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Science Diplomacy News Alert
Forum for Indian Science Diplomacy
www.fisd.in

16-31 AUGUST 2024

ISSUE 140

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

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SCIENCE & TECHNOLOGY

GLOBAL

[NASA Develops Underwater Robots to Study Ice Melts](#)

The NASA Jet Propulsion Laboratory has revealed that it is developing a fleet of autonomous underwater robots which can measure the rate of ice melts in Antarctica. The robots being developed under Project IceNode are about 8 feet long and 10 inches in diameter. They can navigate the ocean currents autonomously to attach themselves to the bottom of the ice sheets and collect relevant data. During the initial testing phases of the project, the engineers successfully operated a prototype robot through a borehole in the Arctic.

[US Researchers Develop Method to Facilitate DNA Data Storage](#)

Research collaboration between the researchers from the North Carolina State University and the Johns Hopkins University has resulted in a major breakthrough in biological computing. As per a recent article published in Nature Nanotechnology, the researchers have developed a new technology that allows for data to be stored in DNA. The technology is based on a network of nanoscale fibers made using soft polymer materials. In addition to enhancing data storage density and stability, the system can facilitate various operations traditionally performed by electronic devices, such as storing, retrieving, erasing, rewriting, and computing data. The technology could potentially rival electronic devices in functionality while offering a more durable data storage solution.

[New Method for Delivering Genetic Instructions to the Brain](#)

Researchers at China's National Centre for Nanoscience and Technology have conducted an experiment to improve neuron signal transmission using sensors. The researchers implanted sensors in the brains of mice to deliver genetic instructions to increase the size of neurons and improve the quality of signals. The experiment involved a new electrode design which features flexible biocompatible polymers and a drug carrier which releases genetic material to boost neuron growth and health. The results showed a notable increase in neuron quantity and activity near electrodes. The results are expected to pave the way for major advances in the field of Brain Computer Interfaces.

INDIA

[ISRO Launches Earth Observation Satellite-08](#)

The EOS-08 satellite was launched by the Indian Space Research Organisation aboard its new

Small Satellite Launch Vehicle on August 2024. The satellite has already commenced its scientific missions using its GNSS-Reflectometry (GNSS-R) instrument. The first land data was collected from the Sahara Desert at a high-resolution mode of 1 kilometre. The instrument also collected ocean data on 19 August 2024 above the Pacific Ocean and accurately measured parameters including wind speed and wave height. GNSS-Reflectometry is a new method of remote sensing that uses signals from Global and Regional Navigation Satellite Systems (GNSS/RNSS), like GPS and NavIC. These signals bounce off various surfaces on Earth, such as oceans, agricultural lands, and rivers.

IISER-Pune Develops New Method for Growing Microcrystals for Advanced Electronics

Researchers at the Indian Institute of Science Education and Research (IISER-Pune) have developed a new method for growing the CsPbBr₃ nanoplatelets. According to the details of the research study published in the Advanced Materials Journal, the new method improves the quality of the crystals, along with improving their ferroelectric properties. The development may pave the way for the development of more efficient sensors and electronic devices. The research was funded by the Indo-French Centre for the Promotion of Advanced Research and the Science and Engineering Research Board of India.

DRDO and TIFR Test Six-qubit Quantum Processor

Researchers from the Defence Research and Development Organisation (DRDO) Young Scientists Laboratory for Quantum Technologies in collaboration with those from the Tata Institute for Fundamental Research have successfully tested a six-qubit quantum processor. The project tested the full functionality of a quantum processor through a cloud-based interface. The system essentially proved its operational readiness by executing quantum circuits and updating results. Future efforts to carry forward this research and development would focus on , expanding access for educational and research purposes, and scaling up to more qubits to address technological and development challenges in creating larger quantum systems.

Indian Institute of Geomagnetism Studies the Martian Magnetic Field

Scientists from the Indian Institute of Geomagnetism have studied Mars to reveal crucial insights about how the magnetic field of the planet affects its ionosphere. According to the findings of the study, the crustal magnetic fields have a strong impact on the ionosphere, especially in the southern hemisphere during daytime. The impact weakens during nighttime resulting in the differences between the two hemispheres disappearing. The analysis is based on nearly eight years of data from NASA's MAVEN (Mars Atmosphere and Volatile Evolution) satellite, which has been orbiting Mars since 2014.

GLOBAL CHALLENGES

[New Method to Break Down Plastics Developed](#)

Researchers from ETH Zurich, Switzerland have developed a new method to break long polymer chains into smaller molecules. In doing so, they have discovered a revolutionary new method to address the growing challenge of plastic pollution. Moreover, the smaller molecules can be employed as base ingredients to manufacture products including jet fuels. The process has been detailed in an article published in the journal, Nature Chemical Engineering.

[UK Scientists' Research Could Lead to New, More Efficient Cancer Treatment](#)

Researchers at the University of Southampton, UK, have discovered a promising piece of information that could have important implications for cancer research. The team led by Professor Salim Khakoo discovered that a type of immune cells called 'Natural Killers (NK)' can specifically target XP01, a cancer-causing protein. So far, it was believed that NKs randomly target cancer-causing cells. The discovery opens the door for NK cells to be used more efficiently in cancer treatment and can potentially provide an alternative to invasive and adverse treatments like the chemotherapy.

[New Method Can Improve Earthquake Early Warning](#)

Researchers from the University of Alaska Fairbanks have developed a new method which can help provide an earthquake early warning month in advance. The method employs machine learning to analyse low-level tectonic unrest and abnormal seismic activity to provide the accurate forecast. As a part of the study, the team examined the 2018 Anchorage and 2019 Ridgecast earthquakes to identify a pattern of abnormal low-magnitude seismic activity. Such activities were found to occur around three months before each quake. An algorithm which was created to analyse seismic data effectively identified an 80% to 85% probability of a major earthquake occurring within 30 days of the abnormal activity. This method could significantly improve earthquake forecasting and help mitigate risks by providing early warnings.

RESOURCES & EVENTS

[CBD Ad Hoc Working Group Meeting on Digital Sequence Information](#)

The second meeting of the ad hoc open-ended working group on benefit sharing from the use of digital sequence information on genetic resources concluded on 16 August 2024. The working group had been created as a multilateral mechanism by the Conference of Parties to the Convention on Biodiversity in December 2022. The working group was to oversee and deliberate upon matters concerning the sharing benefits derived from Digital Sequence Information on genetic resources. The first meeting of the working group held in November 2023 focused on defining the benefit-sharing mechanism's components, such as fund contributions and governance. The discussions during the current meeting focused on the mechanism's elements, reviewed studies, and considered various options for benefit-sharing, with the aim of preparing recommendations for the COP.

WHO Launches Strategic Preparedness and Response Plan for Monkeypox

The WHO has released a Strategic Preparedness and Response Plan to address the human-to-human transmission of Monkey Pox, on account of which a public health emergency had been declared on 14 August 2024. The plan outlines a six-month strategy that is recommended to be followed between September 2024-February 2025 and also mentions a funding requirement of about 135 million dollars. Key elements of the plan include strategic vaccination for high-risk individuals, comprehensive research, and equitable access to medical tools. The WHO also intends to collaborate with various international partners as well as host a virtual scientific conference to align research with control goals.

WMO Releases State of Climate in the Southwest Pacific Report

The WMO State of Climate in the Southwest Pacific Report was launched by the UN Secretary-General António Guterres and WMO Secretary-General Celeste Caulo at the Pacific Islands Forum which was held in Tonga. The report notes sea-level rise in the Southwest Pacific to be exceeding the global average and rapidly accelerating. The report further underlines the unique vulnerabilities faced by the Pacific Islands whose average elevation is just one to two meters above sea level. The report, developed with various UN agencies and partners, also examines recent climate drivers, including El Niño impacts, temperature changes, and extreme weather events in the region. A special briefing document on Surging Seas in a Warming World was also released alongside the report.

SCIENCE POLICY AND DIPLOMACY

UN Body Reaches Milestone Consensus on Space Security

In a major development, the UN Group of Governmental Experts on Practical Measures for the Prevention of an Arms Race in Outer Space (GGE-PAROS) has arrived at a significant consensus on the major elements of a legally binding instrument to ensure space security. Despite the pressing nature of the issue, the consensus on the matter has been long delayed due to opposing positions adopted by nations including China, Russia and the United States of America. The recent consensus has been termed a step forward, with China expressing a commitment to constructive global space governance and advocating for further international negotiations on space-related agreements.

India Presents 4 BHISHM Medicine and Equipment Cubes to Ukraine

India's Prime Minister Narendra Modi presented four BHISHM (Bharat Health Initiative for Sahyog Hita & Maitri) Cubes to the Government of Ukraine on 23 August 2024. The offer was made during the PM's visit to Ukraine. The BHISHM Cube consists of medicines and equipment that can help provide the first line of response to over 200 types of injuries including bleeding, burns and various other types of trauma. Also included within the cube are basic surgical equipment which can support 10-15 surgeries in a single day. The Cubes can also serve as a source of oxygen and power. India has also deployed a team of experts to train Ukrainian personnel on using the cubes.

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