPB experimental areas; experimental stations in Central Mindanao University and Benguet State University.

Future plans: Equip researchers towards application of biotechnology in crop improvement; focus on upstream research.

Cooperation with developing countries: In-country evaluation of germplasm materials; exchange of researchers as visiting scientists; holding of seminars, workshops and trainings related to the project being jointly undertaken; staff development for specific crop and discipline; joint research collaboration on varied disciplines.

International Organization: IPB's Plant-cell and tissue-culture lab: School of biosciences and biotechnology in Griffith University, Australia; Horticulture Research Institute, Dept. Agric., Thailand; Institute of Agric. Genetics, Vietnam; School of Land and Food Sciences, Univ. of Queensland, Australia; Cocoa and Coconut Research Institute, Papua New Guinea; Research Institute for Coconut

and Plamae, Indonesia. IBPs biochemistry lab: Plant Genetic Eng. Lab, Dept. of Botany, Univ. of Queensland, Australia; Protein Eng. Lab, Kyoto Univ., Japan. IPB's Fruit and Ornamental Crops Divis.: University of Queensland and Griffith Univ., Australia. IPB's Cereals Div.: Centro Internacional del Mejoramiento de Maize y Trigo (CIMMYT), Mexico. National Plant Genetics Res. Lab: INIBAP (evaluation of improved banana cultivars); IPGRI (collection, conservation and characterization of indigenous fruits); AVRDC (collection, conservation and use of indigenous vegetables for resource-poor households).

University of the Philippines — Marine Science Institute (UPMSI)

Head of Institution: Gil S. Jacinto.

Address: Velasquez Street, University of the Philippines Diliman, 1101 Quezon City, Philippines. **Phone:** (+63 2) 922-3959. **Fax:** (+63 2) 924-7678. **Email:** library@upmsi.ph, gilj@upmsi.ph. **URL:** www.upmsi.edu.ph.

Scientific Fields of Interest: Biological Sciences, Earth Sciences.

Research and training: Marine botany; physical oceanography; chemical oceanography; marine natural products chemistry; molecular-biology/genetics; marine biotechnology; biological oceanography; marine biology, ecology.

Achievements: Human impact of coral reefs, seagrass and mangrove ecosystems; invertebrate biology, ecology, reproduction, ecophysiology, culture; algal physiology, morphology, taxonomy and culture; marine natural products, algal polysaccharides, biochemistry development of bioscreening methods, toxinology; molecular genetics, quantitative genetics; reef ecology; marine microbiology; physical oceanographic processes, coastal and yellow water oceanography; coastal biogeochemistry, marine pollution chemistry; marine protected areas and coastal resource management.

Facilities: Electrophoresis apparatus; PCR machine; ultra-low freezer; vortex mixer; laminar flow hood, pH meter, UV-Vis spectrophotometer, AAS; nutrient analyzer; HPLC; HRPT (High-resolution Picture Transmission) ground receiving system; ADCP; CTD; Carousel Deck Unit (includes Rosette, AFM, Niskin bottles); Echo sounder; GPS; tide Gauge; Nu-shuttle; wind gauge; underwater camera; video camera; satellite phone; ELISA plate reader; autoclave; lyophilizer; gel documentation system; drying oven; distilling unit; SCUBA gear; compressor; stereo microscope; compound microscope; multimedia projectors; computers; rubber boats; field station with dormitories; library.

Future plans: To review and expand our research and instruction programs and ultimately become the leading marine institutions in the tropical world.

Cooperation with developing countries: Marine Research in the South China Sea - Vietnam; Windy Island Soliton Expedition (WISE) - Taiwan; Southeast Asian Regional Core Research Site (SARCS) - Taiwan.

International Organization: UNEP, UNDP, EU, the Netherlands embassy, Southeast Asian Regional Core Research Site (SARCS-WOTRO), Economic &

Social Commission of Asian and the Pacific (ESCAP), Total Fina Elf corporate Foundation (TOTAL), Australian Institute of Marine Science (AIMS), Land-Ocean Interactions in the Coastal Zone (LOICZ), Pew Fellow in Marine Conservation & the University of New Hemisphere-David Lucille Packard Foundation.

University of the Philippines — National Institute of Physics (NIP) — College of Sciences

Head of Institution: Dr. Caesar Saloma, Director.

Address: Diliman, Quezon City 1101, Philippines. **Phone:** (+63 2) 920-9749.

Fax: (+63-2) 928-0296. **Email:** director@nip.upd.edu.ph. **URL:**

<http://www.nip.upd.edu.ph>.

Scientific Fields of Interest: Physics.

Research and training: Condensed matter; Phototonics; Instrumentation Physics; Plasma Physics; Theoretical Physics; theory; structure and dynamics.

Achievements: ISI publications; training of B.Sc., M.Sc. and Ph.Ds; linkage with private-sector.

Facilities: Femtosecond laser; streak camera; nanosecond laser; MBE machine; LPE machine; SEM; X-ray diffractometer; laser microscopes; computer cluster.

Future plans: Increase number of Ph.Ds graduates to 10 by 2008.

International Organization: Academic exchange agreements with: Faculty of Eng., Osaka University; and Southern Taiwan Optoelectronics Centre, National Sun Yat Sen University

University of the Philippines — Natural Sciences Research Institute (NSRI)

Head of Institution: Ernelea P. Cao.

Address: Miranda Hall, Corner Quirino and Velasquez Streets, University of the Philippines, Diliman, Quezon City 1101, Philippines. **Phone:** (+63 2) 925-2964, 920-5301x6444. **Fax:** (+63 2) 928-6868. **Email:** director@nsri.upd.edu.ph.

URL: www.nsri.upd.edu.ph.

Scientific Fields of Interest: Biological Sciences, Chemistry, Environmental Sciences, Mathematics.

Research and training: Research: Basic biology, including DNA studies and molecular analysis; Chemistry; Mathematics; Meteorological and Environmental Sciences. Non-degree training courses in biological techniques, microbiology, chemical analysis, forensic DNA analysis, and molecular-biology.

Achievements: Scientific publications, laboratory manuals and catalogues.

Facilities: Equipment used for researches in Biology, including molecular-biology, forensic DNA Analysis, chemical analyses, microbiological analyses, microbial culture collection (bacteria and fungi).

Future plans: Expansion of laboratory facilities.

International Organization: United Nations University and the European Union.

Qatar

Ministry of Municipal Affairs and Agriculture — Department of Agricultural and Water Research (DAWR)

Head of Institution: Dr. Hamad Saad Majed Al-Saad.

Address: P.O. Box 1967, Doha, Qatar. **Phone:** (+974) 441-7662. **Fax:** (+974) 441-0526. **Email:** dawrqa@yahoo.com. **URL:**

<http://mmaa.mmaa.gov.qa/eng/index.php?option=content&task=section&id=16&Itemid=52>.

Scientific Fields of Interest: Agricultural Sciences, Engineering.

Research and training: Agricultural research (crops, horticulture, plant protection, range management); Water research (ground water meteorology, irrigation and drainage); Soil research.

Facilities: 50 computers; 3 field research stations; 25 meteorology stations. Library (5000 books in Arabic, 5000 books in English). Central agricultural laboratory and plant tissue-culture lab

Future plans: It is planned to build the department capabilities in order to cope with research problems in the fields of agriculture and water.

Scientific and Applied Research Centre (SARC)

Head of Institution: Mohsin A. Al-Ansi, Director.

Address: P.O. Box 2713, Doha, Qatar. **Phone:** (+974) 486-9950. **Fax:** (+974) 486-0680. **Email:** esc@qu.edu.qa. **URL:** www.qu.edu.qa.

Scientific Fields of Interest: Biological Sciences, Earth Sciences, Environmental Sciences.

Research and training: Remote-sensing; environmental activities; marine biology.

Facilities: Water-quality logging system; research vessel; three 17 feet long boats; Nikon still cameras, underwater camera; Sony video camera; Amphibico case; two cars; analytical equipped labs; library; 20 PCs; 6 color printers; satellite image-processing station plus software; auto CAD; C/N analyzer; GC system agilent + FED/ECD detectors and autosamplers; masterizer 2000 Malvern instruments; electrochemical trace analyzer; microscope and camera for stereoscopic zoom; nanopure Diamond Barnstead; freeze dry system with stoppering tray dryer; streem III glass still barnstead solid inert ion source (MSD0; ICP/MS Agilent 7500c).

Cooperation with developing countries: Cooperation with all organizations in the GCC countries and at international level.

Rwanda

Institut de Recherche Scientifique et Technologique (IRST)

Head of Institution: Dr. Twagiramungu Helmenegilde, Director.

Address: B.P. 227 Butare, Rwanda. **Phone:** (+250) 530 395. **Fax:** (+250) 530 939. **Email:** irst2001@yahoo.fr, irstphar@yahoo.fr. **URL:** www.irst.ac.rw.

Scientific Fields of Interest: Biological Sciences, Chemistry, Environmental Sciences.

Research and training: Traditional medicine; phytomedicine; medicinal plants; botanics; (toxicology of plant extract); essential oils; socio-economy; literature; psychology; renewable energy; teaching material; environmental sciences, etc.

Achievements: Phytomedicines against amoebiasis, cough; scientific teaching materials for physics and chemistry in high schools; economic cooking stoves; publications (chemistry, humanities, etc.).

Facilities: Computers; library (1 main and 3 smaller ones); equipment (HOLS, over, scales, distillators, etc.); field for cultivation (greater than 70 ha).

Future plans: Continue drug research in plants; training and monitoring of traditional healers; writing a Kinyarwanda's dictionary; producing teaching material for scientific high-schools.

Cooperation with developing countries: National University of Rwanda (NUR); Scientific and Agronomic Institute of Rwanda (ISAR); and Togo's University.

International Organization: Koblenz-Laender University (Germany); Université Libre de Bruxelles (ULB); and University of Hohenheim-Stuttgart (Germany).

Saudi Arabia

King Faisal University — Water Studies Center (KFU-WSC)

Head of Institution: Yousaf Aldakheel.

Address: P.O. Box 420, Hofuf, Saudi Arabia. **Phone:** (+966 3) 581-6611. **Fax:** (+966 3) 581-6611. **Email:** wsc@kfu.edu.sa, yaldakhool@kfu.edu.sa. **URL:** <http://www.kfu.edu.sa/>.

Scientific Fields of Interest: Agricultural Sciences, Environmental Sciences.

Research and training: Irrigation and drainage related problems in Arid-lands; Water resource management in Arid-land; Monitoring and evaluation of soil and water properties within the Arabian peninsula.

Achievements: Mapping soil physical and chemical characteristics at Al Hassa oasis. Several reports about research conducted in the center during the past 10 years.

Facilities: Atomic-absorption , flame analyzer, digitizers, GPS; Growth chamber; Greenhouse; Field site; Computers; Library.

Future plans: Development of GIS and remote-sensing lab; construction of new central lab; building of micro-weather station.

International Organization: Joint projects with the Center of Advanced Spatial technology of the University of Arkansas, USA, and ACSAD in Damascus, Syria.

King Saud University — Prince Sultan Research Center for Environment, Water and Desert

Head of Institution: Abdulmalik Al Alsheikh.

Address: P.O. Box 2454, Riyadh 11451, Saudi Arabia. **Phone:** (+966 1) 467-5573. **Fax:** (+966 1) 467-5574. **Email:** psrcewd@ksu.edu.sa.

Scientific Fields of Interest: Earth Sciences, Environmental Sciences.

Research and training: Environmental studies; sand dunes; range management; afforestation; remote-sensing; desertification; desert plants; water research, water harvesting; GIS.

Achievements: Producing satellite image atlas of Saudi Arabia; implementing new techniques in water harvesting; desert plant development.

Facilities: Experimental research station; remote-sensing and GIS integrated unit.

Cooperation with developing countries: Cooperation with other international centres and universities.

Senegal

African Regional Centre for Technology (ARCT)

Head of Institution: Ousmane Kane.

Address: Avenue Djily Mbaye, Imm. Fahd 16 & 17 Floor, B.P. 2435, Dakar, Senegal. **Phone:** (+221) 823-7712. **Fax:** (+221) 823-7713. **Email:** arct@sentoo.sn.

Scientific Fields of Interest: Agricultural Sciences, Environmental Sciences.

Research and training: Processing of roots and tubers, cereals, fruits and vegetables, fish and marine products; Biogas production; Workshops on food processing, information and new and renewable energy technologies.

Achievements: Cassava flour, gari, biscuits, dried and smoked fish, tapioca (pregelatinized starch granules). Maize sheller; Palm oil extraction press; Biogas.

Facilities: Documentation centre and library; computer centre; pilot and demonstration units (cassava processing, palm oil extraction, fish processing).

Future plans: Merge with the African regional centre for engineering design and manufacturing, ARCEDEM. Affiliation with the African Union.

Cooperation with developing countries: MoU with APCTT (Asia-Pacific centre for transfer of technology); Protocol agreement with OAPI, Organisation Africaine de la Propriété Intellectuelle.

International Organization: Agreements with several International Organizations.

Centre de Recherche Océanographique de Dakar, Thiaroye (CRODT)

Head of Institution: Mariama Dalanda Barry.

Address: B.P. 2241, Dakar, Senegal. **Phone:** (+221) 834-8041. **Fax:** (+221) 834-2792. **Email:** maria_dalanda@yahoo.fr.

Scientific Fields of Interest: Biological Sciences, Chemistry, Earth Sciences, Environmental Sciences.

Research and training: Biology and ecology of main species; status of exploited stocks and modeling; socio-economic studies and bio-economic modeling; environmental studies; fisheries management.

Achievements: Status of exploited stocks; Fisheries statistics (landing, fishing effort, prices of fish, fish frequency size); Various technical documents on fishery management, fishery development and organizations, modeling; Environmental issues (upwelling, temperature, salinity and winds data).

Facilities: Research vessel (Itaf Deme) equipped with high scientific equipments for oceanography, trawling and echo integration studies; High-

powered computer department; Chemical and physics laboratories; Well-documented library; Five field stations.

Future plans: Development of a national and sub-regional statistics network; Impact studies of biological rest; Impacts of Protected Marine Areas and artificial reefs.

Cooperation with developing countries: Sub-regional (Mauritania, the Gambia, Guinea, Guinea Bissau, Cape Verde; Sierra Leone); Regional (Ivory Coast, Morocco, Tunisia).

International Organization: COPACE, FAO USAID, JICA, IRD, UNESCO, CEMARE, UICN, and WWF.

Institut Pasteur de Dakar (IPD)

Head of Institution: Philippe Mauciere.

Address: 36 Avenue Pasteur, BP 220, Dakar, Senegal. **Phone:** (+221) 839-9201. **Fax:** (+221) 839-9210. **Email:** direction@pasteur.sn.

Scientific Fields of Interest: Medical Sciences.

Research and training: Arbovirology and Hemorrhagic fever viruses; Molecular virology; Immunology of malaria; Immuno-genetics; Epidemiology (mainly Arboviruses and Malaria); Enteropathogenic Bacter; Polio viruses and Influenza viruses; African simian retrovirus; Medical entomology.

Achievements: The most important collection of African arboviruses (5,418 samples - 148 species); knowledge of epidemiology and immunology of malaria, epidemiology and entomology of arboviruses; thermostabilized yellow fever vaccine.

Facilities: P3 class laboratories; 45 laminar flow equipment; 2 cytofluorometers; 2 field stations (DIELMO and N' DIOP for Malaria studies); more than 50 micro-computers; Internet Connection, nucleotide sequencer, real-time PCR; Library.

Future plans: Establishing a Department of virology to replace presently separate laboratories of virology in an effort to pool resources to survey emerging viral diseases in West Africa.

Cooperation with developing countries: Current official collaboration with the national authorities of the Cape Verde Islands and Mauritania; planned collaboration with Guinea Bissau, Gambia and Mali.

International Organization: International network of Pasteur Institutes (29 Institutes settled on the five continents).

Singapore

Institute of Molecular and Cell Biology

Head of Institution: Sir David P. Lane.

Address: 61 Biopolis Drive Proteos, Singapore, 159958. **Phone:** (+65) 6586-9755, 586-9788. **Fax:** (+65) 6779-1117. **Email:** d.p.lane@imcb.a-star.edu.sg, enquiry@imcb.a-star.edu.sg. **URL:** www.imcb.a-star.edu.sg.

Scientific Fields of Interest: Biological Sciences.

Research and training: Cell biology; developmental biology; cancer biology; structural biology; infectious diseases; genomics and translational research.

Achievements: part of the consortium that successfully sequenced the entire pufferfish (fugu) genome in 2002; role of p53 isoforms in organ development; role of Apoptosis inducing factor (AIF) in maintaining cell malignancy; apical complex genes that control asymmetric division in *Drosophila* neuroblasts; discovery of a high affinity iron transporter that is essential for *Candida albicans* virulence; PCR-base Malaria diagnostic kit; enzyme-linked immunosorbent assay diagnostic kit for SARS.

Facilities: DNA and peptide sequencing; translational research; microarrays; proteomics; histology; transgenic frog; intellectual property; X-ray crystallography; electron microscopy; cell imaging; knockout/transgenic mice; monoclonal antibody; zebrafish facility; drug screening (small molecules).

Future plans: Supporting therapeutic development in Singapore; using disease models for research and development; advanced genetics; collaboration with local health clusters; biomarkers development.

International Organization: Glaxo-Smith-Kline.

National University of Singapore — Department of Biological Sciences

Head of Institution: Prof. Hew Choy Leong.

Address: 14 Science Drive 4, Singapore 117543. **Phone:** (+65) 6516-2692. **Fax:** (+65) 6779-5671. **Email:** dbshead@nus.edu.sg, dbsleesc@nus.edu.sg. **URL:** www.dbs.nus.edu.sg.

Scientific Fields of Interest: Biological Sciences.

Research and training: Research areas in Life-Sciences, ranging from biodiversity and ecology to genomics, proteomics and structural biology; training in laboratory and experimental techniques.

Achievements: Transgenic zebrafish; development of diagnostic test kits derived from horseshoe crab; medically important proteins from snake venoms and toxins; theories on extinctions backed on ecological studies in the region.

Facilities: World class research labs for biotechnology, proteomics, protein science, molecular and cell biology; The Raffles Museum for biodiversity

research; marine research vessel (12 seater motorized catamaran); tropical marine research institute (located on an offshore island with aquaculture facilities and fully equipped labs).

Future plans: To improve research areas of systems biology, bioimaging and chemical biology.

Cooperation with developing countries: We are participating in ETPP programmes with Myanmar, Vietnam and Laos.

International Organization: Academic partners: Singapore: Institute of Molecular and Cell Biology; Genome Institute of Singapore; Temasek Life-Sciences Laboratory; bio-informatics Institute. North America: MIT; University of Toronto; University of Alberta; University of California, San Diego. China: Singh University; Airmen University; Gizmo University. Thailand: Chulalongkorn University. India: Indian Institute of Sciences; Australia: University of Sydney. Industry Partners: Singapore: Novelties Institute for Tropical Diseases; Lilly Systems Biology; IBM.

National University of Singapore — Department of Chemistry

Head of Institution: Hian Kee Lee.

Address: Science Drive 3, Singapore 117543. **Phone:** (+65) 6874-2659. **Fax:** (+65) 6779-1691. **Email:** chmhead@nus.edu.sg. **URL:** www.chemistry.nus.edu.sg.

Scientific Fields of Interest: Chemistry.

Research and training: Analytical science; capillary electrophoresis, supercritical fluid chromatography and extraction, micro-extraction, micro-electrodes electrochemistry-based sensors, atomic microscopy, process sensors; medicinal chemistry and chemical biology; Chinese medicinal herbs; peptide and protein design; genomic and bio-chip technology. Computational modeling and spectroscopy. Molecular design, structure and synthesis; surface chemistry and catalysis; polymer blends; functional polymers; heterogeneous catalysis; microfluidics; homogeneous catalysis; crystal engineering.

Achievements: Has international reputation in analytical sciences; polymer blends; organometallic chemistry; and organic-synthesis.

Facilities: High-field (300-800Mhz) Nuclear-magnetic resonance Spectrometers; GC and LC Mass Spectrometers; X-ray Diffractometers; X-ray Fluorescence Spectrometer; Inductively Coupled Plasma Spectrometers; Atomic-absorption Spectrometers; UV Photoelectron Spectrometer; Supercritical Fluid Chromatograph, GC and HPLC; FT-IR Spectrometers; Laser Raman Spectrometer; capillary electrophoresis systems; microwave extraction systems.

Future plans: Major expansion of research and teaching facilities to incorporate a combinatorial chemistry lab, medicinal chemistry lab, and a more comprehensive analytical instrumentation central facility.

Cooperation with developing countries: Cooperation with Indonesia, Thailand, Vietnam, Malaysia, China, India, the Philippines and Pakistan.

International Organization: Australia, Belgium, Canada, Denmark, France, Germany, Japan, Korea, Switzerland, Netherlands, New Zealand, UK and USA.

National University of Singapore — Institute of Systems Science

Head of Institution: Mr. Lim Swee Cheang.

Address: 25 Heng Mui Keng Terrace, Singapore 119615, Singapore. **Phone:** (+65) 6516-2013, 6516-2020. **Fax:** (+65) 6778-2571. **Email:** training@iss.nus.edu.sg, swee@iss.nus.edu.sg, isshead@nus.edu.sg. **URL:** www.iss.nus.edu.sg.

Scientific Fields of Interest: Engineering.

Research and training: Research: Knowledge management, analysis and distribution. Technologies: metadata, semantic web, expert systems, machine learning. Domain of research: e-learning: community-based collaborative learning, reusable learning objects; bio-informatics: large-scale aggregation of biological knowledge for immunoinformatics; medical informatics: mining of medical databases. IT Planning and management - domain of research: enterprise architecture, best practices in IT processes. Training Master of technology with generalization either in Knowledge Engineering or Software Engineering; graduate diploma in systems analysis; professional diplomas in the areas of .NET, J2EE, Info-comm Security, Mobile and Wireless; professional executive courses in the areas of ICT planning and project management, business process re-engineering and management, architecture and enterprise integration technology, wireless technologies, web services technologies, object-oriented technologies, ICT security, data management, process and quality management.

Achievements: KnowledgeBeans(TM), an e-learning platform powering the Virtual Institute (www.vi.com.sg); approx. 5-6 academic publications per year for international peer-reviewed journals or conferences; various staff-supervised projects by Master of Technology students.

Facilities: Research center with 2,400 book titles; 300 computers.

Future plans: Expansion of research effort involving a larger number of staff; furthering the main lines of research listed above.

Cooperation with developing countries: ISS has been in partnership with the Software Park Thailand since 2004. As part of the collaboration, ISS offers IT management training in the areas of IT planning, IT project management, IT outsourcing and enterprise architecture. Over the last 2 years, we have trained about 290 Thai IT leaders and senior executives. ISS has been in partnership with Hangzhou East Software Parks since 2004. Purpose of the partnership is to train ICT personnel and to promote closer cooperation and exchange of

Singapore

information pertaining to the information and communications technology-sector.

International Organization: Partnership with Sun Micro-systems to launch a Professional Diploma (J2EE and Web-Services) in Thailand and Malaysia.

South Africa

Council for Scientific and Industrial Research (CSIR)

Head of Institution: Dr. Sibusiso Sibisi, President & CEO.

Address: P.O. Box 395 Pretoria 0001, South Africa. **Phone:** (+27 12) 841-2911. **Fax:** (+27 12) 349-1153. **Email:** query@csir.co.za. **URL:** www.csir.co.za.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences, Chemistry, Earth Sciences, Environmental Sciences.

Research and training: Building and construction technology; food, biological and chemical technologies; defense technology; information and communication technology; manufacturing and materials technology; transport and roads; mining technology; water, forestry and environmental technology.

Facilities: CSIR information center (InfoCentre); offices in all nine provinces of S. Africa; several accredited laboratories; wind-tunnel; national laser centre; satellite applications centre; national meteorology laboratory.

Future plans: Alignment with S. Africa's national priorities; consolidating science, engineering and technology excellence as means to sustainable growth; enhanced professionalism in innovation and business excellence; contributing to sustainable development in S. Africa and rest of Africa.

Cooperation with developing countries: Various MoUs with countries such as Kenya (KIRDI); Malaysia (Universiti Sains Malaysia); Mozambique (Eduardo Mondlane University); Southern Africa Development Community (SADC); Regional Research Alliance with Botswana and Zimbabwe. Also links with Tanzanian Industrial R&D organizations.

International Organization: Member of the Global Research Alliance (GRA); projects for the UN and World Bank.

National Research Foundation of South Africa (NRF) — National Zoological Gardens (NZG)

Head of Institution: Dr Clifford Nxomani, Executive Director.

Address: 232 Boom St, Box 754, Pretoria, 0001, South Africa. **Phone:** (+27 12) 328 3265. **Fax:** (+27 12) 323 4540. **Email:** info@zoo.ac.za. **URL:** www.zoo.ac.za.

Scientific Fields of Interest: Biological Sciences, Environmental Sciences.

Research and training: A national facility for research in terrestrial biodiversity and very well-placed as an education platform.

Achievements: Receives close to 600,000 visitors a year.

Facilities: A traditional zoological garden; access to animal collections, biological material and data.

Future plans: Finalize the strategic reorientation process commenced in 2004/05. This included restructuring and realignment of core competencies,

functions and operations. More specifically, the establishment of a fully-functional research department will be initiated. A Life-Science Centre will be established.

National Research Foundation of South Africa (NRF) — South African Institute for Aquatic Biodiversity (SAIAB)

Head of Institution: Professor Paul Skelton, Managing Director.

Address: Private Bag 1015, Grahamstown, 6140, South Africa. **Phone:** (+27 46) 603 5800. **Fax:** (+27 46) 622 2403. **Email:** saiab@ru.ac.za. **URL:** www.saiab.ru.ac.za.

Scientific Fields of Interest: Biological Sciences, Environmental Sciences.

Research and training: A facility serving the nation by generating, disseminating and applying knowledge to understand and solve problems on the conservation and wise use of African fishes and aquatic biodiversity.

Achievements: SAIAB achieves its high level objectives in alignment with the NRF core missions and strategic priorities through conducting various research and communication programmes and projects. The scope of research activities underway or planned encompasses a number of large interdisciplinary and multi-institutional programmes as well as specific research projects. Twenty-one refereed scientific papers for 2005 on different areas of biodiversity were produced and published in a variety of publications. Forty-five books, reports and theses were refereed and produced in 2005.

Facilities: The most significant immediate development will be the completion of a new off-site collection storage facility. The safe transfer of the National Fish Collection to this facility is a major objective. Following this transfer the focus will be to begin the refurbishment of the SAIAB building in a manner that creates a dynamic National Facility for aquatic biodiversity fully geared to modern technological and functional demands. The first priority will focus on the conversion of the ground floor space vacated by the fish collection. At least four units/entities will be catered for in this space: (1) a collection management unit, (2) the library including an information delivery centre, (3) a field operations unit, and (4) a technical unit (workshop).

Future plans: Develop an effective knowledge management system that embraces the core operations of SAIAB, the African Coelacanth Ecosystems Programme (ACEP) and the SAEON Coastal and Inshore Node. Create a medium to long-term funding platform for ACEP. Establishment of an aquatic conservation genetics laboratory. Achieving greater balance between marine and freshwater research capacity. Launch a programme of research on freshwater biodiversity in Angola. ACEP-ASCLME partnership: this partnership is currently under discussion and development. If successful and ACEP is supported by the DST, the partnership will create a major synergy for marine science in the western Indian Ocean. The development of the genetic tissue bank and a basic genetic laboratory for bio-systematic research. The

construction of a new off-site collection facility that will considerably reduce occupational health and safety risk. A strategic alliance with the new BiobankSA being established at the National Zoological Gardens has been negotiated and will further develop the role of SAIAB as a national facility of relevance to the aquatic biodiversity research community.

Cooperation with developing countries: An invitation to enter an agreement with the National Fisheries Institute (Instituto Nacional de Investigação Pesqueira) in Luanda, Angola, holds great attraction and potential in the fields of freshwater and coastal and marine biodiversity and for education and training of personnel for both parties. The invitation has been accepted and an initial contact followed through with a visit to Luanda in November 2005 so that the intention is to focus on developing this opportunity in 2006 and beyond. Several other national and international projects in SADC countries are relevant to the NEPAD initiative and establish SAIAB as an interactive collaborative hub for aquatic biodiversity in southern Africa.

International Organization: The flagship African Coelacanth Ecosystems Programme (ACEP) facilitates dynamic international collaborative studies in the Western Indian Ocean. Several key ACEP partnerships are expected to come on-line in 2006/07 including collaborations with other large-scale international programmes such as the GEF driven Agulhas-Somalia Large Marine Ecosystem (ASLME) and organizations such as NOAA. SAIAB initiated two other large programmes in 2005 that will carry through to the 2006/07 period: a Water Research Commission funded estuarine ecosystem programme (Cape Intermittently Open Estuaries Programme) and an European Commission funded programme on integrating freshwater biodiversity in the development process throughout Africa for which SAIAB is responsible for coordinating the assessment of aquatic biodiversity in southern Africa.

National Research Foundation of South Africa (NRF) — Hartebeesthoek Radio Astronomy Observatory (HartRAO)

Head of Institution: Professor Roy Booth.

Address: P.O. Box 443, Krugersdorp 1740, South Africa. **Phone:** (+27 12) 326-0742, 326-0746, 326-0747. **Fax:** (+27 12) 326-0756. **Email:** roy@hartrao.ac.za.

URL: www.hartrao.ac.za.

Scientific Fields of Interest: Earth Sciences, Physics.

Research and training: A national facility for research and training in radio astronomy and space geodesy. The telescope is available as a single, independent instrument or in global networks of radio telescopes using the technique of very long baseline interferometry (VLBI).

Achievements: The link between space geodesy data application within the earth science and atmospheric science is being developed synergistically to add value to current projects and provide active networking locally and

internationally. HartRAO is the only radio astronomy observatory in Africa and only one of five permanent fundamental space geodesy stations worldwide and is applying the technique of Very Long Baseline Interferometry (VLBI).

Facilities: Radio astronomy is carried out using the 26m radio telescope, operating independently or in VLBI networks for both astronomy and geodetic research. The geodesy programme operates the NASA MOBLAS-6 Satellite Laser Ranger for satellite orbit determination and a network of GPS base stations for accurate position determination. HartRAO, in conjunction with the SKA team, has developed and build the Radio Frequency Interference measurement system. The old HartRAO library was transformed into a geodesy computer and research laboratory.

Future plans: A strong drive exists towards the establishment of permanent GPS stations in the Southern African Development Community (SADC), which HartRAO is at the heart of. The project will include training scientists from Africa and participating in the African Reference Frame (AFREF). Assisting with the initiative to bring the SKA (Square Kilometre Array) to South Africa and build a SKA technology demonstrator telescope in South Africa. The Space Geodesy Programme is investigating the suitability of several sites where the new Space Geodesy Facility can be built. Construction of a 22GHz/1.3cm receiver system for the 26m telescope to exploit the capabilities of the upgraded surface. Automation of cryogenic receiver cool-downs on the radio telescope, enabling continuous observation instead of having to park the telescope. Introduction of the interim pulsar timer to improve pulsar timing. Purchase a new GPS base-station receiver to expand the GPS network over Southern Africa. Commencement of construction phase of IISGEO in preparation for SLR2000. Increase work on the SKA and the SKA demonstrator. Costing about €1 billion, the SKA will be the largest telescope ever. With a receiving area of a million square metres it will be much larger and more sensitive than today's best radio telescope. South Africa is bidding to host the SKA against competitors Australia, China and Argentina. The core of South Africa's proposed site is in the Northern Cape Province.

Cooperation with developing countries: Southern African Development Community (SADC); participation and support for East African Rift studies.

International Organization: Participation and support for East African Rift studies in collaboration with University of Portugal, University of Delft, the Netherlands, and Purdue University, USA.

National Research Foundation of South Africa (NRF) — Hermanus Magnetic Observatory (HMO)

Head of Institution: Peter Sutcliffe, Manager.

Address: P.O. Box 32, Hermanus, 7200, South Africa. **Phone:** +27 (0) 28 312 1196. **Fax:** +27 (0) 28 312 2039. **Email:** psutcliffe@hmo.ac.za.

Scientific Fields of Interest: Earth Sciences, Physics.

Research and training: A research facility that functions as part of the worldwide network of magnetic observatories. Its core function is to monitor and model variations of the Earth's magnetic field.

Achievements: HMO is one of only four geomagnetic observatories whose data are used by the World Data Centre for Geomagnetism for the generation of the Dst ring-current index, which is the most commonly used measure of geomagnetic storm intensity. HMO developed the Magnetic Test Bench, which is a unique avionics test apparatus used for the calibration and verification of mechanical and electronic aircraft compasses and compass components before installation in aircraft.

Facilities: HMO recording stations are the only operational sources of ground-based geomagnetic fields data south of the equator in Africa. The Geomagnetism group studies and monitor variations of the Earth's magnetic field based on model infrastructure. The Space Physics group carries out research to improve the understanding of dynamic processes in the Earth's space environment and their effects on space weather based on model infrastructure. The Technology group utilizes the unique magnetic field calibration facilities and infrastructure, located in a magnetically clean environment, to provide quality-controlled magnetic field and sensor-related services. HMO opened their Interactive Science Centre, which enables learners from rural areas to expand their science skills.

Future plans: The Hermanus Ohlthaver Institute for Aeronomy (HOIA), studying ionospheric measurements is managed by HMO and plans are to consolidate ionospheric research. Re-entry into Antarctic-based research. Responsible for the improvement of the technical maintenance of the SHARE HF-radar facility at the South African Antarctic base. Seeking funds to establish a project called Inkaba ye Africa, to study the effect of what is believed to be a reverse dynamo developing below South Africa. HMO will also play an important role in contributing to the SKA bid since characterization of ionospheric conditions above the proposed SKA sites is a key parameter requirement.

Cooperation with developing countries: The Geomagnetism Group continues to operate magnetometers at different locations including Tsumeb, Namibia, to obtain data in accordance with INTERMAGNET standards.

International Organization: Observations from secular variation field stations and magnetic field data from the Danish Orsted and the German CHAMP low-Earth orbit satellites were used to derive geomagnetic field models for the southern African region.

National Research Foundation of South Africa (NRF) — iThemba LABS

Head of Institution: Professor Krish Bharuth-Ram.

Address: PO Box 722, Somerset West 7129, South Africa. **Phone:** (+27 21) 843 1000. **Fax:** (+27 21) 843 3525. **Email:** Director@tlabs.ac.za. **URL:** www.tlabs.ac.za/public/default.htm.

Scientific Fields of Interest: Engineering, Medical Sciences, Physics.

Research and training: Focus on providing scientifically and medically useful radiation through the acceleration of charged particles using the Separated Sector Cyclotron (SSC), a Van De Graaff Accelerator. It is the primary centre of expertise in radiation medicine and nuclear science and technology in South Africa.

Achievements: The Radio-therapy programme was internationally recognized by the publication of a clinical paper on the use of stereotactic proton therapy for large intracranial arteriovenous malformations. The study covered 10 years of patient treatment and proves that such radio surgery is successful, with an obliteration rate of 67%. The paper was published in the International Journal of Radiation Oncology and Biology Physics. The Nuclear Physics Group had the findings of an experiment on the AFRODITE detector system published in Physics Letters B593 (2004, 61-65). The Nuclear Physics Group also had its first publication in the Physics Review Letters. The researchers were able to locate the strength of various components of the fine structure of giant resonances on an energy-scale.

Facilities: The Schonland Research Institution, where research is conducted in the field of sub-atoms. iThemba LABS utilize the Van De Graaff Accelerator in their research. Funding was received for the Second Proton Beam-line which will be utilized as a prototype line for the MRMC. Currently building up to fourth-generation synchrotron radiation sources and accelerator-based free electron lasers to impact advances in chemistry and biology.

Future plans: Establishment of the MRMC (Major Radiation Medicine Centre); Commence the integration of Schonland; Commence F-18[FDG] production and develop a beam splitter. Develop a pro-type beam-line for the MRMC project; Commence production of the Vertical Beam Target Station.

Cooperation with developing countries: Algeria, Botswana, India, Lesotho, Mosambique, Namibia, Nigeria, and Zimbabwe.

International Organization: Australia, Belgium, Canada, France, Germany, Italy, Japan, Poland and USA, including the Technical University of Darmstadt, Germany; the Birmingham Solar Oscillation Network (BiSON), Birmingham University, UK; the Infrared Survey Facility (IRSF), Nagoya University, Japan; the Monitoring Network of Telescopes (MONET), University of Gottingen, Germany; the Yonsei Survey Telescope for Astronomical Research (YSTAR), Yonsei University, Korea; the SALT Foundation in Germany, New Zealand,

Poland, UK and USA. The SALT detector package was manufactured in South Africa for delivery to the University of Wisconsin.

National Research Foundation of South Africa (NRF) — South African Astronomical Observatory (SAAO)

Head of Institution: Phil Charles.

Address: P.O. Box 9, Observatory, 7935, South Africa. **Phone:** (+27 21) 447 0025. **Fax:** (+27 21) 447 3639. **Email:** pac@sao.ac.za. **URL:** www.sao.ac.za.

Scientific Fields of Interest: Physics.

Research and training: A national research facility for optical/infrared astronomy in South Africa. Its prime function is to further research in astronomy and astrophysics.

Achievements: On-sky tracking of SALT and obtaining image quality very close to specification. The installation of the first batch of edge sensors on the mirror segments of SALT. The publication of SAAO's latest contribution towards the understanding of eta Car, a unique hyper-giant and possible gamma-ray progenitor. SAAO is the only place in the world able to monitor this star at near-infra-red (IR) wavelengths. The design, fabrication and operation of a charged couple device (CCD) mosaicing facility, capable of producing a CCD mosaic flat to better than 20 microns. African Institute of Space Science (AISS) was developed to mobilize the space sciences, including astronomy. The space sciences act as catalysts for innovation and technological development.

Facilities: Made a significant contribution to the South African Large Telescope (SALT) by designing, manufacturing and commissioning first generation instruments for the telescope. The remote observing station is located just outside Sutherland. Two IT hubs are retained within SAAO. One in Sutherland, including the SALT IT-infrastructure and other at the SAAO site in Cape Town. This ensures the providing of high-speed data links for the Sutherland site. A further initiative to integrate SALT into the operations is the decision to use the 74-inch telescope to support SALT by designing and manufacturing a Newtonian Focus camera. The mechanical and electronic workshop at SAAO has changed their focus from the maintenance, repair and upgradation of existing instrumentation to the design and construction of state-of-the-art astronomy instrumentation. Other infrastructure includes the 1.9-m telescope at Sutherland, the 1.0-m telescope, the 0.75-m telescope, the 0.5-m telescope, the Alan Cousins telescope, the Birmingham Solar Oscillation Network (BiSON), the Infrared Survey Facility (IRSF), the Monitoring Network of Telescopes (MONET) and Yonsei Survey Telescope for Astronomical Research (YSTAR).

Future plans: Plans have been drawn up for a visitor centre at SAAO in Sutherland, linked to an activity centre and a science and mathematics academy in the town of Sutherland. Saltcam will be commissioned in the Acquisition Camera and Science Imager (ACSI) of the SALT telescope. The PFIS will be commissioned on the SALT telescope. The first National

Astrophysics and Space Science Programme (NASSP) MSc graduates commence with their PhD research programme in the various NASSP partner universities. The 0.5m and 0.75m telescopes will be redeployed for public outreach. The 1.0m and 1.9m telescopes will continue operations in support of SALT.

International Organization: The SALT Foundation in Germany, New Zealand, Poland, UK and USA.

National Research Foundation of South Africa (NRF) — South African Environmental Observation Network (SAEON)

Head of Institution: Johan Pauw.

Address: PO Box 1758 Pretoria 0001, South Africa. **Phone:** (+27 12) 392-9383. **Fax:** (+27 12) 392-9316. **Email:** johan@saeon.ac.za. **URL:** www.saeon.ac.za.

Scientific Fields of Interest: Biological Sciences, Earth Sciences, Environmental Sciences.

Research and training: Generate long term information relevant to the sustainable management of natural resources and habitat over a range of eco-regions and land uses including: pristine (wild) landscape, partially pristine (managed) landscape, agriculturally (rural) transformed landscape and urban transformed landscape. SAEON establishes research platforms for long-term multi-disciplinary, multi-institutional and participatory ecosystem studies with strong regional and global links.

Facilities: Two nodes have already been established namely the SAEON Ndlovu Node, at Phalaborwa and focusing on the Savanna, as well as a node for the coastal-inshore zone, at Grahamstown. All the nodes have or will have access to standard laboratories and observation sites. A few research towers monitor various atmospheric variables. Ex- and enclosure plots have been established to empirically unravel the co-effects of fire and grazing. Numerous ongoing long-term observations programmes on various indicators of environmental change are being run by a variety of organizations at a variety of sites.

Future plans: Appointment of support staff for the SAEON Ndlovu Node; the construction of a building; financial arrangements with the Kruger National Park. Establishment of an ELTOSA network office to facilitate joint regional programmes. Supporting and influencing International Long-Term Ecological Research (ILTER). In due course, a research vessel for oceanic research will be required to replace the current one. An array of floating monitors is required to improve oceanic monitoring. Free access to satellite imagery and products will enhance the national research effort.

South African National Biodiversity Institute (SANBI)

Head of Institution: Prof. Gideon Smith, Director.

Address: Private Bag X101, Pretoria 0001, South Africa. **Phone:** (+27 12) 843-5187. **Fax:** (+27 12) 804-5343. **Email:** smithg@sanbi.org, info@sanbi.org.

URL: <http://www.sanbi.org/>.

Scientific Fields of Interest: Biological Sciences, Environmental Sciences.

Research and training: Biodiversity taxonomy and systematics; molecular systematics; phylogenetics; management and databasing of preserved and living collections; threatened species biology; bioregional planning; conservation biology; climate change research; alien and invasive species; sustainable use of biodiversity; policy development.

Achievements: Scientific publications; databases; websites; maps; collections.

Facilities: Computers; laboratories; greenhouses; library; equipment; herbaria; living collections; DNA bank; GIS lab

Future plans: SANBI intends to fulfill its legal mandate to provide data on all of S. Africa's biodiversity, for planning, management and development purposes, through setting up a managed network system in partnerships with other research institutions, museums, etc.

University of Johannesburg — Department of Geology — Paleoproterozoic Mineralization Research Group (PPM)

Head of Institution: Prof. B. Cairncross, Head of Dept..

Address: PO Box 524, Auckland Park 2006, Johannesburg, South Africa.

Phone: (+21 11) 489-2301. **Fax:** (+21 11) 489-2309. **Email:** elsam@uj.ac.za.

URL: www.uj.ac.za.

Scientific Fields of Interest: Earth Sciences.

Research and training: The Paleoproterozoic represents one of the richest mineralized eras in geological history. The understanding of the evolution of System Earth in this era is thus of great relevancy for future exploration for mineral deposits. The era hosts orders of magnitude by far the largest concentrations of iron, manganese, platinum and chromium in the world, in addition to very large concentrations of gold, base metals, fluorspar, graphite, etc. Many of the deposits appear to be time-bounded; related to unique environmental changes like oxy-atmoversion and oxyhydroversion, and establishment of first major supercontinents with associated rift zones and collisional mountain belts. The objectives of the research work conducted by the Paleoproterozoic Mineralization Research Group are: to study and model the relationship between environmental change and styles of mineralization in the Precambrian, with a specific focus on the Paleoproterozoic Era; to apply the

knowledge for evaluating the mineral exploration and beneficiation potential of that era (1,6 - 2,5 billion years ago) on a global-scale; to ensure a competitive edge for industrial partners in global mineral exploration and acquisition markets by studying the temporal and spatial distribution, composition, and origin of mineral deposit, on local and regional-scale; to train Post-graduate students in the field of Economic Geology and Geometallurgy. Research is undertaken by a research team, each member with a specific expertise, in partnership with national and international collaborators. Scientific methods involve integrated stratigraphic, sedimentological, petrographic and tectonic studies of selected time-bounded deposits and successions, aided by petrographical, geochemical, paleomagnetic and fluid chemistry systematics; Understanding time-bounded events of mineralization is a major thrust for which intercontinental sequence stratigraphy, absolute age dating, geochemical trends and paleomagnetic reconstruction are essential. Characterization of the composition of time-bounded ores in the Paleoproterozoic is an important component of the applied economic geology part of the project in order to try and ensure cost-effective extraction and beneficiation of the deposits.

Achievements: Over the past three years, the members of the research group have contributed more than 50 publications in internationally peer-reviewed journals, more than 100 conference contributions and have produced 30 confidential technical reports to industry. Furthermore, members have edited one special volume of the South African Journal of Geology, and have contributed chapters to several scientific books.

Facilities: Most analytical facilities are housed and maintained at Spectrau, the Central Analytical Facility of the Faculty of Sciences, UJ: Ar-Ar lab; Paleomagnetism laboratory; Fluid inclusion stage and IR microscope; Research polarization light microscope for reflected and transmitted light; ICP-MS (for solution work); LA-ICPMS; SEM; Electron microprobe; Mineral Liberation Analyzer; XRD; XRF. Each student and researcher equipped with modern computer and Internet access.

Future plans: In collaboration with the University of Melbourne we are currently building capacity to establish the Ar-Ar laboratory that De Beers has donated to the research group. In addition, we expand into the research field of geometallurgy, with strong support by Anglo Platinum, Anglo Research and the JKMRC (Brisbane, Australia). Geometallurgical research should be led by a research chair, for which an application has been submitted to the National Research Foundation.

Cooperation with developing countries: Active collaboration with India (Presidency College Kolkata) and Brazil (University of Belo Horizonte) on the genesis of iron and manganese ores. Very active collaboration with various universities in South America on sedimentary provenance studies. Planned collaboration with the University of Zambia on the origin of sediment-hosted ore deposits in that country. W454

International Organization: Agouron Institute-funded Geo-biology Project was recently completed. No other privately (donor)-funded research currently active or planned.

**University of KwaZulu-Natal — School of Biological and
Conservation Sciences — Cryoconservation Centre of
Excellence for Sub-Saharan Africa (CCESSA)**

Head of Institution: Prof.s Patricia Berjak and N.W. Pammenter.

Address: Durban 4041, South Africa. **Phone:** (+27 31) 260-3197, 260-3190.

Fax: (+27 31) 260-1195. **Email:** berjak@ukzn.ac.za, pammente@ukzn.ac.za.

URL: www.ukzn.ac.za.

Scientific Fields of Interest: Biological Sciences.

Research and training: RESEARCH: 1. Investigations to elucidate the biology of desiccation-sensitive / non-orthodox seeds with a view to comprehend and explain the basis of recalcitrant / intermediate seed responses; 2. Experimentation, generally with zygotic embryonic axes as explants of choice, to develop successful cryopreservation protocols for genetic resources conservation of species producing recalcitrant / non-orthodox seeds; 3. Development of alternative explants for cryopreservation; 4. Production of synseeds for germplasm dissemination; 5. Cryobanking. TRAINING: Specialized modules at Honors (1st Post-graduate year) level in Seed Biology and Cryobiology; M.Sc., Ph.D. & Post-doctoral levels. RESEARCH STUDENTS: Currently 20 at M.Sc. or Ph.D. level.

Achievements: We pioneered the scientific understanding of the basis of recalcitrant seed post-harvest physiology. We are one of the very few groups worldwide working on cryopreservation of germplasm of species producing unstorable (non-orthodox/recalcitrant) seeds. We have a good, consistent publication record and continue to produce M.Sc. and Ph.D. graduates, many of whom have developed successful scientific careers of their own. Every three to four years we convene and host a specialist international workshop, 'International Workshop on Desiccation Tolerance and Sensitivity of Seeds and Vegetative Plant Tissues' (next meeting January 2007). More information on our research and other activities can be found on our website: <http://www.ukzn.ac.za/plantgermcons>

Facilities: In addition to an array of computing equipment and good Internet connectivity, the University Library and arrangements with the regional parks services for field work, we have a purpose-designed database linking spatial coordinates with a range of edaphic and climatic parameters country-wide. Other facilities are readily available for: Genomics analysis, including restriction fragment length; polymorphism; amplified fragment length polymorphism; RAPDs; SSRs; ISSRs; macro-array analysis (with access to micro-array analysis elsewhere in the country); DNA fingerprinting (at a local collaborating laboratory). 2D electrophoresis system for proteomics. Biochemical techniques include isoenzyme comparative analysis; analysis for enzymic and non-enzymic anti-oxidants and reactive oxygen species; lipid analysis (e.g. using GC; HPLC [in conjunction with local collaborating laboratory]); all facilities for

chromatography; and flow cytometry (with a collaborating laboratory). Microscopy (light, fluorescence; transmission and scanning electron microscopy, and adjunct techniques for all these microscopical modes) - noting that technology and software are available for optical sectioning and image analysis; confocal laser microscopy (in conjunction with a colleague at another institution). Simultaneous conductivity assessment of 100 samples; differential scanning calorimetry (DSC). Extensive tissue-culture facilities, including those for fungal culture. Plant physiological equipment includes infra-red gas analyzers (IRGA); thermocouple psychrometry; drought-stress monitor (ultrasonic acoustic emission detector); chlorophyll fluorometer. Seed storage facilities at a range of temperatures. Particularly for recalcitrant seed and cryopreservation studies, flash-dryers; ultra-rapid plunge cooler; thermocouples linked to extremely rapid data collection systems to measure cooling rates; cryovats (liquid nitrogen containers for long-term genetic resources for cryopreservation). Access to suitable University vehicles.

Future plans: To establish a large-scale plant genetic resource cryobanking service for sub-Saharan Africa.

Cooperation with developing countries: We currently have active collaboration with researchers in Ghana, Nigeria and Tanzania and anticipate wider collaborations through the AU/NEPAD Plan of Action.

International Organization: We have ongoing collaboration with the Millennium Seed Bank (MSB), Royal Botanic Gardens Kew. We have adhoc collaboration with colleagues in the US and UK. Presently, we have funding from the Darwin Initiative, through MSB; ongoing modest funding from International Plant Genetic Resources Institute and long-term support from the National Research Foundation, South Africa.

University of Pretoria — Dept. of Microbiology and Plant Pathology — Water Institute

Head of Institution: Prof. Eugene Cloete.

Address: Lynnwood Road, Pretoria 0002, South Africa. **Phone:** (+27 12) 420-3265. **Fax:** (+27 12) 420-3266. **Email:** eugene.cloete@up.ac.za. **URL:** www.up.ac.za.

Scientific Fields of Interest: Agricultural Sciences, Engineering, Environmental Sciences.

Research and training: Water and health: Waterborne pathogens, solar pasteurization, biological control for eutrophication of dams; Waterborne pathogens, biofilms, water-related health research; Water-quality based on the principles of hazard assessment and critical control points; Toxic cyanobacteria in water supplies; Molecular epidemiology of water-borne viruses; Molecular epidemiology of water-borne viruses; Endocrine disruptor chemicals in water; Detection and identification of trace organic compounds. Water, agriculture and wildlife: Health risks to animals posed by inorganic contaminants in borehole

water; Irrigation with mine waste-water, Soil water balance model, wetting front detector; Extension of irrigation techniques to emerging farmers; Agricultural extension; Arid-land irrigation; Veterinary science: Environmental toxicology; Use of crocodile liver cells to monitor water pollution; Distribution of genetic diversity in endemic freshwater fish. Water treatment and supply systems: Water treatment; Rural water-resources development, water treatment; Rotoscope; The effect of toxic metals on wastewater treatment processes; Porous flow (reedbeds); Desalination; Pipeline engineering and economics, Urine diversion sanitation systems; Pipeline design. Water flow in the environment: Geology, groundwater management; Computer models for predicting the weather; Rain forecast; Modeling river dynamics. Water-related decision-making, policy and governance; Economics and policy aspects of water management, decision-making models; Life cycle management, Incorporating sustainable development in business management; Politics of transboundary waters, Conflict resolution & institutional development; African models of transboundary governance; African environmental law, Facilitating intra-Africa trade; International law and environmental law; Natural resources sustainable rural development, governance & development.

Achievements: Regular publication of scientific papers in international journals since 2004 to date.

Facilities: The UPWI is distributed over 6 faculties at the University of Pretoria with extensive infrastructure in terms of labs, state-of-the-art equipment and a comprehensive library.

Future plans: Continuation of the current scope of research.

Cooperation with developing countries: The Institute's founding partners will be actively seeking the partnership and participation of more African universities including, including those from SADC countries. In light of recent collaborations, universities in Egypt, Ethiopia, Kenya, Sudan, Tanzania and Uganda, are among the first potential partner institutions.

International Organization: Formal agreement with the Georgia Institute of Technology in Atlanta, USA.

University of Pretoria — Forestry and Agricultural Biotechnology Institute (FABI)

Head of Institution: Prof. Mike Wingfield.

Address: Pretoria 0002, South Africa. **Phone:** (+27 12) 420-3938. **Fax:** (+27 12) 420-3960. **Email:** mike.wingfield@fabi.up.ac.za. **URL:** www.fabi.up.ac.za.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences, Environmental Sciences.

Research and training: Plant-biotechnology; forest pathology; forest entomology; plant pathology; agricultural entomology; bio-informatics; mycology; microbial biodiversity.

Achievements: Education (Ph.D and MSc) degrees; note a primary focus on education consistent with a university-based institution; research publications; solutions to pest and disease problems for forestry and agriculture industry; biological control products; industrial biotechnology products from microbes; cultures of microbes for industry; DNA fingerprinting techniques; plant-breeding skills and products; gene discovery.

Facilities: Greenhouse and phytosanitary (quarantine) facilities; insectarium; tissue-culture facilities; DNA labs, PCR etc.; DNA sequencers (five including 2 high throughput); large-scale computing; bio-informatics facility; library; farm and nursery facilities; microarray.

Future plans: Expansion of collaborations and research in the broad field of plant-biotechnology, plant protection/improvement and applied mycology.

Cooperation with developing countries: Research collaboration, formal and informal with many countries in Africa, South America, Indonesia, Australia, China, etc. These are based on national bilateral funding agreements, agreements supported by aid projects and projects supported by agricultural and forestry industries.

International Organization: Existing donors, sponsors and collaborators are from many countries in the north and south. Future plans are to include projects with Indonesia, China, Rockefeller Foundation and NUFU (Norway, University).

University of Stellenbosch — Dept. of Electrical and Electronic Engineering

Head of Institution: Prof. W.J. Perold, Chairman.

Address: Private Bag X1, Matieland 7602, South Africa. **Phone:** (+27 21) 808-4368. **Fax:** (+27 21) 808-4981. **Email:** wjperold@sun.ac.za.

Scientific Fields of Interest: Engineering.

Research and training: Power electronics; Electrical machines; Digital speech processing and pattern recognition; Telecommunications; Unmanned aerial vehicles (UAVs); Satellite and space systems; Embedded computer systems; Superconducting microwave devices and integrated circuits (high- and low T_c); Electromagnetic Compatibility (EMC); Passive and active microwave systems; Borehole radar; Computational electromagnetics.

Achievements: Journal and conference publications; Engineering hardware and software products developed as part of contract research for industry; Engineering graduates sought after by industry.

Facilities: Engineering library, as well as a central library with annual budget to purchase new books and journals and subscribed to Science Direct for access to international literature; Networked computers in under-graduate laboratories (240); Machines laboratory (20 fully equipped machine systems for practical work); Satellite systems laboratory, including ground station; Unmanned aerial vehicle (UAV) laboratory; Superconductivity laboratory including cryogenic measurement down to 2 K and high-T_c fabrication capability (laser ablation,

argon ion milling, photolithography, bonding, etc.); Compact antenna range; RF laboratory with various microwave measuring instruments (microwave sources, 50 GHz oscilloscope, network analyzers, etc); Digital signal processing laboratory.

Future plans: In order to train High-quality engineers on under-graduate and Post-graduate level, the department training laboratories need to be upgraded on a regular basis. The electronic laboratories currently need upgrading of computers and measuring equipment. This is a major concern at present and will receive urgent attention. The superconductivity research group, being one of only a few facilities in Africa, is currently extending their research scope to include the fabrication of nano-structures (MEMs and NEMs). In order to be successful it is planned that, over time, some of the capabilities need to be extended by the acquisition of modern fabrication and analysis tools (AFMs, E-beam lithography, computer controlled laser writing equipment, etc.). The satellite and space research activity produced the first satellite ever to be developed in Africa and launched by NASA. This activity will stay an important focus area. The current UAV activity, which is closely related to the satellite programme, is a fast growing field which is generating a lot of international interest (including Africa). This activity will continue to grow in importance. The current small activity on the use of alternative energy sources for equipment (cars for example) will be expanded.

Cooperation with developing countries: At present the department has no formal cooperation agreements with developing countries, apart from ad hoc efforts to help with the development of curricula for universities starting engineering faculties. Some lecturers from other African states have done, or are doing, Post-graduate studies in our department. We are planning to expand ties with other engineering departments (especially in Africa) in the future.

International Organization: The department has student/lecturer exchange programmes with other universities, mainly from Europe. We receive exchange students from Europe (mostly France and Germany) on a regular basis. It is envisaged that these programmes will become more popular in the future and that it will be expanded to include exchange between researchers and students from Africa.

University of Stellenbosch — DST/NRF Center of Excellence for Biomedical TB Research (CBTBR) — Div. of Molecular Biology and Human Genetics (MBHG)

Head of Institution: Prof. Paul D. van Helden, Director.

Address: PO Box 19063, Tygerberg 7505, Cape Town, South Africa. **Phone:** (+27 21) 938-9402. **Fax:** (+27 21) 938-9476. **Email:** pvh@sun.ac.za. **URL:** www.tuberculosis.org.za.

Scientific Fields of Interest: Medical Sciences.

Research and training: THEME I: Target validation and characterization through basic research in mycobacterial metabolism: Mechanisms of DNA repair, replication and mutagenesis in mycobacteria; The regulation and function of aerobic respiratory pathways in mycobacteria; Mechanisms of Rpf-mediated control of growth and culturability in mycobacteria; The physiological role of toxin-antitoxin (TA) modules in *M. tuberculosis*; Functional characterization of ribonucleotide reductase (RNR)-encoding genes in *M. tuberculosis*; Vitamin B12 biosynthesis and the role of B12-dependent enzymes in growth and persistence of *M. tuberculosis*; Targets for new drug development; Trafficking of the *M. tuberculosis* PE and PPE proteins. THEME II: Bridging the gap between basic and clinical research: Molecular Epidemiology, Mycobacterial Genetics and Diagnostics; Mycobacterial Genetics and Evolution; Molecular Immunology: Immune responses in tuberculosis, HIV and worm infections; Host Genetics; Infection Control Studies.

Achievements: Successful under-graduate, Master's and Ph.D students delivered; Research publications annually in peer-reviewed international journals; Community outreach programs in formerly disadvantaged communities; Consultation reports to provincial and local authorities and private companies; Patents, for instance: Warren R, Gey van Pittius N, van Helden P. 2006 Single step method for the diagnosis and speciation of *M. tuberculosis*, *M. africanum*, *M. bovis* and *M. bovis* BCG. SA Provisional Patent 2006/00683.

Facilities: Fully equipped laboratories, including a Bio-Safety Level 3 Laboratory, Tissue-culture facility, 4C walk-in cold-room, 37C walk-in hot-room, 1 Darkroom, 7 -70C freezers, 1 Automated liquid N₂ system, 1 stationary and 2 portable Huxley autoclaves, 1 Transilluminator and video camera system, 1 Spectrophotometer, 3 class II laminar flow hoods, 3 Nikon microscopes, 1 Sorvall GLC4 benchtop centrifuge, 2 water-jacketed CO₂ incubators, 1 Eppendorf 5417C microfuge, 1 Bino class II laminar flowhood, 1 Yihder orbital shaker/incubator, 1 bacterial incubator, 1 Mistral 3001 benchtop centrifuge, 10 PCR machines, 9 high voltage power packs, 4 low voltage power packs, 1 Hybrid Midi dual I4 hybridization oven, 2 Sorval RC5 refrigerated centrifuges, 4 protein mini-gel electrophoresis apparatuses, 2 Becton Dickinson Excalibur flow cytometers, 1 FACS Array and Count apparatus, 5 Eppendorf microfuges, 2 hybridization ovens, 2 water purification systems, DNA sequencer, 2 Bactec 460 machines and 1 BC960 machine, 1 MIGIT Machine, 1 Laser Microdissection Microscope (PALM MicroLaserTechnologies), 1 Light Cycler (Roche), Bio-Plex (Bio-Rad), 1 GloMax Luminometer (Promega). Access to medical library with annual budget to purchase new books and journals and subscribed to Science Direct for access to international literature. Unlimited access to computers for all researchers and Post-graduate students.

Future plans: Development of rapid TB diagnostics; Identification of virulence mechanisms; Implementation of proteomics; Drug research and development; Discovery of surrogate markers for TB treatment response.

Cooperation with developing countries: For the past 8 years, the SU node has been involved in development and transfer of molecular technology to various countries in Africa through funding mostly from the IAEA. In this

initiative we use tuberculosis as a model disease to transfer molecular technology; running of training workshops in Africa and the hosting of African fellows for training purposes; workshop and training on data management and quality assurance programmes (radionuclide based molecular techniques in the detection of drug resistant tuberculosis; and 5 IAEA visitors are scheduled for 2007.

International Organization: TBAdapt - European Union funded Research Project; EDCTP- European Union funded Surrogate Marker Study; Bill & Melinda Gates Foundation (part of GCG-74) and cooperation with Max Plank Institute for Infectious Biology, Berlin, and Germany.

University of Stellenbosch — DST/NRF Center of Excellence for Invasion Biology (CIB) — Dept. of Botany and Zoology

Head of Institution: Prof. Sophie A. Reinecke, Exe. Head.

Address: Private Bag X1, Matieland, 7602 Stellenbosch, South Africa. **Phone:** (+27 21) 808-2408, 808-3236. **Fax:** (+27 21) 808-2405. **Email:** sar@sun.ac.za.

Scientific Fields of Interest: Biological Sciences, Environmental Sciences.

Research and training: Research: Animal-Plant interactions and pollution ecology; Antarctic research - Marion Island; Behavioral ecology; Climate change in space and time, with emphasis on invertebrates (especially arthropods); Conservation genetics; Ecophysiology of freshwater animals; Ecotoxicology; Evolutionary ecology - Zoology and Botany; Fynbos vegetation ecology; Herpetology; Invasion biology of plants and animals; Molecular systematics of plants and animals; Paleontology, especially of extinct Karoo fauna; Plant-biotechnology; Plant physiology with emphasis on photosynthesis; Vegetation of Southern Africa - mapping and ecology. Teaching - Undergraduate modules: Honors degree with specialization in either botany or zoology (one year course, including generic modules, choice modules and practical project); Masters and Doctors degree - by thesis based upon research projects - part-time and full-time options.

Achievements: Successful under-graduate, honours, masters and Ph.D students delivered; 105 Research publications in 2006; Chapters in scientific books; Books published -bench mark publication in 2007 on the Vegetation of South Africa, Lesotho and Swaziland; Consultation reports to provincial and local authorities and private companies on environmental impacts and faunal surveys; Community outreach programs to schools in formerly disadvantaged communities and to the community in general (Talks, radio talks, television programmes, presenting workshops and conferences, initiating practical projects in schools, disseminating information by brochures, exhibitions for schools); Centre of Excellence for Invasion Biology.

Facilities: Full and free access to computers to all students;; several environmental control chambers, aquaria and climate controlled incubators.

Atomic-absorption spectrophotometer, plate reader spectrophotometers, PCR machines and general lab facilities, access to a centralized analytical facility of the University for routine sequencing, chemical analyses (Mass spec, GC etc) and electron microscopic analyses; Access to University main library and to the University Botanical garden. The department has control of a conservation area, the Duthie Reserve, where some endangered plants are protected; Permanent laboratory on Marion Island where regular research is done by members of the department.

Future plans: To increase staff and student diversity to be more representative; to provide a good general under-graduate training in the biological sciences. To generate highly skilled and sought-after Post-graduates who could be leaders in conservation as well as in basic biological research; To focus on national and international priorities in these fields in order to ensure continued relevance; To expand interaction, networking and collaboration with both developed and developing countries.

Cooperation with developing countries: We are currently involved in joint research with several countries in southern Africa, and other African countries. such as Gabon, Nigeria, Sudan, Tanzania, Mauritius and Zimbabwe.

International Organization: We are cooperating with various universities in the UK, France, Italy, Germany, the Netherlands, Czech Republic, Poland, Slovakia, Denmark, Spain, Norway the USA and several others.; with the Natural History Museum in Hungary, Universities of Arizona, Memphis, Iowa, Drexel, Wisconsin (Madison) California (Davis), Florida, Columbia and Wyoming, U.S.A. ; CSIRO, Australia; University of Oslo, Norway; Max Planck Institute, Switzerland; Institute of Zoology, London, V.K.; Cambridge University; University van Silesia, Poland; University of Sheffield, UK; Universities of Montpellier, Besangon, Paris, Rennes and Burgundy, France; Vrije Universiteit, Amsterdam, Netherlands, Ottawa and Victoria Universities, Canada and many others.

University of Stellenbosch — Institute for Wine Biotechnology

Head of Institution: Prof. M.A. Vivier, Chair.

Address: Private Bag X1, Matieland 7602, Stellenbosch, South Africa. **Phone:** (+27 21) 808-3770. **Fax:** (+27 21) 808-3771. **Email:** iwbt@sun.ac.za. **URL:** www.sun.ac.za/wine_biotechnology.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences.

Research and training: Research: the molecular-biology and biotechnology of grapevine and of wine-associated microorganisms, in particular yeast and lactic acid bacteria. In grapevine, the focus is on plant responses to biotic (pathogen-derived) and abiotic (environmental) stresses and the improvement of grapevine cultivars. The yeast projects focus on the molecular regulation of cellular responses to environmental changes and the improvement of wine yeast

strains. Approaches are based on standard genetic, molecular, and microbiological and tissue-culture techniques, as well as whole organism omics systems biology methodologies. Training: Hons. B.Sc; Hons. B.Sc. Agric.; M.Sc.: M.Sc. Agric.; Ph.D. and Ph.D. Agric. All degrees are research-based.

Achievements: Several prominent scientific breakthroughs have been achieved at the IWBT, including the first reports of biotechnologically modified yeast strains to produce various wine-relevant enzymes or metabolites (resveratrol and carnitine). Other important contributions include studies on the transcriptional regulation in response to environmental change in yeast and on the regulation and mode of action of polygalacturonase-inhibiting proteins (PGIP) in grapevine. Grapevine transformation and regeneration systems have been established in the group for several important wine and table grape cultivars and rootstocks. Some of the intellectual property generated (new wine yeast strains) is commercialized through a spin-off company, SunBio, that was established by the IWBT through funds provided by CapeBiotech, a Cape Town based biotechnology innovation centre.

Facilities: In the IWBT building: Three fully equipped molecular-biology laboratories with capacity for 40 researchers and students (equipment includes RT-PCR, PCR, and all relevant equipment for DNA and protein-related experimentation). All laboratories are equipped with computer workstations (including e-mail and Internet access) on every work bench; Analytical laboratory with HPLC (2X), GC-MS, GC-FID, CE, FT-IR spectrometer; Tissue-culture laboratory, grapevine transformation facility and greenhouse; Experimental wine cellar for small-scale wine making; Experimental vineyards on experimental farm. In other buildings: The IWBT occupies parts of a fermentation laboratory in the Department of Biochemistry for batch fermentation and chemostat cultures. Access to well-equipped university library.

Future plans: The IWBT is well established. Future developments will focus on expanding essential support technologies (analytical tools, proteomics and metabolomics platforms) and on providing optimized work environments for Post-graduate students (individual computer work spaces), as well as for administrative and academic staff members.

Cooperation with developing countries: Discussions have taken place with Kyambog University, PO Box 7181, Kampala, Uganda to train staff in biotechnological methodologies. Other discussions are on-going with Prof W Kyamuhangire. Department of Food Science and Technology, Makerere University, PO Box 7062, Kampala, Uganda.

International Organization: Groups have been collaborating on grapevine transformation technologies through a South African -Germany bilateral agreement programme since 2002; a South African-Italy bilateral agreement programme since 2005; This collaboration supported our efforts for gene and promoter isolation and analysis, since Dr. Velasco's group sequenced the grapevine genome in 2006; SA-Flemish bilateral research agreement and a Spain-SA bilateral research agreement, as well as several other research collaborations.

University of the Western Cape — Department of Earth Sciences — UNESCO Chair of Hydrogeology

Head of Institution: Prof. Yongxin Xu.

Address: Private Bag X17, Bellville 7535, South Africa. **Phone:** (+27 21) 9592439/3882. **Fax:** (+27 21) 959-3118. **Email:** unescochair@uwc.ac.za. **URL:** www.science.uwc.ac.za/earthscience/index.htm.

Scientific Fields of Interest: Earth Sciences, Environmental Sciences.

Research and training: Groundwater research and training.

Achievements: Water research commission reports; recharge book: ISBN: 0621167878; publications.

Facilities: GIS; numerical modeling codes; field chemistry kits.

Future plans: Establishing a water institute/centre.

Cooperation with developing countries: Present: UNESCO and SADEC.

International Organization: VLIR (Belgium).

Sri Lanka

Institute of Fundamental Studies (IFS)

Head of Institution: Prof. Kirthi Tennakone, Director.

Address: 70, 1/1 Hantana Road, Kandy, Sri Lanka. **Phone:** (+94 81) 223-2002.

Fax: (+94 81) 223-2131. **Email:** ifs@ifs.ac.lk, tenna@ifs.ac.lk. **URL:** www.ifs.ac.lk.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences, Chemistry, Earth Sciences, Environmental Sciences, Mathematics, Physics.

Research and training: Applied mathematics; computational mathematics and physics; condensed-matter theory; theoretical physics; condensed matter physics; photo-chemistry; solid-state chemistry; semiconductor optoelectronics; nano science; metal coordination chemistry; natural products chemistry; biochemistry; plant-biotechnology; plant reproductive biology; plant-cell biology; biological nitrogen fixation; primate biology; basic food chemistry; ecology & environmental biology; chemical modeling of aquatic systems; structural geology.

Achievements: 57 publications in refereed journals; 43 abstract/conference proceedings; 14 invited lectures/conferences; 3 books/monographs; M.Sc., M.Phil and Ph.Ds completed; 1 award.

Facilities: Computers; conference hall; library; laboratory facilities (Atomic spectroscopy, molecular spectroscopy, chromatography, CO₂ analyzer, particle size analyzer, electrophoresis).

Future plans: Pure mathematics, theoretical physics.

Cooperation with developing countries: Institute of ecology (Univ. of Vienna, Austria); Univ. of Innsbruck, Austria; Shizuoka Univ. Japan.

International Water Management Institute (IWMI)

Head of Institution: Prof. Frank Rijsberman.

Address: 127 Sunil Mawatha, Pellawatte, Battaramulla, PO Box 2075, Colombo, Sri Lanka. **Phone:** (+94 11) 278-7404, 789-080. **Fax:** (+94 11) 278-6854. **Email:** d.molden@cgiar.org, iwmi@cgiar.org. **URL:** www.iwmi.cgiar.org.

Scientific Fields of Interest: Agricultural Sciences, Earth Sciences, Engineering, Environmental Sciences.

Research and training: IWMI's research is organized around four key themes. Basin Water Management provides the overarching context for our research on water productivity and water poverty across the hydrological cycle at the basin scale. Land, Water and Livelihoods identifies and tests technological, policy and institutional interventions to conserve resources and increase land and water productivity. Agriculture, Water and Cities explores the rural-urban interface and interventions that can help ensure the safe and productive use of wastewater

and the sustainability of high-input peri-urban systems. Water Management and Environment examines farm, field and system level interventions to better balance productivity and environmental objectives. Together, the cross-cutting research areas work towards: Increasing the understanding of land and water productivity and its relationship to poverty; Identifying interventions to improve the productivity and sustainability of natural resources; and assessing the impacts of such interventions on productivity, livelihoods, health and resource sustainability.

Achievements: Knowledge generation through applied, policy-oriented research; knowledge-sharing by building a learning organization and making our research findings more widely accessible; knowledge brokerage by opening a window-on-the-world for researchers through the development of international research alliances, both South-South and South-North; knowledge application by establishing impact pathways with development partners to enable broad application of IWMI's knowledge.

Facilities: IWMI Remote-sensing / Geographical Information System (RS/GIS) Lab: state-of-art computer hardware; 7 high end state-of-art Dell and/or other PC workstations; over 40 USB disks each of 120-300 GB of storage; two digitizers; one scanner; and three printers. Adequate GIS software with 30 licenses each of ArcGIS and Arcview (consist of ArcInfo, ArcEditor, ArcView, Spatial Analyst and other extensions. The spatial data at IWMI is organized by RS/GIS unit (through its IWMIDSP). RS/GIS unit is responsible for streamlining and cataloguing all spatial data at IWMI. These data are released as a global public good through IWMIDSP. Comprehensive river basin datasets are available for a number of benchmark basins spread across the World such as Limpopo (South Africa), Ruhuna (Sri Lanka), Krishna (India), and Ganges-Indus (India and Pakistan). Many innovative datasets are in IWMIDSP. These include: AVHRR 0.1 degree monthly data as a single mega file of 956 bands over 20 years (red, near-infrared, 2 thermal infrared bands); MODIS continuous streams of data from 2000 to present every 8-days for several benchmark river basins mentioned above; Ground truth data of the world; SRTM 90-m DEM data for Asia; rainfall data available monthly for last 40-years at 0.5 degree resolution for the entire globe; and Satellite sensor data from sensors such as SPOT vegetation, Landsat ETM+, TM, MSS, and a few IKONOS images for various spots in the World. IWMI Library: Desktop computers, scanners, television set, CD burners, DVD drives, printer, photocopy machine.

Cooperation with developing countries: Currently, IWMI research projects are carried out in 30 countries across Asia and Africa. These projects are administered from IWMI's headquarters in Sri Lanka and its regional offices in India and Ghana. In addition the Institute has sub-regional offices and country offices in China, Ethiopia, Iran, Laos, Nepal, Pakistan, Malaysia, South Africa and Uzbekistan.

International Organization: IWMI is supported by contributions from donor members of the CGIAR including governments and agencies in developed and developing countries and international and private organizations.

Munasinghe Institute for Development (MIND)

Head of Institution: Prof. Mohan Munasinghe.

Address: 10/1 de Fonseka Place, Colombo 5, Sri Lanka. **Phone:** (+94 11) 255-1208. **Fax:** (+94 11) 255-1608. **Email:** mind@eureka.lk. **URL:** www.mindlanka.org.

Scientific Fields of Interest: Earth Sciences, Engineering, Environmental Sciences.

Research and training: Climate change; sustainable development; environment; energy; water; transport; agriculture; disaster management.

Achievements: Books, research papers, journal articles, newsletter, videos other training docs. See web site for greater details.

Facilities: Up to date ICT facilities, including computers, broadband Internet, library, etc.

Future plans: To expand the capacity of MIND in response to requests for training and research outside Sri Lanka.

Cooperation with developing countries: ENDA (Senegal); Univ. of Capetown - ERC (South Africa); SEI (Bangkok); IGIDR (India); IUB (Bangladesh), etc.

International Organization: UNITAR, UNDP, UNEP, EU.

Rubber Research Institute of Sri Lanka (RRISL)

Head of Institution: L.M.K. Tillekeratne, Director.

Address: Dartonfield, Agalawatta, Sri Lanka. **Phone:** (+94 34) 224-7426, 224-7383, 222-3078, 224-8457. **Fax:** (+94 34) 224-7427. **Email:** dirrri@tradenet.lk.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences.

Research and training: Genetics & Plant-breeding; Plant Science, Plant Pathology & Microbiology; Soils & Plant Nutrition; Biochemistry & Physiology; Agricultural Economics; Adaptive Research, Biometry; Polymer Chemistry; Raw Rubber & Chemical Analysis; Rubber Technology & Development; Raw Rubber Process Development & Chemical Engineering.

Achievements: Development of high-latex and timber-yielding clones; tapping systems to reduce tapper requirement and enhance their earnings; cost-effective soil management, fertilizer-use and disease-control methods; methods of minimizing crop losses due to rain; development of non-toxic chemicals for use in crepe rubber manufacture; cost-effective effluent treatment systems to treat rubber factory effluent.

Facilities: Analytical equipment IR; UV auto analyzer, atomic-absorption UV/visible trophometer, polymer processing equipment; Brabender, plasticorder, rubber product-testing equipment, rheometer, tensometer, hardness tester; computers, two field stations (Nirithigakakale, Kuruwita and Polgahawela); technology development for products at lab level, library; biological tissue-culture and gas exchange studies; incubators, rotary

evaporators, water-purifiers, microscopy facilities, audiovisual aids, meteorological field centre, disease control including biological disease control techniques.

Future plans: To increase productivity of the rubber lands to reach the country average of about 1500 kg/ha/yr; to develop new types of rubber and blends of it with other materials.

Cooperation with developing countries: There is ongoing collaboration with most of the rubber growing countries in SE Asia under the ANRPC and IRRDB.

International Organization: Projects funded by EFID & EU.

University of Colombo — Faculty of Medicine — Department of Biochemistry and Molecular Biology

Head of Institution: Prof. Sunethra Atukorala, Head.

Address: Box 271, Kynsey Road, Colombo 8, Sri Lanka. **Phone:** (+94 11) 269-7485. **Fax:** (+94 11) 269-1581. **Email:** sunethra@eol.lk. **URL:** <http://www.medical.cmb.ac.lk/>.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences.

Research and training: M.Sc. in biochemistry, molecular-biology and gene technology; Ph.D. programs in molecular-biology and nutritional biochemistry. The ongoing research programmes in the department include: molecular-biology of filarial parasites, genetic engineering of some economically important plants, studies on micro nutrient deficiency, specially iron, folic acid, vitamin A and zinc deficiency, new cardiovascular risk factors, drug metabolism and interactions, apoptosis, biochemical aspects of organophosphate poisoning enhancement of activity of industrial alpha amylase and medicinal plants.

Achievements: Development of DNA probes and PCR assays for detection of human, cattle and canine filarial parasites; establishment of an internationally recognized research programme on iron and folic acid deficiency among adolescent girls and women.

Facilities: 4 research laboratories with the following facilities: HPLC with UV and electrochemical detectors; FPLC; centrifuges; electrophoresis apparatus; freeze dryer; double-beam spectrophotometers; thermal cycler for PCR; facilities for cell-culture; fluorescence inverted microscope; computers with Internet access; cold room; dark room; animal house. 1 under-graduate teaching laboratory.

Future plans: Upgrading of departmental laboratories.

Cooperation with developing countries: Participation in research seminars at University of Kerala (India) and Baqai Medical University, Karachi (Pakistan).

International Organization: Georgia Institute of Technology, Atlanta, GA, (USA).

University of Colombo — Faculty of Medicine

Head of Institution: Prof. S. Lamabadusuriya, Dean.

Address: P.O. Box 271, Kynsey Road, Colombo 08, Sri Lanka. **Phone:** (+94 1) 695-300, 696-243, 688-749. **Fax:** (+94 1) 691-581. **Email:** deanmedicine@hotmail.com. **URL:** www.cmb.ac.lk.

Scientific Fields of Interest: Biological Sciences.

Research and training: Training of under-graduates for B. Medicine and Surgery; training of Post-graduates in Medical and Paramedical subjects sent by the Post-graduate Institute of Medicine (PGIM); malaria research.

Facilities: 1 Library; 11 student labs and resource centres; service/research; malaria research unit and field station; snake venom unit (serpetarium).

Future plans: Corporate plan

Cooperation with developing countries: Ministry of Health (Government of Bhutan).

International Organization: WHO, World bank (Improving relevance and quality of under-graduate education); and Oxford University/centre for infectious and tropical diseases (OX-COL).

University of Colombo — School of Computing (UCSC)

Head of Institution: Dr. A.R. Weerasinghe.

Address: 35 Reid Ave, Colombo 7, Sri Lanka. **Phone:** (+94 11) 2581-245/8. **Fax:** (+94 11) 2587-239. **Email:** info@ucsc.cmb.ac.lk. **URL:** www.ucsc.cmb.ac.lk.

Scientific Fields of Interest: Engineering.

Research and training: Sinhala application software; graphics for telecasting; Sinhala and Tamil BIOS natural language processing RDBMS and image-processing. Training: specialized courses in all related fields, E-learning technologies, multimedia databases.

Facilities: Large computer facilities.

Future plans: Major initiative in e-Learning with the setting up of a National Center.

Cooperation with developing countries: Regional training programmes in IT with collaboration of development agencies, such as CICC and the Japan International Cooperation Agency (JICA) and Swedish SIDA; accredited by Oracle Corporation and Novel Institute to run their courses in Sri Lanka.

International Organization: Further JICA assistance served in 2002-2005 for capacity-building in multimedia technology and web-based training development. SIDA and Asia-link assistance sought for setting up of National e-learning center. IDRC collaboration in language technology and e-learning Research for Asia.

Sudan

University of Khartoum — Institute of Endemic Diseases

Head of Institution: Prof. Maowia M. Mukhtar.

Address: The Medical Campus, P.O. Box 102, Khartoum, Sudan. **Phone:** (+249 183) 779-712, 793-263, 793-265, 793-267. **Fax:** (+249 183) 779-712.

Email: mmukhtar@iend.org, enemic@uofk.edu, postmaster@iend.org, eltahir@iend.org. **URL:** <http://www.iend.org/>.

Scientific Fields of Interest: Biological Sciences, Medical Sciences.

Research and training: Infections and cancer; epidemiology, immunology and immunopathology of Leishmaniasis; immunogenetics; molecular characterization and taxonomy of Leishmania parasites; epidemiology and immunopathology of Tuberculosis; vaccines; diagnostics of tropical diseases; hemophilia; epidemiology and immunoepidemiology of malaria; population genetics; breast and nasopharyngeal cancers.

Achievements: Publications: Uncommon clinical presentations of cutaneous leishmaniasis in Sudan. Elamin EM, Guerbouj S, Musa AM, Guizani I, Khalil EA, Mukhtar MM, Elkadaro AM, Mohamed HS, Ibrahim ME, Abdel Hamid MM, El Azhari M, El Hassan AM. Trans R Soc Trop Med Hyg. 2005 Nov;99(11):803-8. Sudanese mucosal leishmaniasis: isolation of a parasite within the Leishmania donovani complex that differs genotypically from L. donovani causing classical visceral leishmaniasis. Mahdi M, Elamin EM, Melville SE, Musa AM, Blackwell JM, Mukhtar MM, Elhassan AM, Ibrahim ME. Infect Genet Evol. 2005 Jan;5(1):29-33. Dichotomy of protective cellular immune responses to human visceral leishmaniasis. Khalil EA, Ayed NB, Musa AM, Ibrahim ME, Mukhtar MM, Zijlstra EE, Elhassan IM, Smith PG, Kieny PM, Ghalib HW, Zicker F, Modabber F, Elhassan AM. Clin Exp Immunol. 2005 May;140(2):349-53.

Facilities: Lamina flow hood (4); Cold centrifuge (2); SDS PAGE (3); 2D Ettan11 phore (1); PCR machines (5); Gel documentation system (2); DNA sequencer (1); Computers (20), Library (1); Field stations (2), CO₂ incubators (4); Inverted microscopes (3); -80°C freezers (2); -20°C freezers (8). ELISA readers (3).

Future plans: Establishment of Vaccine and biological production Unit; Establishment of RNA and functional genomics unit; Establishment of Proteomics unit.

Cooperation with developing countries: Collaboration with AHRI Ethiopia; Addis Ababa University Ethiopia; University of Asmara, Eritrea; Sanna University, Yemen;

International Organization: WHO/ TDR; Wellcome Trust (UK); EDCTP; ICGB; DNDi; Collaboration with: Cambridge University; York University, KIT Netherlands; AHRI Ethiopia; Prince Leopold Tropical Medicine Research Institute.

Swaziland

University of Swaziland — Swaziland Institute for Research in Traditional Medicine, Medicinal and Indigenous Food Plants (SIRMIP)

Head of Institution: Prof. O.O.G. Amusan, Director.

Address: Private Bag 4 Kwaluseni, Swaziland. **Phone:** (+268 51) 84011. **Fax:** (+268 51) 85276. **Email:** amusan@uniswacc.uniswa.sz, Sharon@uniswacc.uniswa.sz. **URL:** www.uniswa.sz.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences, Chemistry.

Research and training: Ethnobotanical survey of medicinal and indigenous food plants; phytochemical screening of pharmacological screening of medicinal and indigenous plants; agrobotanical studies of medicinal and indigenous food plants; traditional medicine and indigenous knowledge.

Achievements: Database on indigenous knowledge on medicinal plants used in traditional medical practice in Swaziland and publications in areas of research.

Facilities: University library; 25 hectare farm; PYE UNICAM GC; IR spectrophotometer; graphite furnace and flame photometer; isolated organ bath; plethysmometer and animal house for pharmacological screenings.

Future plans: Development of infrastructure; expansion of bio-assay facilities and propagation of indigenous medicinal plants; continuation of ethnobotanical survey.

Cooperation with developing countries: Member of Southern African Plant Resources Exploration; Network of Analytical and Biological Services in Africa, and the Network for promoting the use of *Phytolacca Dodecandra* as molluscicide.

International Organization: UNEP, UNDP, AU/STRC, Ford Foundation and Rockefeller Foundation.

Syria

Arab Center for the Studies of Arid Zones and Dry Lands (ACSAD)

Head of Institution: Farouk Fares.

Address: P.O. Box 2440, Damascus, Syria. **Phone:** (+963 11) 574-3087, 574-3039. **Fax:** (+963 11) 574-3063. **Email:** acsad@net.sy. **URL:** <http://www.acsad.org/>.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences, Earth Sciences.

Research and training: Survey and evaluation of renewable natural resources, wheat and barley varieties tolerant of drought and salinity and resistant to diseases; fruit trees suitable for arid conditions; rangelands and forests; farming systems in rainfed areas, agricultural biodiversity; sheep and goat breeds productivity by genetic selection and crossing, applied research on camel, use of saline and slightly saline waters and soils waste and treated waste-waters in agriculture; supplemental irrigation and rain water harvesting; water-resources management and water pollution (survey, evaluation, and protection), applied research on geo-information.

Achievements: Providing nontraditional water-resources for irrigation; identifying the genetic resources suitable for the arid regions to increase productivity of cereals, fruit trees, rangelands, small ruminants (Awassi breeds) and camels; rehabilitating the desert areas; identifying the best farming systems in the rainfed areas; drawing up the principles and basics to prevent water pollution and the excessive use of water, approaching best practices for water-resources development and management.

Facilities: A library, field research stations, data banks, geo information (RS, GIS, IT); Laboratories (for analyzing soils, water, plant and animal); Herbarium, Genetic resources Unit, Artificial insemination laboratory and training centers, mathematical models (software).

Future plans: Research on the production of cereal varieties tolerant of drought and salinity and resistant to diseases; research on identifying the farming systems in the rainfed areas and transfer of research results to farmers; research on developing the small ruminants and camels; studies on the development of water-resources management systems; (decision support systems), drought mitigation and early warning system for drought studies on the use of waste and treated waste-water in agriculture.

Cooperation with developing countries: Providing the national centers with genetic resources (cereals, fruit trees, range plants and small ruminants), providing improved animals, frozen semen, materials expertise and equipment; conducting studies and pilot projects pertaining to the development of arid areas, desertification (control and green belts).

International Organization: Cooperation with regional and international organizations for training and research. Some projects and studies are carried out with support from Arab and international funds and technical cooperation agencies.

Atomic Energy Commission of Syria (AECS)

Head of Institution: Prof. Ibrahim Othman.

Address: P.O. Box 6091, Damascus, Syria. **Phone:** (+963 11) 611-1926/7.

Fax: (+963 11) 611-2289. **Email:** atomic@aec.org.sy.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences, Chemistry, Environmental Sciences, Mathematics.

Research and training: Application of nuclear techniques in improvement of animal production and animal health; Radiation induced mutation for crop improvement; Pesticide residues in food and the environment; Irradiation facility for sterilization; Isotope hydrology for water management; Radiation protection; Environmental protection; ores-exploration; nuclear medicine and radiopharmaceuticals; use of radiation in biological research; solid-state physics and its applications; fundamental research in chemistry physics and biology in addition to training and educating the AECS staff.

Achievements: Scientific papers published in international journals; conference proceedings; technical reports.

Facilities: Miniature neutron resource reactor; X-ray diffraction and fluorescence lab; liquid scintillation counter; agriculture research field station; industrial gamma irradiator (CO-60-100KCl); radioactive waste management facility; cyclotron facility for medical radioisotopes; chromatograph; spectrometer; low-dose irradiator; library; ion-beam accelerator; non-destructive testing lab; irradiation facility for sterilization.

Future plans: Energy planning; studies on nutrition management; water management; archaeological dating.

Cooperation with developing countries: India, Pakistan and Lebanon.

International Organization: IAEA, Arab Atomic Energy Agency (AAEA), ICTP, TWAS, TWNSO, ICGEB, UNDP, UNESCO, and EU.

Higher Institute for Applied Science and Technology (HIAST)

Head of Institution: Prof. Dr. Ghassan Assi, Director.

Address: P.O. Box 31983, Damascus, Syria. **Phone:** (+963 11) 512-7345. **Fax:** (+963 11) 223-7710. **Email:** hiast@hiast.edu.sy. **URL:** www.hiast.edu.sy.

Scientific Fields of Interest: Engineering, Environmental Sciences, Mathematics, Physics.

Research and training: Research: Physics: material sciences; characterization of electron's components; renewable energy. Electronical and Mechanical systems: industrial automation; power electronics; CAD/CAM; robotics; mechanical design. Communication: signal processing. Computer Sciences: software development; information systems; communication networks. Training: B.Sc: computer science engineering; communication engineering; electronical and mechanical systems engineering. Specialized diplomas: material sciences and engineering.

Achievements: Physics: characterization of heating solar panels (national project); articles in theoretical physics: High-energy. Electronic and Mechanical systems: Modernization of productionlines in the industry; sprinkler pipes inspection systems; automation of station of sterilization; radiation mass lysimeter; automatic perforation and milling of electronic cards; programming of robot arm. Communications: taxi counter; road signaling system; automization of carpet-manufacturing machines; data transmission system for supervising oil pumping stations. Computer sciences: computerizing of many establishments such as banks, ministries, etc.

Facilities: Physics: furnace; UV-visible IR spectrometer; mechanical testing machine; dilatometer; differential temperature analysis X-ray diffractometer; laser granulometer; lasers; optical set; high precision multimeters; Electronical and Mechanical systems: AC and DC motors; control kits; electronic measurement tools; drives (AC-DC, AC-AC...); Communications: Spectrum analyzer; field analyzer; microwave kit; AM and FM kits; Computer science: Digital network analyzer; servers; computers; Environmental lab: SO_x, NO_x analyzer; dust stack sampler; fluoride stack analyzer; Library.

Future plans: Increasing the number of accepted students for engineering by at least 50%; creating and opening many M.Sc especially in material sciences and industrial automation; enhancing cooperation and projects with industrial sectors in Syria.

Cooperation with developing countries: Collaboration with Pakistan in the field of conductive polymers and in the creation of a center for the development of manufacturing technology.

International Organization: Participation in many project with the European Union in many programmes: MEDA, Eumedia, Tempus, FP6 covering different fields such as: Information Society technologies, education, material science, etc. Planning for bilateral cooperation with technological parks in Campagna (Italy). Projects with organizations like ESCWA, UNESCO, ALECSO, etc.

International Center for Agricultural Research in Dry Areas (ICARDA)

Head of Institution: Mahmoud Solh.

Address: P.O. Box 5466, Aleppo, Syria. **Phone:** (+963 21) 221-3433, 222-5012. **Fax:** (+963 21) 221-3490, 222-5105. **Email:** icarda@cgiar.org. **URL:** www.icarda.org.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences, Environmental Sciences.

Research and training: Research: Improvement of barley, faba bean and lentil; improvement of on-farm water-use efficiency, rangeland and small ruminant production; improvement of bread and durum wheats, chickpea and farming systems in Central and West Asia and North Africa (CWANA). Poverty alleviation through productivity improvement integrated with sustainable natural-resource management practices. Partnerships with national agricultural research and development systems.

Achievements: Improved varieties (with resistance to abiotic stress, such as drought, heat and cold; and to diseases and insect pests) and production technologies of barley, lentil, faba bean, wheat and chickpea. Collection and preservation of germplasm including landraces and wild relatives (gene-bank had over 131,000 collections by 2003). Water harvesting and supplemental irrigation technologies for increased food and feed production through improved on-farm water-use efficiency in the dry areas. Improved rangeland management and animal nutrition for increased livestock production.

Facilities: Biotechnology, entomology, pathology, small ruminant nutrition, Geographical Information Systems laboratories, water harvesting technology facilities, research field sites, gene-bank, computing and biometrics and library.

Cooperation with developing countries: ICARDA operates six outreach programs with resident regional coordinators throughout CWANA. ICARDA has agreements with the governments of most countries of CWANA for cooperative research. ICARDA works in partnership with national agricultural research systems (NARS) of CWANA in conducting agricultural research.

International Organization: ICARDA is one of 15 international agricultural research centers supported by the Consultative Group on International Agriculture (CGIAR). It collaborates with other CGIAR centers, as well as with universities and advanced institutions throughout the world.

**University of Damascus — Faculty of Agriculture —
Department of Soil Sciences**

Head of Institution: Prof. Al-Shater Said.

Address: PO Box 11378, Damascus, Syria. **Phone:** (+963 11) 513-2450, 513-2452, 513-2451, 513-3341. **Fax:** (+963 11) 511-6352. **Email:** agri-fac-dam@net.sy.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences, Chemistry.

Research and training: The effect of different organic matter on the mobility of university elements on the soil; the effect of micro-organisms in the solubility of phosphorus rocks; studies on erosion and soil conservation; the effect of amendments to soil at a physical and chemical property level; waste and treated waste-water in agriculture.

Achievements: Scientific papers published in international journals, conference proceedings, technical reports.

Facilities: A library, field research stations, laboratories (for analyzing soils, water and plants), rainfall simulator for studying soil erosion and soil crusting.

Future plans: The establishment of research units for reclamation of soils and erosion.

Cooperation with developing countries: Student and professor exchanges.

Tanzania

Southern and Eastern African Mineral Centre (SEAMIC)

Head of Institution: Dr. Diamantino Pedro Azevedo, DG.

Address: P.O. Box 9573, Kunduchi Beach Area, Dar es Salaam, Tanzania.

Phone: (+255 22) 265-0347, 265-0321. **Fax:** (+255 22) 265-0319, 265-0346.

Email: seamic@seamic.org. **URL:** www.seamic.org.

Scientific Fields of Interest: Chemistry, Earth Sciences, Environmental Sciences.

Research and training: Upgrading and beneficiation of ores and industrial minerals; R&D in evaluation of industrial minerals and product development, research on dimension stones; research on gemstone deposits and occurrences; research on small-scale mining; application of GIS for resources development and environmental protection; compilation of geographic information for easier access to the public; training in GIS applications, mineralogical and petrological, sample preparation techniques, gemmology, mineral processing techniques and applications, geochemical and environmental analysis, pottery and ceramic ware production.

Achievements: Regional database of mineral resources; ceramic crockery, fire clay crucibles prototype; use of kyanite in the production of crucibles for fire assaying; mineral processing reports including flowsheets; geochemical and mineralogical reports.

Facilities: XRF; XRD; AAS; scanner; furnace; kiln; geophysical equipment; computers and accessories; diamond cutter; UV-visible spectrometer; graphite furnace; hybrid generation system; microscopes; TG-DTA; particle size analyzer; ball mills; filter press; mould-making equipment; forming roll water machine; gamma ray spectrometer calibration facility.

Future plans: Purchase new equipment to upgrade the laboratories, especially for environmental analysis; transform the industrial minerals applications section into a Regional Training and Database Centre; establishment of a gem cutting and polishing unit; expansion of the information access to be one-stop information center of earth sciences for the region; development of appropriate technologies for recovery and utilization of minerals.

Cooperation with developing countries: Providing training for trainees from member countries and other African countries; providing consultancy and advisory services; involvement in regional initiatives and projects.

International Organization: Capacity-building/reinforcement of laboratories (EU); GIS Africa project (BRGM)

University of Dar es Salaam — Faculty of Architecture and Planning (FAP)

Head of Institution: Prof. Francos Halla.

Address: PO Box 35176, Dar es Salaam, Tanzania. **Phone:** (+255 22) 277-5448. **Fax:** (+255 22) 277-5391. **Email:** dfap@uclas.ac.tz. **URL:** www.uclas.ac.tz/fap.

Scientific Fields of Interest: Earth Sciences, Engineering, Environmental Sciences.

Research and training: Architecture; Building economics and quantity surveying; Urban and regional development planning and management.

Achievements: Architectural working drawings for buildings construction; Production of bills of quantities based on architectural working drawings for buildings construction; Town planning drawings or detailed planning schemes for urban development guidance and control; Strategic urban development planning frameworks for guiding city growth; Strategic regional development planning frameworks for guiding ecological, metropolitan and administrative regional growth; Strategic village and rural settlement resource utilization frameworks for guiding rural land development; Project design, planning, execution and management documentation for guiding investments; Research development, execution and dissemination for producing technological and knowledge breakthroughs.

Facilities: A satisfactory state-of-the-art library with digital supplies; A state-of-the-art architectural workshop; A state-of-the-art GIS & RS computer laboratory; 40 State of the art classrooms.

Future plans: As a faculty of UCLAS, which is a constituent college of University of Dar-es- Salaam since 1996, there is a plan to transform to three schools, namely School of Architecture and Design, School of Construction Economics and Management, and School of Urban and Regional Development Planning and Management within the context of an ongoing transformation drive from the status of a constituent college to a fully fledged university of environmental, human settlements and land management.

Cooperation with developing countries: The faculty is well linked to South African University of Cape Town, University of Botswana, University of Nairobi, University of Makerere, and University of Addis Ababa

International Organization: The Faculty enjoys international cooperation arrangements with the Swedish Sida -SAREC programme, Danish ENRECA programme, German University of Dortmund SPRING programme and Solar Energy programme, Norway University of Oslo Link, Swedish University of Stockholm link, Belgian VIREL programme, and United States University of South Hampton programme.

University of Dar-es-Salaam — Institute of Marine Sciences (IMS)

Head of Institution: Dr. Alfonse M. Dubi, Director.

Address: Mizingani Road, PO Box 668, Zanzibar, Tanzania. **Phone:** (+255 24) 223-2128, 223-0741. **Fax:** (+255 24) 223-3050. **Email:** dubi@ims.udsm.ac.tz, director@ims.udsm.ac.tz. **URL:** www.ims.udsm.ac.tz.

Scientific Fields of Interest: Biological Sciences, Chemistry, Earth Sciences, Engineering, Environmental Sciences, Physics.

Research and training: Physical and applied marine sciences (geological and physical oceanography, marine technology); chemical and environmental marine sciences (chemical oceanography, pollution, marine natural products); living resources and ecology (fisheries, ecology, coral reefs, mangroves).

Achievements: Research publications in journals and conference proceedings; seaweed farming techniques; seaweed farming book; coastal erosion study guidelines; advisory services on coastal erosion protection; environmental friendly mariculture systems.

Facilities: Full Internet Connectivity; Over 25 personal computers; Library with online subscription; Field equipment (including boats, current meters, multiparameter Water-quality logger, PAM, grab samplers, piston corer, echosounders, GPS, surveying set, nets, aquarium, diving sets, underwater cameras, etc); Laboratory facilities (including sieving outfit, natural products laboratory, AAS, CHN analyzer, spectrophotometer, Liquid Scintillation Counter, freeze dryer, furnaces, incubators, microscopes, GIS, etc).

Future plans: Physical expansion of office and laboratories - construction for relocation underway; Provision of lecture rooms; Recruitment of additional staff to a compliment of 32; Introduction of specialized Post-graduate-programmes.

Cooperation with developing countries: MoU with Eduardo Mondlane University, Mozambique; To become East African Regional Institute of Marine Sciences for training, research and development.

International Organization: SIDA/SAREC, EU, WHO, WIOMSA, GEF /WB, USAID, IOC-UNESCO, WWF, CIDA.

Thailand

Asian Disaster Preparedness Center (ADPC)

Head of Institution: Suvit Yodmani.

Address: P.O. Box 4, Klong Luang Pathumthani 12120, Thailand. **Phone:** (+66 2) 516-5900. **Fax:** (+66 2) 524-5350. **Email:** adpc@adpc.net. **URL:** www.adpc.net.

Scientific Fields of Interest: Earth Sciences, Environmental Sciences, Social Sciences.

Research and training: Disaster management through disaster reduction in development, capacity-building, creation of partnerships and exchange of experiences, proactive and responsive regional resource, and quality service through a team approach, including public awareness raising, and training and education.

Achievements: Technical services - matching specialist expertise with the needs of disaster and development oriented organizations in the region. Regional programs- Asian Urban Disaster Mitigation Program (AUDMP), Program for Enhancement of Emergency Response (Peer) Partnership for Disaster Reduction - South East Asia (PDR-SEA).

Facilities: Good collection of publications on disasters and disaster management, electronically accessible.

Future plans: Proactively promoting safer communities through disaster reduction and mitigation.

Cooperation with developing countries: Close cooperation with national disaster management organizations all across Asia and the Pacific.

International Organization: Close collaboration with UNESCAP.

Asian Institute of Technology (AIT)

Head of Institution: Prof. Said Irandoust, President.

Address: P.O. Box 4, Klong Luang, Pathumthani 12120, Thailand. **Phone:** (+66 2) 524-6001. **Fax:** (+66 2) 524-6005. **Email:** president@ait.ac.th. **URL:** www.ait.ac.th.

Scientific Fields of Interest: Earth Sciences, Environmental Sciences.

Research and training: AIT is a graduate school with students from 35 or more countries working towards their Masters and Doctoral degrees. At present the institute has about 2000 students on campus. The Institute for academic study is divided into three schools - the School of Engineering and Technology (SET), the School of Environment, Resources and Development (SERD) and the School of Management (SOM). A majority of the graduating students carry out a research project as part of their study. Besides this the institute is also involved in a large number of sponsored research projects with support from

development agencies, industries, government projects, etc. At the moment AIT is handling more than 200 such projects. As far as training is concerned AIT has a separate unit called AIT Extension which carries out training programs in all areas, including engineering and technology, management and development. The courses are of various duration and could be from a few days to months depending on the needs of the sponsoring agency. Training programs and meetings are organized at all levels beginning from Ministerial consultations, training for trainers, scientific workshops, developmental brainstorming, teachers training, etc. A wide variety of training programs cater to increasing demands on such activity in this region and beyond.

Achievements: The scientific outputs from the various fields of study make up a huge volume of work in various sectors of development, technology and management. The outcome of the research is available in the final research project report of the clients involved and the agencies supporting the activity. They are also available in the thesis submitted by students to meet the requirements of the degree. The faculty, scientific staff and students also present their work in international journals and conferences. Some of the major research projects that are ongoing at the moment are in the areas of climate change, wet-lands alliance, urban environment management in SE Asia, 3R environmental management, persistent organic chemicals, etc. Some centers of research that are set up in the institute include Thailand Accident Research Center, etc. AIT aims to maintain a societal perspective to science by producing knowledge for practical application with relevance and appropriate economic impacts.

Facilities: Each of the 20 fields of study have their own laboratories for work. Some of our laboratories have obtained up to date equipment required for their work from project funds. Project support is required for developing the facilities further. The whole institute has good Internet facilities that provide services to all sectors of industry. Some of the fields of study like the agricultural engineering and aquatic systems group have their own experimental farms and ponds for carrying out their experiments. On the whole the institute has equipments which meet the needs of the technological research work being done and are also able to provide testing facilities to a number of clients.

Future plans: The Institute has realized the need for interdisciplinary research and the availability of critical mass of researchers working in an area of work. With this background the institute is working towards the creation of a number of thematic groups which will cut across traditional academic barriers and bring together researchers into knowledge groups which will act as a hub in the region.

Cooperation with developing countries: AIT plays a major role in the development of its immediate region, and in promoting the region internationally. Cooperation is essential to the very concept of AIT. Current AIT partners are Government Agencies, International Organizations, Academic Partners, Private-sector, Alumni and Other Organizations & Networks. Fellowship programs to meet the Human-resources development and institutional capacity-building of government agencies are currently being

discussed with many governments of Asia's developing countries (e.g., Bangladesh, Pakistan, Nepal, Sri Lanka, Bhutan, India, Maldives, Indonesia, and the Philippines). The Institute has also embarked on collaborative partnerships with governments which had provided support for AIT students in the past. For detail information, please visit the following link: http://intraweb.ait.ac.th/interimpage/ait_visitor/partners/index.asp

International Organization: AIT also continues to maintain and launch new initiatives aimed at bringing international funding organizations, foundations and the corporate sector into partnership with AIT for Asia's HRD, R&D and institutional capacity-building initiatives. Notable among these programs are: Asian Development Bank through the ADB-Japan Scholarships Program (ADB-JSP); Japanese Government, through the Joint Japan/World Bank Graduate Scholarship Program (JJ/WBGSP); International Fellowships Program (IFP); United Nations Environment Programme (UNEP).

Chulabhorn Research Institute

Head of Institution: Princess Chulabhorn D. Mahidol.

Address: Vipavadee Rangsit Highway Lak-si, Donmuang Bangkok 10210, Thailand. **Phone:** (+66 2) 574-0622-33, xt. 3923. **Fax:** (+66 2) 574-0616, 575-1497. **URL:** http://www.cri.or.th/cri/activities/act_ins.htm.

Scientific Fields of Interest: Biological Sciences, Chemistry.

Research and training: Natural products, medicinal chemistry and organic-synthesis; environmental toxicology; biomedical research and biotechnology; natural products against cancer and malaria. Collaborative research programmes. Training courses, seminars, workshops and conferences; international programme on environmental and industrial toxicology; regional programme for human resource development in environmental toxicology for Southeast Asian countries.

Achievements: 1) Patent - 2,8-bis (trifluoromethyl) quinoline compounds, synthesis and use for malaria prophylaxis and treatment. Diagnostic kit for melioidosis detection. 2) Petty patent - synthesis of lamellarins and their intermediates. 3) Petty patent (pending): preparation of standardized extracts of *Andrographis paniculata*.; analysis and preparation of polyphenols extracts of *Euphoria longana*. 4) over 140 publications 1999-2004.5) DNA sequences deposited in GenBank.6) Database of normal plasma Amino-acids levels in Thai children (2 months to 12 years).

Facilities: NMR spectrometer; mass spectrometer and hyphenated mass spectrometer equipments; Perkin Elmer system; electron-spin resonance (ESR) spectrometer; high-performance liquid-chromatography (HPLC); DNA sequencer; FPLC; ultracentrifuge; cryogenesis systems; fluorescence microscope; flow cytometer; deep freezers; gel document system; real-time PCR; in-vitro gene expression; inhalation toxicology equipment; microarray system; library; computers and databases.

Future plans: Collaboration with leading scientific institutes and international organizations. Organization of conferences/educational programs to provide a forum for the exchange of the latest information and the most recent advances in research within the international scientific community.

Cooperation with developing countries: Training courses for developing countries on health, environmental toxicology, and related issues, including Environmental and health risk-assessment and management of toxic chemicals in Vietnam.

International Organization: ASEAN Foundation; UNDP regional projects (Environment, Technology, Sustainable Development).

Chulalongkorn University — Environmental Research Institute

Head of Institution: Thavivongse Sriburi.

Address: Phayathai Road, Bangkok 10330, Thailand. **Phone:** (+66 2) 218-8114-7. **Fax:** (+662) 218-8124. **Email:** sthavivo@chula.ac.th. **URL:** www.eric.chula.ac.th.

Scientific Fields of Interest: Environmental Sciences.

Research and training: Research focused on environmental issues (risk and environmental impact assessment; water, air, and noise pollution; hazardous wastes management); policy and management; and global climate change, natural resources.

Facilities: Laboratories equipped with basic and sophisticated equipment for hazardous wastes such as atomic-absorption, spectrophotometer, high-performance liquid-chromatography, total organic carbon analyzer, carbon monoxide analyzer, sulphur dioxide analyzer, gas chromatography.

Future plans: Proposed Post-graduate-programmes on Resources and Environmental Administration in 2006.

International Organization: New Jersey Institute of Technology (Global IUCRC Network); Université Louis Pasteur de Strasbourg, France; five local member universities; academic exchanges and technology transfers. In addition, International Cooperation with United Nations University and ASEAN Countries on Sustainable Education - Higher-education.

Ministry of Public Health — Department of Medical Sciences — National Institute of Health (NIH)

Head of Institution: Dr. Somchai Sangkitporn, Director.

Address: 88/7 Soi Bamrasnaradura Hosp., Tivanond Road, Amphur Muang, Nonthaburi 11000, Thailand. **Phone:** (+66 2) 591-1912. **Fax:** (+66 2) 591-5449.

Email: somchai@dmisc.go.th. **URL:** www.dmisc.moph.go.th.

Scientific Fields of Interest: Biological Sciences, Chemistry, Environmental Sciences.

Research and training: Infectious and non-infectious disease studies; public-health problems such as HIV/AIDS, Polio, Measles, Influenza, Toxicology, Food-borne diseases, thalassaemia and congenital hypothyroidism.

Achievements: Publications, Diagnostic test kits, Biological products such as vaccines. As national reference laboratories, we have assisted local and international institutions for training their staff to improve their scientific skills with good quality assurance.

Facilities: Scanning and transmission-electron microscope; high-performance liquid-chromatography; gas chromatography; infrared spectrophotometer; atomic-absorption spectrophotometer; P3 labs; radioisotope lab; animal center; peptide and nucleotide synthesizers; nucleotide sequencers; FACS analyzer; elispot reader; microarray.

Future plans: Besides continuing to generate High-quality research, the NIH will be a regional center for lab-based information and other related information by initiating interconnected network.

Cooperation with developing countries: Model development on the regional external QA program for HIV/AIDS testing. Laboratory-based surveillance for major communicable diseases in the region.

International Organization: WHO, IAEA, IEIP, JICA, US CDC, Osaka university, Chiba University, Research Institute of Tuberculosis, National Serology Reference Laboratory, Australia, National Institute of Infectious Disease, Kobe University, Hokkaido University.

Naresuan University — School of Renewable Energy Technology (SERT)

Head of Institution: Prof. Dr. Wattanapong Rakwichian, Director.

Address: Phitsanulok-Nakornsawan Road, Amphoe Mung, Phitsanulok 65000, Thailand. **Phone:** (+66 55) 261-067, 261-208. **Fax:** (+66 55) 261-208. **Email:** sert@nu.ac.th. **URL:** www.sert.nu.ac.th.

Scientific Fields of Interest: Engineering, Environmental Sciences.

Research and training: Solar electricity; high-temperature solar thermal; low-temperature solar thermal; bio-mass technology; hydrogen energy; pico-hydro electricity.

Achievements: A designed of plant paper solar dryer project, drying mulberry leaves product with thermal energy from gasifier system; solar dryer combined with biogas; a study of mini-grid concept for villages without electricity in Thailand; 7.2kW PV battery charging station for electricity bus Naresuan Massa transit; electrolyzer development for hydrogen car.

Facilities: PV testing system; 10kWp PV power station; PV battery charging station; 3kW PV grid connected system; PV lighting system; PV fountain system; PV system for communication; solar home system; solar cooling system; solar power absorption refrigerator; meteorological station.

Future plans: To strengthen research; disseminate renewable energy technology use; conduct short courses training; create linkage for World Renewable Energy Network.

Cooperation with developing countries: Technical assistance & support services for Council on Renewable Energy in the Mekong Region (CORE): Cambodia, China, Laos, Thailand and Vietnam. SERT is a secretariat office of CORE. MoU on academic programs, R&D and staff exchange through International Institute for Renewable Energy (IIRE).

International Organization: Bilateral and multilateral cooperation with Germany: DLR, InWEnt, GTZ, ISET, Kassel University. Japan: NEDO, ERECON, Tokyo University of Agriculture (TUAT), AIT. France: Lyon University.

Trinidad & Tobago

Caribbean Epidemiology Centre (CAREC)

Head of Institution: Dr. Carl James Hospedales, Director.

Address: 16-18 Jamaica Blvd, Federation Park, Port-of-Spain, Trinidad & Tobago. **Phone:** (+868) 622-3168. **Fax:** (+868) 622-2792. **Email:** postmaster@carec.paho.org. **URL:** www.parec.org.

Scientific Fields of Interest: Biological Sciences, medical Sciences.

Research and training: Epidemiology; laboratory diagnostic services; sexually transmitted infections; strengthening of medical laboratory services in the Caribbean; expanded programme on immunization; food water and vector borne disease prevention programmes; public-health intelligence research and development; HIV/AIDS; non-communicable diseases; cervical cancer.

Achievements: Research papers; annual report; manuals; surveillance reports.

Facilities: Laboratories; computers; library facilities; lecture theater; training laboratory; multimedia equipment.

Future plans: Construction of a molecular-biology laboratory (interim); construction of an overall new facility.

Cooperation with developing countries: 21 member states plus special services to Haiti and Dominican Republic Anguilla, Aruba, Barbados, Bermuda, Cayman Islands, Grenada, Jamaica, Bahamas, Belize, British Virgin Islands, Dominica, Guyana, Montserrat, St. Kitts Nevis, St. Vincent and the Grenadines, Trinidad and Tobago, Netherlands Antilles, Suriname, St. Lucia, Antigua and Barbuda, Turks and Caicos Islands, Antigua.

International Organization: EU, USAID, CDC, University of Maryland/Fogarty International, British Dept. for International Development, Canadian International Development Agency, GTZ, FTC, NSL, The World Bank, IDB, CDB.

Caribbean Industrial Research Institute (CARIRI)

Head of Institution: Mr. Liaquat Ali Shah, CEO.

Address: c/o Tunapuna Post Office, Tunapuna, Trinidad, West Indies. **Phone:** (+868) 662-7161. **Fax:** (+868) 662-7177. **Email:** mail@cariri.com. **URL:** www.cariri.com.

Scientific Fields of Interest: Chemistry, Environmental Sciences.

Research and training: Occupational health and safety; food microbiology; good manufacturing practices/plant sanitation; HACCP; water/soil sampling techniques; customer relations; financial and marketing management; quality systems.

Achievements: Analytical chemistry; microbiological analyses (food and environment); petroleum testing; calibration and maintenance

(equipment/instruments); food technology/biotechnology; document management systems; industrial materials analyses; environmental management; biodegradability; toxicology; equipment design and fabrication; quality management system implementation.

Facilities: Technical information services department. CARIRI has 2 locations: one at the University of the West Indies and the other at Macoya Industrial Estate, Macoya, and Trinidad.

Future plans: Increase revenue generation by focusing on human resource training and development; improve market thrust; improve customer relations; develop closer relations with clients; use of XRF/SEM equipment for food and metal analysis in oils; develop residual pesticide testing capability.

International Organization: ISO 2001: Quality Management System - United Kingdom Accreditation Service (UKAS) ISO 17025 for testing laboratories.

University of the West Indies (UWI) — Caribbean Agricultural Research and Development Institute (CARDI)

Head of Institution: Wendel Parham.

Address: University Campus, St. Augustine, Trinidad & Tobago. **Phone:** (+1 868) 645-1205/1206, 645-8121. **Fax:** (+1 868) 645-1208. **Email:** infocentre@cardi.org. **URL:** <http://www.cardi.org/>.

Scientific Fields of Interest: Agricultural Sciences.

Research and training: Organic production systems; small ruminant production and marketing systems; hot pepper production; sweet potato production and marketing systems; tree crop production systems; natural-resource management.

Achievements: Whole life cycle feeding systems for small ruminants; manuals for the production of hot peppers and organic agriculture; marketing systems data base; fact sheets, manuals, technical bulletins for a range of food crops.

Facilities: CARDI Information Centre; 10 field stations; 1 tissue-culture laboratory; 2 tractors and associated equipment; computers and communications equipment.

Future plans: Rationalization of scattered resources; decentralization of authority; greater focus on R & D initiatives; concentration of priority commodities.

Cooperation with developing countries: Mexico, Chile, Costa Rica, Brazil, Columbia, Ethiopia & CARICOM countries.

International Organization: European Union; USA-USAID; Canada-CIDA; CGIAR Consultative group on International Agricultural Research.

Tunisia

Centre de Biotechnologie de Sfax (CBS)

Head of Institution: Prof. Hamadi El Ayadi, Director.

Address: B.P. K 3038 Sfax, Tunisia. **Phone:** (+216 74) 440-816. **Fax:** (+216 74) 440-818. **Email:** directeur.general@cbs.rnrt.tn. **URL:** www.cbs.rnrt.tn.

Scientific Fields of Interest: Biological Sciences, Environmental Sciences, Medical Sciences.

Research and training: Screening and identification of bacterial strains producing amylolytic enzymes (amylases, pullulanases, amyloglucosidases, glucose isomerases); purification and biochemical properties study of these enzymes; cloning and expression of the corresponding genes; structure function relationship of enzymes using site directed mutagenesis and molecular modelization; screening and identification of interesting strains especially actinomycetes; purification and determination of the structure of active molecules; cloning and gene analysis of the biosynthesis pathways of interest active molecules; heterologous and homologous expression of corresponding genes; production purification and biochemical study of fungal hydrolases (cellulases, pectinases, xylanases) and of anti-fungal compounds; molecular studies of the genes and construction of chimeric DNA; heterologous expression of proteins of medical interest in yeast (human proteins P53 suppression of tumor, hepatitis vaccine, EBV virus protein, enzymes); molecular and immuno-histochemical studies of human proteins responsible of cancer and other genetic diseases; identification of new partners and of new therapeutical targets for proteins of medical interest; application of recombinant enzymes and proteins in some industrial and medical sectors; microbial biopesticides and particularly of *Bacillus thuringiensis* and *Photobacterium luminescens* (Bioinsecticides, biofungicides, bacteriocines); microbial strains producing active molecules on the pathogens of agriculture, environment and health: isolation and identification of microorganisms of interest, cloning and study of the expression of genes, study of the production, purification; heterologous expression; interaction toxin-receptor; production of biopesticides by fermentation; treatment of recalcitrant waste-waters and sludges; treatment of urban and industrial waste-waters for reuse; production of high-added value products (anti-oxylant by extraction and bioconversion) anaerobic microbiology, isolation characterization of strict-anaerobic bacteria and applications; laboratory specialized in the conception and development of industrial processes for the treatment and valorization of liquid and solid wastes (an electo-methanisation process is developed for the treatment of olive mill waste-water at industrial scale; search of genes involved in salt and drought tolerance in wheat and *Aeluropus litoralis*; genetic transformation of wheat; gene annotation, in silico study of the structure-function relationship of stress proteins; technological development of project, collaborating with the research laboratories and units (depollution, enzymes production, biopesticides

production...); transfer of biotechnology to socio-economical tissue by developing specific projects with industry; services to support research activities of the labs and units: fermentation, extraction and purification, stabilization, large-scale production for assays, etc.

Achievements: Abiotic stress: research on different varieties of wheat that are more tolerant to salinity and dryness; cloning and characterization of wheat vacuolar cation/proton antiporter and pyrophosphatase proton pump; in silico discovery of new genes involved in plant stress tolerance; database of intronless genes in human (annotated and curated database); glucose isomerase of the streptomycetes sp. SK strain: purification, sequence analysis and implication of alanine 103 residue in the enzyme thermostability and acidotolerance; purification and structure elucidation of antifungal and antibacterial activities of newly isolated streptomycetes sp. Strain US80; collection of *Bacillus thuringiensis* and other bacterial strains producing several biopesticides and particularly bioinsecticides; production of bioinsecticides of *Bacillus thuringiensis*; production of bioinsecticides *Bacillus thuringiensis* by fermentation; production of anti-fungal chitinase from *Bacillus thuringiensis*; production of fungicides from several bacterial strains isolated from plants and active on plants pathogenic fungi; gene transfer and heterologous expression in *Bacillus thuringiensis*, *E. coli*, phototrophic luminescence bacterial strains improvement through mutagenesis and by genetic engineering.

Facilities: All main equipment for molecular-biology; computer; library; stain collection; fermentation facilities (2, 7, 20 and 30 Litre); down-stream facilities of pilot-plant scale; tissue-culture facilities.

Future plans: new facilities (3500 square meters).

Cooperation with developing countries: India and some Arab countries.

International Organization: The CBS is an affiliated centre of ICGEB.

Centre de Biotechnologie de Borj Cédria (CBBC)

Head of Institution: Prof. Abdelawahid Ghorbel, DG.

Address: BP 901, 2050 Hammam-Lif, Tunisia. **Phone:** (+216 71) 430-855.

Fax: (+261 71) 430-934, 430-330. **Email:** a.ghorbel@cbbc.rnrt.tn.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences, Engineering, Environmental Sciences.

Research and training: Molecular physiology of grapevine; characterization and quality of olive oil; plant-microorganisms interactions; adaptation of plants to abiotic stresses; aromatic and medicinal plants; establishment of biotechnological tools to produce improved plants tolerant to drought and salinity; identification of bioactive substances from Tunisian phyto-genetic resources.

Achievements: Identification of bioactive substances from Tunisian plants (olives, grapevine, cactus, halophytes, etc.); identification of genes associated to the tolerance of grapevine to drought and salinity; production of transgenic grapevine; molecular evaluation of genetic diversity of Tunisian olives,

grapevines, rhizobia, etc.; understanding of the physiological mechanisms of tolerance to salinity in plants.

Facilities: Laboratories; protein technology, DNA technology; in-vitro culture technology; mineral nutrition technology; lipids technology; aroma technology; greenhouses (controlled and non-controlled); experimental parcels; informatics and Internet facilities.

Future plans: Genomics and proteomics related to the tolerance of plants to drought and salinity; bioactive substances (identification and use); new buildings of the center; purchase of heavy equipment.

Cooperation with developing countries: Maghreb region.

International Organization: EU, Japan as close partner of Techno Park of Borj Cédria, USA.

Centre de Recherches et Technologies de l'Eau

Head of Institution: Prof. Mourad Bedir, DG.

Address: Borj Cedra Technopark, BP 273, Soliman 8020, Tunisia. **Phone:** (+216 71) 473-122. **Fax:** (+216 71) 430-934. **Email:** mourad.bedir@certe.rnrt.tn. **URL:** www.ecopark.rnrt.tn.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences, Chemistry, Earth Sciences, Engineering, Environmental Sciences.

Research and training: Waste-water treatment and reuse for agriculture and industry; Geomaterial exploration; Hydrocarbon exploration; Water Membrane Technologies; Water microbiotic and UV Treatment; Deep water table explorations; Geothermics and Geophysics of deep water; Geostatistics; Geochemical and physical water analyzes.

Facilities: x ray diffractogram; atomic-absorption; electronic microscope; ATD/ATG; Water Distillators; HPLC; Computers; Printers; scanners.

Future plans: National and international R&D projects.

International Organization: EU; Japan; USA.

Centre International des Technologies de l'Environnement (CITET)

Head of Institution: Mr. Belgacem Hanchi.

Address: Boulevard du Leader Yasser Arafat 1080 Chargia (Tunis), Tunisia. **Phone:** (+216 71) 206-482, 206-632. **Fax:** (+216 71) 206-665, 206-642. **Email:** dg@citet.nat.tn. **URL:** www.citet.nat.tn.

Scientific Fields of Interest: Environmental Sciences.

Research and training: List of main training activities: Maintenance and calibration of laboratory equipment; Industrial water treatment; Environmental norms and regulation; Water and oil analyses by Titro- processor; Setting up of SME according to the ISO 14001 referential; Economic impact on environment;

Establishment and management of an information desk; Management of project monitoring; SME internal audit / Environmental verification; Environmental communication and sensitization; Environmental Management System. Master Degree Training: Within the centre interventions widening domains framework particularly in training and capacity-building in environmental technology, CITET created an environmental technology Master 2005/06.

Achievements: Wastewater Treatment Technology: Rural Sewerage; New catalytic technologies of wastewater treatment in the Mediterranean agro-alimentary industries: CAT-MED; Water, Energy and raw material economy in agro-alimentary industries (Milk, Meat, Fish Sector); cultural Water Economy; Wastewater treatment in dyeing enterprises (textile); Federated research program 'Water'; Combating mosquitoes. Valorization of Organic Wastes by Composting: posting organic wastes; Energetic Organic Wastes Valorization of Tunis whole market. Arid Zones Management: Regional initiative for arid zones management: RIDM; Air Pollution. Technologies transfer: Eco- Forum. Household and Lixivate Wastes Treatment Technology: Research on Biological and on evolution Impact of Public Controlled discharges; Lixivate Treatment. Recycling of Hazardous Wastes: Hospital Wastes Treatment; Used batteries, Piles and Accumulators Treatment; Used Soil Recycling; Used Tires Treatment; Electrical and Electronic Wastes Recycling.

Facilities: The Documentation and Information Centre (CDI) of CITET; Environmental Documentary Portal; and, Laboratory Information Management System (LIMS).

Future plans: The CITET aims to pursues the unfolding of its activities to concretize the government politics concerning the protection of the environment and environmental up grading to ensure the strengthening of competitiveness of the Tunisian enterprises facing the challenges of world wide and the realization of the free exchange with the European union. In 2006, the CITET intends to reinforce its offered services in the national and international scale and in all environmental aspects which must help the enterprises to respect the environmental and regulatory norms, the environmental management and the use of processes of clean technologies. The Center intends also to reinforce its relations of international cooperation activities aiming to search new partners and developing new projects.

Cooperation with developing countries: Building human and institutional capacities, whether in Tunisia or in countries of the region, in the field of environmental protection; Providing technical assistance to industrial enterprises to help them improve their environmental performance standards.

International Organization: UNEP, UNIDO, AFD, FFEM, ANME, UN, EC, JICA, BM, BADEA, BAD, KFW, CWBI, BEI, Inwent, GTZ, SBA

Ecole Nationale d'Ingénieurs de Tunis (ENIT)

Head of Institution: Prof. Bahri Rezig.

Address: B.P. 37 Belvedere 1002, Tunis, Tunisia. **Phone:** (+216 71) 872-880.

Fax: (+216 71) 872-729. **Email:** bahri.rezig@enit.rnu.tn, direction@enit.rnu.tn.

URL: www.enit.rnu.tn.

Scientific Fields of Interest: Engineering, Environmental Sciences, Mathematics, Physics.

Research and training: Applied mathematics; materials science & technology; electrical engineering; civil engineering; informatics & telecommunication; mechanical-engineering; industrial engineering; hydraulics; renewable energies.

Achievements: Publications in national and international journals; presentations in national and international meetings.

Facilities: Computer center for students' basic needs; computers and workstations (9) within research labs; civil engineering advanced control machines; GPS station and related instrumentation for Geomatics; mechanical advanced traction and fatigue dynamic control machine; semiconductors materials characterization equipment: scanning electron microscope, high-temperature video microscope, spectrophotometer UV-VIS-NIR, impedance analyzer; thin film production systems (sputtering dc rf), vacuum system, spray pyrolysis system, set of programmable furnaces; vectorial analyzer for HF measurements; bioclimatic experimental building; photovoltaic 1 kWc field station; solar pond of 100 sqm.; industrial integrated production center (flexible workshop with 4 industrial robots coupled with mechanical production unit).

Future plans: Upgrade the information system of the institution: library, administration, evaluation, individualized curricula (Bologna process) in order to build a computer-aided governance tool; enhance research training capabilities in order to answer to the increasing applications coming from the South; build an e-learning center and capability by widening the present experience supported by our continuous education programmes dedicated to professionals.

Cooperation with developing countries: Some cooperation agreements are signed between University of Tunis el Manar and universities from countries from the South. Many students are registered at ENIT coming from Morocco, Algeria, Mauritania, and Madagascar. Some of them have scholarships from regional organization like AUF.

International Organization: Europe: TEMPUS MEDA joint projects, bilateral cooperation Programmes: France (CMCU): Belgium; Spain; Portugal; Greece and Germany.

Ecole Nationale d'Ingénieurs de Tunis (ENIT) — Laboratoire de Modélisation en Hydraulique et Environnement (LMHE)

Head of Institution: Zoubeida Bargaoui.

Address: B.P. 37, Le Belvedere, 1060 Tunis, Tunisia. **Phone:** (+216 71) 860-396. **Fax:** (+216 71) 872-729, 860-396. **Email:** lb.hydenv@enit.mu.tn.

Scientific Fields of Interest: Environmental Sciences.

Research and training: Quantitative and statistical hydrology; Hydrogeochemistry and porous media transfer; River hydraulics and associated risks; Continental and coastal hydrosystems; Mono and multiphase transfer in fluid systems; Water treatment process; Turbomachineries and hydraulic systems.

Achievements: Several publications, among which: JOUINI Z., BEN CHARRADA R. et MOUSSA M., 2005 Caractéristiques du Lac Sud de Tunis après sa restauration. Accepté pour publication dans la revue Marine Life, France.- HAMZAOUI F., GUEDDARI M., BOUHLILA R., RIBEIRO L., KETATA M., 2005 Géochimie des éléments majeurs et du fluor dans les eaux de la nappe de Zeuss-koutine (Sud-Est de la Tunisie) Le 2ème Congress Méditerranéen : Ressources en eau dans le bassin Méditerranéen:WATMED 2, organisé Marrakech (Maroc)14-17 novembre 2005. GUIZANI M., Jose G.VASCONCELOS, Steven J.WRIGHT et MAALEL K., 2005 Investigation of Rapid Filling in Empty Pipes. Annual International Conference Storm water and Urban Water Systems Modeling, Toronto, Canada, February 24-25, 2005. - JENDOUBI A., BOUHLILA R., ZAMMOURI M., et GUELLOUZ L., 2005 Hydrogeology and nitrates contamination of the Mater aquifer, North Tunisia. Workshop on groundwater management in arid and semi-arid countries (WMO). Cairo, Egypt, 4-7 April 2005. - BARGAOUI Z., CHEBCHOUB A., 2004 Investigations du caricature multifractal des débits maximaux annuels de crue, Hydrological Sciences Journal, 49(4) août 2004. - BELLAKHAL G., CHAHED J., MASBERNAT L., (2004)Analysis of the turbulence statistics and anisotropy in homogeneous shear bubbly flow using a turbulent viscosity model. Journal of Turbulence (5) 2004 (036); - KINGUMBI A.,BESBES M., BOURGES J., GARETTA P., 2004 Evaluation des transferts entre barrage et aquifers par la méthode de bilan d'une retenue en zone semi-airde. Cas d'El Haouareb en Tunisie centrale. Revue des Sciences de l'Eau 17/2/213-225;Shayeb H. (2000). Modélisation et simulation d'un procédé de désinfection d'eau usée épurée au stade secondaire en vue de sa réutilisation', 1st International Conférence on Water treatment and Reuse. Adapted to the Mediterranean Area (WATRAMA), Tunis, 25-28 Octobre; Zgolli R., Azouz H., (2003). Numérical approach to the prediction of cavitation in Pumps . Fifth International Symposium on cavitation (CAV2003) Osaka, Japan, November 1-4,2003

Facilities: Hydraulic Laboratory; Field Water-quality measurement; Laboratory Water-quality measurement; Personal computers; Library.

Future plans: We are planning to create a field school in order to monitor the hydrological cycle at a watershed scale; We are planning to develop water treatment capacities in laboratory experiments.

Cooperation with developing countries: We have signed agreement with the laboratory CIMPA of Cotonou university.

International Organization: We obtained 6 international projects since 2003. Donors are: AUF, Tunisian and French scientific-cooperation, Tunisian and Portuguese scientific-cooperation, Tunisian and Spanish scientific-cooperation, arrangement with: Le Centre d'Hydrogéologie de l'Université de Neuchâtel Switzerland.

Institut des Régions Arides (IRA)

Head of Institution: Houcine Khatteli.

Address: Secrétariat d'Etat à la Recherche, Scientifique et à la Technologie, Km. 22, Route de Djorf, 4119 Medenine, Tunisia. **Phone:** (+216 75) 633-005. **Fax:** (+216 75) 633-006. **Email:** houcine.khatteli@ira.rnrt.tn, ira.med@ira.rnrt.tn. **URL:** www.ira.rnrt.tn.

Scientific Fields of Interest: Agricultural Sciences, Environmental Sciences.

Research and training: Wind erosion; water and soil conservation; desert and arid zones; arid rangelands management; stock farming and wild life; arid and oasis farming; socio-economic studies; water-resources in dry areas.

Achievements: Development of a simple technique, cheap and easy to implement, to block sand dunes by the olive trees planted in the sand (technique of 'mulching'); Determination of the optimal number of palm leaves for inert wind-breaking (frangi-vento). This result led to the decrease from 2 to 3 times in the actual cost of the activities of blockage of sand dunes (20 leaves instead of from 40 to 60); Design of a new technique ('gravitational draining buoy') allowing the storage of rainfall water from small-scale hydraulics works in the deep layers of the ground. This technique enables to avoid up to 100% of evaporation of rainfall water-resources; Identification of 4 'psammophit' types drought-resistant that can be planted in the sand dune environment for the stabilization of mobile dunes: *Calligonum comsum*, *Calligonum azel*; *Retama raetam*; *Aristida pungens*; Development of a method consisting in the application of solarization combined with geothermic water during the summer season. This method has resulted in the elimination of up to 90% of the population of 'nematodes' in the sun; Development of an optimal calendar of irrigation of the plant (called 'grenadier') that allows to reduce the death rate to 6 % instead of 15% through the use of a regular rhythm of irrigation (1 time every 15 days); The early separation of young camels has permitted the return of the reproductive call of males and their reproduction, which has decreased the interval between 2 successive births from 24 to 14 months. A record of 5 births in a row has been recorded in the herd of I.R.A.; Development of a specific technique for the production of cheese using camel milk.

Facilities: Publication of scientific and technical reports on arid zones; Well-equipped laboratories; classrooms; conference rooms; library (5000 specialized books) computer room with Internet connection (Intranet 45 PC); catering facilities.

Cooperation with developing countries: Collaboration with similar Institutes, Universities, International Organizations and NGOs - FAO, UNDP, UNEP, SIDA, UNSO, ICARDA, UNESCO, OSS, CCD, World Bank, and others.

International Organization: The Institute cooperates with Food and Agriculture Organization (FAO), UN Educational, Scientific and Cultural Organization (UNESCO), UNSO, Arab League Educational, Cultural and Scientific Organization (ALECSO), Islamic Educational, Scientific and Cultural Organization (ISESCO), Arab Centre for the Studies of Arid Zones and Dry Lands (ACSAD), International Centre for Agricultural Research in the Dry Areas (ICARDA), TWAS - the academy of sciences for the developing world, ICRA, RUG (Belgium), ASDI, and laboratories in Germany.

Institut National de la Recherche Agronomique de Tunisie (INRAT)

Head of Institution: Dr. M. Chermiti Amor, DG.

Address: Rue Hédi Karray, 2049 Ariana, Tunisia. **Phone:** (+216 71) 755-985. **Fax:** (+216 71) 752-897, 716-537. **Email:** chermiti.amor@iresa.agrinet.tn.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences, Earth Sciences, Environmental Sciences.

Research and training: Improving techniques for animal and crop production; studying genetic resources; creating crop varieties and improving animal breeds; conducting agro and socio-economic research in relation with rural environment; contributing to technology transfer; participating to graduate and Post-graduate education as well as training.

Achievements: Registration of new cereal cultivars (durum and bread wheat) and food legumes cultivars. Creation of new hybrids for vegetable crops mainly peppers cucurbits and potato. Selection in fruit trees concerns essentially almond, peach, apricot, apple and citrus. Animal and forage results focus essentially on improvement of meat and milk production as well as forage species leading to a rational animal feeding. Results deal also with natural resources management (Agro-forestry, soil and water conservation...). Adoption of new technologies in rural areas and skill development. environment

Facilities: Regional research activities are carried out through 12 experimental stations in addition to 7 research laboratories (field crops, horticulture, agronomy, animal and forage production, plant protection, agricultural economics, biotechnology and plant physiology) and 3 research units (date palm, information and library science and agricultural environment) set up at INRAT headquarters. Library holdings include about 9,000 monographs and 250 journals dealing with agricultural sciences besides hundreds of

miscellaneous publications. All researchers are equipped with computers and consult a multitude of electronic journals via Internet information portals.

Future plans: Focusing on plant and animal genetic resources; conducting socio-economic research in rural environment; strengthening the contribution to technology application and transfer.

Cooperation with developing countries: Cooperation is set up through research projects with common interests as to scientific and socio-economic aspects for concerned countries. Projects are established at bilateral and multilateral scales.

International Organization: At international level, cooperation deals with several world institutions namely the FAO, EU, IAEA, AOAD, ACSAD, ICARDA, CIMMYT, IPGRI, UNDP and many more.

Turkey

Clean Energy Foundation (CEF)

Head of Institution: Prof. Dr. Demir Inan, President.

Address: PK 219, Kavaklıdere Ankara, Turkey. **Phone:** (+90 312) 468-0309.

Fax: (+90 312) 427-2127. **Email:** temev@temev.org.tr. **URL:** www.temev.org.tr.

Scientific Fields of Interest: Environmental Sciences.

Research and training: Activities of CEF can be considered in 3 main areas: Research and development and application studies; education, information and publicity studies; compiling information and document studies in the fields of renewable energy utilization. There are 3 main working groups: solar architecture in Anatolia; Biogas; Solar cells and their applications.

Achievements: Since the 1999 Marmara Region earthquake, the following projects have been developed: (1). Supplying hot water by solar collectors for 200-300 people living in pre-fabricated housing or tent areas. (2). Establishing a system to provide electricity from solar energy. (3). Supplying clean water from sea-water by using solar energy. (4). Organizing a rebuilding process in the earthquake region in accordance to the climate, environment and energy consciousness. (5). Construction of a solar house and museum in the earthquake region (supported by UNDP/GEF). (6). Bus stop illumination at Afyon city center by solar cells. (7). Illumination of culture house Harran with solar energy. (8). Operating a biogas system to use 1 ton of poultry waste. (9). Illumination of the Van Cat statue with solar cells. (10). Participation in numerous EU projects related to renewable energy.

Facilities: Library and computers.

Future plans: Continue to work on projects related to renewable energy.

International Organization: EU

Scientific and Technical Council of Turkey (TÜBİTAK) — Bursa Test and Analysis Laboratory (BUTAL)

Head of Institution: Dr. Seref GŸcer.

Address: Gaziakdemir Mh. Stadyum Cd. n. 11, P.K. 350, 16372 Bursa, Turkey.

Phone: (+90 224) 233-7822. **Fax:** (+90 224) 233-9445. **Email:**

butal@tubitak.gov.tr. **URL:** http://www.ume.tubitak.gov.tr/text/.

Scientific Fields of Interest: Chemistry, Environmental Sciences.

Research and training: Textile industry (process, method, product development); environmental protection and control; technical textiles and composite materials; food; leather; metallurgy; automotive.

Achievements: Conducting chemical, physical and environmental tests and analysis for the industry; supporting national and international projects implemented in cooperation with universities and as outlined above;

publications in related fields of activities; implementing national and international seminars and symposia.

Facilities: Laboratories for conducting physical, chemical and environmental tests and analysis; equipment and computers for testing and analysis; library with more than 3500 volumes of books as well as international periodicals. CAD/CAM designing in textile; training and lodging facilities.

Future plans: Design and implement joint applied projects in cooperation with universities and also within the 6th Framework EU projects in the relevant fields considering the actual needs of the industry.

Cooperation with developing countries: International group training programmes and JRPs could be organized with UNDP/UNIDO; supporting JRPs with universities and industry.

International Organization: Fellowship programmes sponsored by EU and international organizations (OPCW, IB); international cooperation programmes supported by TUBITAK S&T Research Council of Turkey Tr-access; inter-laboratory parallel testing activities within scope of accreditation with DAR/DAP, DTI, VTT, TITK.

Scientific and Technical Council of Turkey (TÜBİTAK) — Marmara Research Centre — Institute of Energy

Head of Institution: Dr. Mustafa Tiris, Director.

Address: P.O. Box 21, Gebze 41470, Kocaeli, Turkey. **Phone:** (+90 262) 641-2300, 641-3900. **Fax:** (+90 262) 642-355. **Email:** Mustafa.Tiris@mam.gov.tr. **URL:** www.mam.gov.tr.

Scientific Fields of Interest: Engineering.

Research and training: Fuel cell technologies; hydrogen production, distribution, storage and combustion technologies; renewable energy technologies; clean and efficient coal combustion, gasification and gas cleaning technologies; energy production and storage technologies; electrical vehicle and robot technologies; vehicle technologies convenient to alternative fuels; Directed and kinetic energy weapon technologies; power electronics technologies; power network technologies; control technologies for energy processes; fuel technologies; energy conservation and related technologies; direct current energy system technologies.

Achievements: Diesel fuel processing for PEMFCs; molten carbonate fuel cells; hydrogen-powered vehicles; test system for hydrogen burning equipment for naval forces; hydrogen production unit; Elit-1 hybrid electric vehicle; hybrid electric armored personnel carrier; sea systems integration; land system integration; energy storage; solid-state switching for networks; development of fuel cell technologies for clean energy production; Elit-2 hybrid electric vehicle; naval electric distribution system based on solid-state switches.

Facilities: Fuel cell laboratory; power electronics lab; fuel lab; fuel processing lab; electric vehicle lab; battery lab

Future plans: Upgrading and further development of research capabilities with EU projects, Turkey State Planning Organization (SPO) projects, national technology programs, etc.

International Organization: WEAO (Western European Armament Organization); CEPA (Common European Priority Area); EU frame Work programme activities; ANSALDO, TNO, ECN, UniDu, STORK, HDW, etc.

Scientific and Technical Council of Turkey (TÜBİTAK) — Marmara Research Centre (MRC)

Address: P.O. Box 21, 41470 Gebze, Kocaeli, Turkey. **Phone:** (+90 262) 641-2300, 641-2147. **Fax:** (+90 262) 641-2309. **Email:** baskan@posta.mam.gov.tr. **URL:** www.mam.gov.tr.

Scientific Fields of Interest: Biological Sciences, Chemistry, Earth Sciences, Environmental Sciences.

Research and training: Information technology; energy systems and environmental sciences; food science and technology; material and chemical technologies; earth and marine sciences.

Achievements: 2002: ISO 9001 TQM quality certificate, National Quality Award.

Facilities: 5 fully-equipped research institutes in Information Technology, Energy Systems and the Environment, Materials and Chemical Technologies, Food Science, Earth and Marine Science.

Future plans: To become one of the world's leading centers of applied research in science and technology while contributing to the improvement of Turkey's global competitiveness.

Cooperation with developing countries: Planned with Pakistan.

International Organization: Netherlands, Denmark, Greece, USA, Ukraine, Russia, Canada, France, Germany, Macedonia, Italy.

Scientific and Technical Council of Turkey (TÜBİTAK) — Marmara Research Centre (MRC) — Earth & Marine Sciences Research Institute (EMSRI)

Head of Institution: Mehmet Onder Yetis.

Address: PO Box 21, 41470 Gebze/Kocaeli, Turkey. **Phone:** (+90 262) 677-2000. **Fax:** (+90 262) 641-2309. **Email:** info@mam.gov.tr. **URL:** <http://www.ume.tubitak.gov.tr/text/>.

Scientific Fields of Interest: Earth Sciences, Environmental Sciences.

Research and training: Information Technology; Chemical and environmental technologies; Energy Technologies; Material technologies; Food science technologies; Earth and Marine Sciences. Within these different areas,

TUBITAK-MRC performs two main activities to achieve its objectives: mid and long-term market oriented research projects; technical support, analysis and consultancy services and training programs.

Achievements: Publications in international scientific journals and conference proceedings; patents; development of scientific results in pilot-plants; project report, training documents; prototypes.

Facilities: TUBITAK-MRC has ISO 9001: 2000 quality management system since 2000. Tests and laboratory activities of some labs are carried out under the terms of ISO 17025:1999. Labs: alloy development; process development; electron microscope; X-ray; corrosion tests; fine casting; metalography and damage analysis; mechanical tests; thermal operations; ICP-IC; mass and NMR spectrometer; chemical; electronics; multimedia; PCs; fuel analyses; water-waste-water treatment; air-quality; organic analysis; seismology; marine pollution and ecotoxicology; non-destructive analysis; GMO analysis; clinical studies; microbiological analysis; preservation conditions of foods, etc. Infrastructure: library; PCs and workstations and related informatics equipment; software design tools; quality assurance tools; research microscope with photometer; seismic data processing software; ion implanter; furnaces; analytical equipment; several experimental setup (e.g. solar energy measurement, wind energy, gas chromatography systems, and many others); metrology equipment; centrifuges; GPS, RS, INSar; ICP-IC, Multimedia lab; HPLC, XRD and XRF, IR; UV, GC, NMR, GC-MS (gas chromatography-mass spectrometry); GPS (gel-permeation chromatography); EA (elemental analysis); NDT (non-destructive testing); complete NDT; UV spectrophotometers; BIOSCREEN C; protein and fat analysis systems; ELISA reader; PCR; water activity measurement instrument; O₂ and CO₂ analyzers in packages; conductivity measurement unit; fiber analysis system; calorimeter; climatic cabinets; API and impedance for rapid microbiological analysis; image analysis; spray dryer; supercritical fluid extractor; drum dryer; microwave tunnel dryer; solar dryer; tray dryer; presses and mills; canning line; solid-liquid and liquid-liquid extractionlines; distillation units; IQF unit; freeze dryers; various seismic recorder; GPS receivers + hardware; GIS and RS software (Arc/INFO, ArcView, Map Object, Mapinfo, Erdas IMAGINE, Er Mapper, PCI, International Imaging System, Geomatics, Internet Map Server); seismic data processing software (DISCO/FOCUS); GPS data processing software auto analyzer; elemental analyzer; microtox; fluorometer; high-performance liquid-chromatography; polarograph.

Future plans: The research areas will be strongly dependent on two main factors: i) market needs and ii) technology forecasts. Market needs are currently and continuously being assessed by market surveys. Technology forecasts are being adopted from the EU's RTD priorities (especially according to the EU 6th Framework programme), defined for the years of 2002-2005.

International Organization: General Electric (USA); JULICH GmbH (Germany); CNRS (France); Argonne National Laboratory (USA); Force Institute (Denmark); Massachusetts University (USA); Nauka (Ukraine); Flag (Russia); Laval Teknopole (France); Weisman Institute (Israel); STS, Cyril and

Methodius University (Macedonia); DTI (Denmark); TNO (The Netherlands); NSF (USA); CSIR (India); UNIDO; IIR (International Institute of Refrigeration); IARW WFLO (World Food Logistic Organization); AFFoSTI (Afro-Asian Federation of Food Science and Technology Institutions), India; COST; ESF; TWAS; GSF; GLZ; OECD; UNEP/MAP; RAC/CP.

Scientific and Technical Council of Turkey (TÜBİTAK) — Marmara Research Centre (MRC) — Material & Chemical Technologies Research Center

Head of Institution: Prof. Dr. Tarik Baykara, Director.

Address: PO Box 21, 41470 Gebze, Kocaeli, Turkey. **Phone:** (+90 262) 641-2300, 641-3411. **Fax:** (+90 262) 641-2309. **Email:** tarik.baykara@mam.gov.tr. **URL:** www.mom.gov.tr.

Scientific Fields of Interest: Chemistry.

Research and training: Boron technologies and minerals; ceramic technologies; functional coating technologies; sensor technologies; metals technologies; aluminum processing; coating technologies; composite technologies; polymer & synthesis technologies; carbon technologies; NDT & acoustic technologies; Turkish and Ukrainian Joint Research Lab

Achievements: Strategic research projects (in-house projects); contractual research and development projects (industrial and international projects); product/process development, testing, analysis and characterization; technical reports; articles; books; patents; prototypes.

Facilities: Mechanical testing; heat treatment services; tribological measurements; chemical analysis and thermal measurements; chemical analysis assessment and evaluation; corrosion test lab; thermal testing and analysis; x-ray analysis; XRO and XRF analysis; metallography and failure analysis; metallurgic characterization of metals; electron microscopy lab scanning electron microscopy lab transmission electron microscopy lab; IR, UV, GC, NMR, GPS, HPLC, EA; non-destructive evaluation of materials and media by microwave technologies; diffraction subsurface tomography; Eddy-current tomography.

Future plans: Hydrogen storage technology; microwave technologies; nano-clays; electronic ceramics (smart and intelligent materials); photocatalytic sol-gel coating, anti-bacterial coating; remote-sensing and chemical gas sensor materials; nanopower technologies; heat treatable wrought alloys; rapid solidification of Al alloys; Al powder extrusion; titanium casting; high-temperature composites; carbon nanotubes; radar cross section measurements; microwave tomography; flame resistant polymers and additives; microwave digestion; CNC metal working.

International Organization: TNO, NSF, General Electric, JYlich GmbH, CNRS, Weisman Institute.

Uganda

National Agricultural Research Organization (NARO)

Head of Institution: Dr. William Otim-Nape, Acting Director General.

Address: P.O. Box 295, Entebbe, Uganda. **Phone:** (+256 41) 320-512. **Fax:** (+256 41) 321-070. **Email:** dgnaro@infocom.co.ug, wonape@yahoo.com. **URL:** www.naro.go.ug.

Scientific Fields of Interest: Agricultural Sciences.

Research and training: Crop; livestock; forestry; fisheries; food science; agricultural engineering; biotechnology; natural-resource management

Achievements: New technologies, advice on policies; development of new methods.

Facilities: 9 research institutes; 12 agricultural research and development centers; 9 libraries; various laboratories and computers.

Future plans: NARO has moved from a commodity program approach to thematic area approach. Its research strategy and plan is based on 5 themes.

Cooperation with developing countries: NARO is a member of ASARELA, FARA and through the government of Uganda contributes to the CGIAR.

International Organization: NARO is funded mainly by the World Bank (IDA), EEC, DANIDA, Rockefeller, UNDP, DFID, Gatsby, CIP, FAO, GEF, and IDRC.

National Agricultural Research Organization (NARO) — Fisheries Resources Research Institute (FIRRI)

Head of Institution: John S. Balirwa, Director.

Address: P.O. Box 343, Jinja, Uganda. **Phone:** (+256 43) 120-484, 121-369. **Fax:** (+256 43) 120-192. **Email:** firi@infocom.co.ug. **URL:** http://www.naro.ug/research_institutes/FIRRI.

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences, Environmental Sciences.

Research and training: Fish biology, ecology and genetics; taxonomy; aquaculture; fishery socio-economics; capture fisheries; stock assessment; environmental impact assessment and wet-lands ecology; population dynamics; hydroacoustics, eco-system modeling and food-web dynamics.

Achievements: Information packages containing technology, methods, policies and advice to guide development and management of fisheries of different aquatic systems and the development of aquaculture.

Facilities: Laboratories; aquarium; museum; herbarium; workshop; research vessels; library; Internet and local area.

Future plans: Expansion of analytical laboratory, Data and Information Center (Library), Establish GIS Lab, acquire desktop publishing facilities, establishment

of a virtual library, expansion of the Guest House to cater to international students.

Cooperation with developing countries: Cooperation with INASP for electronic journals, FAO Library, JLB Smith Institute of Ichthyology Library in South Africa, Kenya and Tanzania through research and management of shared Lake Victoria, Lake Victoria Fisheries Organization, World Fish Center, so as to make Inter-library loan a reality; Cooperation with International University Council of East Africa (IUCEA) for educational purposes.

International Organization: World Bank, Global Environment Facility (GEF), European Union (EU), International development research centre (IDRC), United States Agency for International Development (USAID), and African Development Bank (ADB).

United Arab Emirates

Sheikh Hamdan Bin Rashid al Maktoum Award for Medical Sciences (SHAMS) — Centre for Arab Genomic Studies (CAGS)

Head of Institution: Prof. Najib Al Khaja, President.

Address: PO Box 22252, Dubai, United Arab Emirates. **Phone:** (+971 4) 398-6777. **Fax:** (+971 4) 398 0999. **Email:** cags@emirates.net.ae, drnajib@emirates.net.ae. **URL:** www.cags.org.ae.

Scientific Fields of Interest: medical Sciences.

Research and training: Honoring individuals, researchers, scientists in the field of medicine; support of research grants; organization of conferences after each award ceremony and a symposium following the conference; supporting and sponsoring hundreds of conferences in the region. The Center for Arab Genomic Studies was established as a division of SHAMS to deal with: collecting and cataloguing information on genetic disorders present in the Arab World; conducting studies on genetic disorders in Arab families; collaboration with the International Human Variome Project Initiative to document and catalogue the genome variation amongst the Arab populace; conducting conferences on human genetics, participated by researchers from all over the Arab world, as well as international organizations like HUGO.

Achievements: Launching of the 'SHAMS Journal of Medical Sciences'. SHAMS also conducts scientific programmes and workshops for medical science students, practitioners, and researchers. The Centre for Arab Genomic Studies (CAGS) launched in 2005, the Catalogue of Transmission Genetic in Arabs (CTGA) database, which is a continuously updated compendium of bibliographic material and observations on human gene variants and inherited, or heritable, genetic diseases in Arab individuals. At present, the database hosts entries for more than 1000 inherited disorders. CAGS initiated efforts to explore the molecular pathology leading to an inherited skeletal abnormality in a UAE family. Initial results of this study have been recently published (Naveed et al., Am J Med Genet A. 2006; 140:1440-6) and work is currently ongoing to depict the gene mutation responsible for this disease. CAGS was represented at the Human Variome Project Initiative Meeting at Melbourne in June 2006. The CTGA database was considered as one of the models for the Project. The first pan Arab Human Genetic Conference, held in April 2006, attracted participants from all over the Arab world. Publication from CAGS include the books 'Genetic Disorders in the Arab World (Vol. 1 and 2), and 'CTGA Database: A User's Guide', a set of leaflets on genetic blood-related disorders for information to the general public, as well as research articulated in reputed journals such as Nucleic Acids Research and American Journal of Medical Genetics.

Facilities: Genetic and Thalassemia centre at Dubai Dept. of Health and Medical Sciences; collaboration with various international and local bodies.

Future plans: SHAMS plans to introduce at least 2 more awards in its next term of awards; efforts are on the way to develop a website for the SHAMS Journal of Medical Sciences in order to give it a wider reach and easy accessibility. CAGS plans to work closely with its extended Arab Council and its members with an aim to enlarge its sphere of activities, and to become a regional centre of expertise related to genetic disorders in the Arab world. CAGS also plans to initiate the Arab Human Variome Project in accordance with the international Human Variome Project initiative.

Cooperation with developing countries: SHAMS endows special awards to honor outstanding medical institutes, universities, and aid agencies working in developing countries, including countries of the Arab region.

International Organization: CAGS collaborates with international organizations like the Human Genome Organization (HUGO), National Institutes of Health (NIH) and the International Human Variome Project Initiative.

Uruguay

Universidad de la República — Facultad de Ciencias — Instituto de Física

Head of Institution: Carlos Negreria.

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URL: <http://www.fisica.edu.uy/>.

Scientific Fields of Interest: Physics.

Research and training: Non-linear physics: bifurcations and chaos; structures formation; experimental laser physics; linear and non-linear spectroscopy of magneto-optically cooled atoms; experimental ultrasonic acoustics: elastic waves in solids; ultrasonic diffusion; gravitational physics; quantum relativity and lattice gauge theories. High-energy physics; hadronic physics; physics and dynamics of minor bodies of solar system.

Achievements: 30 published papers in international journals per year.

Facilities: Laboratory for ultrasonics; laboratory for optics; laboratory for teaching; Computers; Library (4000 books, 80 periodical titles); physics of fluids laboratory.

Future plans: Establish more joint ventures with the productive sector; strengthen the research in different fields.

Cooperation with developing countries: Cooperation at different levels with about 25 institutions in Argentina, Brazil, Chile, Cuba, Mexico and Venezuela.

International Organization: Cooperation with some 30 scientific institutions in Germany, Spain, USA, France, Italy, Portugal, Sweden and Switzerland.

Uzbekistan

Academy of Sciences of Uzbekistan — Heat Physics Department

Head of Institution: Dr. Pulat K. Khabibullaev, Chairman.

Address: 28 Katartal Str. 700135, Tashkent, Uzbekistan. **Phone:** (+998 71) 366-9049. **Fax:** (+998 71) 366-9186. **Email:** hpd@uzsci.net. **URL:** www.hpd.uzsci.net.

Scientific Fields of Interest: Chemistry, Engineering, Environmental Sciences, Physics.

Research and training: HPD brings together 4 laboratories, 1 research center, 1 research institute and 1 seismology research station (in Andijan province). These divisions are listed as below: Laboratory of the physics of inhomogeneous media; Laboratory of the heat physics soft condensed matter; Laboratory of laser physics; Laboratory of Perspective studies; Research center for structural imaging; Institute of Applied Laser Physics; New technology and seismology research station. Also, a joint venture on medical equipment production was established between the Heat Physics Department and the Ministry of Health in the industry related division of the Department. HPD scientific activity is based on the fundamental research on contemporary physics and related areas of science and technology. Scientific achievements of the Heat Physics Department come from last years results obtained in fundamental studies on the areas of solid-state physics, laser physics, non-linear optics, atomic and molecular physics, soft condensed matter physics, physics of mesoscopic systems and nanostructures. HPD training activity lays in area of cooperation with some universities and research centers of some CIS countries such as Kazakhstan, Turkmenistan, Belarus, Ukraine and Russia, with the purpose of providing for under-graduate and Post-graduate students opportunities to perform master's and Ph.D studies. Today, some of the Ph.D and Masters studies started on at the Department have already included few aspects of the above topics and it is expected that the development in this direction will be extensive in the future.

Achievements: A method for zoning of atomic population levels based on the ionization and polarization spectroscopy is elaborated that allowed to discover ionization resonance of a new type; Pioneering studies of critical phenomena in liquid systems, self-organizing process and stability of supermolecular structures in polymer-surfactant systems; Pioneering studies of random electromagnetic waves in non-linear wave-guides are performed; Pioneering studies of non-linear dynamics and quantum chaos in relativistic systems and high-energy processes that allowed to discover a number of new phenomena a(such as absence of quantum resonances in kicked relativistic dynamics, strong suppression of diffusion in classical relativistic kicked dynamics, strengthening of quantum chaos at finite temperature) are performed;

Experimental and theoretical studies of conductance, resistance, thermal and other properties of fullerenes, carbon nanotubes, photonic crystals and conducting polymers are performed; Diluted ferromagnetic semiconductors on the base of GaAs, GaN and ZnO have been developed and studied. It was shown that the Curie temperature in these ferromagnetic semiconductors can be increased using an additional doping by nonmagnetic impurities. These magnetic semiconductors can be used in spintronics, a new area of solid-state physics and electronics; The highly ordered arrays of various metallic (Cu, Cd, Zn) and semiconductor (Cu_xS, CdS, ZnO) nanowires grown in porous alumina matrix have been obtained. The synthesis methods, namely, SILAR (successive ion layer absorption and reaction) technique and pulsed electrochemical deposition were developed. The fabricated nanostructure materials can be used for design of various electronic and photoelectronic devices as well as for precision gas and chemical sensors application.

Facilities: Acoustic equipment for sound speed and absorption measuring in broad frequency region from 0.1 MHz up to 1.0 GHz; Optical equipment for study of following spectrums: emission, absorption, luminescence in ultraviolet, visible, infrared ranges, luminescence quenching and decay time measurement up to 1.0 ns; Electron microscope LEO; 912; with 0.2 nm resolution and 500000 magnification; Optical polarized microscope Polam 111; Equipment for synthesizing of mesoscopic and nanostructural systems; Computers (Pentium III, Pentium VI) integrated on a local network and exited to the Internet; Seismology research station in Andijan province; Library.

Future plans: Plans of the Heat Physics Department are firstly dictated by ongoing research projects which have been performing in local, regional and international levels. Common subject who brings together this research activity can be entitled as the physics of nano-sized structures (e.g., physical systems, devices and processes whose sizes are smaller than microns). In particular, there are few projects oriented to the study and practical use of the non-linear, quantum and thermal processes in quantum functional devices, pharmaceuticals and material sciences. In addition, ecology, seismology and solar energy-related projects are being developed by the research groups of the institution. We are planning further extensive development of the nanotechnology-related research activity with the purpose to attract local and international findings for these investigations in the form of research grants and fellowships. This purpose leads to the formulation of the strategy of the Department for long-term perspective. It can be outlined as follows: Today a great effort is being made by scientific community on extensive attracting of the fundamental science to the solution of the global problems, such as finding of alternative energy sources, demographic and ecological problems, treatment of serious diseases (like AIDS, cancer etc), fighting against terrorism, drug trafficking and many others. In this context, the long-term purpose of the Heat Physics Department becomes making considerable contribution in solving the above problems in close correlation with the World scientific community. Therefore the following additional problems will be the subjects of forthcoming research at the Heat Physics Department: (1) Theoretical and experimental investigations on

hydrogen and thermonuclear energies; (2) Investigations on the practical application of the nano-physics based results to medicine and pharmaceuticals; (3) Non-physical application of the non-linear physics and physical statistics to the problems of modeling and monitoring of catastrophes, diseases and financial processes.

Cooperation with developing countries: The international cooperation of the Heat Physics Department is quite extensive and well-developed. In particular, the staff members of the institute have been visiting research centers, scientific meetings in many countries of Western Europe, U.S., Japan, South Korea, Canada and CIS. There are close collaborations between HPD and University of Alberta (Canada), Research Center at Juelich (Germany), GSI (Germany), City University of New York, Tulane University (U.S.), City University of Osaka (Japan), Seoul National University (South Korea), Feza Gursey Institute (Turkey), University Marie et Pier Curie (France), University of Heidelberg (Germany). The international cooperation is supported by several international (research) grants, fellowships and scholarships. Also, several joint regular seminars, meetings and workshops were organized during recent years. Among them are the Uzbek-South Korean joint workshop (on 2001, 2002, 2003, 2004, 2005), NATO Advanced Research Workshop (2004), joint workshop of HPD and Physics Department of the VI University of Paris (2002).

International Organization: CRDF; INTAS; NATO; COBASE; JICA; Volkswagen.

Academy of Sciences of Uzbekistan — S. Yu. Yusunov Institute of Chemistry of Plant Substances

Head of Institution: Dr. Nasrulla D. Abdullaev, Act. Dir..

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Scientific Fields of Interest: Agricultural Sciences, Biological Sciences, Chemistry, Engineering.

Research and training: Chemical, pharmaco-toxicological investigations of natural and synthetic substances with low and high molecular weights to displaying/synthesis of biologically active substances; Creation of plant protection agents - plant growth stimulators, herbicides, fungicides, defoliants, etc.; Manufacture of drug substances and plant protection agents in pilot and industrial scales on the base of the Pilot Manufacturing Department of ICPS.

Achievements: As a result of investigations our scientists have isolated more than 1200 alkaloids, 350 glycosides, 600 coumarines, flavonoids, esters, lactones and proanthocyanidines, 50 lipids, 30 polysaccharides. Chemical structures of more than 550 new alkaloids, about 250 new glycosides, about 400 coumarines, flavonoids, terpenoids, esters, lactones and proanthocyanidins

were determined. During this period pharmacologists of the Institute have been investigated more 2000 natural compounds, about 60 compounds having essential significance for medical science and practice were investigated and clinically tested, 35 more drugs were permitted to practical use and 15 of them are being produced by pharmaceutical industry and Pilot Manufacturing of the Institute. Among them are Allapinine and Aclesine - antiarrhythmic preparations, Cholosas and CCH (Cholesteric Collection of Hodjimatov), Galanthamine and Desoxypeganine - highly effective drugs for nervous system treatment, Tefestrol -estrogenic preparation, Ecdisten and Jisten-tonic preparations, Cytisine-an analeptic, Cucumazim - enzim preparation, Opec and others. Except the abovementioned, synthetic antihelminthic preparations Medamin, Medapec, Fenasal and Albendazol were elaborated. More 30000 compounds were synthesized by chemists and tested by phytotoxicologists of the Institute and other organizations for herbicide, fungicide, acaricide, insecticide, growth increasing and defoliant activities. Among them synthetic compounds Toluin, Ethoxilin, Rosalin, fungicides Uzgen, Olgin, KMAKH, Nicamizolon, Ridomil, retardants Uztix and Tuzal, defoliants Butilcaptax, Cytodef, growth increasing agents Tetranyl, Doranin, Roslin, Roston, Nitrolin, organic-mineral fertilizing compound Ammonized lignin etc.

Facilities: Chemical, pharmaco-toxicological, technological research laboratories, computers, HPLC, NMR - spectrometers, mass-spectrometers, chromatomass-spectrometers, IR- and UV- spectrometers, diffractometer, equipment for ultra filtration, amino-acid analyzer, IEA-rider and others, Library, Computer Center. Also there is the Pilot Manufacturing Department, special fields for crop protection agents' trials, the laboratory of instrumental methods of analysis etc.

Future plans: It is planned to increase chemical and biological studies of the substances isolated from plants, which were collected in different places. The power of the Pilot Manufacturing department will be intensified for expansions of the assortment of natural and synthetic medical preparations.

Cooperation with developing countries: The Institute is collaborating with scientists from Turkey, Russia and other NIS countries, China

International Organization: At present some international projects in cooperation with foreign partners are elaborated in the Institute according to INTAS, STCU, CRDF and other international programs. These connections will be else more developed in future. The Institute is collaborating with scientists from USA, France, Holland, China, Turkey, Russia and other countries.

Hydrometeorological Research Institute (NIGMI) of Uzhydromet

Head of Institution: Prof. V. Chub, Director.

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Scientific Fields of Interest: Agricultural Sciences, Chemistry, Earth Sciences, Environmental Sciences, Mathematics.

Research and training: Climate change, drought and desertification monitoring; development, improvement and application in the practice of hydro- and agrometeorological calculations and methods; forecasting methods for extreme hydrometeorological phenomena; study of the mechanism of physical processes occurring in the atmosphere, ionosphere and hydrosphere; study of hydrometeorological regime and in Uzbekistan, central Asia and world-wide; climatic investigations, development of new approaches to climate study and its changes; hydrological investigations; water recourse change assessment when it is possible to observe long-term climate change study of glaciers, avalanches and snow cover in the mountains; development, upgrading and application of technical equipment and approaches to measure the characteristics of snow cover in mountains, glaciers and avalanches in central Asia; study and estimation of the atmospheric pollution level, surface water and soil in central Asia; forecast development of environmental pollution changes; analysis of diverse nature and anthropogenic factors impacting on environmental conditions; working out and application weather modification approaches on hydrometeorological events and processes; preparation of scientific-referenced manuals, normative documents on hydro- and agrometeorological regimes and levels of environmental pollution conditions necessary for diverse sectors of national economy; preparation and publication of scientific works; development of regime-referenced database and information systems of hydrometeorological and glaciology; scientific-methodical guidance of works on studies related to hydro-, agrometeorological and glaciological processes; scientific-methodical assistance and national hydrometeorological services for the Aral Sea basin countries including climate research and forecast, study of environmental pollution, drought, desertification and weather modification.

Achievements: Automated software complex for calculation of geopotential fields, temperature, wind components, humidity, pressure above sea-level, continuous precipitation zones and atmospheric fronts based on the regional hydrodynamic atmospheric model; theoretical principles for calculation of mudflows and maximal inrush water discharges in Central Asian conditions; PC software to calculate many years of suspended load characteristics. Forecast of hydrochemical regime and Water-quality; Recommendations on the rational lake water-use in national economy; Method of agrometeorological assessment of moisture provision and productivity of rice in the condition of water-resources deficit. Data summarizing orography impact on the precipitation forming in

different seasons in the region; complex assessment of the Zerafshan river basin water resource condition, rottenness degree of water eco-system; methodology of assessment of ozone effect on environment (health of population, surface plants); analytical GIS of dangerous hydro-ecological events: drought, mudflows and outburst of lakes, dangerous for the territory in Uzbekistan.

Facilities: Computers, scanners, local computer network, scientific library, field stations, alpine station)

Future plans: Development of hydrological investigations based on grants by the Science and Technology Center under the Cabinet of Ministers of the Rep. of Uzbekistan. The Governmental Research Program would include: development and improvement of the hydrological monitoring system for city agglomerates and river basins; development and improvement of satellite monitoring system of hydro meteorological processes using GIS technology; investigation on climate change impact on water resources; working out and submission for international grants for projects on hydrological research; participation in the implementation of the Sub-regional Action Program to combat desertification and drought; participation in the preparation of the Central Asian Countries Initiative for Land Management with the support of the Asian Development Bank and GEF; participation in the GEF/UNDP project 'National Capacity-building Self-assessment for Environmental Management'.

Cooperation with developing countries: Participation in the activities of the Regional Centre of Hydrology (RCH) supported by the Swiss Agency for Development and Cooperation (SDC) and Swiss Aral Sea Mission at the Executive Council of the International Fund of Aral Sea Saving (EC IFAS) established by the Heads of the Central Asian states.

International Organization: Cooperation with USA (USAID-NRMP), Germany GTZ-CCD, Switzerland (SDC, SECO), Japan (JAICA). Cooperation with international organizations WMO, UNESCO, GEF, World Bank, Asian Development Bank, NATO, UNDP and others.

Uzbekistan Academy of Sciences — V.I. Romanovski Institute of Mathematics

Head of Institution: Dr. Shavkat Ayupov.

Address: 29 F. Hodjaev Str. Akademgorodok 700125, Tashkent, Uzbekistan.

Phone: (+998 71) 162-7544. **Fax:** (+998 71) 162-7357. **Email:** mathinst@uzsci.net.

Scientific Fields of Interest: Mathematics.

Research and training: Functional analysis; non-associative algebra; differential equations and optimal control; probability theory and mathematical statistics.

Achievements: Theory of operator algebra and their applications in quantum probability and statistical mechanics are developed; theory of partial differential

equations; non-classical equations of mathematical physics and spectral theory of differential operators are studies; optimal control theory and differential games are considered; limit theorems and stochastic process; statistical estimates; each year members of the institute publish about 150 scientific papers, 2 monographs and 1 textbook in the above fields of mathematics.

Facilities: A library with about 40,000 books and 15 PCs.

Future plans: The institute is a coordinating center for mathematical research all over the country, including mathematical faculties of universities. In the future the institute is planning to extend collaboration with foreign scientific centers, via joint projects, international grants and sending the most talented students and scientists to well-known mathematical centers.

Cooperation with developing countries: Kazakhstan, Kyrgyzstan, Ukraine, Malaysia, Turkey and China. In the future, the institute intends to enlarge cooperation with Chinese counterparts.

International Organization: The IM has a wide cooperation with Russian mathematics.

Venezuela

Instituto de Biomedicina de San Nicolás a Providencia

Head of Institution: Dr. Jacinto Convit.

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jconvi@movistar.com. **URL:** <http://www.biomedicina.org.ve/>.

Scientific Fields of Interest: Biological Sciences.

Research and training: Immunological and host response aspects in cutaneous and visceral leishmaniasis, leprosy, mycoses, onchocerciasis, enteric diseases, tuberculosis mycoses and Chagas disease; characteristics of the pathogen agents involved in the above disease; epidemiological aspects of the disease under study; development of diagnostic methods; development, application and evaluation of control methods. The institute is also in charge of the National Control Programs for Leprosy, Leishmaniasis, Mycoses and Onchocerciasis and also has an important participation in the Tuberculosis program at rural levels, in research in parasite pathology, and in aspects of allergic disease and in viral disease such as dengue. In raining activities it give pre-graduate education in dermatology to students of the J.M. Vargas Medical School and Post-graduate education in dermatology, epidemiology, microbiology and demo- pathology to national and foreign physicians, for a Masters degree in the corresponding specialties.

Achievements: Development of a product that combines Leishmania promastigotes plus BCG for treatment of cutaneous leishmaniasis; changes introduced in the leprosy control program that resulted in its elimination as a public-health problem in 1997 in most of the country; medical care, and epidemiological and research studies of rural and indigenous populations in tuberculosis and parasite diseases aspects; development of diagnostic procedures for allergic diseases; evaluation of a rotavirus vaccine at a national level.

Facilities: Library that has 36 scientific journals for consultation; animal quarters headed by a certified veterinarian and with all the necessary equipment for breeding and maintaining experimental animals including: rabbits for experimentation and for blood for culture media, hamsters; BALB/C Bola and BALD/c IBM mice and NMRI mice; Washing and sterilizing section with autoclaves, washing machines, distilling and double distilling equipment and sterilizing and drying ovens; computation unit that strengthens and supports disease control programs, education programs and research program of the institute; 27 research labs with their corresponding equipment and several common equipment areas with centrifuges, ultracentrifuges, inverted microscopes; incubators; Revco freezer; cold rooms; Beta and Gamma scintillation counters, fluorescent microscopes, photo microscopes, etc.

Future plans: Investigate new forms of preparing the vaccine used for immunotherapy of leishmaniasis to shorten the treatment period and determine

possibilities of using it for preventing the disease; continue the active campaign against leprosy at a national level; reach the eradication of onchocerciasis in the north, control in the south; consolidate a pilot community epidemiological surveillance network for dengue at a national level; contribute to tuberculosis control in indigenous populations and rural areas; contribute knowledge for planning the improvement of the nutritional status of the Venezuelan population; continue with the development of national antigens for the diagnosis and treatment of allergies.

Cooperation with developing countries: At present, the institute maintains cooperation arrangements in Argentina with the Federación de Hospitales Municipales de Buenos Aires; in Mexico with the Instituto de Investigaciones Siglo XXI (Mexico City); In Cuba with the Centro de Ingeniería Genética y Biotecnología (La Habana); In Guadeloupe Island with the Instituto Pasteur (Guadeloupe city); In Nicaragua with the Asociación para el Desarrollo de los pueblos (Managua).

International Organization: The institute also maintains international cooperation arrangements in the US with the Chemistry and Biochemistry Dept. of the Brigham Young University (Provo, Utah); with the University of California in Los Angeles; with the University of Texas (Dallas, Texas); with the Lankenau Institute for Medical Research (Wynewood, PA); with the Univ. of Illinois (Urbana, IL); the Infectious Diseases Research Institute (Seattle Wash.); with the Infectious Diseases Laboratories, Veteran Affairs Medical Center of the New York University School of Medicine (New York, NY); with the Hansen's Disease Center (Baton Rouge, Louisiana); in the UK, with the Immunology Unit, London School of Hygiene and Tropical Medicine (London); with the Univ. of London (London); with the Rayne Laboratory Center for Inflammation Research (CIRE) of the Edinburgh Univ. Medical School (Edinburgh); in France with the Unité d'immunophysiologie et parasitisme intracellulaire of the Institute Pasteur (Paris); in Spain with the Universidad de Cadiz; in Holland with the Royal Tropical Institute (Amsterdam) and the Free Amsterdam University (Amsterdam) and with the Erasmus MC-Sophia (Rotterdam); in Sweden with the departments of Medical Biochemistry and Biophysics of the Karolinska Institute (Stockholm) and in Australia with the Saint Margareth Children's hospital of Perth University (Perth).

Instituto de Estudios Avanzados (IDEA) — Centro de Biociencias y Medicina Molecular

Head of Institution: Prof. Leonardo Mateu S..

Address: Apartado 17606, Caracas 1015-A, Venezuela. **Phone:** (+58 212) 903-5001. **Fax:** (+58 212) 903-5003. **Email:** lmateu@idea.gov.ve.

Scientific Fields of Interest: Biological Sciences.

Research and training: Study and diagnosis of inherited metabolic disease; neuroscience; regeneration of nervous system; immunoproduction; diagnosis

kits development; crystallography and structural biology; bio-informatics; calcium signaling.

Achievements: National reference laboratory of neonatal screening; laboratory of inherited metabolic diseases diagnosis; production of custom anti-bodies.

Facilities: Total working area of 1,800 m²; equipment includes: micro-preparative and ultracentrifuges; photofluorimeters; HPLC systems; electrophysiological recording systems; molecular-biology and biochemical equipment; nucleic-acid sequencing; facilities (PCR, cell-culture facilities); chromatographic and electrophoretic equipment; lyophilizers; bio-freezers and cold room; computers and Internet; X-ray diffraction facilities.

Future plans: We are working on expanding the neonatal screening research and diagnosis laboratory in order to cover a wider range of diseases; also we are expanding our custom antibody facilities.

Cooperation with developing countries: Argentina (neonatal screening).

Instituto Venezolano de Investigaciones Científicas (IVIC)

Head of Institution: Dr. Máximo García Sucre, Director.

Address: Apartado 21827, Caracas 1020-A, Venezuela. **Phone:** (+58 212) 504-1122. **Fax:** (+58 212) 504-1428. **Email:** mgs@ivic.ve. **URL:** www.ivic.ve

Scientific Fields of Interest: Agricultural Sciences, Biological Sciences, Chemistry, Earth Sciences, Engineering, Environmental Sciences, Mathematics, Physics.

Research and training: Scientific fields of activity: agricultural sciences; biology; biochemistry and biophysics; energy; materials; chemistry; engineering sciences; geological and earth sciences; environment; marine sciences; medical sciences; mathematics; physics and astronomy; ecology; microbiology and cellular biology; anthropology; structural biology; social studies of science. IVIC carries out 3 closely related types of activity: basic and applied research in the scientific fields mentioned above; graduate level teaching and technical training, coordinated by the center for advanced studies; provision of services and development of technology for other institutions and professional, organized through the center for technology.

Achievements: 330 scientific publications in international journals in 2004.

Facilities: 240 research projects in the scientific fields of activity mentioned above. Also IVIC supports the building capacities in S&T and provides services to government and industry. Through a plant called 'Quimbiotec' where human blood plasma is processed and produces, on an industrial scale, blood derivatives such as albumin, gammaglobulins and human antihaemophilic factors. IVIC is called the 'Science city' and is spread out within 832 ha. of woods in a mild mountain climate at an altitude of 1672 m. asl. Laboratory equipment for research activities in diverse areas, computational facilities,

computer network, and Internet connections are all available. The library at IVIC 'Marcel Roche' is the most important in Latin America in the fields of science and technology. Online bibliography search through the central computing facility of the main library is possible.

Future plans: Support applied research project according to country requirements; better integration with local communities; strengthening of labs with new researchers and post-doc fellows; develop new research programs.

Cooperation with developing countries: Brazil, Colombia, Cuba, Mexico, Argentina, Chile, Caribbean nations, Peru, Ecuador, Uruguay.

International Organization: Exchange of scientists for projects with Germany, Italy, Australia, USA, UK; international cooperation with IAEA, UNESCO, UN, Cytel, WHO, IGEB, IFS, OAS, AECL, etc.; programmes supported by Franche cooperation; Headquarters of Tropical Center of Ecology and Center for Biological Sciences, sponsored by UNESCO (in the process of creating new International Center for Biological Sciences).

Instituto Venezolano de Investigaciones Científicas (IVIC) — Centro de Biofísica y Bioquímica (CBB)

Head of Institution: Victor Tortorici.

Address: Apartado 21827, Caracas 1020-A, Venezuela. **Phone:** (+58 212) 504-1020, 504-1021. **Fax:** (+58 212) 504-1093. **Email:** victor@ivic.ve. **URL:** <http://www.ivic.ve/>.

Scientific Fields of Interest: Biological Sciences.

Research and training: Ionic movements and bio-energetics of renal cells and in marine invertebrates; Excitation-contraction coupling in skeletal muscle fibers; Myelin structure and interactions; transport mechanisms in gastric mucosal cells and in intestinal epithelial cells; Alimentary strategy in tropical herbivorous animals; calcium-ions in cardiac muscle; neuroactive compounds from marine sources; cerebral tallus in pain modulation; neuronal circuits in vertebrate retinal tissue; neuro-transmitter liberation; regeneration of nervous system, with particular emphasis in retinal tissue.

Achievements: 54 publications in International Journals in 2004.

Facilities: 14 research groups with a total working area of 1,600 sq.m. Equipment includes: High sensitivity electrophysiological recording systems; double-beam and diode-array spectrophotometers; Micro-Spectro photofluorimeters; laser microspot confocal fluorescence; gas chromatography and mass-sensitive detectors; HPLC systems both for small molecules and macromolecules, chromatographic and electrophoretic equipment; transmission-electron microscopes; micro-preparative and ultracentrifuges; lyophilizers; cell-culture facilities; deep freezers and cold rooms. Computers and Internet. Library.

Future plans: Reinforcement of molecular-biology; doubling of physical infrastructure; Stronger financial support (from government or other funding institutions) for multi- or interdisciplinary projects.

Cooperation with developing countries: All cooperation agreements and arrangements are through the parent Institution, namely IVIC. The Centre has no direct contracts, except those related to individual grants for researcher or research groups.

Instituto Venezolano de Investigaciones Científicas (IVIC) — Centro de Ecología

Head of Institution: Jorge Paolini.

Address: Apartado Postal 21827, Caracas 1020-A, Venezuela. **Phone:** (+58 212) 504-1014. **Fax:** (+58 212) 504-1088. **Email:** jpaolini@ivic.ve.

Scientific Fields of Interest: Environmental Sciences.

Research and training: Researchers, technicians and students work together on applied and theoretical projects of great interest for Venezuela, both presently and in the future, covering various eco-systems such as forest, savannahs, agro-eco-systems, rivers, estuaries and lakes.

Achievements: 32 scientific publications in international journals in 2004.

Facilities: Computers, Internet, scientific equipment, laboratories.

Cooperation with developing countries: Malaysia, India, and Thailand.

International Organization: USA, Germany, UK, Italy, and Spain.

Instituto Venezolano de Investigaciones Científicas (IVIC) — Centro de Física

Head of Institution: Rixio Parra.

Address: Apartado Postal 21827, Caracas 1020-A, Venezuela. **Phone:** (+58 212) 504-1530. **Fax:** (+58 212) 504-1148. **Email:** parra@ivic.ve. **URL:** www.ivic.ve/fisica.

Scientific Fields of Interest: Engineering, Physics.

Research and training: There are projects in applied physics and basic physics: semiconductors, interfacial phenomena, conductivity, magnetic materials, atomic physics, quantum optics, catalysis, etc. The center also coordinates Post-graduate studies in the area of physics.

Achievements: 67 scientific publications in international journals in 2004.

Facilities: Computers; Internet; scientific equipment; laboratories.

International Organization: CSIC (Spain); CONACyT (Mexico); CONICET (Argentina); NASA (USA); PCP (France) and other universities around the world.

Instituto Venezolano de Investigaciones Científicas (IVIC) — Centro de Medicina Experimental

Head of Institution: Dr. Maria Nieves Garcia.

Address: Apartado 21827, Caracas 1020-A, Venezuela. **Phone:** (+58 212) 504-1132, 504-1232. **Fax:** (+58 212) 504-1086. **Email:** mngarcia@ivic.ve. **URL:** www.ivic.ve.

Scientific Fields of Interest: medical Sciences.

Research and training: This Center undertakes applied and theoretical research projects with priority in health problem areas of the country, such as: intestinal iron absorption, nutritional iron deficiency anemia, blood groups, hemolytic disease of the new born, blood clotting, thrombolysis, tissue antigens, immunology of organ transplant, genetic disease, and immunological, nutritional and pathological aspects of populations, including indigenous groups. The center trains medical and paramedical specialists and coordinates Post-graduate studies in the areas of immunology, human genetics and biochemistry.

Achievements: 18 scientific publications in international journals in 2004.

Facilities: Computers, Internet, scientific equipment, laboratories.

International Organization: Some projects are carried out with the collaboration of institutions in the USA, Germany, Brazil, Spain, Italy, France, Holland, Mexico, Colombia, Chile, etc.

Instituto Venezolano de Investigaciones Científicas (IVIC) — Centro de Microbiología y Biología Celular (CMBC)

Head of Institution: Hilda A. Perez C..

Address: Apartado 21827, Caracas 1020 A, Venezuela. **Phone:** (+58 212) 504-1242. **Fax:** (+58 212) 504-1382. **Email:** hperez@ivic.ve. **URL:** www.ivic.ve.

Scientific Fields of Interest: Biological Sciences.

Research and training: Molecular-biology and epidemiology of dengue; hepatitis and rotavirus and HIV; immunology of malaria; Leishmaniasis and Schistosomiasis; molecular-biology of Mycobacteria; molecular-biology of Paracoccidioides brasiliensis; cancer and cell biology.

Achievements: Scientific publications in international journals; specialized diagnostics; genome molecular analysis service.

Facilities: Electron and confocal microscopy; medical library; ultracentrifuges; tissue-culture facilities; molecular and molecular-biology essential equipment; nucleic acid sequencing core facilities; biosecurity P3 level laboratory.

Future plans: Upgrading of nucleic acid sequencing facilities.

Cooperation with developing countries: Several cooperations with Latin American countries such as Argentina, Colombia, Mexico and Uruguay.

International Organization: France: Programme Ecos Nord, PCP-PDVI: Pediatric Dengue Vaccine Initiative.

Instituto Venezolano de Investigaciones Científicas (IVIC) — Centro de Química

Head of Institution: Alejandro Arce, Chief of Center.

Address: Apartado Postal 21827, Caracas 1020-A, Venezuela. **Phone:** (+58 212) 504-1300. **Fax:** (+58 212) 504-1350. **Email:** aarce@ivic.ve. **URL:** <http://www.ivic.ve/>.

Scientific Fields of Interest: Chemistry.

Research and training: Chemistry bases; chemistry and industry; chemistry and the environment; medical chemistry.

Achievements: Published 94 scientific articles in international journals in 2004.

Facilities: Computers; Internet; scientific equipment; laboratories.

International Organization: USA, France, Germany, Italy, Holland, Mexico, Brazil, Colombia, and Chile.

Instituto Venezolano de Investigaciones Científicas (IVIC) — Departamento de Biología Estructural

Head of Institution: Dr. Raul Padron.

Address: Apartado 21827, Caracas 1020-A, Venezuela. **Phone:** (+58 212) 504-1098. **Fax:** (+58 212) 504-1666. **Email:** padron@ivic.ve. **URL:** www.ivic.ve.

Scientific Fields of Interest: Biological Sciences.

Research and training: The specific objectives of this department are: the study of the molecular mechanism of the contraction of muscle and its regulation with special emphasis on the structural biology of the thick filaments of striated muscle in relationship with the human disease familial hypertrophic cardiomyopathy; the study of the structural biology of the human myelin in its physiological and pathological aspects; as well as providing scientific services to the community based on scientific expertise, like crystallographic analysis of kidney stones.

Achievements: 4 scientific publications in international journals in 2004.

Facilities: Computers, Internet, scientific equipment, laboratories. The department has allowed for the first time the possibility of performing structural studies in biology and other disciplines and technologies in Venezuela, making available leading structural equipments and technologies, with the aim of inserting the discipline of structural biology in Venezuela. This department of IVIC was designated last year as the Philips Latin American Center for cryo-Electron microscopy (CLAPCME). The web pages of this department as well as of CLAPCME can be visited at <http://cbe.ivic.ve> and <http://clapcme.ivic.ve>.

International Organization: Some projects are carried out with the collaboration of institutions in the USA, Mexico, Spain, France, etc.

Instituto Venezolano de Investigaciones Científicas (IVIC) — Departamento de Matemáticas

Head of Institution: Prof. Stefania Marcantognini.

Address: Apartado 21827, Caracas 1020-A, Venezuela. **Phone:** (+58 212) 504-1412/1413. **Fax:** (+58 212) 504-1416. **Email:** smarcant@ivic.ve. **URL:** <http://matematicas.ivic.ve>.

Scientific Fields of Interest: Mathematics.

Research and training: Logic and set theory; probability; statistics; combinatorial theory; operator theory.

Achievements: 20 papers in international mathematical journals (reviewed cover to cover in AMS Mathematical Reviews and Zentralblatt MATH).

Facilities: 10 desktop computers; 1 portable; 2 work stations; 5 printers; 2 Xerox machines; library 'Marcel Roche' with collections of books and journals (mathematics, physical sciences, social sciences, biology, medicine).

Cooperation with developing countries: Universidad Nacional de Colombia, (Bogotá); UNAM (Mexico); EMALCA (Mexico) and 'Escuela Venezolana de Matematicas' (partially supported by CIMPA).

Instituto Venezolano de Investigaciones Científicas (IVIC) — Unidad de Tecnología Nuclear

Head of Institution: Lila Carrizales.

Address: Apartado 21827, Caracas 1020-A, Venezuela. **Phone:** (+58 212) 504-1571. **Fax:** (+58 212) 504-1095. **Email:** lcarriza@ivic.ve. **URL:** <http://www.ivic.ve/index.htm>.

Scientific Fields of Interest: Engineering.

Research and training: The unit provides radiological protection for the institute and lends its expertise to many other institutions, as well as public and private companies which require radiological dosage recommendations and training in radiological protection procedures. It also is a center for the calibration of doses used in radio-therapy, for the calibration and control of radio-therapy and radio diagnosis equipment, and for radiological protection, etc.

Facilities: Computers, Internet, scientific equipment, laboratories.

Universidad de Los Andes — Facultad de Ciencias — Instituto de Ciencias Ambientales y Ecológicas (ICAE)

Head of Institution: Dr. Lina Sarmiento.

Address: La Hechicera, Mérida 5101, Venezuela. **Phone:** (+58 274) 240-1255, 244-1575. **Fax:** (+58 274) 240-1255, 244-1575. **Email:** icae@ula.ve, lsarmien@ula.ve. **URL:** www.saber.ula.ve/icae.

Scientific Fields of Interest: Biological Sciences, Environmental Sciences.

Research and training: Research: Ecophysiology of wild and crop plants; Adaptive mechanisms to extreme conditions; Population and community dynamics; Eco-systems and agro-ecosystems; Landscape ecology; Ecology and development; Tropical environmental dynamics. Training activities: Undergraduate courses for Biologists (plant ecology option); Post-graduate program on Tropical Ecology at Masters and Ph.D level.

Achievements: Over 200 articles in scientific journals (Oecologia, Acta Oecologia, Journal of Tropical Ecology, Journal of Biogeography, Journal of Experimental Botany, International Journal of Applied Earth Observations and Geo-information, Soil Biochemical Cycles, Soil biology and Biochemistry, Mountain Research, etc.), 12 books, 84 book chapters, 43 Biology degree thesis, 55 Masters thesis; 24 Doctorate thesis. Over 500 congress presentations.

Facilities: Three 4x4 vehicles, 3 portable gas-exchange systems, 1 chlorophyll fluorescence meter, 1 leaf area meter, 2 pressure chambers, 2 dew-point psychrometers, 1 pressure pan for soil water potential determinations, equipment for micro-climatic measurement (total, net and photosynthetically, active radiation, leaf and air temperature, relative humidity), autoclave, drying oven, freezers, microscope, magnifying stereoscopes, precision balances, atomic-absorption spectrometer, 2 Kjeldahl digestors, 2 distillators, automatic titrator, powdering mills, centrifuges, canopy analyzer, climatic stations, data loggers, 4 GPS, desk computers, portable computers, printers, photocopying machines.

Future plans: Increasing our interaction through national and international research projects and networks; developing new strategies through research funding in order to strengthen our research in the established areas and/or new emerging research lines; increase the number of researchers and technical staff.

Cooperation with developing countries: InterAmerican Institute for Global Change Studies (IAI) - Venezuela, Colombia, Brazil, Argentina and Cuba. CYTED: Bolivia, Peru, Ecuador, Colombia, Cuba. CONDESAN: Colombia, Ecuador, Bolivia and Peru.

International Organization: Approved project for the conservation of the paramo eco-system 'Conservation of the Biodiversity of the Paramo in the Northern and Central Andes', funded by the Global Environment Facility, UNEP.

Vietnam

Cuu Long Delta Rice Research Institute (CLRRI)

Head of Institution: Dr. Bui Chi Buu, Director.

Address: Thoithanh Village Codo District Cantho City, Vietnam. **Phone:** (+84 71) 861-954. **Fax:** (+84 71) 861-457. **Email:** buichibuu@hcm.vnn.vn, clrri@clrri.org. **URL:** <http://clrri.org>.

Scientific Fields of Interest: Agricultural Sciences.

Research and training: To carry out research on rice and other major crops in the Mekong Delta. The Institute is engaged in a broad range of education and training activities. It offers a Ph.D program in Plant Genetics and Breeding. It also conducts in-house training, as well as training for government employees in the agricultural sector, for farmers and farmer groups, for industry, for trading companies and for secondary school graduates. It hosts workshops and conferences in all its research fields. It undertakes extension activities for farmers and government employees throughout the Mekong Delta region. Many of its scientists are involved in lecturing and course design at numerous universities in southern Vietnam, and supervise Post-graduate students.

Achievements: More than 40 rice varieties have been released to producers and are still under cultivation; Over 1800 cultivated rice and wild rice accessories have been conserved in its gene-bank; Produced leaf color chart, rice row seeder, corn thresher and seed dryer; Developed two insect bio-control products: Ometar and BioVIP; Publish the journal OmonRice, plus other technical publications, books, book chapters in Vietnamese, and scientific papers in international journals.

Facilities: Infrastructure: The home campus is 360 ha. Laboratories CLRRI has 7 research laboratories, used for the following fields: (i) plant-biotechnology, (ii) plant and soil-analysis, (iii) rice germplasm, (iv) plant pathology, (v) entomology and biocontrol, (vi) quality analysis of crop grain, (vii) microbiology. Net Houses and Weather Station. There are 10 net houses and a glasshouse, with a total area of 5500 square meters. The Institute has its own weather station, linked to research and production activities. Library: The CLRRI library subscribes to numerous international scientific journals and magazines. CLRRI is a registered user of the AGORA network. LAN and Internet Connection.

Future plans: Research: Germplasm conservation of natural resources; Research and develop appropriate cropping practices, integrated-crop management packages and machinery. Capacity-building and infrastructural procurement. Enhance teaching facilities and laboratories. Education and Extension: Offer Post-graduate degree study for Vietnamese graduates. Organize High-quality on- and off-site training on cropping practices and integrated crop management to farmers and farm supply dealers, as well as training of trainers courses. Organize professional and technical training to agricultural technicians and extension officers, Provide expanded vocational training in agriculture to the region through the Technical School. Enhance the

management of agricultural information, knowledge, and technologies. Cooperation and linkage: Foster national and international cooperation in research and education. Establish a network for the production of High-quality rice seed.

Cooperation with developing countries: Bangalore Agricultural University, India; Cambodian Agricultural Research and Development Institute, Cambodia; Chaudhary Charan Singh Haryana Agricultural University, India; China Rice Research Institute, China; Indian Agricultural Research Institute, India; Mahatma Phule Agricultural University, India; Malaysian Agricultural Research and Development Institute; National Agricultural and Forestry Research Institute, Laos PDR; PhilRice, Philippine; Rice Research Institute, North Korea; Thailand Rice Research Institute; University of Philippine.

International Organization: Adelaide University; American Friends Service Committee; Asian Development Bank; Bill & Melinda Gates Foundation, USA; French Agricultural Research Centre for International Development; Danish International Development Assistance, Denmark; European Commission; Food and Agricultural Organization; Freiburg University, Germany; Indian Consulate General, Ho Chi Minh City, Vietnam; International Atomic Energy Agency; International Food Policy Research Institute; International Rice Research Institute; Japan International Research Center for Agricultural Science; Kagawa University, Japan; Lund University, Sweden; National Institute For Agro-Environmental Sciences, Japan; Ohio University, USA; Potash & Phosphate Institute, Rockefeller Foundation, USA; Sweden Research Cooperation Program, Sweden; Swiss National Science Foundation; Tokyo Agricultural University, Japan; United Nations Development Program; United States Department of Agriculture, University of Missouri, USA; Wageningen Agricultural University; World Bank

Food Crops Research Institute (FCRI)

Head of Institution: Prof. Nguyen Tan Hinh.

Address: Lien hong, Giac loc Hai Duong, Vietnam. **Phone:** (+84 320) 716-384, 716-469. **Fax:** (+84 320) 716-385. **Email:** vcltctp@fpt.vn.

Scientific Fields of Interest: Agricultural Sciences.

Research and training: Conducting research on improvement of food crop varieties; developing advanced production technologies for food crops; producing foundation, certified seed of food crops and transferring production technologies to farmers; main working crops include rice, root and tuber crops, legumes, vegetable and some special fruits.

Achievements: The institute has developed 60 varieties/hybrids of food and fruit crops (28 rice varieties, 3 potato, 4 sweet potato...) and several production technologies for food crops which have been put into large-scale production. Some research achievements have been applied abroad.

Facilities: The institute has good infrastructure and facilities for research and development, such as library; computers; laboratory rooms for crop physiology

and biochemistry, plant bionology and plant protection; cold storages; phytotorns; net house; some other equipment; 100 ha. for experiments and seed production.

Future plans: Research on conventional and hybrid rice breeding for high yield, good quality and high adaptability to intensive farming and less favorable areas; research on breeding of vegetables, root and tuber crops and legumes for high yield, good quality and suitable for local consumption and export; development of production technologies for increasing yield and quality of food crops and development of food crop production technologies of food crops based on economical water consumption.

Cooperation with developing countries: Thailand, Philippines, Indonesia, etc.
International Organization: IRRI, CIP, ICRISAT, AVRDC, FAO, and other national research institutions and agencies from Asia, EU, LA countries and Australia.

Institute of Meteorology and Hydrology

Head of Institution: Prof. Dr. Tran Thuc.

Address: 62 Nguyen Chi Thanh Dong Da District Hanoi, Vietnam. **Phone:** (+84 4) 835-9540. **Fax:** (+84 4) 835-5993. **Email:** thuc@netnam.vn. **URL:** www.imh.ac.vn.

Scientific Fields of Interest: Agricultural Sciences, Earth Sciences, Environmental Sciences.

Research and training: Tropical meteorology; climatology; atmospheric physics; applied meteorology and climatology; meteorological and climate prediction; agricultural meteorology and eco-environment; agrometeorological prediction; meteorology for livestock; aquaculture and pest-disease management; agrometeorological experimental station for Red River and Mekong Deltas; applied hydrology; hydrological prediction; water-resources assessment and planning; deltaic hydrology and estuary; weather modification technology; hydrometeorological and environmental measurement automation; information technology and system management; remote-sensing and GIS; environmental management; environmental engineering; environmental impact and risk-assessment; environmental prediction; environmental stations; Ph.D. programmes in atmospheric physics, meteorology, climatology, hydrology, water-resources, river and coast training, dynamics of marine hydrology and lithography, marine chemistry.

Achievements: Climatic characteristics and climatic resource of Vietnam; applied climatology (architecture, biology, energy, tourism); regional and urban climate; atmospheric circulation and monsoon patterns; climate resources and extreme values; climate change: impact and adaptation; tropical meteorology and typhoon, ocean-air interaction; climate information and prediction services; ENSO and its impacts. Provide agrometeorological service from sustainable agriculture, agro-forestry development and food security; agrometeorological conditions and prediction for agriculture, livestock, aquaculture, and pest-

disease management; Crop-yield forecasting; application of weather-crop models; provide agrometeorological information for end-users; experimental studies on tropical agrometeorological problems and adaptability of improved new or hybrid varieties; issue agrometeorological communication and forecast. Assessment of water balance and water-resources for regional areas and river basins; inland hydrology, urban hydrology, watershed hydrology, river-estuary flows interaction; soil erosion and sedimentation studies; dam-break analysis and modeling; flood risk and inundation mapping; flash flood warning and mitigation measures; water-resources assessment, planning and management; flood forecasting and management; irrigation and drainage management; reservoir management. Precipitation enhancement; applied hydrometeorological and environmental measurement automation; applied remote-sensing and GIS in meteorology, hydrology and environment; environmental monitoring, measurement, survey and analysis; conducting environmental impact and risk-assessment for development projects; member of East Asia Acid Deposition Monitoring Network (EANET); outdoor environmental stations in Hoa Binh and Thac Ba reservoir areas; modeling approach to study water and air-quality; 3D hydro-dynamics of East Sea of Vietnam; developing national emission inventory for mobile, point and biogenic sources.

Facilities: High-speed cluster computer; computer software for meteorology, climate, hydrology, hydraulics, air-quality and Water-quality modeling; laboratory capable of analysis of most air and Water-quality parameters.

Future plans: Air-quality forecast for Vietnam; environmental engineering and management; weather and flood forecasting; climate impact, vulnerability and adaptation; water-resources assessment and management.

Cooperation with developing countries: Cambodia, Lao PDR, Thailand, China, Russia

International Organization: WMO; UNDP; GEF; ADB; WB; EU; UNEP-RISO; UNFCCC; MRC; EANET. Australia, Japan, The Netherlands, Sweden, USA, etc.

Vietnam National University

Head of Institution: Dao Trong Thi.

Address: 144 Xuan Thuy Street Cau Giay District Hanoi, Vietnam. **Phone:** (+84 4) 754-7012, 754-7015. **Fax:** (+84 4) 754-7429. **Email:** thidt@vnu.edu.vn, tuvn@vnu.edu.vn. **URL:** www.vnu.edu.vn.

Scientific Fields of Interest: Chemistry, Earth Sciences, Engineering, Environmental Sciences, Mathematics, Physics.

Research and training: Material Science; microbiology; cell technology; enzyme-protein technology; environmental technology; petrochemistry; material chemistry; voice recognition (in IT); regional studies; environmental protection and sustainable development; forecast for natural disaster prevention, etc.

Achievements: VNU boasts of a large scientific center and a key agency of the country. Every year VNU undertakes plans for scientific and technological research, basic and selective research in natural science, social sciences and humanities and directly receives scientific and technological assignments from the Ministry of Science and Technology. Every year hundreds of research projects at the national, VNU/ministerial and college/institute levels are carried out, with their results applied to production and everyday life. Numerous research projects within the framework of international cooperation are also carried out, thus making a worthy contribution to the development of faculty/student exchanges and cooperation with foreign scientific and educational institutions. At present, VNU is the implementing agency for two national programs: basic research in natural sciences, environmental protection; and natural disaster prevention. Besides, VNU is also implementing dozens of national projects including: studies on socio-economic and environmental issues in the eco-region of Quang Binh and Quang Tri provinces; research and development in multimedia technology; General investigation on the lower Mekong delta, etc.

Facilities: Enzyme and protein lab; material science lab; molecular-biology and cell technology lab; environmental analyses lab; network technology & IT service lab; software development and Research lab; multimedia lab; biotechnological lab; etc.

Future plans: To build VNU as a research university so as to make it a Center of Excellence in science and technology transfer comparing equally with higher-education institutions in Asia and around the world.

Cooperation with developing countries: Collaboration is mainly with institutions in developed countries, but there is some collaboration with developing countries like China, Malaysia, Korea, Philippines, and Taiwan.

International Organization: In order to realize VNU's missions of excellence in training and research, VNU has developed close relationships and cooperation with more than 100 higher-education institutions, research institutes and educational organizations all over the world. These cooperative efforts include associations with internationally recognized universities in Australia, Belgium, Canada, China, France, Germany, Indonesia, Japan, Korea, Malaysia, the Netherlands, the Philippines, Russia, Singapore, Sweden, Switzerland, and Taiwan, the UK, the USA and other countries.

Vietnamese Academy of Science and Technology (VAST) — Institute of Chemistry

Head of Institution: Prof. Dr. Tran Van Sung, Director.

Address: 18 Hoang Quod Viet Str., Cau Giay District, Ha Noi, Viet Nam.

Phone: (+84 4) 756-4312. **Fax:** (+84 4) 836-1283. **Email:** chemli@ich.ncst.ac.vn.

Scientific Fields of Interest: Agricultural Sciences, Chemistry, Environmental Sciences.

Research and training: Study terrestrial and marine natural resources of Vietnam; synthesize or semi-synthesize substances of high economical values; study and modify polymer compounds; study advanced material based on synthetic and natural polymers; study scientific basis to improve the sensitivity, precision, and selectivity of modern physicochemical and physical analysis; synthesize and study surface, adsorption-catalysis properties of catalysts; synthesize and study characteristics of materials for systems of energy storage and conversion; study quantitative structure - activity relationship (QSAR).

Achievements: Technology to produce chitin/chitosan for medical purposes (bandage, bio-membrane), food preservation, and as a nourishing foodstuff and food additive etc.; technology for extraction of artemisinin from *Artemisia annua*; rutin from *Sophora japonica*; and rotundine from *Stephania* sp.; study and pilot-scale production of a large volume of flavors and fragrances for the food and cosmetic industry; established the preparation procedure for molecular sieves (Zeolites, AIPO4-n, MCM-41...); nanocomposite conducting polymers; manufactured and installed computerized polarographic analyzers and Water-quality measurement systems for large areas, which have been used in Vietnam and abroad.

Facilities: HPLC; FTIR; MS; NMR 500 MHz; UV-VIS; DSC, DTA, TGA, TMA; AAS; LC-MS; GC, GC/MS; IMpedance spectrum analyzer Zhaner IM6.

Future plans: Advanced technologies and methods in material sciences; development of new medications from natural products; emphasize basic and applied research, encourage technology transfer from laboratory to factory (pharmaceutical, new material, products for treatments of water pollution and agriculture).

Cooperation with developing countries: Scientific collaboration with research institutions and companies in Laos, Thailand and Indonesia.

Vietnamese Academy of Science and Technology (VAST) — Institute of Mathematics (IM)

Head of Institution: Ha Huy Khoai.

Address: 18 Hoang Quod Viet Str., Cau Giay District, Ha Noi, Viet Nam.

Phone: (+84 4) 756-4428, 756-3474. **Fax:** (+84 4) 756-4303. **Email:** hhkhoai@math.ac.vn, vientruong@math.ac.vn. **URL:** <http://math.ac.vn>.

Scientific Fields of Interest: Mathematics.

Research and training: Main research fields: Optimization and control theory; Mathematical analysis, including functional analysis, partial differential equations and numerical analysis; Probability and mathematical statistics; Topology and geometry; Algebra and number theory; Mathematical foundations of Computer Science. Training activities: Ph.D program since 1979; 1979-2005: 123 Ph.D; 1990-1996: 7 Dr. Sc.; Many theses completed at the IM and successfully defended abroad.

Achievements: About 1200 published papers in International Journals, among them the best journals: Duke Mat. J; Math. Ann; Composition Math; J. reine angew. Math; Trans. AMS, ect.; Acta Mathematica Vietnamica: +1964: First issue of Acta Scientarium Vietnamicarum (Sectio Scientarum: Mathematicarum et Physicarum), now Acta Mathematica Vietnamica published by IM; Each year 1 volume, three issues; Vietnam Journal of Mathematics: Published jointly by the VAST and Vietnamese Mathematical Society. Institute of Mathematics plays a key role in edition and publication of VJM.

Facilities: Library: 149 international periodicals, including Annals of Math., Math. Ann.; Inventiones; J. reine angew. Math.; SIAM, ec; About 15000 volumes of books; Open access for all mathematicians and students in Vietnam; Electronic library. The High-performance computing Center: 20 nodes of parallel computing; 100 GFlops of high-performance computing. Computer network: LAN, network and printing facilities; Each member of IM has a PC at work Internet; Free Internet access at work place; Web site of IM: www.math.ac.vn. The Guest House: 3 furnished apartments; PC in rooms, Internet access; Kitchen with oven, fridge.

Cooperation with developing countries: Pukyong University, Pusan, Korea; and National University of Singapore, Singapore.

International Organization: Tokyo Metropolitan University, Japan; Institut de Mathematiques de Toulouse, France; Institut National des Sciences Appliquees de Rouen, France.

Vietnamese Academy of Science and Technology (VAST) — Institute of Physics and Electronics

Head of Institution: Prof. Dr. Nguyen Ai Viet, Director.

Address: 10 Dao Tan Street Ba Dinh, Hanoi, Vietnam. **Phone:** (+84 4) 766-9033. **Fax:** (+84 4) 766-9050. **Email:** vieta@iop.vast.ac.vn. **URL:** www.iop.vast.ac.cn.

Scientific Fields of Interest: Physics.

Research and training: To carry out basic and applied research in physics and electronics; To solve engineering problems in relation to the national needs. The research and training activities are as follows: Condensed Matter Physics (Theory); Mathematical Physics and High-energy Physics; Quantum Electronics; Electronic Physics and Telecom Technology; Photonics; Nuclear Physics; Space Technology; Environmental Physics and Technology; Automation; To train young physicists with MS, Ph.D. programs and advanced long-term and short-term courses: The Institute of Physics and Electronics has taken over the function of a training centre for young physicists throughout the country with MS. and Ph.D. programs. It organizes long-term and short-term training courses on a wide range of physical and electronical specialties. The Institute regularly organizes the thematic schools on physics and electronics, updates training courses in different fields of modern physics and new physical technology; International collaboration in training of physics and electronics by means of exchanges of tutors, scientists, Ph.D. and Master education.

Achievements: IPE is the national pioneer in research and training of the following fields: Condensed Matter Physics (Theory); Mathematical Physics and High-energy Physics; Quantum Electronics; Photonics; Nuclear Physics and Space Technology.

Facilities: Neutron Generator NA-3C with yield of about 10¹⁰ n/s; Electron Accelerator MICROTRON MT-17 providing both Bremstrahlung with maximum point energy of 15 MeV, yield of about 10¹³ ph/s, and fission neutrons with total output of about 10¹¹ n/s; (Pu-Be) isotopic neutron source with neutron yield of 10⁶ n/s; Detectors (High-purity Germanium HP (Ge) - detectors, Planar High-purity Germanium detector, Si(Li) and NaI(Tl)X-ray detectors, Scintillation 3 x 3 gamma detector, Neutron and Beta detector, Single and multi-channel analyzers (8K) with associated electronics); HPGe - NaI (Tl) gamma - gamma coincidence system with resolving times of 0,1 μ s; Multifunctional HP(Ge) 0 HP(Ge) gamma - gamma coincidence system with resolving times of 1,1 ns and 5 ns; Receiving Systems for GMS, NOAA, and Meteor satellites; Digital Image-processing systems Pericolor 2001 with scanner, CCT -driver, digitizer, plotter, photoprinter, color printer...; PC-based on systems for image-processing and GIS; Personal ground station receiving images from satellite Terra-Modis and accompany facilities; GIS mapping equipment; Environmental equipment; Computer work station SUN Ultra1; Ruby, Nd:YAG, He-Ne lasers, Metal vapor lasers, CO₂ lasers, N₂ lasers, dye lasers, diode lasers; Tunable laser and

ultrafast laser systems; Set-up for special problems in laser physics, optics and laser spectroscopy (Raman, Fluorescence, Absorption, Non- linear optics, Laser spectroscopy and Time - resolved spectroscopy; Detectors and optical measuring systems; Equipments of vacuum vaporization and optical thin film fabrication.

Cooperation with developing countries: Present projects of cooperation in training (Masters and Ph.D.): Faculty of Science, National University of Laos, DongDok Campus, P.O.Box 7322 Vientiane Lao PDR; Physical Department, Faculty of Sciences, University of Johor, 81310 Johor, Malaysia; Institute of Technology of Bandung, Indonesia. Planned projects of cooperation (in 2006): Faculty of Science, Royal University of Cambodia; Faculty of Science, National University of Singapore.

International Organization: The Academy of Sciences for the Developing World (Trieste, Italy); The Abdus Salam International Centre for Theoretical Physics (Trieste, Italy); Centre National de Recherche Scientifique (CNRS, France).

Zambia

National Institute for Scientific and Industrial Research (NISIR) — Radioisotopes Research Unit (RIRU)

Head of Institution: Rueben Katebe.

Address: P.O. Box CH 158 Chelston, Lusaka, Zambia. **Phone:** (+260 1) 281013/081, 281081. **Fax:** (+260 1) 281-084. **Email:** rckatebe@yahoo.com. **URL:** <http://www.nisir.org.zm/home.htm>.

Scientific Fields of Interest: Environmental Sciences, Physics.

Research and training: Application of nuclear analytical techniques in minerals, environmental samples, industrial raw materials and finished products; Application of gamma radiation for food preservation, medical sterilization and other radiation processing; Environmental radioactivity measurements and radioactive waste management.

Achievements: Results of R&D work have been published.

Facilities: 14 MeV neutron generator, 45000 Ci (present strength); Cobalt-60 gamma radiation source; 13000 Ci Cesium-137 laboratory irradiator; tube and source excited energy dispersive X-ray fluorescence spectrometer; flame atomic-absorption spectrometer; Mössbauer spectrometer; scintillation and semiconductor based gamma spectrometer coupled with DEC P-350, IBM PS/2 and compatible microcomputers. IR, UV-visible spectrophotometers and INSTRON universal testing machine.

Future plans: Blossom into full-fledged institute for nuclear and radiation sciences with nuclear reactor and electron accelerator. Austere economic climate, which can only take place in distant future.

Cooperation with developing countries: Plan for regional cooperation among XRF laboratories in Africa put into motion by the IAEA.

International Organization: IAEA may assist in some future projects.

University of Zambia — School of Agricultural Sciences

Address: P.O Box 32379, Lusaka, Zambia. **Phone:** (+260 1) 250-587. **Fax:** (+260 1) 295-655, 53952. **Email:** judithlungu@yahoo.com, deanagr@agric.unza.zm. **URL:**

http://www.hridir.org/countries/zambia/PROVCOUN/university_of_zambia/school_of_agricultural_sciences_univ_of_zambia/.

Scientific Fields of Interest: Agricultural Sciences.

Research and training: Training in: Agricultural Sciences; Food Science and Technology; Master of Science; Doctor of Philosophy; Research in the following areas: Department of Agriculture Economics - Value Chains, Poverty and vulnerability assessment and HIV/AIDS; Department of Crop Science - Crop Improvement (wheat, Maize and Beans), Plant Protection, Horticulture;

Department of Soil Science - Land Management (Soil Chemistry and Fertility, Soil Physics, irrigation and Land Evaluation) and food safety; Department of Animal Science - Ruminant and Non Ruminant Nutrition, Alternate Animal Feed ingredients, Management of Village chickens and Quails; Department of Food Science and Technology - Food Safety, Food Nutrition, Food processing and preservation.

Achievements: Two Heat-Resistant Wheat Varieties released; Simple Field Lime estimation technology; Developed bruched-resistant beans; Management Technologies for Village Chickens; Methodologies for Detoxifying Velvet Beans and utilization of velvet beans in poultry rations; Nutrient values of local animal feedstuffs; Zambian Foods Composition Table.

Facilities: 12 Computers; Equipment - Atomic-absorption spectrophotometer (AAS), Instron Texture analyzer, High-performance Liquid-chromatography (HPLC), Gas Chromatography; Field Station 10ha, Poultry, Pig and Cattle houses, University farm (678 ha); Laboratories - Food Microbiology and Food Nutrition Laboratories, Tissue-culture laboratory, Soil Chemistry and soil physics Laboratories.

Future plans: To build the second Phase of the School of agricultural sciences building - first phase was completed in 1988 when there were only 100 students. It is currently not adequate with close to 400 students; To accredit Food Microbiology and Food Nutrition Laboratories by first compiling laboratory methodologies; To make operational the Tissue-culture Laboratory by enhancing capacity of academic and technical staff and acquisition of equipment and reagents; To increase number of Post-graduate MSc students and improve mode of teaching; To increase number of relevant research activities in all Departments in partnership with public and private-sectors and communities; To increase outreach programmes with communities and private-sector; To partner with many relevant private-sector and other research institutions.

Cooperation with developing countries: The school of agriculture belongs to Regional Universities Forum for Capacity-building in Agriculture (RUFORUM) which has 12 African Universities. This facilitates Post-graduate training in centers of Excellency and thereby enhance the institution's human capacity. The school currently partners with National Research Centers in SADC Region for the M.Sc Agronomy programme. The students take courses, work in the School and carry out research in their home country Research institutions. The school intends to partner with other Universities and Research institutions to carry out relevant regional research and sharing of information.

International Organization: Rockefeller Foundation is a major Donor for our MSc programme in Agronomy, The Flemish University - VLIR-IUC is our major Donor in running the Departments of Food Science and Technology and Soil Science and their research activities. USAID is providing training at MSc level to academic staff. We are seeking Donors to help build the Second Phase of the School of Agricultural Sciences building which will provide additional lecture rooms, office spaces, laboratories and School Board room. We are currently cooperating with Kings College of London with funding from DIFD. Other

cooperations are with, CIAT, CYMMT, International Atomic Energy Agency, European Union, NUFU

University of Zambia — School of Mines

Address: P.O.Box 32379, Lusaka, Zambia. **Phone:** (+260 1) 294086. **Fax:** (+260 1) 294-086. **Email:** DNkhuwa@mines.unza.zm, DCWNkhuwa@yahoo.com.

Scientific Fields of Interest: Chemistry, Earth Sciences, Environmental Sciences.

Research and training: Research: Water-resources assessment and evaluation; environmental, related to mining activities; mineral exploration and evaluation; mineral beneficiation; exploration and evaluation and of agro-minerals. Training activities: Small-scaling mining; gemmology.

Achievements: Environmental Geochemical maps of base metal distribution in the soils, vegetation and streams sediments in the vicinity of mining areas of Kabwe and Kitwe. Developed a flow-sheet for the production of Partially Acidulated Phosphate Rock (PAPR) Fertilizer. Advisory report on the stability of the Kariba Dam as a result of the proposed extension works on the south bank to augment hydroelectric power supply to Harare, Zimbabwe. Publications on: Sanitation, groundWater-quality, and public-health problems in Lusaka; Geological and structural controls on the quantity and grade of emerald in the Ndola rural mining district, Zambia.

Facilities: One X-Ray Diffraction (XRD) machine; Two Atomic-absorption spectrophotometers (AAS); A Geographic Information System (GIS) computer laboratory; Flotation facilities; Departmental libraries - geology, mining engineering and metallurgy.

Zimbabwe

Scientific and Industrial Research and Development Centre (SIRDC) — Energy Technology Institute

Head of Institution: Prof. M.M. Elmissiry, Director.

Address: P.O. Box 6640, Harare, Zimbabwe. **Phone:** (+263 4) 860-335. **Fax:** (+263 4) 860-340, 860-350. **Email:** mosad47@yahoo.co.uk, melmissry@sirdc.ac.zw. **URL:** www.sirdc.ac.zw.

Scientific Fields of Interest: Environmental Sciences.

Research and training: Renewable energy; energy- efficiency and conservation; fuel-resources development.

Achievements: Smart solar street; affordable solar drier; efficient bio-mass stores; clever means of energy efficiency and conservation; biodiesel production and optimization.

Facilities: Renewable components test laboratories (loading, switching, powering, data monitoring and storage); renewable laboratories for training (solar home systems); mini/micro hydro units, solar water pumping unit); energy efficiency laboratory (meters, data loggers, compilers); indoor pollution-measuring equipment bill & load analysis software package) and others.

Future plans: Strengthen research staff; acquire laboratory equipment; run in-house Post-graduate-programmes; develop a regional alliance.

Cooperation with developing countries: MoU with BOTEC (Botswana), CSIR (South Africa) and Research Alliance with BOTEC and CSIR.

International Organization: EU Sparknet Project; AFREPREN; UNDP GEF small grant; GTZ; UNESCO

University of Zimbabwe — Department of Biological Sciences

Head of Institution: Dr. C. Zimuazi, Chairman.

Address: P.O. Box MP 167, Mount Pleasant, Harare, Zimbabwe. **Email:** webmaster@compcentre.uz.ac.zw. **URL:** www.uz.ac.zw.

Scientific Fields of Interest: Biological Sciences, Environmental Sciences.

Research and training: Fisheries biology; aquatic ecology; tropical resources biology; tropical entomology.

Achievements: The dept. runs a successful aquatic ecology M.Sc. and Ph.D. fellowship programme; established a center for tropical resources and ecology, specializing in training and research; chosen as one of the sub-regional centers for the international center for insect physiology and ecology (ICIPE) regional post-graduate-programme.

Facilities: 2 student computer labs in the department; an interfaculty research station (Lake Kariba research station).

Future plans: Transform the department into an internationally recognized research and training center in areas like aquatic ecology, tropical resource biology and tropical entomology.

Cooperation with developing countries: Cooperation agreement with NUFU, which sponsors one Ph.D student in plant science; cooperation agreement with the Flemish universities link which sponsors three Ph.D. and five M.Sc. students in aquatic biology; agreement with the ICIPE which sponsors the Masters in tropical entomology programme.

University of Zimbabwe — Institute of Mining Research (IMR)

Head of Institution: Spencer Kahwai.

Address: P.O. Box MP 167, Mount Pleasant, Harare, Zimbabwe. **Phone:** (+263 4) 336-418. **Fax:** (+263 4) 336-418. **Email:** imr@science.uz.ac.zw, speka@science.uz.ac.zw. **URL:** www.uz.ac.zw/units/imr.

Scientific Fields of Interest: Chemistry, Earth Sciences.

Research and training: Analytical chemistry; Applied mineralogy; Economic geology; Metallurgy; Mineral economics; Environmental engineering; Mining geology; Mineral processing; PGMs, processing technology for tantalite, occupational health and safety in the mining sector; Development of exploration methods for small-scale miners.

Achievements: Research reports and papers; analytical results.

Facilities: AAS, XRD, XRF, ICP, Dust and Noise samplers, Coal laboratory equipment, Computers, Library for the mining industry.

Future plans: Advanced researches to assist small-scale miners develop appropriate technology.

Cooperation with developing countries: Research links within the SADC region.

International Organization: Research links with other Universities and research organizations around the world. Fogarty and IDRC are the only foreign-funded projects at the moment.



TWAS – the academy of science for the developing world

Founded in 1983 by a group of eminent scientists under the leadership of the late Nobel Laureate Abdus Salam of Pakistan, TWAS – the academy of sciences for the developing world (formerly the Third World Academy of Sciences) – is an autonomous international organization, based in Trieste, Italy. TWAS's membership currently totals some 840 eminent scientists. More than 80 percent are from developing countries.

The main aims of TWAS are to build scientific capacity, support excellence in science, and promote science and technology for sustainable economic development in the South. TWAS seeks to achieve these goals through a series of programmes that include grant and fellowship schemes, the promotion of South-South collaboration among scientists and serving as the 'voice of science' in the South.

At its headquarters in Trieste, TWAS is also responsible for the administration of four other international secretariats: the InterAcademy Panel on International Issues (IAP, see www.interacademies.net), the InterAcademy Medical Panel (IAMP, see www.iamp.org), the Third World Organization for Women in Science (TWOWS, see www.twows.org) and the interim secretariat of the Consortium on Science, Technology and Innovation for the South (COSTIS, www.twonso.org interim website), which evolved from the Third World Network of Scientific Organizations (TWNSO) established by TWAS in 1988.

Among other relevant activities, TWAS and TWNSO together were essential in establishing COMSATS, the Commission on Science and Technology for Sustainable Development in the South (www.comsats.org), whose membership now numbers 21 and consists of heads of state and governments in the South.

Contact:

the academy of sciences for the developing world (TWAS), ICTP Campus, Strada Costiera 11, 34014 Trieste, Italy, Phone: +39 040 2240327, Fax: +39 040 224559, Email: info@twas.org, Website: www.twas.org



COMSATS – The Commission on Science and Technology for Sustainable Development in the South

The Commission on Science and Technology for Sustainable Development in the South (COMSATS) which was established in October 1994 is an intergovernmental and international organization, aimed at facilitating the socio-economic uplift of the countries of the South through the use of appropriate Science and Technologies for sustainable development.

The idea of forming a joint commission of the highest forum from the countries of the South was first conceived by Prof. Dr. Abdus Salam, the Nobel Laureate, in view of the increasingly widening gap of knowledge, as well as S&T capacity between North and South. In the wake of this scenario the idea was realized by a number of political leaders and head of states of developing nations of the South, who joined hands and translated the idea into reality in the form of a full-fledge commission dedicated to the science-led sustainable socio-economic development of the third world countries.

At present, COMSATS is represented by 21 developing countries spread across three continents, i.e. Latin America, Africa and Asia, coordinated by the Secretariat at Islamabad, Pakistan. A Network of 14 International Science and Technology Centres of Excellence are also linked with COMSATS to play a pivotal role in development of its member states.

COMSATS is focused on accessing, organizing, developing and sharing human and technological resources among the developing countries, with the objective of uplifting their socio-economic condition. COMSATS has been initiating a number of collaborative programmes with its designated focal points, which are mainly ministries of Science and Technology or ministries of Higher Education and R&D institutions, and its Network of International Science and Technology Centres of Excellence. Numerous international organizations of the member states are also making vital contributions towards the achievement of the organizational goals of the Commission. Over the coming years, the Commission shall continue to promote science & technology for overcoming common regional challenges and reducing the imbalances in developmental status of the world, in general, and the developing countries, in particular.

Contact:

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