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SCIENCE DIPLOMACY**

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NEWS ALERT

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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://fsd.in>. Please email your valuable feedback and comments to science.diplomacy@ris.org.in

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GLOBAL

[Harvard scientists observe more robust superconductivity in trilayer graphene](#)

Harvard scientists report successfully stacking three sheets of graphene and then twisting each of them at the magic angle of 1.1 degrees to produce a three-layered structure that is not only capable of superconductivity but does so more robustly and at higher temperatures than double-stacked graphene. The new and improved system is also sensitive to an externally applied electric field that allows them to tune the level of superconductivity by adjusting the strength of that field. The three layered system showed evidence that its superconductivity is due to strong interactions between electrons as opposed to weak ones. Realizing strong coupling superconductivity in a simple and tunable system such as trilayer could pave the way to finally develop a theoretical understanding of strongly-coupled superconductors to help realize the goal of a high temperature, maybe even room temperature, superconductor.

[Ultrasound in the treatment of brain diseases](#)

A new method of transcranial pulsed stimulation with ultrasound (TPS) developed by researchers in Vienna and Toronto is safe and ready for broad clinical application, and is virtually free from any side-effects. Alzheimer's patients in a pilot study displayed sustained improvements over a period of three months. Potential applications of TPS include Parkinson's, stroke, multiple sclerosis, and neuralgia. TPS technique also helps activating deep regions of the brain in a targeted and non-invasive way offering solution to all diseases where it is possible to restore disrupted brain functions by activating still-functional neurons. Another ultrasound technique enables targeted drug, antibody or gene therapy, to be delivered across the blood brain barrier and could be used to treat all brain diseases where local drug therapy is effective, such as tumours and motor system diseases.

[Novel photocatalyst effectively turns carbon dioxide into methane fuel with light](#)

A team led by City University of Hong Kong (CityU) has developed a new photocatalyst which can produce methane fuel (CH₄) selectively and effectively from carbon dioxide using sunlight. Furthermore, this new catalyst is made from copper-based materials, which is abundant and hence affordable. The team synthesised a novel photocatalyst by enwrapping cuprous oxide with copper-based metal-organic frameworks (MOFs). Using this new catalyst, the team could manipulate the transfer of electrons and selectively produce pure methane gas, stably under visible-light irradiation with an almost doubled yield. Also, cuprous oxide with MOF shell was more durable and the maximum carbon dioxide uptake was almost seven times of the bare cuprous oxide. The team is trying to further increase the methane production rate and explore ways to scale up both the synthesis of the catalyst and the reactor systems.

[Drug for treating obesity cuts body weight by 20 percent](#)

The results from a large-scale international trial conducted by about 2000 researchers across 16 countries led by UK researchers, found 2.4 mg of semaglutide once weekly plus lifestyle intervention was associated with sustained, clinically relevant reduction in body weight in participants with overweight or obesity. Three quarters (75percent) of people who received semaglutide 2.4mg lost more than 10 percent of their body weight and more than one-third lost more than 20percent. The average participant in the trial lost 15.3kg; this was accompanied by reductions in risk factors for heart disease and diabetes, such as waist circumference, blood fats, blood sugar and blood pressure. With evidence from this trial, semaglutide has been submitted for regulatory approval as a treatment for obesity. This result is being claimed as a gamechanger for improving the health of people with obesity and could play a major part in helping the UK to reduce the impact of other diseases, such as COVID-19.

[New technology for practical foldable solar cells](#)

International research team have used single-walled carbon nanotube (SWNT) films, embedded into a polyimide (PI) substrate, filling the void spaces in the nanotubes. They also "doped" the resulting material to increase its conductivity and used it as a foldable transparent conductor in perovskite solar cells (PSCs). They introduced small impurities (in this case, withdrawn electrons to molybdenum oxide) into the SWNT-PI nanocomposite layer. Their resulting prototype was only 7 micrometers thick, the composite film had almost 80% transparency at 700 nm, and a power conversion efficiency of 15.2%, the most ever achieved in solar cells using carbon nanotube conductors. The obtained results are some of the best among those reported thus far for flexible solar cells, both in terms of efficiency and

mechanical stability marking a breakthrough in solar harvesting technology. [see <https://onlinelibrary.wiley.com/doi/10.1002/advs.202004092> for more details]

COVID-19

COVID-19 (WORLD)

[WHO expert panel approves Oxford/Astra vaccine for COVAX programme](#)

The World Health Organization Strategic Advisory Group of Experts (SAGE) on immunisation has recommended the use of the Oxford/AstraZeneca AZD1222 vaccine against COVID-19, including in countries where the South Africa variant has been found. An interim recommendation issued by SAGE said, “Countries should conduct a benefit-risk assessment according to the local epidemiological situation including the extent of circulating virus variants.” The Africa Centres for Disease Control and Prevention also supported the rollout of the AstraZeneca vaccine in all countries. The WHO expert panel reviewed the vaccine amid reports of lower efficacy against the B.1.351 strain of SARS-CoV-2, which was identified in South Africa and has spread to at least 30 other countries. The AZD1222 vaccine makes up the bulk of doses secured by the COVAX facility, which aims to ensure equitable access to COVID-19 vaccines.

[SARS-CoV-2 mutates to escape antibody binding](#)

Researchers from the University of Pittsburgh School of Medicine, unearthed how the SARS-CoV-2 virus mutates to create new variants, including the UK strain B.1.1.7, and escapes neutralizing antibodies. It was found that in a recurring pattern of evolution, SARS-CoV-2 evades immune responses by selectively deleting small bits of its genetic sequence and these deletions happen in a part of the sequence that encodes for the shape of the spike protein, so the formerly neutralizing antibody cannot bind with the virus. The molecular “proofreader” that usually catches errors during SARS-CoV-2 replication is “blind” to fixing deletions, and so the changes get included into the variant’s genetic material. Scrutiny of the virus databases revealed that deletions kept happening in the same spots in the sequence, where the virus can tolerate a change in shape without losing its ability to invade cells and make copies of itself.

[SARS-CoV-2 under the helium ion microscope for the first time](#)

Scientists at Bielefeld University have succeeded for the first time in imaging the SARS-CoV-2 coronavirus with a helium ion microscope, in which the samples do not need thin gold coating (which changes the surface structure of the sample). The helium ion microscope has a higher resolution and a greater depth of field. The images under helium ion microscope provided the researchers a direct view of the 3D surface of the coronavirus and the kidney cell (infected cells - artificially produced from the kidney tissue of a species of monkey with SARS-CoV-2) with a resolution in the range of a few nanometres to visualise interactions between the viruses and the kidney cell. This is important in order to develop treatment strategies against the virus.

[Suitcase lab for coronavirus test](#)

In cooperation with several African universities, scientists at Leipzig University have found a mini-laboratory in a suitcase which provides test results that are almost as good as a PCR test, and almost in real time. The compact case could provide rapid coronavirus test results in regions of Africa. The case is a small, mobile laboratory equipped with a diagnostic device, solar power supply, various reagents, some reference RNA extracts and rubber gloves. It takes 15 minutes to get a result. In the mobile lab, saliva sample or a nasal swab is sufficient for the test and all reagents can be used at room temperature. The suitcase uses recombinase polymerase amplification (RPA) to analyse and detect an infection with SARS-CoV-2 almost

in real time. If the performance of the newly developed test is satisfactory, the suitcase laboratory could soon be increasingly used in the clinical field to determine SARS-CoV-2.

Protein sequences provide clues to how SARS-CoV-2 infects cells

A team led by the European Molecular Biology Laboratory analysed sequences of ACE2 and other human proteins involved in SARS-CoV-2 infection, such as a class of proteins called integrins. They focused on short strings of amino acids called short linear motifs (SLiMs), which are involved in transmitting information between the inside and outside of cells. They saw that ACE2 and several integrins contain SLiMs that are probably involved in endocytosis and autophagy - cellular processes of uptake and disposal of substances, respectively. Since SARS-CoV-2 targets proteins involved in endocytosis and autophagy, it means these processes might be hijacked by the virus during infection. The findings might lead to new therapeutic approaches for COVID-19. SLiMs could 'switch' to turn viral entry signals on or off, i.e., reversing these switches using drugs, might stop coronavirus from entering cells

COVID-19 (INDIA)

India exports 17 million doses of COVID-19 vaccines till 8 February

India has exported COVID-19 vaccines worth Rs. 3.38 billion till February 8. The exports, which began in January, include grant of the vaccine doses to friendly countries and commercial shipments. India is taking care of the domestic vaccine requirements first and then giving vaccines to friendly countries. The export of the Covishield vaccine manufactured by the Serum Institute of India, as grant, stood at 6.3 million doses with value of about Rs. 1.25 billion. The commercial exports of 10.5 million doses, in turn, were valued at about Rs. 2.13 billion. In the coming weeks, vaccines will be supplied to more countries in Africa, Latin America, CARICOM (Caribbean) and Pacific Island states. Among the countries that have received supplies as gifts (in million doses) are Bangladesh (2.0), Myanmar (1.7), Nepal (1), Bhutan (0.15), Maldives (0.1), Mauritius (0.1), Seychelles (0.05), Sri Lanka (0.5), Bahrain (0.1), Oman (0.1), Afghanistan (0.5), Barbados (0.1) and Dominica (0.07).

India continues fight against Coronavirus

India reported 12,143 fresh coronavirus infections and 103 deaths on 13 February while the active caseload is at 136,571 which make up to 1.25 per cent of the total caseload. People who took the COVID-19 vaccine on January 16 will receive their second dose on 13 February called a booster shot. As on 12 February, 7.7 million healthcare and frontline workers have received the first dose of the vaccine. India has set a target of inoculating 300 million people by July. India's flagship digital platform to monitor and manage the COVID-19 vaccination programme Co-Win has been integrated into the government's coronavirus contact tracing app AarogyaSetu, to enable users to download their vaccine certificates and other useful information. India's effective reproduction value (R) for COVID-19 remained at 0.92.

India starts second dose of COVID-19 Vaccine from 13th February

The second dose of COVID-19 vaccination started from February 13 for those beneficiaries who have completed 28 days after receipt of the first dose of vaccine. The approval provided by DCGI accords a window of 4 weeks to 6 weeks for the second dose from the first. India started its countrywide vaccination programme on January 16 and by 29 days more than 8

million beneficiaries have been vaccinated against COVID-19. A total of 7,668 health care workers received the second dose of vaccine on the first day.

[Centre reviews COVID-19 vaccination drive with all States and UTs](#)

Twelve States/UTs have vaccinated more than 70 percent of the registered health care workers (HCW). These are - Bihar, Lakshadweep, Tripura, Odisha, Madhya Pradesh, Uttarakhand, Himachal Pradesh, Chhattisgarh, Kerala, Rajasthan, Mizoram and Sikkim. On the other hand, seven States/UTs have reported less than 40 percent coverage of registered HCWs. These are Meghalaya, Punjab, Manipur, Tamil Nadu, Chandigarh, Nagaland and Puducherry. 10 States that recorded the highest number of vaccinations are Jammu and Kashmir, West Bengal, Gujarat, Jharkhand, Andhra Pradesh, Karnataka, Bihar, Uttarakhand, Tripura and Delhi. So far, a total of 34 persons have been hospitalized after being administered the COVID-19 vaccine, which comprises 0.0004% of the total vaccinations. Of the 34 cases of hospitalization, 21 were discharged after treatment, while 11 persons died and 2 are under treatment. A total of 27 deaths have been recorded till date. These comprise 0.0003% of the total vaccinations. No case of serious/severe AEFI/Death is attributable to vaccination, till date.

[Preliminary findings on medicinal plants show hopeful results against COVID-19](#)

The Department of Biotechnology (DBT) is developing therapeutics from natural products in partnership with AYUSH ministry and has screened extracts of over 15 medicinal plants for their anti-viral properties. Preliminary findings of the scientific research on medicinal plants have shown promising results against COVID-19. The first round of scientific experiments has been completed and the results look promising. In next two months, more results will be generated. However, these preliminary findings must be confirmed in clinical trials to establish efficacy.

INDIA – SCIENCE & TECHNOLOGY

[Using banana waste](#)

The National Research Centre for Banana (NRCB), Trichy has signed a memorandum of agreement (MoA) with IIIT-DM, Kancheepuram and Industry Gencrest, Mumbai to develop pilot scale machinery for extracting more than three tonne of banana fiber every day and utilize the sap, central stem and scutcher for producing a variety of products. Banana is cultivated in more than one lakh hectares in Tamil Nadu and more than 10 million tonne of waste is generated after the harvest. Banana fiber can be used in textiles and waste generated after extracting the fiber can be used as acoustic and aircraft panels and self-healing composites. NRCB has developed technology for central stem-based juices, biscuits, etc. for large-scale production. Banana sap can be used as an organic liquid nutrient for enhancing the yield of fruits and vegetables and further reducing the carbon footprint. This technology could be of interest to many developing countries.

[CSIR – CMERI develops Solar – Biodiesel Minigrid System](#)

CSIR-CMERI-Centre of Excellence for Farm Machinery has developed off-grid Solar Biodiesel Hybrid Minigrid of 50kW peak capacity system for providing 24X7 power. The experiments were conducted during different times of day, month and different seasons to understand the performance of the system under different conditions of loading, solar radiation

etc. This hybrid minigrid system is not only lighting the residential colony but also being used to run 10hp and 5hp agricultural pumps. Its capacity can further be increased in future through addition of more number of solar trees and battery banks. Other sources of energy like wind energy and biogas can also be integrated into this system, which can help in addressing energy needs of local communities.

DRDO licences 14 technologies to 20 industries

Defence Research and Development Organisation (DRDO) has licensed 14 DRDO developed technologies to 20 industries. The technologies transferred are from the area of electronics, laser technology, armaments, life sciences, materials science, combat vehicles, naval systems, aeronautics, sensors, etc. The product technologies transferred are Low Level Transportable Radar (LLTR), Inertial Navigation System for Ship Application (INS-SA), Long Range Optical Target Locator (OTL 1500), Hand Held Through Wall Imaging Radar (HH-TWIR) and Commander TI (Thermal Imager) Sight for T-72 Tank. NMRL-Fuel Cell based Air Independent Propulsion Technology for Naval Submarines and Multi Agent Robotic System (MARS) will be produced by Indian industry based on DRDOs technology.

Aqua Rejuvenation for Irrigation Unit-- comprehensively treats Waste Water

Aqua Rejuvenation Plant (ARP) comprehensively treats wastewater, based upon diverse purification parameters. It can rejuvenate approx. 24,000 litres of water which would be sufficient for almost 4 acres of agricultural land (barring seasonal variations in water requirements). The technology developed by CSIR-CMERI is capable of removing all pollutants from sewage (below W.H.O recommended level) and based upon geographical variations they may be modified. The technology combines both mechanical and physico-chemical treatment processes in order to purify the municipal sewage water from the household uses. The filter media used in the technology is locally source-able so as to ensure that there would not be any stress in the supply chain for scaled-up manufacturing of ARP. The technology will help in solving two problems at one go, first to convert sewage water to potable water which may be used for agricultural purposes thereby conserving the fresh water resources and second to reduce the burden of pollutant enriched grey water by converting it into potable one.

Significant reduction of heavy metal pollution during COVID-19 pandemic

A team of scientists from Indian Institute of Technology Kanpur conducted a study to quantify the impact of restricted anthropogenic activities on the water chemistry resilience of large rivers and found that efforts to minimize industrial wastewater can substantially reduce heavy metal pollution in the Ganga water in a short time span of a few months. The daily geochemical record of the Ganga River were analysed to find that reduced industrial discharge during 51 days of mandated nationwide lockdown decreased the dissolved heavy metal concentrations by a minimum of 50percent. In contrast, nitrate and phosphate inputs predominantly derived from agricultural runoff and domestic sewage maintained a chemical status quo. This study adds to the body of research on world's large rivers which have been intensely studied to better understand the impact of climate change and direct human interventions on river water quality and quantity.

Technology transfer of CSIR-CMERI developed Water Purification Technologies

CSIR-CMERI transferred four indigenously developed water purification technologies to three prominent MSMEs engaged in the Water Purification domain. The technologies transferred to

the MSME partners were high flow rate Arsenic removal filter, domestic Iron water filter, domestic Fluoride, Arsenic & Iron Removal (FAIR) filter, and high flow rate Fluoride & Iron removal filter. For wider reach of these technologies especially to rural regions of the country, CSIR- CMERI forged a partnership with the MSMEs. These indigenously developed Water Purification technologies are much more effective and affordable with low maintenance cost than imported technologies. The MSME partners can also tremendously benefit from this technology transfer, by availing the Government Marketing Promotion Schemes, to reach out to our immediate neighbouring countries and African Nations.

IN BRIEF

[New class of antibiotics against resistant bacteria](#)

Researchers in Denmark have developed a substance that has the potential to become a new effective antibiotic by conjugating pleuromutilin. 35 novel (+)-pleuromutilin conjugates were studied and one of them, with a para-benzyladenine substituent, proved particularly potent against MRSA and displayed no cytotoxicity in four mammalian cell lines. The substance fights both resistant enterococcus, streptococcus and staphylococcus bacteria. The substance and the pleuromutilin class do this via a unique mechanism of action, which also causes resistance to develop at a very slow pace. So far, the substance has been tested on bacteria and human cells. The next step towards becoming an approved drug is animal studies and then clinical studies in humans.

[A new modifier increases the efficiency of perovskite solar cells](#)

A Russian-Italian research team have modified perovskite-based solar cells using MXenes -- thin two-dimensional titanium carbides with high electrical conductivity. The MXenes-based modified cells showed superior performance, with power conversion efficiency exceeding 19% and improved stabilized power output with respect to reference devices. The team has shown that the addition of a small amount of titanium carbide-based MXenes to light-absorbing perovskite layers improves the electronic transport process and optimizes the performance of the solar cell. The approach proposed by the researchers can be easily scaled to the format of modules and large-area panels. Doping with MXenes does not change the fabrication sequence and integrated only to the initial stage of ink preparation without changes to architecture of the device.

[Photonics for artificial intelligence and neuromorphic computing](#)

A team of scientists, from the University of Exeter, developed fast, energy-efficient, future computing systems that use light instead of electrons to process and store information. In this new approach - photonic neuromorphic computing, the core information processing tasks of computing and memory are fused together. The signals are communicated and processed using light rather than electrons, giving access to much higher speeds and vastly reducing energy losses. The researchers also tried to make the computing hardware isomorphic with biological processing system i.e. human brains, by developing devices to directly mimic the basic functions of brain neurons and synapses and then connecting these together in networks that can offer fast, parallelised, adaptive processing for artificial intelligence and machine learning applications.

[Researchers design next-generation photodetector](#)

Northwestern University researchers have developed a new long-wavelength infrared (LWIR) photodetector using band structure engineering based on a type-II superlattice material. This new design, which demonstrated enhanced LWIR photodetection during testing, could lead to

new levels of sensitivity for next-generation LWIR photodetectors and focal plane array imagers. The work could have applications in earth science and astronomy, remote sensing, night vision, optical communication, and thermal and medical imaging. The architecture uses a unique type-II superlattice material that optimizes LWIR photodetectors to run with low power, higher optical gain, and excellent stability. The photodetector uses a type-II superlattice material on a heterojunction phototransistor device structure.

[An optical coating with unique properties](#)

Researchers from the US have developed a new class of optical coatings, so-called Fano Resonance Optical Coatings (FROCs) that can be used on filters to reflect and transmit colours of remarkable purity, and can be made to fully reflect only a very narrow wavelength range. They applied a thin, 15 nanometer-thick film of germanium to a metal surface, creating a surface capable absorbing a broad band of wavelengths. They combined that with a cavity that supports a narrowband resonance. The new technology could be used to separate thermal and photovoltaic bands of the solar spectrum and to increase the life of a photovoltaic cell.

[Silicon anode structure generates new potential for lithium-ion batteries](#)

Researchers from Japan have developed a nanostructure using silicon that improves the anode in lithium-ion batteries. The team deposited silicon atoms on top of metallic nanoparticles and showed that the silicon atoms form columns in the shape of inverted cones, to form an arched nanostructure, increasing the strength and structural integrity of the anode. Electrochemical tests showed the batteries had a higher charge capacity and longer lifespan. The vaulted structure could be used when materials are needed that are strong and able to withstand various stresses, such as for bio-implants or for storing hydrogen.

[New drug target for Ebola, Marburg viruses](#)

Ebola and Marburg viruses (filovirus category) are among the most deadly viruses. Researchers at the University of Illinois, Chicago have identified a second site on the filovirus glycoprotein to which small drug molecules can bind and prevent infection making small drug molecules more effective and reduce the risk of side effects. They found that the drugs were binding to a previously unknown site on the viral surface glycoprotein required for cell infection. There are already drugs approved by the FDA that can bind to the new site identified by the researchers. Interfering with both sites on the viral surface glycoprotein with combination of drugs, reduces the chances of mutation in the glycoprotein and drug resistance.

[New synthetic peptides could attenuate atherosclerosis](#)

A German research team has designed Synthetic “mini” receptors that block atherosclerosis. They used short chains of amino acids - i.e. peptides - that mimic certain chemokine receptors and are able to specifically inhibit chemokine mechanisms that promote atherosclerosis, whereas chemokine mechanisms that control important physiological processes in the body are not affected. Thus, the new molecular concept could bear therapeutic potential for atherosclerosis and other inflammatory diseases.

RESOURCES AND EVENTS

[PM inaugurates World Sustainable Development Summit 2021](#)

Prime Minister of India on February 10 inaugurated World Sustainable Development Summit

2021 via video conferencing. The theme of the Summit is 'Redefining our common future: Safe and secure environment for all'. The Prime Minister emphasized climate justice for fighting against climate change. Climate justice is inspired by a vision of trusteeship- where growth comes with greater compassion to the poorest. Climate justice also means giving the developing countries enough space to grow. He said India will exceed its commitments and targets from Paris, including reducing emissions intensity of GDP by 33 to 35 percent from 2005 levels. The Prime Minister highlighted the initiative taken for a Coalition for Disaster Resilient Infrastructure.

3-day meet on nanoscience and nanotechnology begins

The sixth international conference on nanoscience and nanotechnology held at SRM Institute of Science and Technology, Kattankulathur, Tamil Nadu, commenced on 1 February. The institute's Department of Physics and Nanotechnology organised the biennial conference in association with partners from Japan, Taiwan, New Zealand, Australia, Italy and India. The 3 day meeting provided a platform for researchers and scientists to assess recent trends and developments. Scientific sessions included low-dimensional and 2D materials, surfaces and thin films, nanocomposites and catalysts, and multifunctional nanomaterials.

Aero-India 2021 gets off to a flying start

Aero India 2021, Asia's largest Aerospace and Defence Exhibition held from 3 to 5 February, 2021 in Bengaluru, witnessed participation of over 540 exhibitors including 80 foreign companies and defence ministers, delegates, service chiefs and officials from more than 55 nations. It provided a platform for exchange of ideas and forge partnerships in the aerospace and Defence sectors. India pavilion at Aero India 2021, showcased India's design and manufacturing supply chain associated with various facets of the rotary wing system. Hindustan Aeronautics Limited (HAL) got an order for 83 new indigenous Light Combat Aircraft Tejas MK1A for Indian Air Force valued at more than Rs. 480 billion, the biggest "Make in India" defence contract till date. The Home Minister of India announced that the government plans to spend 130 billion dollars on military modernisation over the next seven years. He said that steps had been taken to strengthen the nation's security apparatus with domestic manufacturing and complex Defence platforms stressing on the focus of the Aatmanirbhar (self-reliance) Policy.

MoU between DRDO and IISc for Joint Advanced Technology Program

DRDO has signed a Memorandum of Understanding (MoU) on 8 February with Indian Institute of Science (IISc) Bengaluru for creation of JATP–Center of Excellence (JATP – CoE) in the premises of IISc to enable Directed Basic & Applied Research through multi-disciplinary & multi-institutional collaboration. The focused research efforts at the centre will lead to realization of indigenous technologies in the critical areas to develop state of art technologies. DRDO will support JATP in equipping it with advanced and unique research facilities to conduct advanced research in areas such as Advanced Aerospace Systems & Materials, High Temperature Materials, Micro & Nano Systems Science and Technology, Artificial Intelligence & Robotics, Quantum Technologies etc.

India's first Centre for Wetland Conservation and Management

Minister of State for Environment, Forest and Climate Change, announced the establishment

of a Centre for Wetland Conservation and Management (CWCM) as part of the National Centre for Sustainable Coastal Management (NCSCM), Chennai. The dedicated Centre would address specific research needs and knowledge gaps and will aid in the application of integrated approaches for conservation, management and wise use of the wetlands. The Centre also aims to build partnership and networks with relevant national and international agencies. CWCM would serve as a knowledge hub and enable exchange between State/ UT Wetland Authorities, wetland users, managers, researchers, policy-makers and practitioners. The Centre would also assist the national and State/ UT Governments in the design and implementation of policy and regulatory frameworks, management planning, monitoring and targeted research for its conservation.

[UAE and Chinese spacecraft reach Mars orbit, US to follow](#)

Hope, the first planetary mission from the United Arab Emirates (UAE) arrived into orbit around Mars on 9 February to study the martian atmosphere and climate. UAE founded its space agency in 2014 and will be the fifth country to send missions to Mars after the United States, the Soviet Union, Europe, and India. Over the next few months, Hope will observe changes during the day and night using infrared and ultraviolet spectrometers and an imaging camera. China's Tianwen-1 robotic spacecraft - the country's first interplanetary mission successfully entered orbit around Mars on 10 February, carrying scientific instruments, including radar to scout for subsurface water and a high-resolution camera, the spacecraft also carries a lander and a 240 kg rover. A landing attempt will come in May or June. The US (NASA) 1 ton spacecraft Perseverance is expected to arrive directly at Mars surface on 18 February.

SCIENCE POLICY AND DIPLOMACY

[Science diplomacy and policy for India discussed](#)

Science attaches, diplomats and representatives of foreign missions in India from about 20 countries discussed best practices for shaping India's upcoming science policy at the round table conference organized for consultation on the draft Science Technology and Innovation Policy (STIP). The representatives highlighted the need to reconnect with Indian diaspora for nurturing action towards their host countries and gave suggestions for implementation of 'One Nation One Subscription'. They also suggested the need for appointing Chief Scientific Advisor in each state headed by the Federal Chief Scientific Advisor, and including STI as a key element in every societal engagement. An open attitude for collaboration with international partners in research and development, selective support to research infrastructure based on evaluation and criteria, aligning current and future efforts towards decentralization, targeted action plan for implementation of the policy were also proposed.

[Union Budget 2021-22 supports new research funding agency](#)

India's latest budget for 2021-22 has allocated Rs 500 billion over the next five years for the newly created National Research Foundation (NRF), an umbrella body that is expected to fund research across a range of disciplines, from science and technology to humanities. The NRF will also seed and build research capacity at universities that have until now not been big players in research, including building capacity through an institutionalised mentoring mechanism by involving expert researchers from premier institutions of the country. The NRF would be an autonomous body with representation by all major research and education bodies. The budget allocations for many key science departments saw small reductions of

around 2-5 percent over what was apportioned last year. The Department of Biotechnology however has seen a hike in allotment of 30 percent.

[USA, Russia Extend New START for Five Years](#)

With only days remaining until its expiration, the United States and Russia officially sealed an extension of the 2010 New Strategic Arms Reduction Treaty (New START) for an additional five years, keeping in place the treaty's verifiable limits on the deployed strategic nuclear arsenals of the world's two largest nuclear powers. The United States Department of State and the Russian Foreign Ministry issued separate statements on February 3rd announcing that the formal exchange of documents on the extension had been completed. The United States will use the time provided by a five-year extension of the New START Treaty to pursue arms control that addresses all of its nuclear weapons. The Biden administration plans to pursue bilateral talks with China, in parallel with a US-Russian dialogue, rather than trilateral arms control talks. The United States has expressed concern about Russia's tactical nuclear weapons and new nuclear weapons delivery systems (two of which, the Sarmat and Avangard, as well as China's advancing nuclear capabilities. Signed in 2010, New START caps the United States and Russian strategic nuclear arsenals at 1,550 deployed warheads and 700 deployed missiles.

[Climate action agenda 2030 launched](#)

The Climate Adaptation Summit (CAS) 2021 has launched the Adaptation Action Agenda 2030 and Decade of Action establishing practical climate adaptation solutions and plans leading to 2030. The Adaptation Action Agenda 2030 joins over 50 partners to establish initiatives aimed at concrete actions and partnerships to increase climate resiliency. The Action Agenda is designed to complement the SDGs and promote progress towards the adaptation and resilience goals of the Paris Agreement on climate change, and encourages partners to collaborate to deploy knowledge tools, technical assistance frameworks, digital innovation, financing solutions, and youth empowerment programmes to support adaptation projects. Leaders at the CAS called for accelerated investment in adaptation to meet developing countries requirements of USD 70 billion in adaptation costs, likely to rise to USD 140 billion – 300 billion by 2030. Also launched during the Summit were the Adaptation Action Coalition, Race to Resilience, and Africa Adaptation Acceleration Program.

[International SKA observatory signals new era for radio astronomy](#)

The SKA Observatory (SKAO), dedicated to radio astronomy, was launched on 9 February following the first meeting of the Observatory's Council. Headquartered in the UK on the grounds of the Jodrell Bank with sites in Australia and South Africa, SKAO is tasked with building and operating the two largest and most complex radio telescope networks ever conceived. SKAO's telescope in South Africa will be composed of 197 15 metre-diameter dishes located in the Karoo region, 64 of which already exist and are operated by the South African Radio Astronomy Observatory (SARAO), while the telescope in Australia will be composed of 131,072 two-metre-tall antennas located on the Commonwealth Scientific and Industrial Research Organisation's (CSIRO) Murchison Radio-astronomy Observatory. The first SKAO Council meeting followed the signature of the SKA treaty on 12 March 2019 and its subsequent ratification by Australia, Italy, the Netherlands, Portugal, South Africa and the United Kingdom and entry into force on 15 January 2021. SKAO Observer countries include Canada, China, France, Germany, India, Japan, South Korea, Spain, Sweden and Switzerland, and whose future accession to SKAO is expected.

[Gender bias hampers women's careers in STEM](#)

While women play a critical role in science and technology, women career scientists still face gender bias, accounting for only 28 per cent of engineering graduates and 40 per cent of graduates in computer science and informatics, according to a UNESCO report on gender titled "To Smart, the Digital Revolution will Need to be Inclusive". The report highlighted that women are not benefitting fully from employment opportunities open to highly educated and skilled experts in cutting edge fields, such as artificial intelligence. Also, women founders of start-ups struggle to access finance, and in large tech companies they remain underrepresented in both leadership and technical positions. Only 2.9 per cent of women hold CEO positions in the ICT industry, 2.7 per cent of manufacturing companies worldwide are led by women, and that number drops to 1.4 per cent in the construction industry, and to 0.005 per cent in the oil and gas industry.

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