



*The President House of COMSATS' host country, Pakistan, celebrates the organization's Silver Jubilee.*

Honourable President of Pakistan, Federal Minister for S&T, Government of Pakistan, diplomatic mission in Islamabad and COMSATS Secretariat officials attended the graceful ceremony.

(Details on page 02)

## Inside this Issue

- From the Executive Director's Desk 1
- Highlights from COMSATS Secretariat 2
- Special Section:** Capacity Building Events in Tunisia and Turkey 9
- Some Activities of COMSATS' Centres of Excellence 14
- S&T and Development News from Member States 20
- Article:** COMSATS' Experience of Science Diplomacy 21
- Science, Technology and Development 23
- COMSATS' Brief and Announcements 24

**Patron:**  
Dr. S. M. Junaid Zaidi  
Executive Director COMSATS

**Editors:**  
Ms. Farhana Saleem  
Ms. Isra Mahmood

**Designing & Development:**  
Mr. Imran Chaudhry

## From the Executive Director's Desk

At the cusp of the 2020s, COMSATS draws immense satisfaction from the successful completion of the first 25 years of its existence. The Organization's Silver Jubilee celebration was held at Awan-e-Sadr, Pakistan. In their statements, both the President of Pakistan and the Minister for Science and Technology underlined the growing importance of science and technology especially given the global technological revolution and digitally induced transformations. Their remarks along with the congratulatory messages from other associates of COMSATS are a source of strength and happiness for the Secretariat. It will be our endeavor to bring the Organization at the forefront of science-led sustainable development activities and knowledge-based solutions through various initiatives. We look forward to the continued support of COMSATS' member states.

The year 2020 will also mark the beginning of the third decade of the Millennium reminiscent of the global pledge outlining social priorities as contained in the Millennium Development Goals (MDGs) of 2000. The enormity of the sustainable development challenges and the mixed outcomes of the MDGs subsequently led to the adoption of the Sustainable Development Goals (SDGs). Each of these two global initiatives began with euphoria kindling the hope that the global commitments, partnerships and cooperation will create conditions for achieving the targets by 2030. COMSATS as an international and intergovernmental organization is conscious of its role in this regard. Its overarching aim of sustainable socio-economic development through the application of science and technology – a vision developed much before the MDGs and

SDGs – continues unabated.

Ever since the adoption of the SDGs, COMSATS has made determined efforts to create awareness about the 2030 Global Sustainable Development Agenda. During the period of reporting, in collaboration with The World Academy of Sciences (TWAS) and TUBITAK of Turkey, COMSATS organized a workshop on SDGs which was attended by scientists and researchers from the developing world. Another capacity-building event was held in Tunisia that helped in generating shared learning on biotechnology for food, agriculture and health. At the same time, other outreach activities also continued during the period which involved a conference on Science Diplomacy organized by COMSATS, COMSTECH, ECO Science Foundation, Pakistan Academy of Sciences and the Ministry of Foreign Affairs highlighting the significance of scientific collaboration in promoting better understanding among countries.

As COMSATS' commitment towards capacity building and training, International Centre for Training and Development has been launched. It will provide an important platform to various stakeholders in Pakistan and in other member states for engagement, interaction and training. I am sanguine that this facility will be optimally utilized.

In the end, let me wish a very happy New Year. May 2020 bring prosperity and success to the governments and peoples of the member states.

## HIGHLIGHTS FROM COMSATS SECRETARIAT

### COMSATS Silver Jubilee Celebrations

COMSATS celebrated the completion of 25 years of its inception early October 2019. The celebrations culminated in a graceful celebration at host country, Pakistan's President House and an online medical camp to mark the silver jubilee.

#### Silver Jubilee Ceremony at Aiwan-e-Sadr, Islamabad, Pakistan

As part of COMSATS Silver Jubilee celebrations, a graceful ceremony marking the landmark was held at Aiwan-e-Sadr, Islamabad, on 10<sup>th</sup> December 2019. The ceremony was graciously hosted by the Ministry of

COMSATS' role is important for bringing sustainability and prosperity in the region through S&T.

**H.E. Dr. Arif Alvi, President of Pakistan  
Head of State, Host Country**

Portugal, Palestine, Romania, Sudan, Sri Lanka, Turkey, Turkmenistan and Yemen. A number of government officials, including senior officials from Ministry of Science and Technology, Ministry of Foreign Affairs, as well as officials from COMSATS Secretariat, COMSATS University Islamabad, COMSATS Internet Services, and representatives of international organizations attended the ceremony.

COMSATS' efforts in the fields of education, health and Internet technologies are well-aligned with the global sustainable development paradigm and important for furthering development plans of COMSATS member states.

**H.E. Chaudhry Fawad Hussain  
Federal Minister for S&T  
Chairperson COMSATS  
Consultative Committee**

importance of multilateralism in S&T and considered initiatives taken by COMSATS an excellent example of Science Diplomacy. Reiterating his office's support to COMSATS, he urged the foreign missions and international



Science and Technology, Government of Pakistan. Dr. Arif Alvi, President of Pakistan, and Mr. Chaudhry Fawad Hussain, Federal Minister for Science and Technology, graced the ceremony with their presence.

The ceremony had an impressive attendance of over 160, including Islamabad based diplomatic missions from Embassies of Bosnia and Herzegovina, Belarus, Egypt, France, Hungary, Jordan, Kazakhstan, Kenya, Libya, Morocco, Nepal, Nigeria,

In his congratulatory remarks on the occasion, Dr. Arif Alvi was of the view that with education, skilled human resource, able minds and strong cooperation, the Global South can address present day challenges to help achieve Sustainable Development Goals. He urged the member states to support COMSATS' initiatives in this direction and more countries to join the organization as member states.

Speaking on the occasion, Mr. Fawad Hussain emphasized the

organizations to help further organization's cause of bringing peace through S&T in the region.

Dr. S. M. Junaid Zaidi, Executive Director COMSATS, communicated greetings of Hon. Nana Addo Dankwa Akufo-Addo, President of Ghana and the Chairperson of COMSATS, to the Honourable President and Minister. He lauded long-haul patronage of Government of Pakistan and Ministry of S&T towards COMSATS' operations.



### Online Medical Camp at Ahmadpur Lumma

As part of COMSATS' Silver Jubilee celebrations, COMSATS Telehealth (CTH) organized an online medical camp on 9<sup>th</sup> and 10<sup>th</sup> December 2019, in Ahmadpur Lumma, a town near Rahim Yar Khan District of Pakistan. The medical camp was organized in collaboration with Fauji Fertilizer Company (FFC) and Global Institute for Healthcare Quality (GIHQ).

The two-day camp served around two hundred patients from the area seeking medical attention for variety of ailments including respiratory infections, skin problems, joint pains, hypertension and diabetes. The doctors at CTH Centre in Islamabad were linked with the patients to FFC's Sona Centre set up at Ahmedpur Lama. A large number

of women and children turned up to benefit from the camp, a number of which also suffered from nutritional deficiencies.

The camp not only provided medical care to the patients, but also helped in creating awareness about telemedicine and its benefits to the medical community and health sector professionals in the area.

### Membership to ANSO, China

COMSATS has been endorsed for membership of the Alliance of International Science Organizations (ANSO) during its Governing Board meeting held on 6<sup>th</sup> November 2019, in Beijing, China. The final decision on membership shall be made during ANSO General Assembly scheduled

to be held in Moscow, in May 2020. COMSATS was one of the fifteen organizations endorsed for membership in 2019.

The membership shall enable COMSATS' Member States and Centres of Excellence to participate in ANSO's activities including fellowship and scholarships; prize and awards; training program; collaborative research; and professional associations.



### COMSATS Represented at World Science Forum 2019, Budapest, Hungary

A two-member delegation of COMSATS comprising of Engr. Qaiser Nawab (Assistant Director, Programmes) and Engr. Fiaz-ur-Rehman Khattak (Senior Web Developer) participated in the World Science Forum (WSF) 2019, held at Budapest, Hungary, from 20<sup>th</sup> to 23<sup>rd</sup> November 2019.

The forum was opened by H.E. Dr. János Áder, President of Hungary and Prof. László Lovász, President of Hungarian Academy of Sciences (MTA), at the Budapest Palace of Arts (Müpa), on 20<sup>th</sup> November 2019.

This year's forum themed "Science,





Ethics and Responsibility” was organized in collaboration with WSF partner organizations, including International Science Council (ISC), Inter-Academy Partnership (IAP), European Academies Science Advisory Council (EASAC), American Association for the Advancement of Science (AAAS), the World Academy of Sciences (TWAS), and the United Nations Educational Scientific and Cultural Organization (UNESCO).

More than 1100 participants including scientists and researchers, educationists, policy-makers, leaders, media and civil society representatives from over 100 countries gathered to discuss the future role, funding mechanisms, conduct and dissemination of scientific findings.

The four-day event covered various topics ranging from education, research, water science, food systems to leadership, democracy, Science Communication, and Science Diplomacy. The Forum featured 50 sessions during which 150 speakers discussed various issues pertinent to the themes of the event. A Declaration signed as an outcome of discussions and deliberations made recommendations vis-à-vis the following: leveraging the potential of science for global well-being; strengthening global standards for research integrity; fulfillment of

academic freedom and human right to science; and the responsibility and ethics of communicating science.

### International Centre for Training and Development (ICTD) Inaugurated at COMSATS

The International Centre for Training and Development (ICTD) was inaugurated at COMSATS Secretariat, Islamabad, on 20<sup>th</sup> December 2019.

The Centre has been jointly established by COMSATS and American Institute of Pakistan Studies (AIPS) under an Agreement signed between the two Organizations in January 2018. The aim of the Centre is to provide trainings by foreign experts in areas including

climate change, intellectual property rights, higher education and leadership, and energy policy.

Speaking at the ceremony, Dr. S. M. Junaid Zaidi, Executive Director COMSATS, opined that leadership and decision-making skills can be inculcated in the youth through expert trainings which can help achieve sustainable development in the South. He hoped that ICTD would suitably serve the cause.

In her inaugural remarks, Dr. Farhat Haq, President of AIPS, considered establishment of the Centre important for networking between US-based experts and relevant actors in Pakistan. Dr. Haq highlighted the need for translating and aligning expertise from the North with local needs and



challenges. She anticipated that the established Centre would benefit COMSATS' network in the developing countries and would also help activate intellectual resources available in AIPS network of 44 universities and 28 research centers.

Country Director (Pakistan) of AIPS, Mr. Nadeem Akbar, introduced AIPS and highlighted the undertakings and programmes of the Institute that include research and travel grants, junior faculty trainings and exchanges, and fellowship.

### Establishment of an OBOR Research Centre Honored

A dinner was hosted to celebrate the launch of 'Academician Professor Atta-ur-Rahman One Belt and One Road Traditional Medicine Research Center' at the Hunan University of Chinese Medicine (HUCM), Changsha, China. Dr. Atta-ur-Rahman is a celebrated scientist of Pakistan and patron-in-chief of COMSATS Centre of Excellence in Karachi, Pakistan, the International Center for Chemical and Biological Sciences (ICCBS).

A number of officials of COMSATS, Vice Chancellors of various universities, senior faculty members of the Universities and S&T Institutions as well as the members of the diplomatic community were present at the dinner.

As the host, Dr. S. M. Junaid Zaidi, Executive Director COMSATS, welcomed the distinguished guests and considered the establishment of the Center an honor for Pakistan and COMSATS and an important initiative under OBOR project.

Prof. Iqbal Choudhary, Director International Centre for Chemical and Biological Sciences (ICCBS-Karachi), briefed about the Research Centre established in the name of Prof. Atta-

ur-Rahman in China, and noted his achievements in the field of traditional medicine, as a Founding Director of ICCBS.

Other distinguished guests also recalled and celebrated the achievements of Dr. Atta.

### Cooperation with Member States

#### Meeting with Chairperson Consultative Committee, Federal Minister for S&T, Pakistan

On November 6, 2019, Dr. S. M. Junaid Zaidi, Executive Director COMSATS called on H.E. Mr. Chaudhry Fawad Hussain, Federal Minister for Science and Technology, Government of Pakistan, at the latter's office in Islamabad.

In his capacity as the Chairperson of COMSATS' Consultative Committee, Mr. Fawad was apprised of COMSATS' undertakings, including Silver Jubilee celebrations. Dr. Zaidi acknowledged the strong patronage of Pakistan's Ministry of Science and Technology towards COMSATS' operations over the years.

During the meeting, the Minister was also briefed about COMSATS' forthcoming statutory-body meetings

including the one to be chaired by him in the first quarter of next year, i.e. COMSATS' Consultative Committee Meeting.

The Minister was also presented COMSATS' Silver Jubilee commemorative postal stamp.

#### Meetings in Sri Lanka

Visiting Sri Lanka for participation in ITI's biennial Research Symposium held in Colombo, COMSATS' delegation held important sideline meetings.

On 18<sup>th</sup> December 2019, the Executive Director COMSATS, Dr. S. M. Junaid Zaidi, held a meeting with Hon. Thilanga Sumathipala, State Minister of Technology & Innovation, at his office. Mr. Tanvir Ahmad, Acting High Commissioner of Pakistan in Colombo; Mr. Chinthaka S. Lokuhetti, Secretary at the Sri Lankan Ministry of Technology and Innovation; Dr. Radhika Samarasekera, Director General, ITI; Dr. Ilmi Hewajulige, Additional Director General ITI; and Mr. Farhan Ansari, Sr. Assistant Director (Programmes) at COMSATS Secretariat, were also present during the meeting.

During the meeting, the Executive Director informed the participants of the meeting about collaboration between COMSATS and Sri Lanka, and





the former's various projects including COMSATS University Islamabad. He hoped for due participation of Sri Lankan institutions in the upcoming meetings of COMSATS' organs.

The State Minister appreciated the programmes and activities of COMSATS as well as its contributions towards socio-economic development of the member countries. The matter of ITI's upgradation to make it a top-notch research centre in the developing world was also discussed.

Speaking during the meeting, the Pakistani High Commissioner highlighted the ongoing collaboration taking place between the governments of Pakistan and Sri Lanka, including scholarships, expert-exchange, technology transfer, etc. He assured his full support for facilitating collaborations between COMSATS and the government of Sri Lanka.

### Meetings in Tunisia

A two-member delegation of COMSATS visited Tunisia in connection with the International Workshop on "Agriculture, Food Security and Biotechnology: Role of ICTs", held from 4<sup>th</sup> to 6<sup>th</sup> November 2019 (page 11 ). The delegation comprised of Mr. Tajammul Hussain – Advisor Programmes, and Mr. Babar Sultan – Protocol Officer.

On the sidelines of the event, the delegations held important meetings at COMSATS' Centre of Excellence in Tunisia, Water Researches and Technologies Centre of Borj-Cedria (CERTE), University of Monastir, and the Embassy of Pakistan in Tunisia.

On 4<sup>th</sup> November 2019, Prof. Hédi Bel Hadj Salah, President of the University of Monastir, was briefed about COMSATS, as well as the benefits that the University of Monastir could avail by being a part of COMSATS' Network of International S&T Centres of Excellence. Prof. Salah was invited to visit COMSATS Secretariat, COMSATS University Islamabad (CUI) as well as other renowned universities/institutions of Pakistan and other COMSATS' member states in order to explore the opportunities of cooperation in the

areas of mutual interest. Prof. Salah was appreciative of COMSATS' programmes and activities and took keen interest in student-exchange, faculty development and joint research programmes of COMSATS.

On 5<sup>th</sup> November 2019, the delegates met H.E. Mr. Muhammad Hassan, Ambassador of Pakistan, in his office. Pleased to learn about COMSATS' activities, His Excellency highlighted some key areas, including ICTs, Biotechnology, Nanotechnology, and Artificial Intelligence, in which Tunisia and other member countries of COMSATS could further collaborate. He also proposed jointly establishing a technology park in Tunisia.

Later during the day, COMSATS' officials visited CERTE and met with its Director General, Prof. Ahmed Ghrabi. During the meeting, Prof. Ghrabi made a presentation highlighting the structure, activities, achievements, research projects, international collaboration as well as current activities and future programmes of CERTE.

Discussions with Prof. Ghrabi pertained to creating a Network of institutions working in the field of water resources; joint capacity building events with other members of COMSATS' Network; and



Tunisia availing scholarships offered by other COMSATS' Centres of Excellence.

An Agreement of Cooperation was proposed between COMSATS and CERTE for reciprocal exchange of students and researchers among COMSATS' member states.

### Meetings in Turkey

A delegation of COMSATS comprising of Executive Director, Dr. S. M. Junaid Zaidi, and Sr. Assistant Director (Programmes), Mr. Farhan Ansari, visited Turkey for co-organization of the International Workshop on Sustainability, SDGs and Global Challenges, held from 3<sup>rd</sup> – 5<sup>th</sup> December 2019, in Gebze, Turkey. (Details on page 09).

The delegation availed the opportunity to hold sideline meetings and make visits to and learn about scientific institutions in the country.

A meeting was held with H.E. Prof. Hasan Mandal, President of COMSATS' Centre of Excellence in Turkey, The Scientific and Technological Research Council of Turkey (TUBITAK), and Prof. Orkun Hasekioglu, TUBITAK, on 2<sup>nd</sup> December 2019. Dr. Zaidi thanked TUBITAK officials for support on recently held capacity building activities on Metrology and SDGs. Dr. Zaidi identified capacity building and policy making as key areas where Turkey could support other member states and COMSATS' network.

Prof. Mandal thanked COMSATS for its collaboration and assured his continued support in future. He appreciated COMSATS' faith in TUBITAK to be a key player in the organization's ongoing and future activities, and considered the association especially useful owing to the invaluable learning available from other Centres of Excellence. During a visit to Canovate Electronics



located in Istanbul, a meeting was held with the chairperson of the Board of the company, Mr. Can GUR, and other senior officials. Headquartered in Turkey, the company works in the areas of electronics, energy, high-tech systems, aviation, IT systems, real estate, etc. Interactions at and visit to Canovate factory and production facilities helped learn about potential collaboration of the company with COMSATS Centres of Excellence.

The visit to Turkey also provided an opportunity to experience the advancements and developments taking place in the TUBITAK, which is one of the strongest nodes in COMSATS' Network. Laboratories of TUBITAK Institutions in the areas of Energy; Food; Environment and Cleaner Production; and Genetic Engineering and Biotechnology provided useful insights. Interaction with the scientists of these institutions further added to the officials' learning with regard to human resource and technical capacities of these institutions.

### Meetings in Hungary

On the sidelines of the World Science Forum 2019, COMSATS' delegates held meetings with a number

of officials attending the forum, including HRH Princess Sumaya bint Al-Hassan, President of COMSATS Centre of Excellence in Jordan, i.e., Royal Scientific Society, and H.E. Dr. Bonginkosi Emmanuel Nzimande, Minister of Higher Education, Science and Technology of South Africa.

Other delegates met belonged to TWAS, Italy; European Academies' Science Advisory Council (EASAC), Germany; AAAS, USA; Japan Science and Technology Agency (JST), Japan; Organization for Women in Science for the Developing World (OWSD), Italy; HRZZ-Croatian Science Foundation (CSF), Croatia; Institute for Global Environmental Strategies (IGES), Japan; Center for Development Research (ZEF), Germany; London International Youth Science Forum (LIYSF), United Kingdom; Institute of Advanced Studies Kőszeg (iASK), Hungary; Polish Academy of Sciences (PAN), Poland; Epitopoietic Research Corporation (ERC), Belgium; and UNESCO, France.

The purpose of these meetings was to apprise them about COMSATS' international programmes and outreach to initiate and strengthen mutual cooperation.

Also, meetings were held with the representatives of Hungarian educational institutions during which opportunities of collaboration were explored for skill-development, scientific exchanges as well as scholarships for COMSATS' member states.

During the visit, the delegates also met with the diplomatic missions of Pakistan to Hungary and Belgrade with a view to build cooperative ties in areas of mutual interest.

### Meeting with Ambassador of Morocco

On 30<sup>th</sup> December 2019, Dr. S.M. Junaid Zaidi, Executive Director COMSATS, paid a visit to the Honourable Ambassador of Morocco to Pakistan, H.E. Mr. Mohamed Karmoune, at his office in the Embassy of Morocco in Islamabad.

During the meeting, H.E. Mr. Karmoune was apprised of COMSATS' forthcoming statutory bodies meetings to be held in the first quarter of the next year. Furthermore, the support of his good office was also sought for the expansion of COMSATS' membership. Other matters regarding strengthening of COMSATS' Network and its activities also came under discussion during the meeting.

## Capacity Building Events

### International Young Diplomats School (IYDS)

The third edition of the International Young Diplomats School (IYDS) was jointly organized by COMSATS and the Institute of Peace and Diplomatic Studies (IPD) at COMSATS Secretariat, from 3<sup>rd</sup> to 5<sup>th</sup> December 2019. Apart from foreign participants from China and Indonesia, the three-day event attracted participants from various

regions of Pakistan, including KPK, FATA, Interior Sindh, South and North Punjab, Islamabad Capital Territory, Balochistan, and AJK.

The School was opened on 3<sup>rd</sup> December with an interactive session themed on "Breaking a Barrier and Creating Synergies". The subsequent sessions of the event featured talks by foreign diplomats from Romania; Denmark, Switzerland, Germany, Sri Lanka, France, Australia, UK, US and EU.

The various sessions covered topics relating to development cooperation, diplomacy and foreign policy traditions of the afore-mentioned countries. Other topics discussed included climate diplomacy, leadership, education opportunities available in United Kingdom and Australia, prospects of foreign investment, and projects in various development sectors.

### Seminar on Science Diplomacy

COMSATS in collaboration with the OIC Ministerial Standing Committee on Scientific and Technological Cooperation (COMSTECH), Science Diplomacy Division of the Ministry of Foreign Affairs (MoFA), and Pakistan Academy of Sciences (PAS), organized a Seminar on Science Diplomacy at COMSTECH Secretariat Islamabad, on

27<sup>th</sup> November 2019.

The event was inaugurated by Dr. Tariq Banuri, Coordinator General of COMSTECH and featured addresses by representatives of the Pakistan Academy of Sciences, Division of Arms Control and Disarmament Division-II (ACDIS-II) & Science Diplomacy of Pakistani Ministry of Foreign Affairs (MoFA), Higher Education Commission, ECO Science Foundation (ECOSF), COMSTECH and the Ministry of Climate Change, Government of Pakistan.

Speaking on the occasion, Ambassador (R) Fouzia Nasreen, Advisor SDGs, noted that over the years, COMSATS has remained cognizant of the soft aspect of cooperation through Science Diplomacy. She opined that Science Diplomacy framework has significant stake in combating challenges posed by the fourth industrial revolution. She highlighted that various initiatives of COMSATS and considered the organization devoted to developing more nuanced collaboration among its member states in the field of emerging technologies.

The Seminar attracted members of the diplomatic community, civil society, public and private sector organizations, think tanks and academia.





## SPECIAL SECTION: CAPACITY BUILDING EVENTS IN TUNISIA AND TURKEY

Within the framework of United Nations 2030 Global Agenda, COMSATS programmes and activities are being given a renewed focus through incorporation of means to facilitate the realization of Sustainable Development Goals (SDGs). In particular, COMSATS is organizing events to help create awareness about SDGs, facilitate networking among relevant stakeholders from its Network to encourage collective action, as well as present solutions to problems and challenges being faced by the developing countries. In connection with this, two events were organized by COMSATS in Turkey and Tunisia, respectively, which not only helped create awareness on the subject themes but also provided platform for building effective synergies among the participants to aid individual efforts for achieving SDGs.

### International Workshop on 'Learning about Sustainability, SDGs and Global Challenges' (3<sup>rd</sup> – 5<sup>th</sup> December 2019, Gebze, Turkey)

An international workshop was jointly organized by COMSATS in collaboration

with the Scientific and Technological Research Council of Turkey (TUBITAK), Turkey, and the World Academy of Sciences (TWAS), Italy, from 3<sup>rd</sup> – 5<sup>th</sup> December 2019, in Gebze, Turkey.

The workshop provided training to the scientists from least developed and S&T-lagging countries on the concept of sustainable development, the rationale of Sustainable Development Goals (SDGs), importance of SDGs targets set as benchmarks for monitoring the progress of the implementation processes, as well as on the planetary boundaries.

The Swedish International Development Cooperation Agency (SIDA) sponsored the event that was attended by 35 scientists belonging to Algeria, Botswana, Bangladesh, Benin, Burkina Faso, Congo, Italy, Kenya, Mali, Nepal, Niger, Palestine, South Africa, Senegal, Sri Lanka, Tanzania, Togo, Turkey and Uganda.

#### Inaugural Session

In his remarks at the inaugural, Dr. S. M. Junaid Zaidi, Executive Director COMSATS, considered international partnerships, in particular South-South

and Triangular Cooperation, imperative for accelerating progress towards the 2030 Global Agenda. He highlighted the need of collective action for environmental protection, biodiversity conservation and combating the harmful effects of climate change.

Dr. Max Paoli, Programme Coordinator TWAS, shed light on the importance of responsible and green consumption and production. He noted with pleasure the reversion of carbon footprint (fuel consumed for their transportation) of foreign participants of the event through carbon-offsetting scheme (planting of appropriate number of trees).

In his opening remarks, Prof. Dr. Orkun Hasekioglu, TUBITAK, hoped that the present activity would enhance cooperation among COMSATS Centres of Excellence in the areas pertaining to SDGs.

#### Technical Proceedings

The technical proceedings of the event were divided into four sessions, each session comprised of plenary presentation on following topics followed by brainstorming sessions and





presentation of recommendations.

### **Sustainable Development, SDGs, Planetary Boundaries**

Dr. Max Paoli, Programme Coordinator, The World Academy of Science (TWAS), Italy, made a presentation overviewing United Nations Millennium Development Goals (MDGs) and Sustainable Development Goals (SDGs).

Elaborating the concept of Planetary Boundaries, Dr. Paoli introduced nine processes regulating the stability and resilience of the Earth System as climate change, loss of biosphere integrity, land-system change, altered biogeochemical cycles (phosphorus and nitrogen), freshwater use, ocean acidification, atmospheric aerosol loading, stratospheric ozone depletion, and novel entities.

Dr. Paoli highlighted the increasing levels of atmospheric carbon dioxide and discussed Keeling Curve graph that reflects the accumulation of carbon dioxide in the Earth's atmosphere based on continuous measurements taken at the Mauna Loa Observatory on the island of Hawaii from 1958 to the present day. Discussing the possible actions for environmental impact mitigation, Dr. Paoli quoted Kenya's example banning the use of plastic bags and imposed strict penalties against plastic use.

Dr. Paoli also underscored the importance of having an educated and well-informed society for it to take actions for bringing real change for sustainable socio-economic development. In this connection, Dr. Paoli also noted with satisfaction the role COMSATS and TWAS are jointly playing to highlight and address sustainability-related issues and challenges for achieving SDGs.

### **Greenhouse Effect, Climate Change and Future Consequences**

Dr. Pauline Dube, Associate Professor at the University of Botswana, Botswana, in her presentation covered the effects and implications of climate change. She elucidated the rate with which world's population, resources usage, economic growth, urbanization and globalization has increased paralleled with threat to sustainable growth in terms of failure to address the key global challenges. She informed that as the earth system has shifted from Holocene to Anthropocene, high energy in the form of heat, light, electrical, chemical, nuclear and gravitational is being consumed globally.

She considered fossil fuel combustion the main contributor towards air pollution. She added that greenhouse gases have largely affected the global climatic conditions leading to extreme weather events such as abrupt rainfalls,

land degradation, desertification, tropical cyclones, land-based acidification, and ocean acidification.

Prof. Dube considered interventions each at individual, national, regional and international level and sound policies important for adaptation and mitigation of climate change to meet the climate-related targets set by United Nations in its Global Agenda. She was of the view that significant transformations in the form of low-carbon energy systems, sustainable transportation infrastructure, close-loop manufacturing, and social norms for sustainable lifestyles are needed for better and sustainable future.

### **Energy Sources, Technologies and Policies**

In his presentation, Dr. Fehmi Akgun, Associate Professor at the Energy Institute of TUBITAK, Turkey, focused on energy sources, utilization, latest technologies in the field as well as policies for sustainable energy use.

He introduced different types of energy sources that include coal, renewables, hydroelectricity, nuclear energy natural gas and oil and stated that their production and consumption varies region-wise. He considered biomass and waste decomposition and their conversion to energy highly sustainable method of energy production.



Prof. Akgun further talked about various energy technologies and regarded gasification a promising technology for processing of coal and biomass to produce synthetic fuel. He also stated polygeneration an important clean coal technology.

Dr. Akgun highlighted some general energy policies on a global scale and stressed the on-going changes in energy technologies as well as the importance to harness such technologies for actualization of SDGs. He concluded his talk by emphasizing the significance of clean and renewable energies, and the need for the development of clean energy technologies.

### Biodiversity

A comprehensive presentation focusing on biodiversity and the various threats to plant and animal species was given by Dr. Boudjema Samraoui from the University of Annaba, Algeria. He informed that about 99 per cent of the species that have existed ever since the beginning of life on earth have gone extinct. Dr. Samraoui deemed natural disasters, human activities, emerging diseases, fragmentation and habitat loss important factors in the process of extinction of certain animals.

It was noted that the populations of wild animals have more than halved since

the 1970s, while the human population has doubled.

### Key Recommendations

Each presentation was followed by meaningful discussions and deliberations where the participants shared knowledge, thoughts and ideas relating to education for sustainable development; ecosystems and development; the future of energy and demands of development; and climate catastrophe and impact of human activities.

The brainstorming sessions enabled the participants to chalk-out recommendations in order to address the socio-economic challenges in their respective countries. Some important recommendations of the workshop are as follows:

- To address climate change related food insecurity, salinity and temperature-resistant crops and crops requiring less water should be produced. Furthermore, use of hydro-retentive fertilizers (such as POLYTER) and consumption of crops requiring less resources and time should be encouraged.
- Use of biomass fuel, biogas, pyrolysis, solar PV, wind energy, geothermal energy, hydroelectricity and ocean energy as well as their effective use was recommended

for reducing carbon emission and carbon footprint.

- Dams and smart drainage systems and channels should be constructed apart from planting trees to help avert floods and droughts.
- In order to reduce the loss of biodiversity, pesticides use should be minimized, proper waste management systems should be established and the misuse of antibiotics and other drugs should be abandoned.

### 5<sup>th</sup> International Conference on 'Agriculture, Food Security, and Biotechnology: Role of ICTs' (4<sup>th</sup> – 6<sup>th</sup> November 2019, Monastir, Tunisia)

COMSATS in collaboration with ISESCO has been organizing International Conferences on 'Agriculture, Food Security, and Biotechnology' since 2015. The first Conference held in Egypt was followed by three other conferences in Sudan, Pakistan and Morocco, respectively.

Continuing this series of conferences, COMSATS co-organized the 5<sup>th</sup> International Conference on 'Agriculture, Food Security, and Biotechnology: Role of ICTs' with the Islamic Educational, Scientific and Cultural Organization (ISESCO) and the Inter Islamic Network on Information



Technology (INIT) in Monastir, Tunisia, from November 04 – 06, 2019. The Conference was hosted by TYAN and the Ministry of Higher Education and Scientific Research of Tunisia and was held in conjunction with the International Thematic Workshop on ‘Sustainable Agriculture, Food Security and Biotechnology: Best Strategies and Good Practices’ organized by TWAS Young Affiliates Network (TYAN).

Over 50 researchers and subject experts from 25 countries including Algeria, Bangladesh, Benin, Cameroon, China, Egypt, Gambia, Italy, Iraq, Jordan, Kazakhstan, Morocco, Nigeria, Niger, Oman, Pakistan, Philippines, Senegal, Sri Lanka, Sudan, Tunisia, Turkey, Uganda, and Yemen attended the event. In addition, representatives of COMSATS’ Centres of Excellence in Iran (Iranian Research Organization for Science and Technology – IROST), Kazakhstan (Al-Farabi Kazakh National University – KazNU), and Sri Lanka (Industrial Technology Institute – ITI) participated in the event as speakers.

### Inaugural Session

The Conference was inaugurated on 4<sup>th</sup> November 2019 by Prof. Hedi BEL Hadj Salah, President of University of Monastir and Professor Mokhtar

Mahouachi, President of Jandouba University.

In her inaugural remarks on the occasion, Dr. Jalila Ben Salah-ABBES, Executive Committee Member of TYAN for Arab Region and Associate Professor of ISBM, Monastir University, considered the event crucial for networking of scientists and young researchers of the subject fields.

In his message, read out by Mr. Tajammul Hussain, Advisor (Programmes), Dr. S.M. Junaid Zaidi, Executive Director COMSATS, highlighted the significance of information and communication technologies for presentation of innovative and sustainable solutions to help overcome the digital divide between rural and urban communities of developing world.

Representing the Executive Director INIT, Mr. Atiq-ur-Rehman, Senior Programme Officer at INIT stated that the integration of ICTs in agriculture, biotechnology and food security has significant impact on reduction of the gaps between agricultural community, bio-technologists, food security experts, governmental and non-governmental organizations.

### Technical Proceedings

The three-day conference consisted of six technical sessions comprising of talks and presentations.

During the first session, presentations were made on the topics including usage of geographical information systems (GIS) and remote sensing technologies in agricultural field; role of ICTs in agriculture, biotechnology and food security: case of computer simulated path analysis in predicting yield and quality of agricultural production; orphan crops in agroforestry: an approach for sustainable agriculture and circumventing environmental challenges in Africa; insecurities and management of pastoral mobility by ICT in the Sudano-Sahelian zone of Cameroon; and precision forestry towards sustainable forest management.

The session on “Climate Change Adaptation for Sustainable Agriculture” covered topics relating to the role of agricultural extension in development of ICT functions with the aim of sustainable rural development; and the potential of novel African isolates of *spodoptera littoralis* nucleopolyhedrovirus for tomato pest control.



The third session, themed “Crop Improvement, Protection and Management”, covered presentations were made on improvement of the resilience of local populations by the use of an improved bleeding technique of gum from *Sterculia setigera* in Senegal; scaling up climate-smart farming techniques: the CILSS approach; strategies for sustainable crop production intensification Sultan; artificial intelligence based techniques for Omani’s dates classification; plant growth regulators loaded silver nano-bullets effect growth of tomato (F1 hybrid super-special) seedling plugs; genetic structure of populations of *Rhizoctonia solani* AG1-IA from rice in China, Japan and the Philippines; and soil health, weed dynamics and productivity of wheat and desi chickpea in long-term rice-based conventional and conservation production systems.

The fourth session on “Food Nutrition Security: New Concepts and Strategies” covered topics on beneficial microorganisms from Sri Lankan dairies as candidates in nutrition, healthcare and biochemical industries; personalized diet recommender system using anthropometric indices; future biofuel from microalgae and cyanobacteria; performance evaluation of collard based bio-filter for treating fish tank effluent; effects of fermentation and extrusion on the proximate and organoleptic composition of unripe

plantain and pigeon pea blends; and new era in solving water scarcity for agriculture-food systems.

The fifth session, themed “Medicinal plants for Industry and Biotechnology Application”, covered topics on symbiotic relationships, better plants and marine soft corals life using metabolomics; cytotoxic and genotoxic effect of purified lantadene (A) loaded by synthesized gold nanoparticles on tumor cell lines; medicinal and functional values of natural antioxidants; synthesis and characterization of novel coumarins; recent advances of artificial intelligence in agriculture and food security; biosynthetic potential of novel bioactive *Streptomyces* recovered from Escravos River, Delta State Nigeria; a comparative metabolomic study on field grown Desi and Kabuli varieties of chickpea (*Cicer arietinum* L.) under irrigated and drought stress conditions; promising novel drug candidates against rheumatoid arthritis targeting Macrophage Migration Inhibitory Factor.

The last session was devoted to food safety regulation and standards and covered presentations relating to the work of the international expert committees of FAO / WHO JECFA and JMPR; application of foodomics for the promotion of food safety and food security; occurrence of Toxigenic Fungi, Aflatoxins and ochratoxin A in Algerian wheat, dried figs and nuts;

cattle owners’ perception of the impact of bovine trypanosomosis in East Darfur state- the Sudan; and resistance and virulence determinants of faecal salmonella species isolated from slaughter animals in Benin.

In parallel, brainstorming sessions were held between TYAN members for discussing prospects of collaboration under the themes of the Conference. As a result of these discussions, following projects were finalized to be jointly executed under TYAN/TWAS support programme: production of salt-tolerant rice; design of multitask robot prototype for agricultural needs; and boosting *Balanites aegyptica* valorization through quality enhancement of derived products.

As a result of deliberations and active discussions made during the Conference, important areas in line with the targets of Sustainable Development Goals were identified to gain knowledge of the current status of research in specific thematic areas and build capacity in Sustainable Agriculture, Food Security and Biotechnology research especially among common member countries of the partner organizations. Important connections were made among participants to address regional issues particularly in the areas of SDGs related to sustainable agriculture, food security and biotechnology.

## SOME ACTIVITIES OF COMSATS' CENTRES OF EXCELLENCE

### BCSIR-Bangladesh holds its Congress

A three-day BCSIR Congress 2019 in conjunction with the International Union of Forest Research Organizations (IUFRO) WP 5.07.03 Conference on "Green Technology of Pulp, Paper and Allied Industries" was held at the Bangladesh Council of Scientific and Industrial Research (BCSIR), Dhaka, from 12<sup>th</sup> – 14<sup>th</sup> December 2019.



The Congress was inaugurated by Honorable Architect Yafesh Osman, Minister of Science and Technology, Government of Bangladesh and presided over by Mr. Md. Faruque Ahmed, Chairman of BCSIR. Mr. Md. Anwar Hossain, Honorable Secretary, Ministry of Science and Technology graced the Congress as the chief guest.

The Congress comprised of 29 technical sessions during which technical papers were presented by 200 participants from ten countries. In addition, about 30 participants from different countries including Australia, China, India, Finland, Nigeria, Malaysia, Sudan, South Korea and Canada also presented their research findings during the technical sessions.

### 4<sup>th</sup> Biennial Research Symposium held at ITI-Sri Lanka

The Industrial Technology Institute (ITI), Sri Lanka, organized the fourth Biennial Research Symposium at the Modern Research and Development Complex (MRDC), Malabe, Sri Lanka, from 17<sup>th</sup> – 18<sup>th</sup> December 2019.

Organized under the theme "Excellence

Dr. Bandula Gunawardena, Honourable Minister of Higher Education, Technology and Innovation, Sri Lanka, and Mr. Thilanga Sumathipala, Honourable State Minister of Technology and Innovation, Sri Lanka, graced the inaugural as the Chief Guest and Guest of Honour, respectively. COMSATS' delegation comprising of Dr. S.M. Junaid Zaidi, Executive Director COMSATS, and Mr. Farhan Ansari, Sr. Assistant Director (Programmes) also participated in the Symposium.

Prof. R.U. Halwathura, Professor of Civil Engineering at the University of Moratuwa, Sri Lanka, delivered the keynote address during the Symposium. The outstanding performance of ITI scientists and engineers was also appreciated during the award ceremony where more than 28 researchers were conferred awards and certificates in various categories.

### RSS-Jordan hosts ACI's Regional Conference

A regional Conference on Concrete Materials and Design was organized jointly by American Concrete Institute (ACI), Jordanian Concrete Association, the Royal Scientific Society (RSS) and the Jordanian Engineers Association.

in Science, Technology and Innovation for Sustainable Development", the Symposium had the participation of 40 scientists and engineers from ITI.





Speaking on behalf of HRH Princess Sumaya bint El Hassan, President of RSS, Jordan, Dr. Bassam Al-Hayek, Head of Sustainable Development Technologies at RSS, informed that RSS has devised a set of Jordanian national construction codes that are being used in various sectors including engineering and design sectors. Furthermore, Engineer Nizar Qaqish, President of Jordan Concrete Association and Dr. Randall Poston, President of American Concrete Institute also spoke at the inaugural.

During the two-day conference, participants discussed latest technological developments in the field of concrete construction and polymer compounds for building reinforced concrete and mass concrete and exploring errors in concrete construction.

### **RSS-Jordan Co-organizes Annual Meeting of WAB-Net**

RSS, Jordan, and EcoHealth Alliance (EHA), USA, jointly organized the Second Annual Meeting of the Western Asia Bat Research Network (WAB-Net) in Amman, Jordan, from 9<sup>th</sup> – 11<sup>th</sup> December 2019.

The three-day meeting included scientific presentations, training in

environment. core One Health principles, science communication, and grant writing. More than 55 local and foreign participants (researchers, laboratory experts and zoonotic disease specialists) from Georgia, Turkey, Pakistan, Iraq, Oman, Saudi Arabia, United Arab Emirates, Azerbaijan and Armenia attended the meeting.

### **President of RSS-Jordan launches Arab Charter on Ethics in Science at WSF 2019**

HRH Princess Sumaya bint El Hassan, President of RSS, Jordan, launched the "Charter of Ethics of Science and Technology in the Arab Region" at the World Science Forum held in Budapest, Hungary, from 20<sup>th</sup> – 23<sup>rd</sup> November 2019.

The Charter is an umbrella ethical instrument that aims to ensure that science and technology serve human development in the Arab region in a true manner. It frames science and technology activities in the Arab region, supports an environment that enables science and technology to thrive, protects science and technology workers and outcomes and guides science and technology activities away from non-ethical practices that could harm the individual, society or the

environment.

Initiated at a regional consultation in Beirut in July 2017, the Charter comprised of multi-stakeholder consultation process involving 500 experts from the Arab region.

### **TÜBİTAK MAM-Turkey Strengthens Cooperation with National Institutions**

TÜBİTAK Marmara Research Institute (TUBITAK MAM), Turkey, signed a Strategic Partnership and Cooperation Protocol with ASPİLSAN, Turkey, on 22<sup>nd</sup> November 2019.

Under the umbrella of this Protocol, the two sides agreed to cooperate in the fields of battery technologies, energy storage systems and fuel cells for use in aviation, rail systems and similar sectors.

On the other side, cooperation of TUBITAK MAM with the TCDD Railway Research and Technology Center (DATEM), Ankara, was reviewed during the visit of the former's delegation.

Prof. İbrahim KILIÇASLAN, President of TÜBİTAK MAM, received briefing on the certification, measurement and test activities of DATEM that has a significant role in the railway sector. Subsequent to the meeting, the delegation was shown around the laboratories and the Centers of Excellence of Materials and Energy Institutes of TUBITAK MAM.

### **Events hosted by TUBITAK MAM-Turkey**

A workshop on cooperation between TÜBİTAK-MAM and SAHA İstanbul was held on 17 December 2019. The workshop had the participation of senior officials from Institutes of Chemical Technology, Energy and Materials of TUBITAK MAM apart from officials from the companies of SAHA İstanbul.



The workshop comprised of presentations by the Materials Institute, the Energy Institute and the Institute of Chemical Technology, followed by onsite visits to these Institutes.

Earlier from on 13<sup>th</sup> – 15<sup>th</sup> November 2019, second mid-term meeting of the ERNETMED Project on the “Use of Photovoltaic Solar Power for Desalination of Seawater and Mineral Production” was held at TÜBİTAK MAM, under the EU Horizon 2020 program. The project aims to develop a high-efficiency trailer for producing drinking water and minerals from seawater using photovoltaic solar power.

The meeting was attended by researchers from various universities, research centers and companies in the project partner countries, including Morocco, Algeria, Tunisia, Italy, France and Germany.

### Awards and Distinctions for Al-Farabi KazNU-Kazakhstan Scientists

On 12<sup>th</sup> December 2019, award ceremony was organized by Elsevier at Al-Farabi Kazakh National University (KazNU), Kazakhstan, to honour the winners of Scopus Award Kazakhstan – 2019. Following six scientists were awarded the Scopus Award.

- *Best Paper of the Year*: awarded to a team of scientists from Kazakhstan and Great Britain which includes Koshim Asima Galymzhankyzy, Associate Professor, Department of Cartography and Geoinformatics at Al-Farabi KazNU;
- *Top Researcher in Engineering and Technologies*: awarded to Professor Zayadan Bolatkhan Kazykhanuly, Dean of Faculty of Biology and Biotechnology at Al-Farabi KazNU;
- *Top Researcher in Social Sciences*: awarded to Sayabek Ziyadin Tattibekuly, Director, Center for Economic Research at Al-Farabi KazNU;
- *Young Researcher of the Year*: awarded to Moldabekov Zhandos Abydyanovich, post-doctoral fellow at Physics and Technology Faculty, at Al-Farabi KazNU;
- *Women in Science Award*: awarded to Kerimrai Aiyngul Mergenovna, post-doctoral fellow at Chemistry and Chemical Technology Faculty at Al-Farabi KazNU; and
- *Scopus Award* to Al-Farabi KazNU Eurasian Chemico-Technological Journal.

Prof. Galym Mutanov, Rector of KazNU, has been awarded the prestigious international award “Leader of Science – Web of Science Awards – 2019” in a ceremony held at Al-Farabi KazNU on 13<sup>th</sup> November 2019. Additionally,

Prof. Mutanov received an independent award as the author of a scientific monograph, which was included in the world’s leading database of scientific citations, Web of Science Core Collection.

During the ceremony, Dr. Zhandos Moldabekov, post-doctoral student of KazNU, having 42 scientific publications in high-ranking journals, was recognized as the “Best Young Scientist”. The scientific journal of KazNU “International Journal of Biology and Chemistry” became the best among domestic specialized scientific publications.

### HAINA Academy of ICTs Opens at Al-Farabi KazNU-Kazakhstan

Al-Farabi KazNU, Kazakhstan, and Huawei Technologies Kazakhstan have jointly opened HAINA (Huawei Authorized Information and Network Academy) Academy of Information and Communication Technologies (ICTs) at Al-Farabi KazNU. Currently, equipped with material and technical base set and necessary IT equipment, the Academy will allow KazNU graduates to become highly qualified specialists in the fields of IT, digital technologies and telecommunications.

Besides, the Academy will provide the most successful students an opportunity to regularly practice their skills at Huawei Headquarters in Almaty and the company’s branch partners.

### CUI-Pakistan opens ‘Al-Farabi Corner’ at the Junaid Zaidi Library

COMSATS University Islamabad (CUI), Pakistan, has opened an ‘Al-Farabi Corner’ at its Junaid Zaidi Library at Islamabad Campus of the University. The establishment is the result of a partnership agreement reached between Dr. S.M. Junaid Zaidi,





Executive Director COMSATS, and Prof. Dr. Galym Mutanov, Rector of KazNU, during the 21<sup>st</sup> meeting of COMSATS Coordinating Council, held in April 2018.

### **CUI-Pakistan organizes 17<sup>th</sup> International Moot on Frontiers of Information Technology**

A three-day 17<sup>th</sup> International Conference on 'Frontiers of Information Technology' (FIT-2019), was organized by COMSATS University Islamabad (CUI) at COMSTECH Secretariat, Islamabad, from 16<sup>th</sup> – 18<sup>th</sup> December 2019. Held under the theme "Artificial Intelligence for Economic Development", the Conference gathered participants from Australia, Austria, France, Japan, Netherlands, Russia, UK and USA.

The conference accepted 67 out of 269 submitted research papers, which were presented in 27 sessions along with several invited talks from world-renowned scholars, researchers, experts and leaders in the industry focusing on Artificial Intelligence, Water Informatics and Efficient Energy Systems, among others.

### **3<sup>rd</sup> Annual Conference of CPEC Consortium of Universities Organized by CUI-Pakistan**

COMSATS University Islamabad (CUI), Islamabad, and China Academy of Higher Education (CAHE), China, with the patronage of the Higher Education Commission (HEC) of Pakistan jointly organized the 3<sup>rd</sup> Annual Conference of CPEC Consortium of Universities themed on "Academic Collaboration for Sustainable Partnerships" from 18<sup>th</sup> – 19<sup>th</sup> November 2019.

The conference was aimed to review progress of academic collaborations among partner institutions, identify new areas of cooperation for development of human resource, and expand academic linkages among the universities of the two countries.

Addressing the gathering, H.E. Mr. Makhdum Khusro Bakhtyar, Minister for Planning, Development and Reform, urged the universities to carry out diagnostic studies of all crucial sectors to identify potential areas in which Pakistan needs to conduct research and come up with sustainable solutions.

In his welcome address, Lt. Gen. (R) Muhammad Asghar emphasized that Pakistan needs to learn from China as to how it lifted its population from poverty.

Speaking at the conference, the Chinese Ambassador considered China-Pakistan Economic Corridor, and the CPEC Consortium of Universities manifestations of strong bilateral relations.

### **ICCBS-Pakistan Signs Agreement to Upgrade Provincial Chemico Laboratory**

On 5<sup>th</sup> December 2019, ICCBS, Pakistan, signed a Memorandum of Understanding (MoU) with the Department of Health, Government of Sindh, to improve Chemico Bacteriological Laboratory of the Department. Under the agreement, ICCBS will be provided grant by the provincial government of Sindh for the up-gradation of the Chemico Bacteriological Laboratory.

The MoU was signed by Prof. Dr. M. Iqbal Choudhary, Director of ICCBS, and Mr. Abdul Waheed Shaikh, Serologist & Chemical Examiner during a ceremony held at the office of the provincial health minister.

### **ICCBS-Pakistan Conducts Successful Clinical Trials of Chinese Medicine for Bronchitis**

The Center for Bioequivalence Studies and Clinical Research (CBSCR) at the International Center for Chemical and Biological Sciences (ICCBS), Pakistan, has successfully completed one-year trial of Yinhuang Qingfei Capsule, first-ever traditional Chinese medicine (TCM) for bronchitis.

Prof. Dr. Raza Shah, General Manager of the Bioequivalence Studies and



Clinical Research at ICCBS, Karachi, while presenting the test report during a ceremony informed that randomized double-blind clinical trial in patients with chronic simple bronchitis were conducted to test the efficacy and safety of the Yinhuang Qingfei Capsule against Amoxicillin-Clavulanate.

The medicine was found to be suitable and effective for Pakistani population and is an effective alternative to Amoxicillin whose resistance in bacteria is increasingly been reported.

Yinhuang Qingfei Capsule is a natural herbs preparation that has been developed by Hunan Anbang Pharmaceutical, China, for the treatment of an acute attack of chronic bronchitis, whose current treatments though effective cause a series of adverse reactions.

### Director ICCBS-Pakistan becomes Member of Pakistan's National Committee on S&T

Prof. Dr. Muhammad Iqbal Choudhary, Director ICCBS, has become member of the national committee constituted by the Federal Ministry of Science and Technology to develop a network of centers for advanced technologies in the country.

The high-level committee has been mandated to select 15 advanced technology centers to upgrade them to state-of-the-art centers in the field of science and technology.

### ICCBS-Pakistan organizes International Moot

The 7<sup>th</sup> International Symposium-Cum-Training Course on Molecular Medicine and Drug Research was held at the Dr. Panjwani Center for Molecular Medicine and Drug Research (PCMD), International Center for Chemical and Biological Sciences (ICCBS), Pakistan, from 4<sup>th</sup> – 7<sup>th</sup> November 2019.

Over 700 scientists from 35 countries including Turkey, Iran, Iraq, China, Egypt, Syria, Italy, Nigeria, Greece, USA, UK, Germany, France, Australia, Canada, Brazil, Sweden, New Zealand, Hungary, Indonesia, Jordan, Malaysia, Kazakhstan, Ethiopia, Sudan, Thailand, Oman, Cameroon, Bangladesh, Sri Lanka and Nepal attended the international event.

Speaking at the closing ceremony, Prof. Iqbal Choudhary, Director ICCBS, informed the participants of the event about the international program of ICCBS under which a number of foreign scholars had accepted to be adjunct faculty at ICCBS.

### CSIR-Ghana to Develop Digital Agricultural Innovation Hub

The Council for Scientific and Industrial Research (CSIR), Ghana, will develop a Digital Agricultural Innovation Hub (DAIH) for the management of agricultural data by the mid of 2020. DAIH would put all the technologies developed over the years by CSIR for the access of farmers and the public.

The various technologies developed are not accessible to farmers; therefore, the hub would help address the issue through simplified and packaged information about their farm produce.

### Al-Quds University-Palestine Introduces Virtual Anatomy Labs Technology

Al-Quds University (AQU), Palestine, has introduced virtual anatomy laboratories, first of their kind in Palestinian medical schools.

The project has been sponsored by the England based Al-Quds Foundation for Medical Schools in Palestine and the United Nations Development Programme (UNDP). The technology will be used to perform virtual dissections which will enhance students learning by providing them with medical information in an innovative way to better meet the needs of the market.

The anatomy labs contain the equipment and software needed to provide efficient practical teaching to medical students in their basic stages as well as to the students of Dentistry and Pharmacy.

Al-Quds University's Health Complex houses five faculties: Faculty of Medicine, the Faculty of Dentistry, the Faculty of Pharmacy, the Faculty of Health Professions, and the Faculty of Public Health.

## GMOs Detection & Monitoring - A Field Study from the Jordanian Markets

### Introduction

Genetically modified (GM) plants (e.g., soybean and maize crops) have become a reality in agriculture, and are used in the production of food and feed (Figure 1).

In Jordan, huge amounts of maize feed are being imported each year from different countries all over the world such as Canada, Russia, Romania, Israel, India, Ethiopia, Ukraine, Spain, USA, Bulgaria, Brazil, Uruguay, Lebanon, Argentina, Paraguay, Moldova, Turkey, South Africa, Egypt, Syria, Iraq, etc. (Figure 2).

### Monitoring of GM Products in Jordanian Markets

The Royal Scientific Society (RSS) recognized the importance of developing a national-regional experience for detecting GM products to ascertain their potential risks on human and animal health and biodiversity.

Research activities started in 2008 to monitor GM products in Jordan by the Biosafety Unit at RSS. Where the results of the studies have been published in international journals & proceedings of scientific conferences.

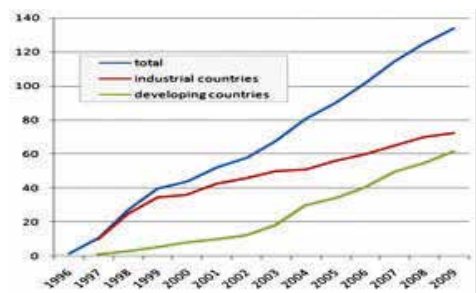


Figure-1

### Detection of GMO in Food and Feed Samples

In 2008, a study was conducted to survey GM maize and soybean, and to monitor GM elements in food and feed products in the local markets. The results obtained in 2008/2009 showed that 18% of tested food and feed maize and soybean samples were carrying 123 bp DNA fragments, and 25% of detected GM maize samples were carrying an additional DNA fragment of 386 bp.

The 2012 research activity showed that the incidence of GM maize in Jordan increased significantly. 72.5% of tested maize samples contain GM elements, and 69% of identified GM maize products were carriers of second DNA fragment of 386 bp.

### Conclusions and Recommendations

- It was possible to detect GM maize and soybean in unlabeled food and feed products sold in the Jordanian market.
- These results show the importance for implementing a national policy for GM monitoring in Jordan.
- There is a need to enforce implementation of labeling system/ regulation.



Figure-1

### Summary of Methodology & Results

- The primer pair (p35S-cf3, F & p35S-cr4, R) used for detection of CaMV 35S promoter normally amplify a 123 bp fragment.
- Amplified 390 bp fragment was observed in some but not all GM maize sold in Jordan's market carrying MON810 event.
- The 390 bp fragment was not detected in the standard authorized genetic event GM maize MON810.

### Published Papers

- AL-HMOUD, N.D., AL-HUSSEINI, N.T., AL-OBAIDE, M.A., KÜBLER, E., FARFOURA, M., AL-OBAIDE, H. & AL-RUSAN, H. (2014). Unconventional P-35S Sequence Identified in Genetically Modified Maize. *GM Crops & Food: Biotechnology in Agriculture and the Food Chain*, 5(1), 1-7.
- AL-HMOUD, N.D., AL-RUSAN, H., HAYEK, B.O. & IBRAHIM, M.A. (2010). Detection of Genetically Modified Maize and Soybean Food Products in the Jordanian Market. *Biotechnology*, 9(4), 499-505.
- AL-RUSAN, H., AL-HMOUD, N.D., HAYEK, B.O. & IBRAHIM, M.A. (2010). A Study on the Occurrence of Genetically Modified Soybean and Maize Feed Products in the Jordanian Market. *Journal of Cell and Molecular Biology*, 8(2), 87-94.

## S&T AND DEVELOPMENT NEWS FROM MEMBER STATES

### Colombian Department of STI Upgraded to Ministerial Level

COMSATS focal point in Colombia has been conferred the Ministerial status. Formerly known as the Administrative Department of Science, Technology and Innovation (COLCIENCIAS), the Ministry of Science, Technology and Innovation (Minciencias), Colombia, has been constituted on 5<sup>th</sup> December 2019 through signing of Decree 2226 by the President of Colombia, H.E. Mr. Iván Duque Márquez.

H.E. Dr. Diego Fernando Hernandez Losada, the former Director General of COLCIENCIAS has been appointed as the first Deputy Minister for Knowledge, Innovation and Productivity in the newly established Ministry.

### Morocco to Boost Economic and Sustainable Growth through Partnerships

Morocco has taken several steps to help boost its economic growth and promote sustainable growth within the country. In this connection, the country has signed agreements with various organizations and countries in sectors crucial to its national economy.

To cope with the adverse effects of climate change in its Taza Province, the Moroccan government has initiated The Taza Mountain Integrated Rural Development Project (PRODER-Taza) in collaboration with the International Fund for Agricultural Development (IFAD), Italy (Morocco World News, 9<sup>th</sup> December 2019). The project will benefit the rural areas by increasing their productivity and ability to adapt to climate change.

In another partnership with the Organization of Eastern Caribbean States (OECS), Saint Lucia, Morocco

launched the Moroccan-Caribbean Soil Fertility Mapping Project to boost its capacity in the agriculture sector (Loop St. Lucia, 21<sup>st</sup> December 2019).

Morocco has also signed a declaration of intent with France for the development of innovative partnerships in the fields of higher education, scientific research and innovation. (Xinhuanet, 20<sup>th</sup> December 2019).

In a similar vein, Morocco and El Salvador pledged to strengthen bilateral cooperation in the areas of agriculture, renewable energy, health, water and tourism (Xinhuanet, 19<sup>th</sup> December 2019).

### Pakistan Launches New Typhoid Vaccine against Resistant Bacterial Strain

Pakistan has become the first country to launch a new vaccine that provides immunity against an extremely drug-resistant (XDR) strain of typhoid. The new typhoid vaccine was approved by the World Health Organization (WHO) in 2018.

The vaccine launch was funded by the GAVI vaccine alliance (Geneva), WHO, the World Bank, and the United Nations International Children's Emergency Fund (UNICEF), among others (Reuters, 15<sup>th</sup> November 2019).

The immunization campaign, started in the southern Sindh province, is expected to become a nationwide program and part of routine child vaccination schedules by 2021.

### Tunisia to Produce Sustainable Biofuels in Collaboration with Italy

Società Nazionale de Distribution des Petroles (SNDP), Tunisia, collaborates



with Eni, Italian Energy Company, for the cultivation of castor to be used to produce sustainable biofuels (Biofuels International, 5<sup>th</sup> December 2019). The Agreement was signed by Mr. Nabil Smida (President and General Manager of SNDP) and Mr. Giuseppe Ricci (Chief Refining and Marketing Officer) at the Tunisian Ministry of Industry.

The collaboration is the world's first example of semi-industrial non-food being cultivated in a pre-desert area to produce sustainable biofuels. It will also help develop a local sustainable agro-energy supply chain.

Further, through this association, environmental-friendly vegetable oil will be made as an alternative to palm oil, which is to be phased out in the European Union by 2030.

### Kazakhstan Deepens Cooperation with Germany in Agriculture Sector

A joint statement has been signed between the Ministry of Agriculture, Kazakhstan, and the Federal Ministry of Food and Agriculture, Germany, to advance cooperation as part of the Kazakh-German agrarian political dialogue project (Eurasia Diary, 9<sup>th</sup> December 2019).

The document is aimed at cementing the bilateral agricultural cooperation and will facilitate mutual exchange of knowledge and experiences.

# COMSATS' EXPERIENCE OF SCIENCE DIPLOMACY

by Ambassador Fauzia Nasreen

Science Diplomacy is an effective tool for outreach and networking and for creating influential inter-linkages at international and regional levels. The role of Science Diplomacy has increased in the 21<sup>st</sup> Century. Technological innovations and transformations because of the scientific breakthroughs are impacting our lives deeply. Correspondingly, the planetary challenges are necessitating changes and compelling the global community to shift from "business-as-usual" to proactive and hands-on approaches.

The Fourth industrial revolution is posing more challenges for the developing countries due to weak governance structures, weak policy frameworks, lack of awareness, capacity and smart education, insufficient funds and the challenges of poverty, hunger, disease and over population.

The emerging paradigms also present opportunities with scopes for expanded Science Diplomacy framework. The organization stands to benefit from the leadership of the Commission's Chairman, the President of Ghana, Hon. Nana Akufo-Addo, who is leading development of Africa and championing the cause of the countries of the South particularly in the context of SDGs.

Since its inception in 1994, COMSATS has focused on sustainable socio-economic development through science, technology and innovation – an aspiration which is inbuilt in the Sustainable Development Goals. The World Academy of Sciences (TWAS) and COMSATS' Technical Advisory Committee comprising of 10 internationally renowned scientists provide connections with the North on a more permanent basis. Linkages with the United Nations agencies such as UNOSSC, UNESCAP, UNESCO and others provide COMSATS and its

member states an additional leverage for institutional opportunities.

## Diversity

COMSATS presents a picture of diversity, in terms of regions, levels of development, culture and socio-economic template. The organization represents 27 countries from three continents: Asia; Africa and Latin America and a population of 37.3 % of the total world's population. There is also variation in terms of Gross Domestic Products (GDP), Human Development Index (HDI) and science and technology indicators and investments.

The GDP of these countries ranges between US\$ 12.24 trillion to US\$249.7 billion. Similarly, GDP Growth rate varies from 7.4 % to 0.8 %. HDI shows that 9 of the member states are in high category; 7 in medium and 9 in low. From the more advanced countries to Less Developed countries (LDCs), there is scope for robust Science Diplomacy and mutual collaboration.

The capacity to invest in R&D and science and technology is directly correlated with the availability of resources. COMSATS' objective is to effectively bridge this gap by enabling sharing of the collective strengths of its member states.

## Structural Capacity

Over the last two and a half decades, COMSATS has played an important role in helping to overcome some of the development constraints faced by its member countries. Its Network of 22 International Scientific Centres of Excellence (CoEs) has been instrumental in fostering scientific cooperation. In the field of higher education, COMSATS has encouraged

member states to award scholarships. Its Centre of Excellence and flagship project, COMSATS University (CUI), has provided 100 scholarships to applicants from member states that have been availed predominantly by students from Africa. Correspondingly, the CUI faculty and students have benefitted from the opportunities offered by the developed countries/institutions, such as Commonwealth, European Union, US and other countries. This circular cooperation symbolizes the essence of Triangular cooperation.

In order to give more focus to the research work within the framework of COMSATS, focused International Thematic Research Groups have been constituted, each led by one of the Centres of Excellence. The areas are Climate Change and Environmental Protection; Information Technology; Natural Products Sciences Mathematical Modeling; Agriculture Food Security and Biotechnology; and Renewable Energy.

## Core Principles of COMSATS

COMSATS has all along been cognizant of the soft aspect of cooperation through Science Diplomacy especially as it helps in: i) building cooperative arrangements; ii) pooling of scientific knowledge and resources; iii) promoting knowledge-based economies and societies; iv) fostering of sustainability, development and constructive transformation; and v) most importantly overcoming the development challenges confronted by the world today.

## Prominent Initiatives

In the digital age, it is imperative to propagate smart technologies, broadband and 3D and IoT. COMSATS has the privilege of being the pioneer

internet service provider since the early 1980s. Aligning ICT related activities with the demands of modern time remains a desired goal for COMSATS.

Global developmental challenges, such as climate change, soil degradation, loss of biodiversity, disasters and droughts necessitate reliance on collective wisdom and expertise as these problems are not geographically bound. More pronounced effects can be seen as growing water scarcity is aggravating food insecurity and causing health problems. An international workshop arranged in Cairo on Water Resources highlighted the importance being attached to water issues. The realization is that if not tackled, the potential for conflict because of migration and disparities could lead to serious instability. Bio-economy and biotechnology initiatives can potentially provide answers to efficient use of natural resources and to preventing their depletion.

Interaction with China's Tianjin Institute of Biotechnology (TIB) and COMSATS' pursuit of creation of Technology Parks, universities and dedicated Centres in its member countries continues relentlessly. With the aim of providing a network for climate and sustainability, COMSATS has set up COMSATS Centre for Climate and Sustainability (CCCS). It allows 13 climate change centres in the member countries to exchange information and data.

Since 2005, various activities have been organized in collaboration with ISESCO. These include capacity building workshops and training programmes. The workshops have been in the areas

of Repair and Maintenance of Scientific Equipments in Teaching, Research Institutions and Small Scale Industries; Internet Security; Nanotechnology; National Innovation System and Intellectual Property; and Applications of ICT in Education, Healthcare and Agriculture. ISESCO recently arranged a workshop in Monastir on Agriculture, Biotechnology and Food Security. It was well attended by the African countries. COMSATS has effective agreements with both OIC and ISESCO.

### COMSATS and SDGs

Integration of SDGs in the plans, programmes and vision of COMSATS is reflected in several of its initiatives. Notwithstanding the fact that COMSATS' activities traditionally had been well within the framework of recently developed SDGs, focus now is on creating awareness about the role of S&T in the implementation of SDGs. Three events were organized towards this direction. An international seminar on SDGs: The Role of Universities was organized last year with the participation of international speakers from US, Australia, Turkey and TWAS as well UNDP Resident Representative in Pakistan. Deliberations were held on three sub-topics: Promotion and Advocacy for SDGs; SDGs Implementation: Perspectives on Education, Research and Development; and Frontier Technologies: Scientific Institutions Driving Innovation. A follow-up seminar titled SDGs Implementation: Collaboration among Universities was also held last year.

As a manifestation of COMSATS' desire to build human resource for

the future, engagement of youth in various activities has been encouraged. This has involved participation in Commonwealth Youth Forum; NAM summit's side event on youth as well as the recent World Science Forum. To commemorate the First UN Day on Multilateralism and Diplomacy for Peace, a seminar on the Role of Youth in the Implementation of SDGs was held in April 2019. To sensitize the young scientists from COMSATS' member states to relevant SDGs, a workshop was held recently in Turkey in collaboration with TWAS and TUBITAK.

### Looking Ahead

COMSATS has intelligently integrated some of the latest transformative trends in its activities over the period of 25 years. COMSATS' keen interest is expanding on key areas which are: institution building; frontiers of technology in the region through pioneering projects; capacity building; facilitating academic and scientific excellence; policy advocacy; participation in international forums and South-South and Triangular cooperation; promotion of joint research for common solutions; information dissemination and management.

In so far as the future vision is concerned, efforts are being devoted to developing more nuanced collaboration among member states/CoEs in the field of emerging technologies; collaboration between COMSATS and International Organizations in the field of science and technology; formalizing future vision in keeping with collective aspirations; and commercialization of research through Technoparks.

**About the Author:** Ms. Fauzia Nasreen is a former diplomat with an extensive experience as a practitioner of diplomacy, researcher, trainer and manager. Her area of expertise is public policy, policy analysis, peace and conflict resolution and defence and strategic issues. Previously, she has served in various capacities in a number of missions. She has been ambassador to Nepal and Poland and High Commissioner for Australia. Ms. Nasreen has also been teaching as visiting faculty at prestigious higher education institutes of Pakistan. **Email:** [fauzia.nasreen@comsats.org](mailto:fauzia.nasreen@comsats.org)



## SCIENCE, TECHNOLOGY AND DEVELOPMENT

### New Ideas for Managing the Menace of Plastic Pollution

Chemists at Nanyang Technological University (NTU), Singapore, have devised a method to use sunlight to turn plastic waste into valuable chemicals (Science Daily, 11<sup>th</sup> December 2019). A team led by NTU Assistant Professor, Soo Han Sen made a catalyst from the affordable, biocompatible metal vanadium, commonly used in steel alloys for vehicles and aluminum alloys for aircraft. The research team mixed plastics with the catalyst in a solvent allowing the solution to harness light energy and convert the dissolved plastics into formic acid – a chemical used in fuel cells to produce electricity.

In another development, Brazilian scientists have developed and demonstrated biodegradable plastics from cassava starch (SciDev.Net, November 12, 2019). This environment friendly plastic is 30 per cent tougher than those produced from rice and potato starch. Due to the huge environmental challenge from those of petroleum resulting in climate change, bio-plastics are less harmful to the environment and could help tackle pollution.

### Scientists Develop Highly Sensitive Sensor to Detect Gout-Causing Compounds

A mass-producible wearable sensor has been developed by researchers at California Institute of Technology, California, which can monitor levels of metabolites and nutrients in the blood of a person by analyzing their sweat (Medgadget, Inc., 27<sup>th</sup> November 2019). In contrast to others, this sensor can detect metabolites even in low concentration in the blood. The study, published in Nature Biotechnology, used biosensors made of graphene to measure respiratory and heart rate, as

well as levels of uric acid and tyrosine. The sensor was able to detect uric acid levels in healthy individuals and gout patients with high sensitivity and accuracy. The high sensitivity of sensors make them ideal for monitoring conditions such as kidney and cardiovascular diseases or diabetes at home.

### A Novel Method to Boost Sustainable Bio-Based Economy

A team of researchers from Manchester Institute of Biotechnology (MIB) at the University of Manchester, England, have developed a novel technique to convert low value waste biomass into valuable high-value chemicals (Energy Live News Ltd., 26<sup>th</sup> November 2019). The technique offers a promising alternative to producing chemicals which are otherwise derived from petrochemical resources.

In their study, the team demonstrated a highly efficient process in a single vessel and converted ferulic acid (a phytochemical found in plant cell walls) from waste material of sugar cane and wheat straw crops into coniferol. Very useful for the industry, coniferol is a chemical building block for everyday products including fabric softeners, food flavourings, and therapeutic drugs.

### Compound Developed To Enhance "Smog-Eating" Effect

In collaboration with Italcementi Heidelberg Cement Group and universities from England, Netherlands, Italy, and Israel, Graphene Flagship has developed a graphene-titania photocatalyst that can be coated on the surface of materials to passively remove pollutants from the air (The Titi Tudorancea Bulletin, 5<sup>th</sup> December 2019). Organic pollutants, such as nitrogen oxides and volatile

compounds, are the main cause of atmospheric pollution with serious implications to human health and life.

As also demonstrated by the team, photocatalysts in a cementitious matrix can largely decrease air pollution by reducing NOx and enabling self-cleaning ("smog-eating" effect) when applied to surfaces.

In this study, published in Nanoscale, the team coupled graphene with titania to develop a graphene-titania composite that showed enhanced photocatalytic activity, degrading up to 40% and 70% more pollutants and NOx, respectively, than pristine titania.

### A Simple Blood Test to Detect Early Breast Cancer

Researchers at the University of Nottingham, England, have developed a simple blood test to detect breast cancer up to five years before the appearance of clinical symptoms of the disease (Medical News Today, 4<sup>th</sup> November 2019). In this research, the scientists developed a blood test to detect those autoantibodies in the blood and indicate whether or not breast cancer is present.

The team believes this to be an easier screening method which is not only more cost-effective but also less uncomfortable than traditional mammograms.



## Scholarships offered by COMSATS' Centres of Excellence for Member States

Students from COMSATS' Member States are welcome to benefit from the following offers from COMSATS' Centres of Excellence:

- Hundred (100) scholarships for students/researchers for postgraduate studies at all campuses of COMSATS University Islamabad (CUI), Pakistan.
- Five (05) post-graduate scholarships, for Masters of Science in Mathematics at Lahore Campus of COMSATS University Islamabad (CUI), in collaboration with the International Centre for Theoretical Physics (ICTP), Italy.
- Five (05) post-doctoral fellowships at the International Center for Chemical and Biological Science (ICCBS), Pakistan.
- Five (05) post-doctoral fellowships at the National Research Centre (NRC), Egypt.
- Postgraduate Scholarships and Post-doctoral Fellowships at the International Centre for Climate and Environment Sciences (ICCES), and Tianjin Institute of Industrial Biotechnology (TIB), under PIFI Programme.
- Three (03) PhD scholarships at the Al-Farabi Kazakh National University (KazNU), Kazakhstan..

For further details on the scholarships, please visit [www.comsats.org](http://www.comsats.org) or write to [tajammul@comsats.org](mailto:tajammul@comsats.org) and [farhan@comsats.org](mailto:farhan@comsats.org).

## Upcoming COMSATS' Statutory Body Meetings

### COMSATS' Coordinating Council

23<sup>rd</sup> Meeting of COMSATS' Coordinating Council to be held at ICCBS, Karachi, Pakistan, (3<sup>rd</sup> & 4<sup>th</sup> March 2020) in conjunction with Conference on Science and Technology for Sustainable Development (2<sup>nd</sup> March 2020).

For more information write to:  
[farhan@comsats.org](mailto:farhan@comsats.org)

### General Meeting of the Commission

COMSATS' 4<sup>th</sup> General Meeting of the Commission (14<sup>th</sup> April 2020) in conjunction with Accra Forum on Science and Technology for Sustainable Development (15<sup>th</sup> April 2020).

For more information, write to:  
[nisar@comsats.org](mailto:nisar@comsats.org) or visit: [accra-forum.org](http://accra-forum.org)

## COMSATS Network of Centres of Excellence



BCSIR-Bangladesh  
[www.bcsir.gov.bd](http://www.bcsir.gov.bd)



Embrapa Agrobiologia-Brazil  
[embrapa.br/grobiologia](http://embrapa.br/grobiologia)



ICCES-China  
[english.icces.ac.cn](http://english.icces.ac.cn)



TIB-China  
[english.tib.cas.cn](http://english.tib.cas.cn)



CIF-Colombia  
[www.cif.org.co](http://www.cif.org.co)



NRC-Egypt  
[www.nrc.sci.eg](http://www.nrc.sci.eg)



CSIR-Ghana  
[www.csiir.org.gh](http://www.csiir.org.gh)



IROST-Iran  
[www.irost.org](http://www.irost.org)



ICENS-Jamaica  
[www.icens.org](http://www.icens.org)



KazNU-Kazakhstan  
[www.kaznu.kz/en/](http://www.kaznu.kz/en/)



RSS-Jordan  
[www.rss.jo](http://www.rss.jo)



ICCBS-Pakistan  
[www.iccs.edu](http://www.iccs.edu)



NMC-Nigeria  
[www.nmcabuja.org](http://www.nmcabuja.org)



CUI-Pakistan  
[www.comsats.edu.pk](http://www.comsats.edu.pk)



AQU-Palestine  
[www.alquds.edu/en](http://www.alquds.edu/en)



UCAD-Senegal  
[www.ucad.sn](http://www.ucad.sn)



ITI-Sri Lanka  
[www.iti.lk](http://www.iti.lk)



IRCC-Sudan  
[www.ircc.gov.sd](http://www.ircc.gov.sd)



HIAST-Syria  
[www.hiast.edu.sy](http://www.hiast.edu.sy)



TIRDO-Tanzania  
[www.tirido.org](http://www.tirido.org)



CERTe-Tunisia  
[www.certe.rnr.tn](http://www.certe.rnr.tn)



TUBITAK-Turkey  
[www.tubitak.gov.tr/en](http://www.tubitak.gov.tr/en)

Honourable mentions: Mr. Anya Augustine Igwebiuke and Mr. Leonel Javeres Mbah Ntepe



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.



COMSATS Secretariat  
Shahrah-e-Jamhuriat, G-5/2  
Islamabad - Pakistan  
Tel: (+92-51) 9214515 to 17  
Fax: (+92-51) 9216539  
Email: [comsats@comsats.org](mailto:comsats@comsats.org)  
URL: [www.comsats.org](http://www.comsats.org)



@COMSATS\_en



@COMSATSOOfficial



@COMSATS\_en