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NEWS ALERT

Forum for Indian Science Diplomacy

RIS Science Diplomacy News Alert is your fortnightly update on Indian and global developments in science research, technological advancements, science diplomacy, policy and governance. The archives of this news alert are available at http://fisd.in. Please email your valuable feedback and comments to science.diplomacy@ris.org.in

GLOBAL

IAEA and FAO launch Plant Mutation Breeding Network

The International Atomic Energy Agency (IAEA) and the Food and Agriculture Organization of the United Nations (FAO) have launched the Plant Mutation Breeding Network (MBN) which aims to improve efficiencies in crop mutation breeding across the region. In addition to strengthening their national capacities in plant mutation breeding and associated biotechnologies, participating governments are expected to exchange national germplasms. The MBN will facilitate multi-environment field trials in different countries to see where the crops thrive better. New speed breeding technologies are expected to be shared within the region through workshops, scientific visits and fellowships. The network encourages establishing platforms to enable the exchange of the technology and known genes of interest. MBN is currently composed of experts from Bangladesh, China, India, Indonesia, Lao PDR, Malaysia, Mongolia, Myanmar, Pakistan, the Philippines, Sri Lanka, Thailand and Viet Nam.

UN Conference to draft Treaty for the High Seas

The Third Session of the Intergovernmental Conference (IGC) on the Conservation and Sustainable Use of Marine Biodiversity of Areas Beyond National Jurisdiction (BBNJ), began in New York is going on from 19th-30th August. It will consider the draft text of an agreement that addresses important topics including: marine genetic resources (MGRs) (including questions on benefit-sharing); area-based management tools (including marine protected areas); environmental impact assessments; and capacity building and marine technology transfer. Differences have arisen over principles and approaches to be agreed particularly as they relate to marine genetic resources, between advocates of the common heritage of humankind, and those for the freedom of the high seas. The areas of the oceans involved, commonly called the high seas, are those areas of ocean for which no one nation has sole responsibility for management. In all, these make up 40 percent of the surface of the Earth, comprising 64 percent of the surface of the oceans and nearly 95 percent of its volume. This Treaty would be a major extension to the UNCLOS Convention of 1982

which 165 countries have ratified and 14 more have signed (while 16 countries including the US have not signed it).

Nanoscale imaging through standard biology lab equipment

Standard optical microscopes can image cells and bacteria but not their nanoscale features which are blurred by a physical effect called diffraction. Overcoming this diffraction limit require expensive and elaborated instrumentation or imaging procedures. Australian researchers from the ARC Centre of Excellence for Nanoscale BioPhotonics (CNBP) have found a simple way to bypass diffraction limitations using standard optical imaging tools. They used a particular type of fluorescent markers, so-called upconversion nanoparticles that can enter into a regime in which light emitted from the particles grows abruptly ¬- in a super-linear fashion -- when increasing the excitation light intensity. If this effect is exploited under the right imaging conditions, any standard scanning optical microscope can spontaneously image with super-resolution on any type of scanning microscope. Super-resolution can be achieved without setup modifications and image processing. Thus, this method has the potential to enter any biological lab, cost-effectively.

Novel genome-editing technology to capture diverse mutations

Salk Institute researchers have developed a new tool -- SATI (short for intercellular linearized Single homology Arm donor mediated intron-Targeting Integration) -- to edit the mouse genome, enabling the team to target a broad range of mutations and cell types. The new genome-editing technology could be expanded for use in a broad range of gene mutation conditions such as Huntington's disease and the rare premature aging syndrome, progeria. The new gene knock-in method, which the scientists call SATI, works by inserting a normal copy of the problematic gene into the non-coding region of the DNA before the mutation site. This new gene then becomes integrated into the genome alongside the old gene via one of several DNA repair pathways, relieving the organism of the detrimental effects of the original, mutated gene, without risking damage associated with fully replacing it. The scientists tested the SATI technology in living mice with progeria, and were able to an extension of life span (45% increase compared to untreated progeria mice). A similar extension of life span, when translated to humans, would be more than a decade. Thus, the SATI system represents the first in vivo gene correction technology that can target non-coding regions of DNA in multiple tissue types.

Affordable medicine to lower heart disease related cost-burden

A low-cost pill made up of four cardiovascular drugs could significantly reduce the burden of heart diseases, especially in low- and middle-income countries, according to a study undertaken in Iran. The so-called polypill, which combines different drugs into a single dose, reduced the risk of heart attack, stroke and heart failure by around a third. The study is based on a five-year randomised trial involving 7,000 men and women aged between 50 and 75 years from the Golestan province in Iran. A fixed-dose polypill strategy, if adopted widely, could play a key part in reducing premature mortality due to cardiovascular disease by at least a third by 2030, as targeted by the UN. The pill's ingredients are aspirin, atorvastatin and hydrochlorothiazide, and enalapril, which lowers cholesterol. In Iran, each pill cost 4.5 US cents. Five tablets a week is also very effective and could prevent up to 70 per cent of cardiac attacks. The pill should be seen as an additional component of cardiovascular disease prevention strategies.

INDIA

IIT Madras Develops 'GraspMan' – A Robot-equivalent of Human Hand

Researchers at the Indian Institute of Technology, Madras (IIT-Madras) have developed a robot with grasping and locomotion abilities like a human hand that can be used for industrial purposes and in search and rescue operations. The multimodal robotic system named 'GraspMan' comprises a pair of graspers (machine-equivalent of human hands) that enable it to conform to the geometry of an object being grasped. The motivation behind this research is to make a robot, with minimum design for specific tasks, capable of navigating and manipulating across different environments. The combination of locomotion and manipulation gives it the ability to hold an object and walk, arm-swinging like baboons (brachiation). In industrial use, it can climb on pipes, hold them and assemble. Besides, it can aid machines used in search-and-rescue operations and locomotory applications.

NTPC Plans Ultra-Mega Solar Plant in Kutch

National energy major National Thermal Power Corporation (NTPC) is planning to set up an ultra-mega solar park in the Kutch region, Gujarat. This park is envisaged to produce up to 5,000 mega watts and involve an investment of Rs 20,000 crore (~ US $2.812 Billion) or more. NTPC is looking at two-three more locations in the Kutch and will invite others for investment; the company is also exploring Rajasthan for setting up an ultra mega solar park. NTPC plans to tie up with municipalities for producing electricity from solid waste, as a follow up on a pilot project in Banaras in UP, that converts bio-waste into electricity.

Wipro-IISc collaborate in Autonomous Systems, Robotics and 5G

Wipro Limited, a leading global information technology company, today announced a strategic partnership with the Indian Institute of Science (IISc), India's premier public establishment for research and higher education in science and engineering, to conduct advanced applied research in autonomous systems, robotics and 5G space. The two organizations have jointly set up the Wipro IISc Research and Innovation Network (WIRIN), a hybrid industry academia collaboration unit, which will drive idea discovery, research and innovation in technology and product design. A group of senior professors and research staff from IISc and engineers, developers, architects and researchers from the autonomous systems, robotics and 5G domains at Wipro will constitute the team at WIRIN. They will focus on the research and development of cutting-edge technologies in Artificial Intelligence, Machine Learning, Visual Computing, Human Computer Interaction (HCI) and Vehicle-to-everything communication (V2X). The insights from the research will be leveraged by Wipro for its customers and the industry ecosystem. The Institute will benefit from advancing its research goal and capacity building besides commercialization of the research outcomes.

Ministry of External Affairs launched 'Performance Smartboard'

Ministry of External Affairs (MEA) assigned the design and development of a Performance Smartboard (https://meadashboard.gov.in/) to TO THE NEW, a leading digital technology company. The dashboard is an initiative of the government to provide quick insights into various citizen-centric services like visas, Pilgrims, OCI cards and even the posts of MEA across the world, in one glance. The Dashboard has been set as a major priority by the Hon'ble Prime Minister of India for all the Ministries, bringing transparency and accountability across government departments and is also a tool for performance monitoring, allowing citizens and senior officials to view the key performance indicators. It

encourages users to swiftly understand the key metrics of various schemes, programs, and initiatives of the MEA.

Sanfe launches Reusable Sanitary Pads made of Banana Fibers

Sanfe, IIT Delhi-incubated start-up, designs and develops products for improving female health and hygiene and is now forayed into the sanitary napkin/pad segment with the launch of first Reusable Sanitary Pads, made with composite banana fibre. These sanitary pads can last upto two years (around 120 washes). Sanfe's Reusable Pad has been developed, incorporating inputs from several IIT Delhi Professors. The reusable pads are ultra-thin and are highly absorbent with Quadrant True Lock Technology, which makes the pad leak proof and avoids creating any rashes. A Reusable Sanitary Pad is made up of four layers of different fabrics. A patent has also been filed for the design. A pack of two pads is priced at Rs. 199. These reusable sanitary pads can be used multiple times (up to 120 times) after washing them in cold water with detergent. This invention could lead to huge social and economic benefits.

Pune Scientists Develop Tech to Detect Early Spread of Cancer

A group of Pune-based scientists have developed a 'liquid biopsy' technology to detect early spread of cancer and claim it is the fastest in the world. The 'OncoDiscover' technology has been approved by the Central Drugs Standard Control Organisation, the national regulatory body for pharmaceuticals and medical devices, they said.This technology is expected to revolutionise the early diagnosis and management of cancer patients in India,and has been launched by Actorius Innovations and Research, a Pune-based start-up. OncoDiscover is the first-of-its-kind to be licensed to manufacture for sale under the new Medical Device Guidelines, 2017, for early detection of metastasis in epithelial origin cancers.The start-up has been funded for high-risk innovations by the Biotechnology Industry Research Assistance Council, an industry support wing of the Department of Biotechnology. A team of scientists worked to crack the technological challenges in detecting circulating tumor cells (CTCs) from lung, breast, colorectal, head and neck cancers. The new technology has been patented internationally and "clinically validated" via multiple clinical trials. While a similar CTC detection test approved by the US FDA costs USD 1,000 and is unaffordable for most Indians, OncoDiscover comes at a fraction of that cost. The test is now available in Pune at the OncoDiscover Liquid Biopsy Technology lab for cancer patients in India.

EU to support Waste-Water Treatment Project at IIT Kharagpur

Indian Institute of Technology (IIT), Kharagpur will steer a European Union (EU)-funded project to evolve technologies for reusing wastewater after treating it.IIT Kharagpur is the lead Indian partner of the multi-institutional, multi-crore Saraswati 2.0 project. The project is being funded by the European Union and the Government of India's Department of Science and Technology and the Department of Biotechnology.As part of the project, three water treatment plants will be set up at the IIT Kharagpur campus to treat wastewater and make them fit for use in irrigation.Seven such plants will be also set up in the other partner Indian institutes, which are IIT Madras, IIT Bhubaneswar, IIT Roorkee, NITIE Mumbai, MNIT Jaipur and TERI School of Advanced Studies.IIT Kharagpur will manage the project along with its lead European partner, BOKU (University of Natural Resources and Life Sciences, Vienna).Saraswati 2.0 builds on the Saraswati project of 2012-17.The treated wastewater can be used for irrigation or for non-potable purposes such as flushing of toilets.

DBT proposed new guidelines for nanotechnology applications in Agriculture

The central government's department of biotechnology (DBT) has now come out with draft guidelines to regulate the use of nanotechnology in the agriculture sector. This would encourage commercialisation of the technology in products like nanofertilisers and nanopesticides, for example, while ensuring quality and safety. Nanotechnology has been supporting the Indian agricultural market to develop products and processes with higher efficiency and lower costs. With the increasing scope to commercialise this technology, the government has now proposed a set of guidelines to regulate and maintain quality and safety of the products and processes. These regulations will oversee the use and spread of hundreds of nano-agri input products (NAIP) and nano-agriproducts (NAP) which have been circulating in the Indian market for some years now, to prevent nanoparticle toxicity in humans and the environment. All stakeholders have been invited to give their comments and suggestions by the end of August 2019. At present, there are no unanimously acceptable international guidelines for nano-agriproducts.

Chandigarh Varsity develops IoT based Patient Assistance System

Students at Chandigarh University have come to help such patients who are not capable of speaking or using any signs to describe their needs to their attendants, particularly old persons with dementia, paralytic, physically disabled patients or last stage cancer patients. The team has developed a gesture based sensor technology, which can be attached to the patients' hand to provide notifications for certain requirements. The system has been designed with some pre-stored gestures (currently upto 4) along with IoT board, gesture sensors, power circuits, wi-fi nodules, LCD screen speaker for emergency and the system can also with attached to voice based online systems such as Google Alexa. Currently costing about Rs. 5000, the team is working onto decreasing the cost by developing the server based model where multiple devices can be attached. One of the main task of this IoT Patient Assistant System is to keep monitoring all the factors that a patient may need to be taken care for like number of times a patient called for assistance and how many times no one attended them, storing the important statistics like heartbeat level, BP Level, blood sugar monitoring. The students have filed a patent for the system and will try to enhance its capability, in future.

PM's visit strengthens India-France cooperation in Science and Technology

France and India agreed to deepen their space cooperation so as to meet new challenges together and to train medical support personnel for Indian astronauts, for India's manned space mission by 2022. They agreed on a framework for the realization of joint maritime domain awareness mission and launch of a Space Climate Observatory for combating climate change. In the digital space, enhancing cooperation in the strategic sectors of quantum computing, Artificial Intelligence and exascale supercomputing were set as priority areas. It was decided to step up work on six nuclear power reactors in India in Jaitapur, Maharashtra, and on extending cooperation with the Global Centre for Nuclear Energy Partnership (GCNEP) for another five years. The joint partnership in International Thermonuclear Experimental Reactors (ITER) and European Council for Nuclear Research (CERN) projects was also discussed. Some areas of STI cooperation included defence, aerospace and renewable energy. In line with this decision, India and France desired to cooperate to implement joint projects in the African continent, to promote sustainable development.

India-Bahrain cooperation in Science and Technology strengthened

During the first ever visit of an Indian Prime Minister to Bahrain. both sides agreed on collaboration between with ISRO in the area of Space Technology, to assist in building the CubeSat, and to establish a ground station, data sharing and training. Bahrain also decided to join the International Solar Alliance (ISA). A MoU for Space cooperation was asigned in March 2019, whihch envisaged to set up a Joint Working Group, drawing members from DOS/ISRO and the Bahrain National Space Science Agency (NSSA) of Bahrain, to explore newer research activities and application possibilities in the field of remote sensing of the earth; satellite communication; satellite navigation; space science and exploration of outer space.

India and Bhutan boost cooperation in Space

The Ground Earth Station of the South Asian Satellite was recently inaugurated in Thimphu, which was constructed with the support of the Indian Space Research Organization (ISRO). The South Asia Satellite (SAS) launched in 2017, is a gift to the countries in the South Asia region and has enabled Bhutan to improve the reach and cost-effectiveness of Bhutan Broadcasting Service, while also enhanced the disaster management capacities within the region. During the recent visit of Hon'ble PM of India, increased bandwidth on an additional transponder was proposed as per Bhutan's requirements and also as a gift to the people of Bhutan. Leaders of both the countries also agreed to collaborate on joint development of a small satellite for Bhutan. In this regard, a Joint Working Group (JWG) is to be formed for implementing the project and other related activities, including developing a geo-portal system for Bhutan for natural resources and disaster management, using remote sensing and geo-spatial data. The two Prime Ministers also inaugurated the inter-connection between India's National Knowledge Network and Bhutan's Research and Education Network.

Role of BASIC countries in realising Paris agreement

In the run-up to the United Nations Framework for Climate Change (UNFCC) Conference of Parties (COP-25) meet to be held later in the year in Chile in December, the BASIC countries held its 28th Ministerial meeting on Climate Change from 14th to 16th August in Sao Paulo, Brazil. It was observed that BASIC countries coming together and putting views, is an important aspect of UN negotiations and shows their determination in making Paris agreement accepted by all the countries in its true letter and spirit. BASIC countries issued a joint statement highlighting key issues for the next Conference of Parties (CoP25). The BASIC Ministers urged developed countries to fulfill their climate finance commitments of mobilizing USD 100 billion annually for developing countries in a transparent manner and on a grant basis, by 2020. This support should be new and additional, and aligned with their 0.7% of GNP commitment with respect to Official Development Assistance (ODA). The countries noted with concern the insufficiency and inadequacy of the support provided by developed countries so far.

We welcome your comments and valuable suggestions. Please write to us for receiving publications, updates and notices regarding seminars, conferences etc.

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