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Contributions from readers are welcome on any matter relevant to the mission of COMSATS, namely the promotion of South-South cooperation in science and technology for sustainable progress of the developing countries. The responsibility for the accuracy of any information rests with the original source. Views expressed in this publication do not necessarily reflect those of its editors, publisher or COMSATS.



*D. G. IRCC-Sudan with Resource Persons and Participants of COMSATS' Workshop on Repair and Maintenance of Scientific Equipment, held in Khartoum*

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## From the Executive Director's Desk

The countries of the South, in general, are continuing to lag behind in the rapid pace of scientific and technological developments at global level. The national resources and international support for bridging the gap between the advanced and developing countries is perhaps inadequate to make a visible impact. Thus, cynicism abounds and takes the form of deriding the sincere efforts at national and international levels that do contribute towards alleviating capacity deficit.

The South-South cooperation through multilateral fora is a good example of ground-level support delivery, which nevertheless remains less projected and under-appreciated. The highly successful joint programme of COMSATS and ISESCO, for the repair and maintenance of scientific equipment in developing countries, which has been going on since 2004, is worth international recognition in view of its direct benefits to working scientists. Given the market-economy trends, which are steered by the consideration of profitability, and restrained only by international trade rules rather than moral compulsions, it is not uncommon that some multinational companies fleece the developing world institutions through the supply of equipment at exorbitant prices. It is often observed that due to lack of indigenous purchasing

expertise, the imported items either do not serve the intended purpose, or their production is already slated to be stopped. The weakness of the recipient institutions is also manifested in the form of inadequate funds for continuous supply of spares and agreements of maintenance support by the supplier. Resultantly, non-operative equipment worth millions of dollars is found dumped in the universities, R&D organizations and industries in resource-deficient countries.

Wouldn't it be nice if some of this equipment is repaired and put to use as intended at the time of purchase; would it be possible to do so with the help of experts from within developing countries?; wouldn't it be highly welcome if the service is provided at no cost to beneficiary institution?; can COMSATS lead this effort and deliver tangible results? These were the questions that prompted the programme of 'Repair and Maintenance of Scientific/ Engineering Equipment in Universities, Research Institutions and Small Scale Industries', leading to the training of personnel and on-site repair of faulty equipments by COMSATS' team of experts, benefitting hundreds of scientific workers in COMSATS' member countries. A report of two such

*continued on page 5*

## NEWS/ACTIVITIES/HIGHLIGHTS FROM COMSATS SECRETARIAT

### COMSATS' RESEARCH GROUP ON CLIMATE CHANGE MEETS IN CHINA

COMSATS' International Thematic Research Group (ITRG) on 'Climate Change and Environmental Protection' is one of the three active groups carrying out collaborative research in specialized scientific areas. Under the leadership of Prof. Lin Zhaohui, the Director International Center for Climate and Environment Sciences (ICCES), China, the ITRG is undertaking joint research project entitled 'Characteristics and Mechanism of the Extreme Climate Events under the Climate Change Background', which is being funded by the Ministry of Science and Technology, Government of China.

The second meeting of the Group was held on 21<sup>st</sup> July 2013, in Beijing-China, on the sidelines of the ten-day International Training Workshop on "Extreme Weather and Climate Events: Detection, Monitoring, Prediction and Risk Management for Developing Countries" (14-23 July 2013). The meeting was co-organized by COMSATS and its Centre of Excellence in China, the ICCES.

The primary objectives of the meeting were to identify suitable and willing researchers to participate in the activities of the Group; finalize an Action Plan for steering the research efforts of the Group to achieve the desired results, as well as to delegate specific research assignments among the group members, who are willing to perform the assigned tasks in their own laboratories, as well as share climate data and research results with their Group Leader. The meeting was attended by 33 participants from China, Egypt, Ethiopia, Iran, Malaysia, Mongolia, Nepal, Nigeria, Pakistan, Sri Lanka, Thailand, Uganda and USA.

The technical proceedings of the meeting comprised: a brief presentation by Advisor (Programmes) COMSATS on the background and objectives of ITRGs and COMSATS' expectations from the Group's second meeting; presentation by the Group Leader on the progress made by

the existing Group members, as well as future aspirations of the group; and presentation of research papers relevant to the theme of the joint research project by 17 participating researchers. In their presentations, the participants deliberated on various weather phenomena with regard to agricultural productivity and environment; health; variability of rainfall and hydroclimate anomalies; rainfall runoff; and prediction of various extreme weather events and related disasters. Relevant models were also discussed in these presentations.

During the discussion session, the participating researchers identified their areas of interest, as well as their expertise that could contribute to success of the project. The Director ICCES urged the participants to share their respective countries' meteorological data to suitably execute the project. The participants pledged to cooperate for sharing of expertise for training and capacity building; preparation of prediction models; collection and sharing of meteorological data; and publication of joint research papers related to the theme of the project.

The meeting also finalized an Action Plan with given timeline for the execution of the project, and decided to take the first step in this regard, i.e. to collect meteorological data and perform preliminary analysis of different extreme-weather events in the countries of collaborating institutions. The Group members agreed to provide progress reports on quarterly basis to the Group Leader regarding the status of implementation of the project.

### COMSATS-ICCES TRAINING WORKSHOP ON EXTREME WEATHER HELD IN CHINA

The ten-day International Training Workshop on 'Extreme Weather and Climate Events: Detection, Monitoring, Prediction and Risk Management for Developing Countries' was successfully held from 14<sup>th</sup> to 23<sup>rd</sup> July 2013, in Beijing, China. The workshop was organized by COMSATS' Centre of Excellence in China, the International Center for Climate and Environment Sciences (ICCES), with co-sponsorship from Chinese Academy of Sciences (CAS), The World Academy of Sciences (TWAS), the Commission on Science and Technology for Sustainable Development in the South (COMSATS), and the International S&T Cooperation Program of China.

The inaugural session of the event was held on 15<sup>th</sup> July 2013, that featured speeches and messages by Mr. Jinghua Cao, Deputy Director General, Bureau of International Cooperation, CAS, China; Dr. Imtihan Elahi Qureshi, Executive Director COMSATS; Prof. Jiang Zhu, Deputy Director, IAP, China; Prof. Lin Zhaohui, Director ICCES, and Mr. Zamir Ahmed Awan, Science Counselor, Embassy of Pakistan in China. The technical sessions of the workshop provided training on important topics in-line with the theme



*Distinguished guests of the informal opening ceremony of 2nd meeting of ITRG*



*Group Photo of the participants of the Workshop on 'Extreme Weather and Climate Events: Detection, Monitoring, Prediction and Risk Management for Developing Countries*



*Federal Minister for Science and Technology receiving a briefing on COMSATS by E.D. COMSATS*

of the event. These include: observation and detection of extreme climate events, their monitoring and prediction, and management of related risks. Invited lectures by six subject experts belonging to Australia, China and USA, as well as 11 oral presentations by local and foreign participants were the major highlights of the technical proceedings. Moreover, the event included scientific visits to the University of Chinese Academy of Sciences (UCAS); Chinese Meteorological Agency (CMA); and ICCES/IAP Supercomputing Facility.

Attended by a total of 62 participants, including 29 participants from outside China, the workshop facilitated scientific and technological cooperation among the participating research organizations belonging to various developing countries, and enhanced their capacities to timely predict, detect and monitor extreme weather and climate events, and to work-out necessary measures for their mitigation at national, regional and international levels. The countries represented during the workshop include: Bangladesh, China, Egypt, Ethiopia, India, Iran, Malaysia, Mongolia, Nepal, Nigeria, Pakistan, Sri Lanka, Thailand and Uganda.

### **BRIEFING ON COMSATS GIVEN TO THE INCUMBENT PAKISTANI MINISTER FOR SCIENCE AND TECHNOLOGY**

On 16<sup>th</sup> July 2013, the Federal Minister for Science and Technology, Government of Pakistan, Mr. Zahid Hamid, was briefed on the international programmes and activities of COMSATS. Accompanied by the then Federal Secretary, Ministry of Science and Technology, Mr. Akhlaq Ahmad Tarar, the Minister was on a visit to COMSATS Secretariat. In the presence of other senior officials of COMSATS Secretariat, the Executive Director COMSATS, Dr. Imtihan Elahi Qureshi, made a presentation on COMSATS' international programmes and flagship projects in the host country Pakistan, including COMSATS Institute of

Information Technology, and COMSATS Internet Services.

Dr. Qureshi introduced COMSATS as an inter-governmental organization and informed the high government officials about its membership, governing bodies and major projects and programmes, including its International Thematic Research Groups (ITRGs). It was noted that the objective of scientific cooperation for development is further consolidated through collaboration with international development organization, the most notable among which are UNESCO and ISESCO. COMSATS also makes efforts for creating synergies with other important scientific organizations of the South and the North, including TWAS, AS-ICTP and CERN.

COMSATS' participation for preparing Pakistan's Science, Technology and Innovation Policy (2012) was also noted. Discussing the financial affairs of COMSATS, the Executive Director sought the Minister's support to enhance Government of Pakistan's annual grant to COMSATS for suitably fulfilling its international obligations and smoothly undertaking its national and international activities. Support of the Ministry was also solicited for establishing COMSATS' Endowment Fund in accordance with the commitment by the Prime Minister of Pakistan made during the 2<sup>nd</sup> COMSATS' Commission Meeting (April 2012).

The Minister was appreciative of the role being played by COMSATS for S&T-led development in the South. He lauded COMSATS' joint research initiative through its ITRGs, particularly the one working on Medicinal Plants, and suggested to commercialize the useful products that may be developed as a result of the Group's research. The Minister noted with pleasure the efforts of COMSATS Internet Services for education and health sectors, its tele-health initiative in particular. He showed willingness to support the expansion of CIS' tele-health operations to far-flung areas of the country.

## SPECIAL SECTION: COMSATS' TRAINING WORKSHOPS ON REPAIR AND MAINTENANCE OF SCIENTIFIC EQUIPMENT HELD IN SUDAN AND GHANA

### Introduction

Having trained more than 200 scientists, engineers, technicians and academics in repair and maintenance of scientific equipment in the past, COMSATS' capacity-building programme continues to benefit the developing countries. The recent beneficiary countries of these trainings are Sudan and Ghana, where two five-day national workshops on "Repair and Maintenance of Scientific, Engineering Equipment in Universities, Research Institutions and Small Scale Industries" were held during the month of August 2013. These events were the sixth and seventh of the series of workshops, which started in Sudan in 2004 and was followed by similar national events in other developing countries, including Syria, Senegal, Egypt and Tunisia.

The main objective of these workshops is to develop indigenous capacities of the local scientists and institutions in the developing countries for repair and maintenance of their scientific equipment to ensure uninterrupted R&D activities and to encourage and promote self-reliance among scientists for repairing and maintaining their scientific equipment, and help them save time, effort and finances involved in outsourcing the task.

The modules covered during these two back-to-back events pertained to: Spectrophotometer Systems; Flame Photometer Systems; Dialysis Systems; Patient Monitors; Gas Chromatographic Systems; HPLC Systems; Spectrum Analyzers; Electron Microscopes; Centrifuge Systems; Laboratory Glassware; Balances; Thermal Equipment; pH Meters & Colorimeter; Microscopes; and Laboratory Planning and Management. The training sessions comprising lectures were complemented by hands-on training in the labs of local laboratories.

Among the equipment on which hands-on demonstrations

were made in the local labs were: Spectrophotometer; Colorimeter; different kinds of Centrifuge and Leaf Porometers; Digital Balance; Flame Photometer; Conductivity Meter; Autoclave; and Nitrogen Generator.

The highlights of these visits were the introductory seminars on functions and operations of the relevant scientific equipment; trouble-shooting of the faulty equipment; experts' direct supervision, commentary and suggestions during the hands-on sessions; and the repair of the faulty equipment by the participants themselves.

Two experts, Dr. Muhammed Yaqub and Mr. Arif Karim, from Pakistan Council for Scientific and Industrial Research (PCSIR) Pakistan, were mobilized and sponsored by COMSATS to impart training for the workshops.

### Workshop in Sudan

Held in collaboration with the Islamic Educational, Scientific and Cultural Organization (ISESCO), the workshop in Sudan commenced on August 18, 2013, in Khartoum. The event was hosted at the premises of the Industrial Research and Consultancy Centre (IRCC), a COMSATS' Centre of Excellence in Sudan. Prof. Ahmed El Tayeb, Chairman Board of Directors of IRCC, graced the inaugural ceremony of the workshop as the Chief Guest. The ceremony was attended Dr. Azhari M. Elbadawi, Director General IRCC; Mr. Nisar Ahmad, Senior Assistant Director (Systems), COMSATS; and Engr. El Haq Yousif El Makki, Chairman Engineering Chamber, Sudan. Also present on the occasion were the senior officials and representatives from the Sudanese Ministries of Industry, and Science and Communications, as well as from other institutions of Sudan, including Measurement and Calibration Centre, Medical Military Hospital, National Cancer Institute, National Public Health Laboratory, Pharmaland pharmaceuticals, Wad Madani Teaching Hospital (El Gezira State), and Elmek



Opening Ceremony of the Repair and Maintenance Workshop in Sudan



COMSATS' Experts demonstrating repair techniques to participants of the Workshop



Group Photo at the Closing Ceremony of the Repair and Maintenance Workshop in Ghana

Nimir Hospital. Mr. Ballal Yousaf, Under-Secretary Ministry of Industries, Government of Sudan, formally closed the ceremony on August 22, 2013.

During the workshop, the trainees attended seminars on troubleshooting and repairing during the 10 technical sessions of the workshop; the knowledge acquired thereby was later practiced in the labs of IRCC; Central Laboratory, Soba; and Military Hospital, Omdurman.

### Workshop in Ghana

The 7<sup>th</sup> workshop on 'Repair and Maintenance of Scientific Engineering Equipment in Universities, Research Institutions and Small Scale Industries' was held soon after the one in Ghana. Following an inaugural session on August 26, 2013, the 18 technical sessions of the workshop continued till the month end. This workshop was hosted by COMSATS' Centre of Excellence in Ghana, the Council for Scientific and Industrial Research (CSIR), at one of its research institutes, the Institute of Industrial Research (IIR) in Accra.

The guests of honour of the inaugural ceremony included Dr.

A. B. Salifu, Director-General CSIR; Mr. Nisar Ahmad, Senior Assistant Director (Systems) COMSATS; Mr. H. A. Obiri, Director IIR; Dr. G. N. Laryea, Acting Deputy-Director IIR; and Mr. E. N. Kotey, Head of Metrology Department, IIR. The ceremony also had a significant participation of senior officials of CSIR and lab technicians belonging to the various institutes of the Council: Building and Road Research Institute (BRRI); Institute of Industrial Research (IIR); Crop Research Institute (CRI); Oil Palm Research Institute (OPRI); Water Research Institute (WRI); Institute of Technological Information (INSTI); Food Research Institute (FRI); Savanna Agri Research Institute (SARI); and Science and Technology Policy Research Institute (STEPRI). The event featured speeches by Director IIR, Executive Director COMSATS and D.G CSIR. The event was closed on August 30, 2013, by Dr. Yahuza Mohammed Gomda, Director Science, Technology and Innovation of the Ministry of Environment, Science, Technology and Innovation, Government of Ghana. Three local resource persons, Mr. Godfried Ampo, Mr. Benjamin S. Addy and Mr. Gabriel A. Mensah, also joined the experts mobilized by COMSATS from PCSIR to impart training during this workshop.

### Outcomes of the Training Workshops

The Sudan and Ghana workshops resulted in training more than 70 participants, including engineers, researchers, technicians and students of various institutions from these countries. It is safe to say that these workshops have led to developing indigenous capacity of these countries by training the master-trainers for maintenance of scientific equipment used in the academic and research institutions which serve as engines of growth in a country.

#### Excerpts from a letter from D.G. IRCC to E.D. COMSATS

"The need for such a workshop was apparent since our research centres, universities and hospitals have stacks of faulty instruments. This is due to shortage in trained and qualified engineers.....The workshop surely laid a strong foundation for the future, and no doubt has surpassed our expectations with its immense success".

#### contd. from page 1 ... 'From the Executive Director's Desk'

workshops, held in Sudan and Ghana, is included in this issue.

COMSATS has always been proactively engaged with its worldwide Centres of Excellence, to facilitate exchange of manpower and technical know-how among member countries. One of the most profound ways of doing so is the organization's successful venture of creating research groups with multi-national teams of scientists. The

meeting of one of these groups, working in the field of Climate Change is also included in this issue of the Newsletter, which manifests healthy state of South-South cooperation in S&T through the platform of COMSATS. This would hopefully be a matter of satisfaction for COMSATS' Member States.

Any constructive criticism, sound advice or general comments from Newsletter readership regarding COMSATS' activities and programmes are most welcome.

## BIOGRAPHIES OF EMINENT SCIENTISTS: BERNARDO ALBERTO HOUSSAY

Bernardo Alberto Houssay was born in Buenos Aires, Argentina, on April 10, 1887. He was one of the eight children of Dr. Albert and Clara (née Laffont) Houssay, who had come to Argentina from France. His father was a barrister. His early education was at a private school, the Colegio Británico. He then entered the School of Pharmacy of the University of Buenos Aires at the exceptionally early age of 14, graduating in 1904. He had already begun studying medicine and, in 1907, before completing his studies, he took up a post at the Department of Physiology. Here he began his research on the hypophysis that resulted in his M.D. thesis (1911), a thesis which earned him a university prize.



In 1910, he was appointed Professor of Physiology in the University's School of Veterinary Medicine. During this time, he had been doing hospital practice and, in 1913, became Chief Physician at the Alvear Hospital. In addition to this, he was also in charge of the Laboratory of Experimental Physiology and Pathology in the National Department of Hygiene from 1915 to 1919. In 1919, he became Professor of Physiology in the Medical School at Buenos Aires University. He also organized the Institute of Physiology at the Medical School, making it a centre with an international reputation. He remained Professor and Director of the Institute until 1943. In this year, the then Government deprived him of his post, as a result of him voicing his concern that there should be effective democracy in the country. Despite receiving many invitations from abroad, he continued his work in an institute which he organized with the support of funds contributed by the Sauberan Foundation and other bodies. This was the Instituto de Biología y Medicina Experimental. In 1955, a new Government reinstated him in the University.

Dr. Houssay has worked in almost every field of physiology, having a special interest in the endocrine glands. He has made a lifelong study of the hypophysis and his most important discovery concerns the role of the anterior lobe of the hypophysis in carbohydrate metabolism and the onset of diabetes. He has worked on many other topics in physiology and pharmacology, including the physiology of circulation and respiration, the processes of immunity, the nervous system, digestion, and snake and spider venoms.

Apart from his research, he has been active in promoting the advancement of university and medical education, and of scientific research, in Argentina.

Dr. Houssay is the author of over 500 papers and of several books. He has won many prizes ranging from that of the National Academy of Sciences, Buenos Aires, in 1923, to the

Bernardo Alberto Houssay was one of the most prominent and influential Latin American Scientists of the twentieth century. His total dedication to the pursuit of knowledge and his untiring efforts to foster scientific and technical training among his compatriots received worldwide recognition. For more than twenty-five years his Institute of Physiology at the University of Buenos Aires was the scientific beacon for all of Latin America, and from its laboratories emerged disciples who were to occupy prominent positions in scientific research and training throughout the continent.

Dale Medal of the Society of Endocrinology (London) in 1960.

He holds honorary degrees of twenty-five universities and is a member of the Argentine National Academy of Medicine, the Academy of Letters, the National Academy of Sciences of Buenos Aires, the Academy of Moral and Political Sciences of Buenos Aires, and of the Pontifical Academy of Sciences. He is honorary professor of 15 universities, foreign associate of 11 academies or learned societies, member (honorary or correspondent) of 38 Academies, 16 Societies of Biology, 11 of Endocrinology, 7 of Physiology and 5 of Cardiology. He has been decorated by the governments of several countries.

He married Dr. Maria Angelica Catan, a chemist, who died in 1962. They have three sons, Alberto, Hector, and Raul.

In 1947 Houssay was awarded the Nobel Prize for Physiology or Medicine. That year the prize was divided, one half being awarded jointly to Carl Ferdinand Cory and Gerty Theresa Cori, née Radnitz, "for their discovery of the course of the catalytic conversion of glycogen". The other half went to Bernardo Alberto Houssay, "for his discovery of the part played by the hormone of the anterior pituitary lobe in the metabolism of sugar".

Bernardo Houssay died on September 21, 1971.

*From Nobel Lectures, Physiology or Medicine 1942-1962, Elsevier Publishing Company, Amsterdam, 1964*

*This autobiography/biography was written at the time of the award and first published in the book series Les Prix Nobel. It was later edited and republished in Nobel Lectures.*

## ACTIVITIES/NEWS OF COMSATS' CENTRES OF EXCELLENCE

### SCHOLARS FROM CIIT-PAKISTAN PARTICIPATE IN INTERNATIONAL EVENTS

Dr. Tanvir Akbar Kiani, Assistant Professor, Department of Mathematics of COMSATS Institute of Information Technology (CIIT), participated in the "School on Hands-on Research in Complex Systems", which was held on July 1-12, 2013, by Abdus Salam International Centre for Theoretical Physics (AS-ICTP). The activity, which is inherently interdisciplinary, covered a wide range of topics from biological networks to spatial patterns in fluids to laser chaos. The School offered an interactive experience to the participants along with hands-on research experience involving tablet experiments with real-time computer data acquisition. Computational modeling associated with data acquisition was also deliberated upon during the event. Technical sessions were focused mainly on complex systems in the physical and life sciences.

A delegation of CIIT participated in 3W Istanbul 2013 – Istanbul International Solid Waste, Water and Wastewater Congress 2013, held on May 22-24, 2013. The Congress was organized at the Halic Congress Center in cooperation with the Turkish Ministry of Environment and Urbanism, and Ministry of Forestry and Water Affairs, to address sustainable management of solid waste, water and wastewater. The delegation from CIIT comprised of Dr. Musarrat Jabeen, Associate Professor in the Department of Development Studies; Ms. Marriam Arif, Lecturer at Humanities Department, CIIT; and Mr. Adil Rasheed, a student of BBA, Department of Management Sciences, CIIT. The delegation presented a paper on 'Indexing Water Security in Abbottabad (Pakistan) in Perspective of Climate Change and Institutional Capacity' and an oral presentation titled, 'Framing the Chemistry of Himalayan Water Conflict in South Asia in Perspective of Climate Change', as well as a poster presentation on 'Assessment of Water Security Perception in Perspective of Climate Change in Balochistan'. These were among 164 oral and 111 poster presentations made by the participants from 29 different countries of Balkans Peninsula, Middle East, Central Asia, Africa and Europe. In all, 27 keynote speakers from Turkey and abroad attended the Congress.

### RESEARCH GRANTS AND FELLOWSHIPS WON BY CIIT

The Higher Education Commission (HEC) of Pakistan has granted Dr. Sarfraz Shafiq of the Department of Environmental Sciences, CIIT, Abbottabad, a research grant worth Rs. 0.5 million for his research project titled 'Identification and Characterization of Lead (Pb) responsive genes in wheat (*Triticum aestivum*)'; and to Prof. Dr. Ishtiaq Jadoon of the Department of Earth Sciences, CIIT, a grant of Rs. 3.5 million, under National Research Programme for Universities (NRPU). Dr. Jadoon's project will undertake research for three years on the Sulaiman mountain system,



CIIT Delegation participating in 3W Istanbul 2013

which is an area of active petroleum exploration and is known for high intensity of earthquakes in the region. Moreover, HEC start-up project grant of Rs. 0.471 million has been approved for a project titled 'Direct and Inverse Problems for Time Fractional Diffusion Equations'.

Dr. Abdullah Shah, Associate Professor, Department of Mathematics, CIIT Islamabad, is in China for a research visit under TWAS-UNESCO Associateship Scheme. Mr. Aamir Ali, Lecturer at the Department of Mathematics, CIIT, who is working on his Ph.D thesis, has won one of the two prestigious 6 months ERASMUS MUNDUS fellowships for "Universite de Nice Sophia-Antipolis (UNS)," Nice, France, for the years 2012/2013. During his stay at UNS, he submitted two research papers for publication in international journals. Dr. Nawaz Malik of CIIT was awarded a fully funded Ph.D scholarship by the Marie Curie funding agency (EU) in the field of Bioinformatics.

### EXPERTS OF EMBRAPA AGROBIOLOGIA-BRAZIL DISCUSS USE OF MICROORGANISMS IN AGRICULTURE

"Brazil is the largest consumer of pesticides in the world and the fourth largest consumer of nitrogen fertilizers. The people who have the opportunity to interact with the private sector, know that the country is eager for new technologies, and new products", said Dr. Eduardo Compello, Director General Embrapa Agrobiologia, on the occasion of a three-day workshop on 'Microorganisms in Agriculture: Potential Applications and Regulations', held in Urca, south of the city of Rio de Janeiro. Held from July 2-4, 2013, the workshop was attended by Brazilian and foreign researchers, legal experts and representatives of private sector. The event was sponsored by Ibero-American Business Networking, under a project that studies the diversity of beneficial microorganisms as an alternative for promoting plant growth and maintenance of the quality of agricultural soils. The Network - Dimiagri project - began in 2008 and is about to reach its maturation. The following countries are a part of

this initiative: Brazil, Argentina, Uruguay, Mexico, Guatemala, Colombia and Spain. The event included discussions not only about the importance of sustainable agriculture but also about aspects related to the marketing of inoculants in Brazil. Discussions were also made on registration processes, law and marketing access to biodiversity, and included comparisons between what happens in Brazil and other nations.

Dr. Campello further underscored the need for new biological inputs for pest control and fertilization of plants as the environment tolerance towards the use of synthetic molecules and environmental imbalance has been tested to its limits. He believed that the gap between research and the private sector for drawing the required investments is one of the bottlenecks.

Speaking on the occasion, an agronomist, Ricardo Silva Araújo, from the Total Biotechnology, Paraná, commented that there is a link missing between industry and research institutes. "This association", he said in his lecture about the Brazilian inoculants industry," is important as there is always the possibility of the company and academia profit from new products". Mr. Araújo informed how Brazil is saving millions of dollars in agriculture every year using biological nitrogen fixation. He pointed out some issues relating to innovation in agriculture for adopting biological products and processes: lack of coordination with private companies, high costs for small domestic industries, bureaucracy for product registration and overzealous academic, and the predominance of multinational companies in the market.

It was noted that there are a number of standards and protocols regarding the use and marketing of inoculants in Brazil. The two main ones are the normative instructions numbers 13/2011 and 30/2010, issued by the Secretariat of Agricultural Protection, Ministry of Agriculture, Livestock and Supply (MAPA), noted an agroeconomist, Hideraldo Coelho. He believed that all products must be evaluated and approved before they are made available in the market.

Working in the area of regulation and supervision of maps, Laucir Rodrigues Gonçalves, stated that legislation is a need for standardization of products that are marketed, for which she called on the researchers to identify and indicate the problems encountered by them in legislation.

#### **RSS-JORDAN AND THE NORWEGIAN EMBASSY IN AMMAN SIGN AN AGREEMENT**

An agreement was signed in Amman on July 2, 2013, between the Royal Scientific Society (RSS), Jordan, and the Norwegian Embassy in Amman. The agreement will enable RSS to implement a project for the development of Jordan's National Network on Environmental Compliance and Enforcement. This Network will include all institutions working in the field of compliance and enforcement of laws



*Officials of RSS and the Norwegian Embassy in Amman during the signing ceremony*

and regulations that deal with conservation of natural resources in order to enhance cooperation and dialogue among these institutions.

The Network will work on the preparation of Jordan's national priorities list in the field of environmental compliance and enforcement as well as identifying obstacles and developing a plan for Jordan's National Environmental Compliance & Enforcement.

This project comes within Jordan's efforts to activate environmental compliance and enforcement to achieve sustainable development and bring forth the Jordanian experience in this area in preparation for the transfer of expertise to other Arab countries through the Arab Network for Environmental Compliance and Enforcement (ANECE) launched in the 1<sup>st</sup> regional meeting held in 2009.

The agreement was signed by H.E. Petter Olberg, the Norwegian Ambassador and Dr. Muhammad Saidam, Executive Director for Knowledge at the Royal Scientific Society, Jordan.

#### **NMC-NIGERIA SECURES CIIT SCHOLARSHIP AWARDS FOR ELEVEN NIGERIANS**

In pursuit of its cardinal mandate to generate a critical mass of high level mathematical scientists, the National Mathematical Centre (NMC) Abuja, Nigeria, secured scholarship awards for eleven Nigerians from the COMSATS Institute of Information Technology (CIIT), Islamabad. The scholarships were awarded to the Nigerian graduates to study in various Master degree (MS) programmes offered by CIIT, Islamabad, commencing from September 2013. The scholarship awards cover tuition, boarding and lodging, while COMSATS Headquarters has provided air travel to the awardees. Eight of the scholarship awardees have resumed studies at the Islamabad Campus of CIIT.



## ARTICLE: PATENT OF RSS-JORDAN FOR PREVENTING GALVANIC CORROSION

Dr. Farqad Al Hadeethi \*

There are three major reasons for preventing galvanic or dissimilar metal corrosion in industry: safety, economics and conservation. In fact, large industries cannot withstand major galvanic corrosion failures, especially those causing personal injuries, fatalities, unscheduled shutdowns and environmental contamination. Therefore, considerable efforts are generally exerted in corrosion control at the design and operational stages. Basically, a galvanic corrosion cell forms when two or more different metals are directly in contact with each other and placed inside a conductive environment (electrolyte) causing an electric current to pass through the cell due to the potential difference initiated between or among metals. This potential difference will provide a stronger driving force for the dissolution of the less noble (more electrically negative) metalise or metals in the galvanic series. On the other hand, it is worth mentioning that the electrochemical reactions occurring among the metals and the surrounding environment follow the laws of Thermodynamics. Therefore, better understanding of the principles of chemistry, electricity and chemical engineering explains why galvanic corrosion processes are time, temperature and motion dependent, as well as affected by ion and electrolyte concentrations. The electrochemical system (Galvanic Corrosion Monitoring and Analyzing System (GCMAS)) shown in Figure-1 has thus been invented to provide better understanding of the above-mentioned principles. GCMAS was registered as a patent in the European Patent Office (Patent no. EP1956357), the Jordanian Patent Office (Patent no. 2377) and has also been filed as a patent in USA (Patent no. 2008/0257729 A1), Japan (Patent no. JP2008304448), and India (Patent no. 246/DEL/2008A).

Flat metallic specimens of the dimensions 15x30x2 mm made of different metals or alloys coupled together using the designed cell shown in Figure-2, whereby the galvanic current values and directions can be monitored at the same time for the whole combination by exposing it to

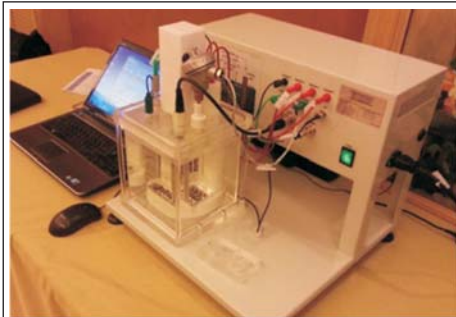


Figure-1: Galvanic Corrosion Monitoring and Analysis System (GCMAS)

identical corrosive medias (electrolytes) under specific operating conditions.

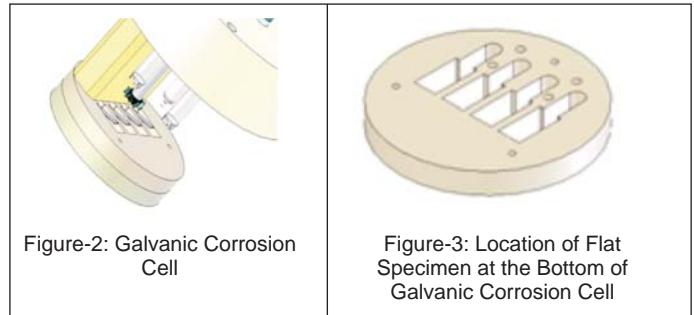


Figure-2: Galvanic Corrosion Cell

Figure-3: Location of Flat Specimen at the Bottom of Galvanic Corrosion Cell

The electrolyte is kept perpendicular on the flat specimens, which are kept at the bottom of the galvanic corrosion cell to allow electrochemical reactions (Oxidation and Reduction) to occur on the surface of the coupled flat specimens as shown in Figure-3.

The control panels of GCMAS software package used to measure and map the galvanic currents and coupling potential with time, without affecting the continuity of the electrochemical reaction. This software package measures the temperature and pH of the corrosive environment, as well as enables the user to measure and control the speed of agitation in order to direct the migration of ions from the bulk of the electrolyte to the surface of the metallic specimens when the electrochemical reaction is under the control of Mass Transfer. In summary, the benefits of GCMAS could be listed as follows:

1. It could be utilized for selecting the appropriate materials (i.e. metals or alloys) for fabricating mechanical structures used in various industrial applications in order to prevent galvanic corrosion.
2. It enables the user to explore and identify thoroughly the causes of reversal of polarity, which occur among metals at certain temperatures and area ratio of Cathode to Anode.
3. It helps in understanding the causes of localized corrosion phenomena (i.e. Pitting and Crevice) generated due to the galvanic coupling among metals.
4. It enables the user to predict new galvanic series of metals by introducing different corrosive environments.

\* **About the Inventor:** Dr. Farqad Al Hadeethi is an Associate Professor and Senior Researcher in the field of chemical engineering/corrosion and electrochemical reaction engineering at the Royal Scientific Society of Jordan. In his current position, Dr. Al Hadeethi is conducting research on new corrosion inhibitors, new coating materials, using advanced concepts, as well as adopting new methodologies to solve various corrosion problems in the Jordanian industry. He is also working on researches related to renewable energy and the utilization of electrochemical/chemical processes in conjunction with biotechnology, nanotechnology and PV cells to produce, purify, store and utilize hydrogen as an energy-carrier using PEM fuel cells. He has supervised number of post-graduate students, as well as published several books, scientific papers and essays in the field of electrochemical reaction engineering. He is a member of International Corrosion Council (ICC) and the International Association for Hydrogen Energy (IAHE).



## SCIENCE, TECHNOLOGY AND DEVELOPMENT

### AUTOMATING CANCER DETECTION USING ADVANCED MICRO ELECTRONICS

Microelectronic engineers in Singapore have developed and tested sensor technology that can detect and measure a chemical signature of bladder cancer. According to a report (*Science Daily, August 31, 2013*), the light-based sensor could eventually be used for the early diagnosis and subsequent tracking of the progression and treatment of many different tumors. The report was based on a research led by Yong Shin at the Institute of Microelectronics of Agency for Science, Technology and Research (A\*STAR), Singapore. After further testing of the technology, Shin and co-workers are planning to develop a lab-on-a-chip device incorporating the sensor that can process fluid samples within about five minutes.

Genes that suppress tumors can be deactivated by the attachment of a methyl group to a specific DNA sequence -- cytosine next to guanine -- in their promoter region. The methyl group prevents the gene from being used as a template for protein synthesis and reduces the capacity of the cell to control its own proliferation. Several well-established chemical methods exist for detecting such DNA methylation, but they are expensive, time-consuming and dependent on laboratory expertise. Shin and his team focused particularly on silicon micro-ring resonators that amplify light at specific resonant frequencies. The resonators developed by the researchers are very sensitive detectors of a shift in light frequency, including the shift that occurs when a methyl group is attached to or detached from DNA.

### GM RICE HOLD KEY TO FOOD SECURITY AND DISEASE PREVENTION

According to a study published at *Nature Genetics*, a gene (the Deeper Rooting 1(DRO1)) that gives rice plants deeper roots can triple yields during droughts, according to Japanese researchers (*SciDev.Net, August 4, 2013*).

"If rice adapts to or avoids drought conditions using deeper roots, it can get water and nutrients from the deep soil layers," says the study's lead author Yusaku Uga, a researcher at Japan's National Institute of Agrobiological Sciences. Rice is particularly susceptible to drought owing to its shallow roots.

The International Rice Research Institute (IRRI) estimates that an additional 8 to 10 million tonnes of rice will be needed each year to keep rice prices affordable at around US\$300 per tonne. Finding a drought-resistant variety of rice may be the key to attaining this goal, according to researchers.

Another study published in the *Journal of Clinical Investigation* has claimed to develop a strain of rice called

MucoRice-ARP1, genetically engineered by adding an antibody to fight rotavirus originally found in llamas to the rice genome. This strain of rice can help to protect against diarrhoeal diseases offering a cost-effective way to protect children in developing countries (*SciDev.Net, August 18 2013*).

MucoRice-ARP1 could complement existing vaccine schedules. It would not be a substitute for a vaccine, says Miren Iturriza-Gomara, a virologist at the UK-based University of Liverpool and one of the study's authors, "but it's something that in certain situations could be very helpful". The rice could also prove useful during rotavirus outbreaks by lowering transmission rates.

### UNIQUE SEMICONDUCTOR CONSTRUCT ENABLES HYDROGEN FUEL FROM SUNLIGHT

In the search for clean, green sustainable energy, bionic leaves represent an ideal alternative to fossil fuels. These leaves could produce energy-dense fuels from nothing more than sunlight, water and atmosphere-warming carbon dioxide, with no byproducts other than oxygen. Through the process of photosynthesis, green plants harness solar energy, and oxygen is released as a byproduct.

A major step has been achieved by researchers trying to mimic this phenomenon, and improve the process, in collaboration with the U.S. Department of Energy (DOE)'s Lawrence Berkeley National Laboratory working at the Joint Center for Artificial Photosynthesis (JCAP). Scientists constructed a photocathode consisting of a semiconductor gallium phosphide, which can make use of a greater number of available solar photons than can semiconductors that absorb ultraviolet light. This means that the gallium phosphide semiconductor is capable of producing significantly higher photocurrents and rates of fuel production and a molecular cobalt-containing hydrogen production catalyst from the cobaloxime class of compounds (*Science Daily, August 29, 2013*).

Gary Moore, a chemist with Berkeley Lab's Physical Biosciences Division and Principal Investigator for JCAP, and his colleagues are now investigating semiconductors that cover a broader range of solar spectrum, and catalysts that operate faster at lower electrical potentials. They also plan to investigate molecular catalysts for carbon dioxide reduction.

Moore says, "We believe our method provides researchers at JCAP and elsewhere with an important tool for developing integrated photocathode materials that can be used in future solar-fuel generators, as well as other technologies capable of reducing net carbon dioxide emissions."

## PROFILE OF HEAD OF COMSATS' S&T CENTRE OF EXCELLENCE

### DR. AZHARI MOHAMED ALBADAWI, DIRECTOR-GENERAL IRCC, SUDAN

Prof. Dr. Azhari Mohamed Elbadawi is the Director General, Industrial Research and Consultancy Centre (IRCC), which is a public sector research and development institution of Sudan responsible for the promotion and development of industrial sector in the country. The Centre is also a designated Centre of Excellence of COMSATS, and Dr. Elbadawi a member of COMSATS Coordinating Council.



Being an industrial expert, Dr. Elbadawi has also been serving the Sudanese Coordination Council of Engineering Research & Industrial Technologies, Sudan Academy of Sciences, in the capacity of Head/Faculty Dean, since 2011.

Dr. Elbadawi holds a Ph.D. from the University of Huddersfield, the United Kingdom. After doing a Diploma in Engineering Studies from the Khartoum Polytechnic institute (now University of Sudan), in 1979, he proceeded to UK for higher studies and completed his postgraduate diploma and M.Sc from the University of Leeds, West Yorkshire.

In 1979, he started his career as Production Supervisor for Dyeing, Printing and Finishing at the Blue Nile Textile Company in Medani, Sudan. He continued working at the company, and served as Research & Development Manager from 1982 to 1984. With over five years of first-hand industrial experience Mr. Elbadawi turned into an academic and joined the University of Gezira in 1984 as a lecturer and Industrial Training Coordinator.

As a Research Fellow at the German Institute of Industrial Research in Stuttgart, Germany, from 1987 to 1990, he further polished his skills and built his expertise. Later in his professional career, he served the Engineering Composites Research Centre, University of Ulster, Northern Ireland, as a Research Officer. Continuing his role as a passionate academician, Dr. Elbadawi remained affiliated as a part-time lecturer with the University of Huddersfield and Bolton Institute of Higher Education in the United Kingdom (2000-2003). For the university level students, he has been conducting special courses on: (i) foam application; (ii) materials testing and quality control; (iii) industrial textiles; and (iv) home textiles and fabric care. He is keen on transferring his knowledge to those who have similar interests. He also has a passion to put his experiences to good use to help boost international linkages with academic institutions abroad and establish collaborative research and exchange programmes with them.

Dr. Elbadawi has special research interests and experience in:

- Cotton grading and classification system in Sudan;
- Cotton quality – from the field to the ginneries;
- Ginning and the quality of ginned cotton;

- Effect of storage on cotton quality and defining spinning limits of the various cotton varieties;
- Pre-treatment of flax roves as a precursor to wet spinning; and
- Chemical, ultrasonic and enzyme pre-treatment schemes.

Dr. Elbadawi has been mentoring research students and tutoring graduates and has supervised many final year graduate projects in textile clothing and technology both in Sudan and at Huddersfield University in the UK. As an academic, Dr. Elbadawi supervised Ph.D theses on 'Investigation on the knitting process', while some of the M.Sc level research supervised by him pertained to: 'Effect of storage conditions on cotton quality'; 'Cotton mixing as a precursor to spinning'; 'Enhancing productivity in cotton spinning mills'; 'Impacts of yarn quality in knitting'; and 'Analysis of dye-house liquid-waste'. Dr. Elbadawi has been interested and involved in textile technology throughout his career, finding it most fascinating and exhilarating. These interests have allowed him to work for many years in the industry and to attain a high level of academic excellence and recognition.

As an active researcher, Dr. Elbadawi carried out extensive research on moisture in cotton, in collaboration with the Sudanese Standards and Metrology Organization (SSMO) and the Sudan Cotton Company.

In October 2003, Dr. Elbadawi got affiliated with the Industrial Research and Consultancy Centre as Associate Professor and attained professional growth to later become its Director General for the first time in June 2005, for one year. He was appointed as Director General of the Centre for the second time in October 2011. Since then, Dr. Elbadawi has been spearheading the various R&D, capacity-building, consultancy and international cooperation programmes of the Centre. During the interim period between his first and second appointment as D.G at IRCC, he rendered his services as Advisor and Consultant to the Federal Minister for Industry, Government of the Sudan (July 2006 to September 2011).

Dr. Elbadawi has a number of publications to his credit, some of which include: 'Adoption of Small and Medium Technologies in Sudan', 'Recent Applications of Nanotechnology', 'Polyester Applications in Industry', 'Environmentally-friendly Textile Finishing System', and 'Multi Factorial Analysis of Foam Properties'.

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## COMSATS' BRIEF AND ANNOUNCEMENTS

### SELECTED FORTHCOMING SCIENTIFIC EVENTS IN COMSATS COUNTRIES

10-12 October 2013	ITHET 2013 – 12 <sup>th</sup> International Conference on Information Technology Based Higher Education and Training, Antalya, Turkey ( <a href="http://www.ithet.boun.edu.tr">www.ithet.boun.edu.tr</a> )
21-22 October 2013	ICIEET 2013 – 2 <sup>nd</sup> International Conference on Internet, E-Learning and Education Technologies, Istanbul, Turkey ( <a href="http://www.icieet.com">www.icieet.com</a> )
31 Oct. to 2 Nov. 2013	WCTS – World Clean Technology Summit 2013, Kampala, Uganda ( <a href="http://www.pilotinternationalconferences.com">www.pilotinternationalconferences.com</a> )
27-29 November 2013	IRCIEST 2013 — International Research Conference on Innovations in Engineering, Science and Technology, Batangas City, Philippines ( <a href="http://www.irciest.com.ph">www.irciest.com.ph</a> )

### REGIONAL WORKSHOP ON NATIONAL INNOVATION SYSTEMS AND INTELLECTUAL PROPERTY 7-9 October 2013, Islamabad-Pakistan

During the past few decades, the concept of 'National Innovation System' (NIS) has become popular as a core conceptual framework for analyzing the technological change. Similarly Intellectual Property Rights (IPR) is of enormous importance to safeguard the business interests of the industries which are part of the NIS.

With these realizations at work, the Commission on Science and Technology for Sustainable Development in the South (COMSATS), in collaboration with Islamic Educational Scientific and Cultural Organization (ISESCO), Inter-Islamic Network on Information Technology (INIT), and COMSATS Institute of Information Technology (CIIT), Islamabad – Pakistan, is convening a 3-day Regional Consultative Workshop on 'National Innovation System and Intellectual Property (Asia Region)' for middle to high-level policy planners and administrators, academicians, and Ph.D students. The event is scheduled to be held on October 7-9, 2013, in Islamabad, Pakistan. For more information, please visit [www.comsats.org](http://www.comsats.org) or write to Advisor (Programmes) at [huseint@comsats.net.pk](mailto:huseint@comsats.net.pk).

### CALL FOR PAPERS FOR COMSATS JOURNAL SCIENCE VISION: VOL. 19

Science Vision is a biannual scientific journal of COMSATS. It primarily aims at highlighting the important scientific and technological developments that have a bearing on socio-economic conditions of the people. It invites research as well as review articles that have general scientific descriptions, with comprehensive elucidation of the impact of S&T discoveries and innovations for creating understanding of the contemporary issues and challenges.

COMSATS invites scholarly contributions for the Volume 19 (January to December 2013) of its journal. Scientists, researchers, policy-makers and young scholars from S&T organizations and R&D institutions are encouraged to contribute articles on any scientific field of interest relevant to the focus of the journal. As per the policy of the journal, contributors are compensated for their time and efforts with a modest amount of honorarium.

For more details, please visit COMSATS' official website: [www.comsats.org](http://www.comsats.org) or the journal's website: [www.sciencevision.org.pk](http://www.sciencevision.org.pk). Contributions may be sent to the Managing Editor at: [comsats@comsats.org](mailto:comsats@comsats.org).

### A BRIEF ON COMSATS

The Commission on Science and Technology for Sustainable Development in the South (COMSATS) is an inter-governmental organization, with its Secretariat located in Islamabad, Pakistan.

COMSATS, currently, has 21 countries as its members, spread across three continents, i.e. Africa, Asia and Latin America. A network, of 18 International Science and Technology Centres of Excellence, is also affiliated with COMSATS to contribute to scientific development of its Member States. For detailed information, please visit COMSATS' website: [www.comsats.org](http://www.comsats.org).

### COMSATS NETWORK OF INTERNATIONAL S&T CENTRES OF EXCELLENCE

- Bangladesh Council of Scientific and Industrial Research (BCSIR), Bangladesh
- Centro Internacional de Física (CIF), Colombia
- COMSATS Institute of Information Technology (CIIT), Pakistan
- Council for Scientific and Industrial Research (CSIR), Ghana
- Embrapa Agrobiologia, Brazil
- Higher Institute for Applied Sciences and Technology (HIAST), Syria
- Industrial Research and Consultancy Centre (IRCC), Sudan
- Industrial Technology Institute (ITI), Sri Lanka
- International Center for Chemical and Biological Sciences (ICCBS), Pakistan
- International Center for Climate & Environment Sciences (ICCES), China
- International Centre for Environmental and Nuclear Sciences (ICENS), Jamaica
- Iranian Research Organization for Science and Technology (IROST), Iran
- National Mathematical Centre (NMC), Nigeria
- National Research Centre (NRC), Egypt
- Royal Scientific Society (RSS), Jordan
- Tanzania Industrial Research and Development Organization (TIRDO), Tanzania
- TÜBİTAK Marmara Research Center (MAM), Turkey
- University Cheikh Anta Diop (UCAD), Senegal