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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.



Incumbent and Former Executive Directors of COMSATS with Dr. Ishfaq Ahmad and Ms. Shahnaz Wazir Ali at the ceremony to commemorate 20th Anniversary of COMSATS

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From the Executive Director's Desk

COMSATS organized two commemorative functions in October this year. First, to celebrate the 20th Anniversary of the establishment of COMSATS (pages 7-11), and the second for the 50th Anniversary of the founding of International Centre for Theoretical Physics (ICTP), Trieste, Italy (page 6), on 14th and 18th October 2014, respectively. It is a coincidence that the inception of both organizations took place on the 5th October exactly 30 years apart, but it is certainly no coincidence that both represent the realization of the ambition of one man, the Pakistani Nobel Laureate, Prof. Abdus Salam. It was Salam's lifelong passion to see underdeveloped countries embarking on a journey of progress using the vehicle of Science and Technology. He generously devoted time to engage his brilliant mind for the betterment of teaming millions in the South using motivational lectures, inspiring articles, counseling of world leaders, establishment of capacity-building institutions and creation of international organizations to promote S&T cooperation within the developing countries, as well as between the North and the South. The ICTP, aptly re-named as the Abdus Salam-ICTP, is carrying forward Salam's mission with phenomenal success.

For COMSATS, he prescribed an extremely ambitious work plan based on direct involvement of the Heads of Government/State and creation of a Network of R&D organizations in different developing countries, funded by their respective governments. It is easy to guess where Salam wanted to see COMSATS in 20 years. With his grand vision for the developing world, he would have wished the COMSATS Network to become a paragon of scientific excellence in the South. There may yet be a long way to

go to achieve this objective. However, it is considerably gratifying to note that the Network is thriving and expanding, with currently nineteen Centres of Excellence employing more than 10,000 researchers. Apart from ICTP and COMSATS, another remarkable achievement of Salam was the establishment of The World Academy of Sciences (TWAS), that brought together outstanding scientists from the entire developing world on one platform. The 25th General Meeting of TWAS held in Muscat, Oman, on 25-28 October 2014, was attended by more than 300 Fellows of the Academy, out of a total number standing currently at 1,148 (page 5). The TWAS prizes announced on that occasion portrayed the richness of scientific expertise having strong roots in many developing countries. Salam would have taken a sigh of relief by observing that finally some of the countries of the South are catching up with the industrialized world. On the other hand, he may have been saddened to see a large number of countries still struggling to come out of the abyss of underdevelopment – in some cases even regressing from their previously attained levels of progress.

COMSATS will gallantly hold its fort, even if slow progress of S&T development in some of its member countries is disconcerting. It has to do so because it is the brainchild of a man who believed that the destiny of nations is in the hands of its men and women of science. For COMSATS, the key to success is the strong engagement of the Members of Coordinating Council with COMSATS Headquarters. The pages of this Newsletter showcase such an engagement which obviously needs to be strengthened. Any feed-back from readers will be highly welcome.

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NEWS/ACTIVITIES/HIGHLIGHTS FROM COMSATS SECRETARIAT

COMSATS-ISESCO NATIONAL TRAINING WORKSHOP ON REPAIR AND MAINTENANCE HELD IN IRAN

A five-day national workshop on 'Repair and Maintenance of Scientific Engineering Equipment in Universities, Research Institutions and Small Scale Industries' was conducted in Karaj, Iran, from September 28 to October 02, 2014, to provide training for necessary capacity-building of over 65 researchers, academicians, technicians, and engineers from different scientific institutions of Iran.

Held under the COMSATS-ISESCO biennial cooperation agreement (2014-15), the training workshop was co-organized with COMSATS' Centre of Excellence in Iran, the Iranian Research Organization for Science & Technology (IROST); Standard Research Institute (SRI), Iran; and the Instructors Training Centre (ITC) of the Technical and Vocational Training Organization (TVTO), Iran. The University of Tehran and ITC were the host institutions for the workshop. The main objective of the workshop was to develop indigenous capacities of the Iranian scientists and institutions for repair and maintenance of their scientific equipment needed for uninterrupted scientific R&D activities.

The workshop was inaugurated by the Acting President for International Cooperation, IROST, Dr. Mahmoud Molanejad, on September 28, 2014. Dr. Abbas Sadri, Director of ISESCO Regional Office in Tehran; Mr. Nisar Ahmad, Deputy Director (Systems), COMSATS and Dr. Maryam Jalili, SRI, represented their organizations at the inaugural ceremony. Also present on the occasion were the senior officials and representatives from the organizing institutions, the registered trainees, and representatives from various scientific institutions of Iran. The inaugural speeches and messages in general underscored the significance of repair and maintenance of scientific equipment for smooth R&D activities. Welcoming the representatives from COMSATS and ISESCO, experts and participants, Dr. Molanejad appreciated the holding of the workshop on such an

important theme in Iran. Dr. Sadri, who was also representing the Director General ISESCO, H.E. Dr. Abdulaziz Othman Altwajri, hoped that the workshop would result in strengthening the capacities of the participants for the upkeep of their scientific instruments and building linkages among them. It was also noted that ISESCO has placed the preventive and run-time maintenance of laboratory equipment given in its Annual Action Plan as one of its priorities. Speaking on behalf of the Executive Director COMSATS, Mr. Nisar Ahmed recalled the history of the series of workshops on the subject and thanked ISESCO for sustained cooperation between the two organizations.

Spread over 10 technical sessions, the training was conducted by two resource persons from Pakistan Council of Scientific and Industrial Research (PCSIR), Dr. Muhammad Yaqub and Mr. Arif Karim. These sessions comprised of lectures and hands-on training on troubleshooting and repairing of the systems including: spectrophotometers; flame photometer systems; pH meters; colorimeter, laboratory balances, gas chromatographic systems; HPLC systems; thermal equipment (oven & furnace); thermal analyzer; electron microscopes; atomic absorption microscopes and XRF system. To further improve their field experience, the participants were taken to different labs of the University of Tehran and ITC. Using the knowledge and techniques learnt during the workshop, the participants successfully made operative some of the faulty expensive equipment, including: Flame photometer, Electric Ovens (02 numbers), Analytical Balance, pH meter and Electrophoresis Apparatus.

The closing ceremony of the event was held on October 02, 2014. Dr. Mahmoud Molanejad, the Acting President for International Cooperation, IROST; Dr. Mehdi Rajibi, Programme Officer, ISESCO Regional Office in Tehran; and Dr. Maryam Jalili (SRI) gave votes of thanks on the occasion, while Mr. Nisar Ahmad presented the technical report of the workshop.



Organizers and guests at the inaugural session of workshop on Repair and Maintenance, Iran



Subject expert imparting hands-on training at the Repair and Maintenance Workshop

4TH INTERNATIONAL WORKSHOP ON 'INTERNET SECURITY ORGANIZED IN TANZANIA

Tanzania is reported to have lost nearly US\$ 6 million so far due to cyber crimes, noted Prof. Patrick Makungu, Permanent Secretary, Ministry of Communication, Science and Technology, Government of Tanzania, during the inaugural address of the 4th International Workshop on 'Internet Security: Enhancing Information Exchange Safeguards', which was held on October 19-23, 2014, in Dar-es-Salaam, Tanzania.

The event was jointly organized by COMSATS; the Islamic Educational, Scientific and Cultural Organization (ISESCO); the Inter Islamic Network on Information Technology (INIT); the COMSATS Institute of Information Technology (CIIT), Pakistan; and the Tanzania Commission for Science & Technology (COSTECH), Tanzania. The event was fourth of the series of workshops on the theme held to train IT professionals of developing countries, enabling them to collectively address issues and challenges related to information and Internet security. The earlier three workshops on similar theme were held in Syria (2011), Jordan (2012) and Tunisia (2013).

Hosted by COSTECH, Tanzania, the five-day event provided a forum to the participating researchers and professionals to learn about the latest advancements in the field of Internet security; the use of state-of-the-art technologies for protection of network and network accessible resources from different types of software attacks; and to work out effective Internet/ information security solutions for general public, governmental organizations and commercial enterprises through rigorous risk analyses and security management approaches. About 60 young researchers, practitioners, academicians, system administrators and programmers working in the field of Internet/information security from Egypt, Iran, Jordan, Kenya, Nigeria, Pakistan, Senegal, Tunisia, and Uganda benefited from the training imparted at the workshop.

Prof. Makungu, who was representing H.E. Prof. Makame M. Mbarawa, Minister for Communication, Science and Technology, Government of Tanzania, in his inaugural address, expressed gratitude to the foreign experts and participants for travelling to Tanzania to participate in the event. He conveyed the message of H.E. Prof. Makame M. Mbarawa, in which the honourable Minister thanked ISESCO, COMSATS, CIIT and INIT for organizing the

workshop in Tanzania. While stressing the importance of Internet security, the honourable Minister informed that according to a report of the Center for Strategic and International Studies (CSIS), USA, more than US\$ 445 billion are annually lost worldwide due to widespread cybercrimes, electronic theft, and online piracy, including infringement of intellectual property rights, with more than 800 million data-records getting hacked into or stolen. He noted that currently Tanzania has about 26.97 million mobile phone subscribers. He stated that the developing countries must not succumb to the activities of the cyber criminals, and should join hand with developed countries to ward off such activities. Some initiatives launched by the Government of Tanzania for controlling cybercrimes were also shared, including the establishment of the Cyber Crime Unit in the police force; development of cyber law; and establishment of Computer Emergency Response Team (CERT).

Earlier, in his welcome address, Dr. Hassan Mshinda, Director General COSTECH, Tanzania, expressed pleasure on hosting the important workshop, and welcomed all foreign and local participants of the event. He was hopeful that the event would help establish strong cooperative ties between Tanzanian S&T organizations and COMSATS.



Group photo of the participants of the workshop on Internet Security held in Dar es Salaam, Tanzania

Dr. S.M. Junaid Zaidi, Rector CIIT (also the President INIT), in his message read out on the occasion by Mr. Muhammad Atiq-ur-Rehman, Senior Program Officer, INIT, recalled new legislations at national and international levels, as well as policy and organizational changes in the field of

Information Technology. INIT, he stated, is conscious of the need to enable the scientific workforce of the Islamic countries to face the challenges related to protecting their information assets.

Dr. Aicha Bammoun, Science Directorate, ISESCO, stated that the rapid growth and widespread use of electronic data-processing and business conducted through the Internet, along with numerous occurrences of international terrorism, have fueled the need for better techniques to protect computers, and the information being stored, processed and transmitted. Dr. Bammoun considered ISESCO's collaboration with COMSATS for implementing technical programmes for the benefit of common Member States as one of the most fruitful ones.

Dr. I.E. Qureshi, Executive Director COMSATS, in his message read out on the occasion by Mr. Tajammul Hussain,

Advisor (Programmes) COMSATS, thanked ISESCO, INIT, CIIT, and COSTECH for joining hands with COMSATS in order to organize this important workshop. He informed that COMSATS is committed to developing and strengthening linkages among the countries of the South for exchange of resources, technology, and knowledge. The four resource persons that imparted training during the workshop were: Dr. Haider Abbas, Research Fellow/Assistant Professor, Center of Excellence in Information Assurance, King Saud University, Saudi Arabia; Dr. Malik Najmus Saqib, Assistant Professor, CIIT, Pakistan; Mr. Zafar Mir, Regional Manager, Information Security Risk, MENA – HSBC, UAE; and Mr. Asad Raza, Lecturer of Information Technology (Networking & Security), Majan University College, Oman.

The specific topics covered during the workshop included: Organizational Security and Industry Standards; Information Security Policies, Objectives and Procedures; ISO 27001 ISMS Standard and related Security Controls; ISMS Policy/Procedures Writing; Information Assets Identifications; Risk Assessment; Risk Treatment; Statement of Applicability; Business Continuity Planning; Cloud Computing; Security Risks and Threats of Cloud Computing; Organization's Cloud Security Concerns; Symmetric Key vs. Asymmetric Key Cryptography; Block Ciphers vs. Stream Ciphers; Hash Functions; Digital Signatures; Kerberos; Secure Electronic Transaction; Introduction to Ethical Hacking and Penetration Testing; Information Gathering; System Hacking; Breaking Wireless Security; Introduction to Information Security Design Principles; Emerging Cyber Threats and their Significance; Dissecting a Cyber Attack; Various Phases in Planning a Cyber Attack; Recent Distributed Denial of Service Attacks; Possible Mitigation Solutions to Service Attacks; Password Attacks; Introduction to SIEM (OSSIM); Integration of OSSIM with other tools; and Prevention Methods.

Speaking at the Concluding Ceremony held on October 23, 2014, the Executive Director COMSATS considered the workshop an ideal example of South-South cooperation. Dr. Mafunda Dugushilu, Director of Innovation, Entrepreneurship and Commercialization, COSTECH, who was the Acting Director General COSTECH (in the absence of Dr. Hassan Mshinda), thanked the partner organizations for jointly organizing this event.

COMSATS STRENGTHENS TIES WITH SCIENTIFIC INSTITUTIONS OF TANZANIA

As part of its efforts for science diplomacy and sensitization of its Member States for S&T-led development, a three-member delegation of COMSATS, comprising Dr. I.E. Qureshi, Executive Director COMSATS; Mr. Tajammul Hussain, Advisor (Programmes) COMSATS; and Mr. Farhan Ansari, Sr. Assistant Director (Programmes) COMSATS, held a number of meetings with the senior officials of the Government of Tanzania on the sidelines of the 4th International Workshop on 'Internet Security: Enhancing Information Exchange Safeguards'.

On 21st October 2014, a meeting was held with Dr. Hassan Mshinda, Director General, COSTECH and Dr. L.C. Manege, Director of Industrial Research, Tanzania Industrial Research and Development Organization (TIRDO), Tanzania. COMSATS' officials discussed matters related to



Technical session of the workshop on Internet Security in progress

Tanzania's participation in COMSATS' programmes. Noting TIRDO's consistent participation in COMSATS Coordinating Council meetings, Dr. Qureshi was of the view that Tanzania should make best use of the opportunities offered by COMSATS. Highlighting the importance of the International Thematic Research Groups (ITRGs) of COMSATS, Dr. Qureshi urged the D.G. COSTECH to allocate necessary funds to enable TIRDO for effective participation in the activities of COMSATS ITRGs, as well as other COMSATS' programmes.

Resumption of Annual Membership Contribution (AMC) was also proposed as an effective way by which Tanzania could reap the benefits of capacity building events organized by COMSATS.

Dr. Mshinda informed the COMSATS delegation regarding the efforts being made by COSTECH for the development of S&T in the country, and assured of his full support in future as well. In light of the discussions held during the meeting, it was agreed that COSTECH will act as COMSATS' Focal Point in Tanzania, and would coordinate COMSATS related activities in the country.

During another meeting held on the same day with Prof. Patrick Makungu, Permanent Secretary, Ministry of Communication, Science and Technology, Government of Tanzania, the opportunities offered by COMSATS in the fields of higher education, capacity building and scientific research were highlighted. The Permanent Secretary

appreciated the efforts being made by COMSATS to facilitate capacity building and international collaboration of Tanzanian scientists and institutions, and agreed to take actions to ensure that Tanzania makes full use of the opportunities offered by COMSATS. It was agreed that under COMSATS Distinguished Professorship scheme, a lecture of a suitable expert will be arranged at the Nelson Mandela African Institute of Science and Technology.

The COMSATS' delegation also met Prof. Esther Mwaikambo, President Tanzania Academy of Sciences (TAAS), and Dr. A. P. Nanyaro, Executive Director TAAS, on 23rd October 2014 in the office of President TAAS at Hubert Kairuki Memorial University, Dar-es-Salaam. During the meeting, the scientific potential of Tanzanian universities and organizations was discussed. Prof. Mwaikambo agreed to sensitize the fellows of Tanzania Academy of Sciences regarding the benefits offered by COMSATS, with a view to enhance the participation of Tanzanian scientists and researchers in COMSATS' programmes. The round of meetings ended with a consultation with the Chargé d' Affairs, Pakistani High Commission in Dar-es-Salaam, Mr. Muhammad Iqbal, during which matters related to enhancing cooperation between COMSATS and Tanzania were discussed. Mr. Iqbal agreed to facilitate COMSATS' initiatives in Tanzania.

COMSATS DELEGATION VISITED TIRDO, TANZANIA

In compliance with the Coordinating Council's decision, the Executive Director COMSATS visited COMSATS' Centre of Excellence in Tanzania, TIRDO, during his visit to Tanzania. The visit was meant to gather first-hand knowledge of technical and human resources as well as the on-going activities of TIRDO. The Executive Director was accompanied by Mr. Tajammul Hussain, Advisor (Programmes) COMSATS, and Mr. Farhan Ansari, Sr. Assistant Director (Programmes) COMSATS.

At the onset of the visit, the COMSATS' official met a number of senior officials of TIRDO, including its Director General, Prof. Mkumbukwa M.A. Mtambo; Director of Industrial Research, Dr. Ludovick C. Manege; Acting Director of Engineering and Development, Mr. Robert Nindie; and Director of Information Communication and Technology Transfer, Dr. George S. Oreku. Introducing his organization to the visiting delegates, the Director General TIRDO informed that TIRDO is making efforts to build its capacity for providing services to the local industries. He appreciated COMSATS' support in this regard and noted that three scientists of TIRDO were participating in the Internet Security workshop organized by COMSATS (October 19-23, 2014).

The Executive Director COMSATS highlighted the history, mandate, organizational structure, as well as COMSATS programmes pertaining to three broad categories, i.e. Education, Capacity Building, and Scientific Research. In

this regard, he urged TIRDO to avail the postgraduate scholarships offered by COMSATS Institute of Information Technology (CIIT) and other Centres of Excellence. Among other things, he expressed pleasure that TIRDO has nominated a scientist for participating in COMSATS' International Thematic Research Group on 'Mathematical Modeling' to be launched during December 2014, and encouraged TIRDO to make relevant nominations for other active ITRGs as well. The Executive Director invited the Director General to visit Pakistan with a view to strengthen its linkages with Pakistani scientific/research organizations and universities, specifically CIIT, and hoped that TIRDO will be represented during all future Coordinating Council Meetings of COMSATS.

Dr. Manege also made a presentation about TIRDO for the COMSATS' delegates, who later visited three departments and various laboratories and workshops of TIRDO. On the occasion, the Executive Director announced to donate a Bomb Calorimeter to TIRDO. He also agreed to sponsor an expert to provide training to TIRDO's scientists regarding the operation of the Atomic Absorption Spectrometer.

COMSATS REPRESENTED AT 25TH GENERAL MEETING OF TWAS

On invitation from the Executive Director TWAS, Prof. Romain Murenzi, and the Omanese Ministry of Higher Education, the Executive Director COMSATS, Dr. I. E. Qureshi, participated in the 25th General Meeting of The World Academy of Sciences (TWAS) held in Muscat, Sultanate of Oman, on October 25-28, 2014, as observer. He was one of the 350 delegates attending the meeting that included TWAS Fellows, representatives of Governments and international organizations, as well as academics of international repute. Among the highlights of the General Meeting were the announcement of TWAS-2013 prizes for seven outstanding scientists in the developing world. Other special prizes included TWAS-Celso Furtado Prize, C. N. R.



Dr. Qureshi with Prof. Khatijah Yusoff (Member COMSATS Technical Advisory Committee)

Rao Prize, Atta-ur-Rahman Prize and TWAS Regional Prize. The lectures delivered by eminent scientists elaborated the cutting edge research in the areas of High Energy Physics, Laser Spectroscopy, Applications of Light, Materials Science, Chemistry, and Biology. Another special feature of the meeting was the announcement made by Executive Director COMSATS about COMSATS' offer of Membership to Oman, with a few words of introduction about COMSATS.

A number of meetings and consultations were held on the sidelines of TWAS General Meeting, by the Executive Director COMSATS. During a sideline meeting with Dr. Rawiya Al Busaidi, Minister of Higher Education, Sultanate of Oman and Mr. Talal Al Balushi, Director of International Relations, The Research Council of Oman, Dr. Qureshi presented the papers concerning offer of Membership of COMSATS to Oman.

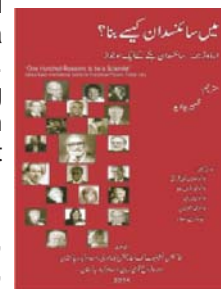
Various options of holding conferences in South Asia and Central Asia under the auspices of TWAS Regional Office in Delhi, India, with the support of COMSATS, were discussed with Prof. Romain Murenzi (Executive Director TWAS, Italy) and Prof. Rabia Hussain (TWAS Vice Chairperson for South Asia and Central Asia). Discussion on the possibility and mechanism of Science Diplomacy cooperation between TWAS and COMSATS started early this year between the two executive Directors was also followed up. Dr. Qureshi also held a meeting with Prof. M. H. A. Hassan, Lifetime Honorary Member of COMSATS Coordinating Council and Prof. Glaucius Oliva, Member COMSATS Technical Advisory Committee (TAC) and President National Council for Scientific & Technological Development (CNPq), Brazil. In view of Brazil already having representation on COMSATS Network its State Membership to COMSATS was further pursued. Brazil's membership of COMSATS was further pursued. CNPq's support was requested to finance the training of scientists at COMSATS' Centre of Excellence in Rio de Janeiro (Brazil), the Embrapa Agrobiologia; and facilitate the exchange of faculty and students between COMSATS' Member Countries and Brazil under the national programme of Brazil, 'Science without Borders'. Ways to further enhance the role of TAC members with respect to COMSATS international activities was a major point of discussion with Prof. Khatijah Yusoff, Dean Faculty of Biotechnology and Biomolecular Sciences, University of Putra Malaysia, Malaysia, who is also a member of TAC. In another meeting, Prof. Keto Mshigeni, Vice-Chancellor, Hubert Kairuki Memorial University, Dar es Salam, former President Tanzanian Academy of Sciences, Tanzania, was requested to provide support in effective coordination with Tanzanian scientific infrastructure.

Status of the on-going cooperation between TWAS and COMSATS in connection with the publication of profiles of R&D organizations, under the TWAS programme 'Excellence in Science' was discussed with Mr. Edward Lempinen, Public Information Officer, TWAS.

50TH ANNIVERSARY OF AS-ICTP CELEBRATED IN ISLAMABAD

COMSATS and the Pakistan Chapter of Abdus Salam International Center for Theoretical Physics (AS-ICTP), jointly celebrated the 50th Anniversary of the AS-ICTP on 18th October 2014, to highlight the remarkable achievements of the Centre over the period of last half-century. Held at COMSATS Institute of Information Technology (CIIT), Islamabad Campus, the ceremony was attended by more than 100 ICTP alumni. Among participants, many have been associated with the Center since its inception. These included, Prof. Fayyazuddin, Prof. Ghulam Murtaza, Prof. M. Zafar Iqbal, Prof. Abdullah Sadiq, and Dr. N. M. Butt. Other prominent participants included, Dr. Imtinan Elahi Qureshi, Dr. Aslam Baig, Dr. Hamid Saleem, Dr. Kashif Sabih and Dr. Arshad S. Bhatti. The speakers shared their personal experiences and memories of stay at ICTP and highlighted the role of ICTP in the development of their scientific and academic careers.

The celebrations were marked by the soft launching of the Urdu translation of the book, entitled "One Hundred Reasons to be a Scientist", published by ICTP in 2004. The highly challenging task of translating the book took almost four years with inputs from a panel of 20 subject specialists.



In the end, Dr. Imtinan Elahi Qureshi, Executive Director, COMSATS, highlighted the commonalities between the AS-ICTP and COMSATS as both institutions were established by Prof. Abdus Salam. He emphasized the role played by COMSATS in promoting Prof. Salam's vision of South-South cooperation.

COMSATS PARTICIPATED IN INTERNATIONAL CONFERENCE ON BIOPESTICIDES IN TURKEY

Senior Assistant Director (Programmes) COMSATS, Ms. Huma Balouch, participated in the International Conference on Biopesticides 7 (ICOB7), held in Antalya, Turkey, from 20-24 October 2014. The event brought together more than 300 participants (including 75 presenters, 60 poster presenters) from 28 countries. Ms. Balouch presented her research paper on the "Study of Phenotypic Polymorphism and Detection of Genotypic Polymorphism in *Menochilus sexmaculatus* (Coleoptera: Insecta) using RAPD PCR". Her talk focused on how RAPD PCR analysis can be used in species and strain identification. She highlighted the importance of the molecular techniques in analysis of genetic variation of insect population and identification of cryptic insect species and biotypes, and underscored the need for integrating RAPD-PCR into classical identification methods of insects.

SPECIAL SECTION: 20TH ANNIVERSARY OF COMSATS

The realization of Dr. Abdus Salam's vision for a high-level international platform for S&T cooperation, in the form of the establishment of Commission on Science and Technology for Sustainable Development in the South (COMSATS), celebrated its 20th Anniversary, on October 14, 2014. The graceful ceremony held in Islamabad marked the inception of COMSATS during the Foundation meeting held in the same city on October 4-5, 1994.

The ceremony was presided over by Dr. Ishfaq Ahmad, former Advisor to the Prime Minister of Pakistan on Science and Technology, and founding member of COMSATS International Technical Advisory Committee. Ms. Shahnaz Wazir Ali, President of the Shaheed Zulfikar Ali Bhutto Institute of Science and Technology (SZABIST, Pakistan) and former Special Assistant to the Prime Minister of Pakistan, also graced the occasion with her presence. The event was made memorable with the participation of COMSATS family in Pakistan, including all former Executive Directors, officials from COMSATS Secretariat, COMSATS Institute of Information Technology (CIIT), COMSATS Internet Services (CIS), COMSATS focal ministry in Pakistan, the Ministry of Science and Technology, and its affiliated institutions. Also present on the occasion were representatives of COMSATS Member State embassies in Islamabad, including China, Egypt, Kazakhstan, Korea D.P.R, Sri Lanka, Sudan and Tunisia; as well as representatives of COMSATS partner international organizations.

The Executive Director COMSATS, Dr. Imtihan Elahi Qureshi, who is currently serving a second consecutive term in his position, delivered the welcome remarks. COMSATS is vibrant and healthy, assured Dr. Qureshi at the start of his speech, a note that was welcomed by the audience. He highlighted the sound state-of-affairs at COMSATS through a presentation covering the scope, activities, and future aspirations of the organization. The essential features of COMSATS future strategy were brought to the notice of the

audience, as a way forward to achieving the organization's vision. In this regard, it was informed that COMSATS Strategy (2012-2016) document was approved by the Coordinating Council and endorsed by the Consultative Committee, two of the statutory bodies of COMSATS. The document provides strategic direction and a roadmap for achieving its mission of Science and Technology led sustainable development to help revitalize the process of South-South cooperation and improve the efficiency of COMSATS Network of International S&T Centres of Excellence in its international operations. During his presentation, he also outlined the key priority areas for the next ten years, which include strengthening of COMSATS Endowment Fund; attaining desired momentum for the International Thematic Research Groups; strengthening advocacy of S&T-led development in Member States; and realizing substantial outcomes for the new and planned initiatives of the organization, such as COMSATS Distinguished Professorship Scheme; ST&I Panel of Experts, as well as COMSATS Technology Park.

Dr. Qureshi appreciated the presence of worthy guests, some of whom had played key role in the establishment and progress of COMSATS. Paying rich tributes to Dr. Ishfaq Ahmad, Dr. Qureshi stated that he has blazed the scientific skies in the country through his leadership of scientific institutions. Dr. Qureshi also expressed his admiration and gratitude to his small team at COMSATS Secretariat, who over the years have been making their best efforts for the success of the organization. A special mention was made of those who have been associated with COMSATS and have since passed away.



The Incumbent and Former Executive Directors of COMSATS with the Guest of Honour and the Chief Guest



Chief Guest, Dr. Ishfaq Ahmad, Former Advisor to the Prime Minister of Pakistan delivering his address



In his remarks on the occasion, Dr. Ishfaq Ahmad gave an account of his personal interaction with Prof. Dr. Abdus Salam and considered the establishment of COMSATS as the latter's fulfilled desire. Based on his personal interactions with the great visionary, Dr. Ahmad recalled how fondly Prof. Salam used to discuss the idea of establishing an organization that would gather a number of developing countries at an international forum created for advocacy of S&T for development. He also acknowledged and appreciated the efforts of Ms. Wazir Ali, and the incumbent and former Executive Directors of COMSATS, for their contributions towards the establishment and growth of COMSATS. To further strengthen the international programmes of COMSATS, Dr. Ahmad proposed that the organization should enhance collaboration with policy-related institutions.

Ms. Shahnaz Wazir Ali, who signed the Agreement to establish COMSATS on behalf of the Government of Pakistan in 1994, referred to COMSATS as Prof. Salam's brainchild. She considered his untimely departure a great loss to the country. Cherishing the achievements of the organization, she noted that COMSATS has been promoting the cause of science and technology for sustainable development in Pakistan almost all by itself. She believed that scientists have a greater responsibility of identifying new ways to finding solutions to the socio-economic problems in developing countries. She was especially appreciative of a number of strategic initiatives taken by COMSATS in Pakistan. She offered her personal and political support for promoting the cause of COMSATS in Pakistan.

The three former Executive Directors of COMSATS present on the occasion noted that the organization has come a long way in realizing the vision of Prof. Salam and showed confidence in the present leadership and programmes of COMSATS. Mr. Parvez Ahmed Butt, the founding Executive Director especially felt intrigued by COMSATS' initiative of International Thematic Research Groups (ITRGs), which he believed is promoting the right use of scientific research by pooling intellectual resources from the countries of the South for national development. Giving a brief history of the early days, he noted the devotion and sincerity that was invested over the years for strengthening the newly established organization. In order to improve the efficacy of COMSATS programmes, he proposed some key initiatives that, inter alia, included: measuring and mapping of scientific resources in the Member States for honoring the deserving scientists and availability of relevant data for use; and efforts for promoting the correlation between government functionaries, entrepreneurs and researchers, which he referred to as Technology Triangle, for passing the benefits of S&T advancements to the various strata of the society.

Dr. S. M. Junaid Zaidi, the founding Rector COMSATS Institute of Information Technology (CIIT) and former interim Executive Director of COMSATS, shared some of the historic episodes that took place during the Foundation Meeting, and appreciated the catalytic role played by H.E. Mr. B. W. Mkapa, the then Tanzanian Minister for Science, Technology and Higher Education in establishing COMSATS. He noted with pleasure his early contributions towards the organization that included drafting the concept papers on CIS and CIIT.



Ms. Shahnaz Wazir Ali addressing the participants of the 20th Anniversary celebration function

Reminiscing about the humble beginning of CIIT in 1998, he shared the success of CIIT over the years, that is noticeable through its students enrolment of 35,000, more than 700 research publications during 2014, and the operational budget of PKR 4.7 Billion, most of which, he noted, is generated by the institute itself. He attributed the phenomenal growth of CIIT to the support from the present and former Executive Directors of COMSATS and thanked them for their positive approach. He considered CIIT an important Centre of Excellence of COMSATS, which bears the organization's name and called for a special support from COMSATS Coordinating Council.

Dr. Hameed Ahmed Khan gave a brief account of some of the activities undertaken during his tenure as the Executive Director COMSATS from 2000-2008. He thankfully acknowledged the contributions of his predecessors and the incumbent Executive Director in making COMSATS a success. In the light of his personal experience over the years, Dr. Khan stated that the key to success of the organization lies in careful planning and efficient implementation. He also advocated a good balance between basic and applied research, as well as the sharing of facilities, experience and manpower among the developing countries, which he believed is what COMSATS has been trying to achieve over the years.

In his video recorded message, Prof. M.H.A Hassan, the former Executive Director of The World Academy of Sciences (TWAS), recapitulated the history of COMSATS from his perspective. He also recalled that Prof. Abdus Salam was driven by the intense passion for achieving the highest standard of scientific excellence, and for changing the working conditions of scientists in the developing world. He mentioned that Prof. Salam's idea was to make a Head-of-the-State level commission, which had the necessary political backing to implement its programmes and strengthen institutions within each member country with the funds of the country to give sense of ownership to the



The recorded interview of Dr. M.H.A. Hassan being played during the anniversary function



The Executive Director with his COMSATS Secretariat Team

Centres of Excellence (COEs) rather than making new institutions and trying to find funding from the West. These CoEs could then invest in developing world class researchers.

Also, a message from Dr. Eduardo Posada F., Director of International Centre of Physics (CIF) and the Chairperson Coordinating Council, was read on the occasion by the Advisor (Programmes) COMSATS, Mr. Tajammul Hussain.

Dr. Arshad Saleem Bhatti, Dean Faculty of Sciences CIIT, shared his views on the internationalization of science and technology in Pakistan. He emphasized the use of science diplomacy as the means to achieving breakthroughs and creating headways for international scientific cooperation. Dr. Bhatti noted that a paradigm shift has taken place in the country, whereby the universities are nowadays better placed to play a bigger role in the national development of the country, especially due to suitable funding and the greater freedom to make their own international agreements and MoUs for scientific collaboration. He quoted the example of CIIT that is benefiting from the agreements reached with institutions like University of Illinois at Urbana-Champaign (UIUC), USA, and Tsinghua University School of Sciences (TUSS), China. Dr. Bhatti also noted that as part of its internationalization activities, CIIT has a standing offer of 100 scholarships to students from COMSATS member countries. At present, the institute has about 50 foreign students in its various campuses. He also emphasized the need to be a part of multilateral research activities, such as experiments in CERN and SESAME, where a large number of countries participate and take home new experiences to benefit their scientific communities. Dr. Bhatti appreciated the role played by Dr. Ishfaq Ahmed who over the years ensured Pakistan's participation in such international activities.

At the end of the event, a short interactive discussion session took place that was steered by Dr. Ishfaq Ahmad and Ms. Wazir Ali. The issues touched upon during the

**Message from Mr. Charles Grant
Director General, International Centre for
Environmental
and Nuclear Sciences (ICENS), Jamaica**

“The 20th anniversary of COMSATS is the occasion of great celebration by the progressive scientific Community of the 21 Member States who have truly embraced the philosophy of South-South cooperation. The first 20 years have been a resounding success; we have seen the number of designated COMSATS Centres of Excellence almost double from the original 10, which included ICENS, to 19, with numerous linkages to international institutions being established (North-South collaboration). The important milestones reached to date could not have been achieved without strong Governmental commitment and a well-organized secretariat; to this end we must all congratulate the Government of Pakistan and the COMSATS Secretariat for their steadfast support of the vision.



On behalf of ICENS and the Government of Jamaica, I wish the organization a bright and prosperous future, I am sure the next 20 years will be even more impressive. No celebratory statement of COMSATS could be complete without mention of one of its most outstanding founders, the late Prof. Abdus Salam, who conceived the idea of COMSATS and who recognized that the socio-economic development of nations of the South is inextricably linked to their indigenous capacities in science and technology. While we celebrate the legacy of the esteemed late Prof. Salam, we should be mindful to note that the journey is by no means complete, let us all take this opportunity to redouble our efforts, both nationally and institutionally, to achieving our common goal so aptly enshrined in COMSATS’ mission statement: “To help create a world where all nations are at peace with each other and capable of providing a good quality of life to their populations in a sustainable way, using modern scientific and technological resources.”

**Message from Dr. Bahadır Tunaboğlu
President, TUBITAK Marmara Research
Center (MAM), Turkey**

“Over the recent decades, developing countries have emerged as the engine of global economic growth. Projections show that this significant role of the emerging economies will make a distinctive mark within the next decades, as well.



In that regard, COMSATS which set off with the purpose of accompanying the developmental adventure of the countries of the South, adopted an unerring mission 20 years ago. Having successfully promoted cooperative activities among the countries of interest, COMSATS has proven itself as an esteemed inter-governmental organization in the area of science and technology.

As TUBITAK MAM, we are proud to be a part of the COMSATS’ Network of Centers of Excellence. We hereby congratulate COMSATS on 20 years of superlative efforts to enhance the South-South cooperation and strongly believe that our relations will further develop in the years to come”.

session included North-South divide, open knowledge sharing, and role of S&T in addressing key development issues. Highlighting the relationship between Science and Society, Ms. Wazir Ali called for flexible and adaptive approaches, free of stereo-typing.

Dr. Zaidi opined that COMSATS is capable of performing even better if the financial restraints are somewhat relieved, to which Dr. Qureshi assured that utmost efforts were being made to mobilize more financial resources for the organization and pledged to do more in the future. Mr. Tajammul Hussain, Advisor (Programmes) COMSATS, considered COMSATS Network a great asset and a possible means to addressing various key issues of the developing countries.



**Message from Dr. A.K.M. Asaduzzaman
Chairman, Bangladesh Council of Scientific and
Industrial Research (BCSIR), Bangladesh**

“On the occasion of the 20th Anniversary of COMSATS, on behalf of BCSIR and the people of Bangladesh, I would like to express my heartfelt felicitations to all the stakeholders from the member countries who have been contributing in developing COMSATS as an important regional platform for cooperation in science, technology and innovation which is essential for the South in building knowledge and technology based economies focused at sustainable development.



As in the past, BCSIR as a technical partner of COMSATS is committed to continue and enhance its role in all the relevant areas of science, innovation and technologies with an ultimate aim to improve the quality of living of the people in the South through effective transfer of technologies among the Member States so as to reduce the gap between the North and the South”.

**Message from Prof. Eduardo Posada
Director International Centre for Physics (CIF),
Colombia, and Chairperson, COMSATS
Coordinating Council**

“I have been the Chairperson of COMSATS Coordinating Council since 2010. It is indeed an honour to chair the annual meetings of the forum that comprises of reputed scientists, who are the Heads of high-profile R&D institutions in their respective countries. I feel elated when I see these scientific leaders interacting with each other, with a view to exchange scientific information, to explore new collaboration avenues, and to consider possibilities of launching new scientific research programmes.



The real-time cooperation in terms of learning from each other's experiences, best practices and success stories that is provided through Council meeting is indeed something to be proud about. The translation of these discussions into MoUs and agreements during the Council meeting is a unique contribution of COMSATS towards promoting South-South Cooperation.

Equally important is the first-hand observation of how the laboratories of a particular Centre of Excellence are organized, what facilities are available and how enthusiastic are the researchers. This possibility is provided by organizing the Council meeting in a different country every year, hosted by a different Centre of Excellence, which invites Council Member to have a tour of its laboratories.

And finally, we are all particularly grateful to Dr. Qureshi for his enthusiastic leadership of COMSATS. He and his team are dedicated and hardworking people, with whom it has been my pleasure to work. COMSATS is lucky to have successive Executive Directors, who have done remarkable work during all these years in the consolidation of one of the most important initiatives of Prof. Abdus Salam, the outstanding son of Pakistan. My own Centre in Colombia, CIF, was established in Dec. 1985 with the support of ICTP and Prof. Abdus Salam. The Centre has become internationally known as a prime institution for high quality training and advanced research. I take this opportunity to express my deep gratitude to COMSATS and TWAS, who have jointly published a booklet on the scientific programmes of CIF. This booklet is widely distributed and has played an important role in our international visibility.

Happy anniversary and my best wishes for many more years of successful achievements.”

Dr. Ahmad concluded the session with his remarks. He encouraged all to follow Prof. Salam's passion for identifying problems and finding their solutions. He noted that COMSATS is important for scientific scene in Pakistan and we are proud to be associated with it .

The distinguished guests of the event were presented a special newspaper supplement published in a leading daily of Pakistan that highlighted the organization's history, organizational structure, key achievements, as well as various projects of international standing and their impact over the years. Congratulatory messages were received from some Centres of Excellence.



Executive Director COMSATS presenting the event souvenir shield to the Chief Guest Dr. Ishfaq Ahmad

S&T INDICATORS OF MEMBER STATE

In Spectrum: People s Republic of China



1. Please briefly introduce China as an important member of the world community; its current standing in terms of Human Development Index and other Socio-economic Indicators.

The People s Republic of China is a developing country with a population of 1.3 billion. Since the founding of New China in 1949, and especially since the reform and opening-up policies were introduced in the late 1970s, the Chinese Government has actively implemented the principle of respecting labor, knowledge, talent and creativity, and has adopted a series of policies and measures to boost employment and develop education, science and technology, culture, public health and social security in the country. China now has the biggest manufacturing industry and export-oriented trade industry in the world. Over the last ten years, China has maintained fast growth rate, and emerged as the second largest economy in terms of GDP in 2010 (only mainland China calculated) according to IMF statistics.

China is one of the five major emerging national economies: Brazil, Russia, India, China, and South Africa (BRICS). China is classified as a country of medium human development according to the Human Development Index, presented in the Human Development Report (2013). Now the world benefits from China s economic growth.

well as sustainable development.

Since 2006, China has intensified its efforts in the sphere of top-level designing and systematic planning of science and technology innovation and education development. The country has formulated outline of the National Plan for Medium- and Long-term Scientific and Technological Development (2006-2020), which puts forward four principles, i.e., indigenous innovation, leapfrogging in priority fields, enabling development, and leading the future.



H.E. Mr. Sun Weidong

Outline of the National Plan for Medium- and Long-term Human Resources Development (2010-2020) and Outline of the National Plan for Medium- and Long-term Educational Reform and Development (2010-2020), focus on establishing a culture of innovation. At the 18th Session of the Chinese Communist Party (2012), the Innovation-driven Development Strategy was put forward, which is a forward-looking national strategy for accelerating China's economic transformation, solving deep-rooted problems, and injecting vigor to growth. The Chinese Government has launched the National High-tech R&D Programme (863 projects), National Key Basic Research Programme (973 projects), National

An interview with the Ambassador of People's Republic of China to Pakistan, H.E. Mr. Sun Weidong

2. Please highlight the vision of the Government of China for sustainable national development and the role it envisages Science, Technology, and Innovation to play for its development.

The Government of China continues to implement the strategy for sustainable development. It intends to optimize development on state-owned land; promote conservation of resources, enhance protection of natural ecological systems and environment, solve a series of problems concerning fog and haze pollution, and strive to build 'Beautiful China' with blue sky, green land and clean water. China will pay more attention to the livelihoods of the people; tackle the problems regarding people s living, residence, transport, education, medical care; care for senior citizens and to help them live a better life.

To promote sustainable development and social harmony, the Chinese Government pays attention to promoting institutional reforms in the fields of economy, science, technology, and education, for pursuing its strategy of invigorating the country through science and education, as

Key Technology R&D Programme, National Natural Science Foundation and other national programmes and initiatives. It has built 387 national key research laboratories and 294 national engineering technology research centers; implemented the Skills Training Plan: Hundred, Thousand, Ten-Thousand Talents Project, Changjiang Scholars Programme in universities, as well as some other major human resource development programmes. China has established 105 national high-tech parks and zones that are important drivers of China's regional economic growth having combined operating revenue of RMB 16.7 trillion Yuan in 2012 that contributed 14.5% of China's industrial added-value output.

Many national scientific and technological programmes support and finance wide ranges of development, such as high-speed trains and railways, remote sensing and navigation systems, high yield crops, heavy machinery, etc. Science, technology, and innovation is playing a key role in the overall economic growth of China.

Socio-economic and S&T indicators of China

	1990	2000	2010	2012
Total Population (in Billion)	1.135	1.263	1.338	1.351
GDP per capita (current US\$)	314	949	4,433	6,093
GDP per capita growth (annual %)	2.55	6.78	9.91	7.13
Trade (% of GDP)	27	44	55	52
High-tech exports (% of manufactured exports)		18.98	27.51	26.27
ICT goods exports (% of total goods exports)		17.71	29.12	27.06
R&D expenditure (% of GDP)		0.90	1.76	1.98
Patent applications, nonresidents	4,305	26,560	98,111	117,464
Patent applications, residents	5,832	25,346	293,066	535,313
Researchers in R&D (per million people)	..	543	890	1,020

Source: World Bank Indicators (2014)

3. What major achievements have been made in terms of Science and Technology during the last 10 years?

Science, technology and innovation (ST&I) is helping solve key problems and supporting the social and economic development in China. In the past 10 years, China has made great progress and advancement at the international level in the domain of basic research, such as in the fields of quantum science, particle physics, life sciences, and nanotechnology. Manned space and lunar exploration, Direct Broadcasting Satellite (BeiDou) navigation system, high-speed railway and train, deep sea exploration, supercomputer, and 12,000-meter deep sea oil drilling machine platform, are just some of China's achievements due to its ST&I capacity in high-tech fields. Visible progresses have been made in the key national R&D programmes, focusing on TD-LTE technology with 4G license; fourth generation nuclear power station technology; new drugs research and development; waste-water treatment; as well as infectious disease surveillance and monitoring. Photovoltaic power generation; electrical cars; hybrid rice seed culture; superconductivity; and multiple function stem cell, are a few of the achievements in the fields of basic and applied research in the country. All the above-mentioned achievements have made the new and strategic emerging industries in China to rapidly develop, enhancing its overall national strength.

4. Which government body is chiefly responsible for promoting the culture of Science and Technology, and implementing the science, technology and innovation policy in the country?

The highest decision and policy-making body of science, technology and education in China is the Central Leading Team for Science and Education of the State Council of China, which consists of Heads of several related commissions and ministries, such as the Ministry of Science and Technology, Ministry of Education, and Ministry of

National Land Resources. The National Steering Group of Science and Technology Institutional Reform and Innovation System Building, is in-charge of the reform and innovation, and consists of 26 commissions, ministries, academies and agencies. The Ministry of Science and Technology is the main body entrusted to formulate ST&I policies and plans, lay down and implement national R&D programmes.

Research institutes and centers work under various ministries, academies, agencies, such as Ministry of Education, Ministry of Environmental Protection, Chinese Academy of

Sciences, and Chinese Academy of Agricultural Sciences. Most of the provinces set up provincial academies of sciences, under which there are some provincial research institutes and agencies, centers under the academies. Universities and colleges under the Ministry of Education set up research institutes and laboratories. Over 200 national key laboratories are mainly run by the Chinese Academy of Sciences and universities under the Ministry of Education. There are 105 National High-tech Industrial Parks and Zones, as of September 2012, under the local provincial and municipal governments.

5. What is the existing S&T capacity of the country in terms of skilled human resource, number of S&T/R&D institutions, laboratories, scientific publications, revenues through patents, etc.?

As of 2008, skilled human resources accounted for around 114 million people in China. In 2012, the scientific and technical human resources were around 65 million people. The full-time R&D personnel (full-time scientists and engineers) nation-wide reached 3.2 million in 2012. As of 2012, the Chinese Government had 3,674 R&D institutions, including 3,017 S&T institutions focusing on natural sciences and technology; 318 research institutions on social sciences and humanities; and 339 scientific and technical information and documentation institutes and centers. China has built 387 national key research laboratories and 294 national engineering technology research centers throughout the country, excluding a large number of other laboratories and engineering technology centers run by local institutions and agencies as well as enterprises. The total patent applications reached 1,633,347, in 2011, and the total patents granted were around 960,513. In 2013, China's domestic effective invention patents reached 590,000. In 2011, scientific and technical papers published in China reached 530,000, of which 144,000 were indexed by SCI, 124,000 indexed by EI, and 52,000 indexed by CPCI-S, ranking 2nd, 1st, 2nd in the world, respectively. China remained the second largest

country in terms of the number of scientific and technical papers published in the world in 2013. Technical contracts were awarded across the country, worth RMB 746.9 billion Yuan, in 2013. The total revenue from the business of high-tech industry amounted to RMB 11,000 billion Yuan in 2013.

6. What role are the S&T organizations and R&D institutions under the Ministry of Science and Technology playing to support the operations of the Ministry?

The Ministry of Science and Technology (MoST) in China plays the key role in formulating national ST&I policies and plans, financing and implementing national R&D programmes, and organizing S&T activities related to national social and economic development. There are many research institutions under related ministries and government agencies performing R&D activities. MoST has no research institutions under it, however, it has over 20 S&T centers supporting the role of the Ministry. Some of the centers help support, coordinate and supervise the promotion work on remote sensing, biotechnology, agricultural technology, high-tech R&D, research infrastructure and platform building, as well as scientific and technical information exchange.

7. China's performance on MDGs is quite promising, what are China's priorities beyond 2015 on the post MDG agenda?

The Chinese Government has already formulated a grand plan for building a moderately prosperous society in all respects by 2020, which is based on the concept of Beautiful China, proposes the construction of ecological civilization, and calls for making the Chinese Dream come true. China will continue to push forward the implementation of the MDGs and devote itself to the development agenda beyond 2015, which focuses on poverty eradication, development and advancement through mutual cooperation. The efforts made towards achieving the MDGs were also focused on building a moderately prosperous society in all respects, along with setting higher and clearer targets for development. To fully achieve these targets, China will adhere to some of the following strategic priorities:

China continues to give central importance to economic development and continuously expand domestic demand, aiming at increasing individual income (especially the income of farmers and low-income urban groups), and improving social security and consumption environment, thus to make consumer demand play a bigger role in driving economic growth. China is in a process of strategically restructuring its economic set up: strengthening the fundamental role of agriculture; pursuing a new model of industrialization; and expediting the development of the services sector. China is promoting industrial upgrading through scientific and technological innovation, advanced

industrialization, IT application, urbanization and agricultural modernization, all at the same time, pursuing balanced and mutually reinforcing development between regions, as well as pushing for integrated urban-rural development.

China is steadily promoting equal access to basic public services, enhancing government's capacity in providing social security and seeking to establish a sound and sustainable basic public service system that meets China's national conditions and covers both urban and rural areas. China is implementing a job-first strategy and the policy of promoting entrepreneurship, market-regulated and government-backed employment, as well as facilitating business start-ups, in an effort to achieve the macroeconomic goal of full employment. China has put in place a social security system that covers urban and rural residents and improves the social insurance system, social aid system and basic medical and healthcare system. China will continue to improve the environment for women's development, and promote their equal participation in social and economic development and equal share in development outcomes.

China remains committed to the basic State policy of conserving resources and protecting the environment. China has taken measures to respond to climate change; put in place an accountability system for meeting energy-saving and emission-reduction targets; phase out energy-intensive and highly polluting production facilities; promote low-carbon, energy-saving and environment-friendly technologies and products; and pursue a circular economy. Laws, regulations and standards on energy-saving and emission reduction have been strengthened. Resource conservation and environmental protection have been integrated into each and every aspect of production, circulation, consumption and construction. Protection and management of water resources have been improved and water-saving society has become a common understanding. China has intensified its efforts for environmental protection by improving the network for collecting and transporting urban household waste and sewage-treatment facilities, and raising water and air quality. Efforts have also been made in protecting and rehabilitating the natural ecosystem; strengthening the ecosystems of forest, wetlands and deserts; improving the development and management of nature reserves, as well as biodiversity preservation.

8. South-South Cooperation is considered important for national and regional progress of the developing countries. How is Government of China employing this mechanism in its development agenda?

China is a developing country and an active initiator and supporter of South-South cooperation. For a long time, China's cooperation with developing countries has been an important part of its overall open-up strategy, providing the

basis for an over-all win-win economic situation. In the face of the changing global situations and new challenges, the Government of China maintains a stance that developing countries should strengthen unity and pay attention to multiple ways of South-South cooperation, strengthen capacity-building; and use multiple resources to expand cooperation channels. China is willing to develop broad cooperative ties with countries of the South in the fields of economy, science and technology, education and culture, on the basis of the principles of equality and mutual benefits. For some developing countries with greater socio-economic difficulties, China would like to provide them as much help and assistance as possible. In the perspective of its own development agenda, China regards such mechanism as mutually beneficial.

9. In which specific areas of Science and Technology does the Government of China need support of international community? Kindly share some collaborative arrangements in this regard.

So far, the Chinese government has established scientific and technical cooperation with 154 countries and regions in the world. China's international S&T cooperation ranges from mere product import to joint research and development, which strengthen ST&I activities in the country. Through international science and technology cooperation, S&T resources in the world are mobilized by China to implement a large number of key programmes and projects related to people's livelihood and economic growth. Thus promoting the development of some key technologies in the country in order for it to leapfrog and reach a point where China would stand at the same level with the world's advanced countries in a number of frontier technology fields.

The Chinese government has established many scientific and technical cooperation mechanisms and foundations, including 10 international innovation parks, 55 joint international research centers, 222 international S&T cooperation bases, as well as some joint R&D and business incubation centers. China has actively participated in international mega science programmes, such as International Thermonuclear Experimental Reactor (ITER) and Square Kilometre Array (SKA). China has implemented S&T Partnership Programme with Africa, ASEAN, and South Asian countries to actively carry out South-South cooperation, and scientific and technical assistance.

In the future, China will join the global innovation network by actively participating in international mega science and engineering programmes, with an aim to share large-scale global research infrastructure facilities, and to open national

Knowledge Economy Index & Knowledge Indexes for China (KAM 2012, World Bank)*

Rank	84
Change in Rank (from 2000)	+7
Knowledge Economy Index	4.37
Knowledge Indexes	4.57
Economic Incentive Regime	3.79
Innovation	5.99
Education	3.93
ICT	3.79

* Category ranking on a scale of 0-10

S&T programmes for high level foreign scientists and groups to work together. China will continue intergovernmental innovation dialogues and S&T cooperation. The country started its first innovation dialogue with EU last year. China completed the fourth Sino-US innovation dialogue and cooperation in the fields of energy, agriculture, environment, health and personnel exchange. The S&T cooperation will be strengthened with Russia and Central Asian Republics. China will carry out S&T diplomacy and assistance to neighboring

countries, and implement the strategy of S&T cooperation with these countries. It has started the construction of Silk Road Economic Belt; 21st Century Maritime Silk Road; and the China-Pakistan Economic Corridor; as well as initiated China-South Asia Science and Technology Partnership Programme. China will speed up the agenda of China-ASEAN Science and Technology Partnership Programme, and the process of implementing China-Africa Science and Technology Partnership Programme by promoting the construction of joint laboratories, enhancing advanced and suitable technology transfer, and absorbing foreign young scientists to come to China for study and joint research. Areas of international cooperation between China and other countries include, R&D in agriculture, electrical cars, new materials, advanced manufacture, new and clean energy, biotechnology, health, biomedicine, high-tech, energy saving and environment protection.

10. What role does the Government of China expect the Commission on Science and Technology for Sustainable Development in the South (COMSATS) to play for the national development of China and for promoting S&T in the country?

The global economic development enters new stage and developing countries still face challenges such as, climate change mitigation, livelihood improvement and economic development. As S&T has a pivotal role in socio-economic development, more and more countries pay greater attention to enhancing the role of S&T in their own economic and social development. The Government of China has accumulated rich experience in the promotion of high-tech industry and the improvement of people's livelihoods by developing science and technology, which China would like to share with other countries.

COMSATS can play, important role in these mechanisms in the form of holding science, technology and innovation forums, establishing joint laboratories and technology-transfer centers, S&T capacity-building including jointly organizing training workshops and seminars, exchanging and sharing information, selecting students to study in China, as well as by exchanging scientific and technical personnel.

ACTIVITIES/NEWS OF COMSATS' CENTRES OF EXCELLENCE

BCSIR-BANGLADESH ORGANIZES TRAINING ON ATOMIC ABSORPTION SPECTROPHOTOMETER (AAS)

Bangladesh Council of Scientific and Industrial Research (BCSIR), Bangladesh, in collaboration with Network of Instrument Technical personnel and User scientists of Bangladesh (NITUB), organized a week long 54th Training programme on Application, Maintenance and Troubleshooting of Atomic Absorption Spectrophotometer (AAS), from September 3-10, 2014. Bangladeshi scientists and technologists from different universities and organizations, as well as a scientist from Nepal attended the training programme. Prof. Dr. A. I. Mustafa, former Chairman BCSIR, inaugurated the training programme, which had Dr. Perter Sundin, Head of International Science Programme (ISP), Sweden, as a special guest. The training workshop spread over six working days and comprised a series of lectures and lab work. The lectures focused on basic principles of AAS, standard operating procedure, quality control and assurance mechanisms, as well as troubleshooting & maintenance of instruments and applications used for carrying out AAS analysis. The participants made hands on learning during the lab sessions that included training on quantification of trace metals in water sample by flame technique; measurement & detection of Arsenic in water by HG-AAS technique; and analysis of environmental and biological samples, essential elements in food, soil samples, as well as geological samples.

INTERNATIONAL COOPERATION AND CAPACITY BUILDING ACTIVITIES OF CIIT-PAKISTAN

Prof. Dr. Jaishankar Raman, Assistant Provost for International Affairs, Valparaiso University, USA, visited COMSATS Institute of Information Technology (CIIT), Islamabad Campus, on October 20, 2014, to discuss matters related to cooperation reached under a Memorandum of Agreement signed in July 2014 by the representatives of the two universities. Dr. Raman held detailed meetings with the officials of International Office and other Heads of departments of CIIT.

Earlier, On September 3, 2014, CIIT Abbottabad Campus signed a Memorandum of Agreement with the Department of Pharmaceutical Chemistry, Pharmaceutical Institute, University of Bonn, Germany, for cooperation in the field of drug research and development. During the reporting period, CIIT also organized a number of capacity building and awareness raising events. The CIIT Islamabad Campus hosted the 1st edition of the Forum on Sustainable Architecture and Cities, on October 16, 2014, in cooperation with the Embassy of France in Islamabad. The objective of the forum, in conformity with the terms of reference of the 21st Conference of Parties (COP21) on Climate Change, was to create necessary awareness in all the stakeholders, including, civil society, government, architectural communities, private companies and NGOs, and to get their feedback. The COP21 will be held in Paris in December 2015



Panel of Experts steering discussion at Climate Summit Pakistan organized by CIIT in Islamabad

by the United Nations Framework Convention on Climate Change (UNFCCC).

In a prequel to the Global Climate Change Summit hosted by the UN Secretary-General on September 23, 2014, in New York, experts gathered in Islamabad a day earlier for the Climate Summit Pakistan, which was organized by the Centre for Climate Research & Development (CCRD) of CIIT and the United Nations in Pakistan. The objective was to ensure Pakistan's contribution to the global discussion on Climate Change. The event brought together representatives of academia, international organizations, government, the private sector and civil society to discuss Pakistan's vulnerability to climate change and to some of its extreme manifestations like floods and droughts.

CIIT also hosted a forum on 'The World Beyond 2015: Is Higher Education Ready?' in Islamabad, on September 10, 2014. The objective was to be a part of the international campaign being carried out by the Association of Commonwealth Universities (ACU) to raise awareness about how higher education institutions need to respond to the global challenges beyond the year 2015.

PATRON-IN-CHIEF ICCBS-PAKISTAN, DECORATED WITH CHINA'S FRIENDSHIP AWARD

In a formal ceremony in Beijing, on September 29, 2014, China's Friendship Award was conferred upon Prof. Dr. Atta ur Rahman, the Patron-in-Chief of the International Center for Chemical and Biological Sciences (ICCBS), Karachi, Pakistan. He was amongst the 100 foreign experts from 25 countries that received the nation's highest honor to a foreigner for contributions to the country's economic and social progress. The Award to Prof. Dr. Atta ur Rahman is in recognition of his tremendous and historic contributions towards developing strong linkages between China and Pakistan in various fields of science and higher education. He was responsible for initiating a major programme of academic

collaboration and linkages with Chinese universities and other institutions as Federal Minister of Science and Technology, and later as Chairman, Higher Education Commission of Pakistan. Under these programmes, some 400 students were sent to various Chinese universities and research institutions for Ph.D. level training. Prof. Rahman has initiated strong collaborations with many Chinese Institutes. Prof. Rahman had signed an Executive Protocol for Scientific Cooperation between Chinese Academy of Sciences (CAS) and Pakistan Academy of Sciences (PAS) under which many training workshops have been organized in Pakistan and China.

Prof. Dr. Atta-ur-Rahman's book entitled *The Wondrous World of Science* has been recently translated into Chinese language. Recently, Prof. Atta-ur-Rahman has also been awarded the International Cooperation Award by the Chinese Academy of Sciences (CAS).

ICCES-CHINA HOLDS 13TH CTWF SYMPOSIUM AND REVIEWS ITS RESEARCH PROJECT WITH THAILAND

The International Center for Climate and Environment Sciences (ICCES), China, and Institute of Atmospheric Physics (IAP), China organized the 13th CAS-TWAS-WMO Forum International Symposium on Extreme Weather and Climate: Past, Present, Future, on September 8-11, in Beijing, China. The Symposium had the support of Chinese Academy of Sciences (CAS), The World Academy of Sciences (TWAS), CAS-TWAS-WMO Forum on Climate Science (CTWF), and COMSATS. The 4-day symposium had more than 90 participants from 13 countries. Forty-five researchers presented their research results on inland and coastal flooding, heat wave and drought, extreme events of air pollution and society impacts of extreme events.

Another important happening at ICCES during the reporting period, was the visit of Thai delegation to ICCES (October 12-18, 2014), to review the progress of Thailand-China Cooperative Research Project on Development of Seasonal Climate Prediction in Thailand Using IAP-DCP Model. The Thai delegation was led by Prof. Dr. Usa Humphries from the King Mongkut's University of Technology Thonburi (KMUTT). Dr. Sirapong Sooktawee from the Thai Ministry of Natural Resources and Environment and Mr. Boonlert Archevarahuprok from Thai Meteorological Department accompanied Prof. Humphries. This two-year project, officially launched in September 2013, focuses on transferring the IAP Dynamical Seasonal Prediction System (IAP-DCP Model) to Thailand.

The Director ICCES, Prof. Zhaohui Lin, Deputy Director, Prof. Bueh Cholaw, and other scientists from the Center attended the meeting. The two parties held thorough discussions on challenges faced during the process of transferring the model, and scheduled the future research work plan. In the 2nd year of this project, Thai research team will conduct



13th CTWF International Symposium on Extreme Weather and Climate: Past, Present, Future (Sept 8-11, 2014)

experimental seasonal climate prediction in Thailand using IAP-DCP model, to enhance the capability for flood/drought predictions on regional scale. Thai delegation and ICCES officials also agreed on supporting short-term visits of Thai scientists, or staff members of partnering organizations to ICCES, for trainings in 2015.

TUBITAK MAM, TURKEY, ORGANIZES SEMINAR ON INTEGRATED COASTAL ZONE MANAGEMENT

TUBITAK Marmara Research Center (MAM), Turkey, hosted the Third International Symposium on Integrated Coastal Zone Management (ICZM), on 14-17 October 2014, in Antalya, Turkey. This international multi-disciplinary event promoted integration of science and knowledge for the sustainable management of coastal resources. It provided a platform to scientists, engineers, managers, and policy-makers for discussing recent advances and innovative ideas, as well as sharing experiences and networking. The four themes covered in the symposium were: Understanding the impacts on ecosystem health; Environmental impacts - confronting local and global pressures; Emerging methodologies and progress towards assessing sustainable development; and Managing coasts - the science-policy-governance interface.

IROST-IRAN HOLDS TRAINING WORKSHOP ON SOLUTIONS TO OPTIMIZE ENERGY CONSUMPTION

A training workshop, titled *Solutions to Optimize Energy Consumption in Iranian Universities and Research Institutions*, was organized, on October 18-20, 2014, by the Institute of Advanced Materials and Renewable Energy of Iranian Research Organization for Science and Technology (IROST), Iran. The workshop aimed to inform, enable and improve the skills of installation experts, working at technical and construction companies, regarding optimization of energy consumption, as well as the difficulties and issues related to the maintenance of installations at Iranian universities and research centers.

SCIENCE, TECHNOLOGY AND DEVELOPMENT

NEW DISCOVERY WILL ENHANCE FOOD AND BIO-FUEL YIELDS

A research by a team of scientists led by Dr. Thomas Brutnell, Director of the Enterprise Rent-A-Car Institute for Renewable Fuels at the Donald Danforth Plant Science Center, USA, is expected to help prioritize candidate genes that can be used for crop improvement and reveal new pathways and information about how plants fix carbon. The team has developed a new way of identifying genes that are important for photosynthesis in two important food crops, maize and rice. The findings of this research were published in a paper published in *Nature Biotechnology* (October 12, 2014), reported by *Science Daily*. The researchers have also demonstrated their findings through a mathematical model enabling to access relevant datasets that compare C4 photosynthesis traits in plants like maize to C3 photosynthesis in plants like rice. The research establishes that C4 crops, including maize, sorghum, switchgrass and sugarcane, are able to withstand drought, heat, nitrogen and carbon dioxide limitations better than C3 crops, such as rice, wheat, barley and oats.

The C4 crops have the ability to efficiently make use of carbon dioxide and water that make carbohydrates we eat and cell wall polysaccharides; the sugars that are important to producing next-generation biofuels. The identification would help scientists genetically engineer C4 traits into C3 grasses that can be translated into crops in order to have better food and biofuel yields.

SKIN PATCH COULD REPLACE THE SYRINGE FOR DISEASE DIAGNOSIS

Success in diagnosing malaria through a skin patch has been reported by *Science Daily* (October 22, 2014). The research published in the ACS journal *Analytical Chemistry* shows successful designing and testing of a small skin patch to detect malaria proteins. Until recently, scientists have been trying to develop diagnostic patches that are covered with thousands of microscopic hollow needles on one side and can sample the fluid in the skin. This idea has now been optimized so that it could capture two biomarkers for the malaria parasite, *Plasmodium falciparum*. To test it, they injected malaria proteins into the bloodstream of live mice and applied the patch to their skin. The patch successfully captured the proteins in the skin tissue.

This could be the first step towards medical diagnostics that could one day replace the syringe for drawing blood. Apart from being less painful alternative, this technique could someday be adapted for use in humans to diagnose other diseases as a far safer option than syringes. This development also has a great potential economically, as the need for trained personnel, expensive lab equipment and facilities for analysis could be greatly reduced.

SOLAR AMMONIA PROCESS MAY SPUR FERTILIZER REVOLUTION

A research promising cheaper and cleaner methods of producing ammonia for fertilizers published in *Science* has recently been reported by *SciDev.Net* (September 9, 2014). This new method could offer an alternative to the conventional Haber-Bosch method being used to generate ammonia for fertilizer. In this method, hydrogen needed to make ammonia is acquired from methane, creating CO₂ as a byproduct. The new method has been developed by Stuart Licht of George Washington University in the United States and his colleagues, who have demonstrated a relatively efficient electrochemical process in which water and nitrogen react directly to form ammonia. The process takes place in molten hydroxide salt and requires a nanostructured iron oxide-derived catalyst. Removing the step of generating hydrogen from the process can result in lowering the energy requirements.

Once commercialized, the research could relieve the developing countries from a lot of their agriculture and food security related financial burdens.

FIRST HOOKWORM VACCINE PASSES BRAZILIAN SAFETY TRIAL

Hookworm parasites infect more than 600 million people worldwide, attaching themselves to their host intestines to feed on blood. Infection can lead to iron deficiency and capillary damage, and may retard children's growth and mental development. The drugs commonly used to treat hookworms help cure them for the time being but do little to fight repeated infections due to exposure to polluted water. The first ever hookworm vaccine developed by researchers from the Sabin Vaccine Institute Product Development Partnership (Sabin PDP) could deal with repeated hookworm infections, as reported in *SciDev.Net*, on October 7, 2014. The vaccine is said to have the potential to not only treat existing infections but also provide lasting immunity. The human trials of the vaccine showed that it was well tolerated by 102 healthy volunteers, and blood tests showed that they developed an immune response. The vaccine's active ingredient is a protein from the adult *Necator americanus*, the species of hookworm that most commonly infects humans. When patients are exposed to the harmless form of the protein in the vaccine, they develop antibodies that recognize it. Upon infection, these antibodies could recognize the hookworm proteins, and mobilize the immune system.

The director of the clinical trials of the drugs showed confidence that the vaccine could be incorporated into existing vaccination programmes in countries like Brazil, where hookworm is a great medical concern.

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

MR. CHARLES NATHANIEL GRANT, DIRECTOR-GENERAL ICENS, JAMAICA

Mr. Charles Grant is the incumbent Director-General of the International Centre for Environmental and Nuclear Sciences (ICENS) located at the University of the West Indies, Kingston, Jamaica. He succeeded Dr. Richard Annells, on his retirement as the head of ICENS in September 2014.



Mr. Grant intends to continue the ground-breaking work on trace elements in the Jamaican bio-sphere and their relation to agriculture, health and economic development that was initiated by Professor Gerald Lalor (Emeritus Director-General and Chairman Board of Directors ICENS) and continued by Dr. Annells. Moreover, he plans to expand on one of the mandates of the Centre, increase peaceful uses of atomic energy. The main foci over the next three years will be the successful completion of the core conversion of the SLOWPOKE-II Research Reactor, as well as the implementation of regional nuclear safety and security programs.

Mr. Grant obtained his B.Sc. (Hons.) in Physics from the University of Surrey, England, in 1990. As part of the B.Sc. programme, Mr. Grant spent one year as an intern at the Standard Elektrik Lorenz company (now ALCATEL), in Stuttgart, Germany; where he provided support in the development of a 3-D modelling software and the design strategy of NMOS, PMOS and BiCMOS transistor. Mr. Grant obtained his M.Sc. in 1992 from the same University in Radiation and Environmental Protection, with specializations in Reactor Physics and Instrumental Neutron Activation Analysis (INAA).

Mr. Grant began his career at ICENS (formerly the Centre for Nuclear Sciences) in 1993. During his 21-year service at ICENS, he has successfully occupied several positions within the organization, including Reactor Manager and Head of the Nuclear Analytical Facilities. Mr. Grant has been intimately involved in the development and execution of many of the institution's major programs. These include: the Inter-American Development Bank (IDB) sponsored program, Geochemical Atlas of Jamaica; International Development Research Centre (IDRC) funded program, Eco-Health Consequences of Cadmium in Jamaica; International Atomic Energy Agency (IAEA) sponsored project, Nuclear Methods Applied to Socio-Economic Development; Organization of American States (OAS) funded project, Mineral Contents of Indigenously Grown Foods in Jamaica, as well as Mexican Bilateral project, Geochemical mapping of soils and food crops using nuclear analytical techniques.

Mr. Grant has been responsible for the development of the analytical and quality assurance systems for the Neutron Activation Analysis Laboratory. During his tenure as its Head, the laboratory was recognized at the regional and international levels as the State of Practice laboratory. Most recently, the strategic plan for the utilization of the ICENS Reactor Laboratory topped the list of 31 strategic plans, submitted by research reactor managers from around the world. The strategic plans were evaluated in a 2013 review by a group of international experts. Between 1994 and 2002, Mr. Grant also served as a part-time lecturer on Radiation Protection and Radiation Biology at the University Hospital of the West Indies School of Medical Radiation Technology.

At the international level, Mr. Grant has been designated as an IAEA expert in the field of Research Reactors and Neutron Activation Analysis. He was recently seconded on a short-term contract as a full staff member to the IAEA, where he was responsible for 14 national and regional projects in four countries. For the last four years, Mr. Grant has been a Board Member of the IAEA Regional Technical Agreement, ARCAL

Regional Cooperation Agreement for the Promotion of Nuclear Science and Technology in Latin America and the Caribbean. He has been the National Coordinator for a regional IAEA project and one national project, as well as two bilateral projects with Mexico. Mr. Grant is the National Coordinator for the IAEA country declarations and additional protocols to the Safeguards Agreement; National Coordinator for the IAEA Radiation Safety Information Management System (RASIMS); the IAEA National Focal Point for Denial of Shipment of Radioactive Material; as well as member to several other national and university committees.

Mr. Grant has authored numerous papers published in international peer-reviewed journals; made presentations at international conferences; drafted technical reports; as well as contributed to book chapters. He is also a peer reviewer for several international Journals. In addition, he has constituted several newspaper articles and gave radio and television interviews.

Mr. Grant is married and has two children.

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COMSATS' BRIEF AND ANNOUNCEMENTS

SELECTED FORTHCOMING SCIENTIFIC EVENTS IN COMSATS COUNTRIES

2 December 2014	Foundation Meeting of COMSATS International Thematic Research Group on Mathematical Modeling, Abuja, Nigeria (www.nmcabuja.org/itrq_2014.html)
17-19 December 2014	12 th International Conference on Frontiers of Information Technology (FIT), Islamabad, Pakistan (www.fit.edu.pk)
12-15 January 2015	5 th International Symposium-cum-Training Course on Molecular Medicine and Drug Research (MMDR-5), Karachi, Pakistan (www.iccs.edu)

International Workshop on Applications of ICTs in Education, Healthcare and Agriculture and Second Meeting of COMSATS ITRG on ICTs, December 15-16, 2014, Islamabad, Pakistan

COMSATS, in collaboration with the Islamic Educational, Scientific and Cultural Organization (ISESCO), the Inter Islamic Network on Information Technology (INIT) and COMSATS Institute of Information Technology (CIIT), Pakistan, is organizing an International Workshop on Applications of ICTs in Education, Healthcare and Agriculture on December 15-16, 2014, in Islamabad, Pakistan. The event will cover various topics related to telemedicine/e-health, drug information services, e-education, and precision agriculture. The Industry experts, academicians, PhD students, entrepreneurs and policy makers, belonging to COMSATS & OIC Member States, are invited to participate in the workshop.

Moreover, the Second Meeting of COMSATS International Thematic Research Group on Information and Communication Technologies, being led by CIIT-Pakistan, will be held on the side-lines of the afore-mentioned workshop, during which the Group members will discuss their progress regarding the execution of joint research project, entitled: e-Solutions for Community Using Low-cost Wi-Fi.

For more information, please visit www.comsats.org, or write to hussient@comsats.net.pk.

CALL FOR PAPERS FOR COMSATS JOURNAL SCIENCE VISION: VOL. 20(2)

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 by publishing research as well as review articles. 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 in line with the focus of the journal.

COMSATS invites scholarly contributions for the Volume 20, Issue 2 (July to December 2014) of Science Vision. In view of 2014 being celebrated as the International Year of Crystallography, scholars are also encouraged to send papers highlighting the potential and applications of the field. As per the policy of the journal, contributors are compensated for their time and efforts with a modest amount of honorarium. Contributions may be sent to the Managing Editor at: comsats@comsats.org. For more details, please visit the journal's website: www.sciencevision.org.pk.

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A BRIEF ON COMSATS

COMSATS is an inter-governmental organization, with its Secretariat located in Islamabad, Pakistan. Currently it has 21 countries as its Member States and an affiliated Network of 19 scientific institutions.

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