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SCIENCE & TECHNOLOGY

GLOBAL

Deep Learning for Improved Earthquake Forecasting

Researchers at the University of California, Santa Cruz and the Technical University of Munich created a new model that uses deep learning to forecast aftershocks: the Recurrent Earthquake foreCAST (RECAST). They found that the RECAST model — which can, essentially, learn how to learn — performed slightly better than the ETAS model at forecasting aftershocks, particularly as the amount of data increased. The computational effort and time were also significantly better for larger catalogs. New advances in machine learning make the RECAST model more accurate and easily adaptable to different earthquake catalogs. The model's flexibility could open up new possibilities for earthquake forecasting. With the ability to adapt to large amounts of new data, models that use deep learning could potentially incorporate information from multiple regions at once to make better forecasts about poorly studied areas. Using deep-learning models will also eventually allow researchers to expand the type of data they use to forecast seismicity.

Natural compound found in plants inhibits deadly fungi

Scientists at Emory University.have found that a natural compound found in many plants inhibits the growth of drug-resistant Candida fungi -- including its most virulent species, Candida auris, an emerging global health threat.Laboratory-dish experiments showed that the natural compound, a water-soluble tannin known as PGG, blocks 90% of the growth in four different species of Candida fungi. The researchers also discovered how PGG inhibits the growth: It takes up iron molecules, essentially starving the fungi of an essential nutrient.By starving the fungi rather than attacking it, the PGG mechanism does not promote the development of further drug resistance, unlike existing antifungal medications. Laboratory-dish experiments also showed minimal toxicity of PGG to human cells. C. auris is often multidrug-resistant and has a high mortality rate, leading the Centers for Disease Control and Prevention (CDC) to label it a serious global health threat. In 2007, the new Candida species, C. auris, emerged in a hospital patient in Japan. Since then, C. auris has caused health care-associated outbreaks in more than a dozen countries around the world with more than 3,000 clinical cases reported in the United States alone. The leaves of the Brazilian peppertree contain PGG, a compound that has shown antibacterial, anticancer and antiviral activities in previous research. Laboratory-dish experiments demonstrated that PGG blocked around 90% of the growth in 12 strains from four species of Candida: C. albicans,

multidrug-resistant C. auris and two other multidrug-resistant non-albicans Candida species. The researchers are investigating its potential efficacy as a topical antifungal.

Anti-bacterial gel more effective than other silver-based drugs

Russian scientists from Tver State University have developed an anti-bacterial gel based on silver and sulfur-containing amino acids. It is a hundred times more effective than other silver-based counterparts that also fights bacteria causing nosocomial infections. The proposed medication is cheap, non-toxic and easy to synthesize, which means it could potentially be used to cure hospital-acquired infections. The scientists of have synthesized silver nanoparticles via an eco-friendly technology that doesn't require toxic reactants. The scientists replaced hazardous substances with sulfur amino acids that human bodies have. The amino acid molecules reduce silver from its salts, create a gel and retain its structure.Due to these properties, it has become easier to create gels with silver nanoparticles—it's enough to just mix amino acid solutions and silver salts. This makes it possible to stop using noxious chemicals and doesn't require any specific conditions, which simplifies the process.The team has tested the obtained gel's antibacterial abilities on ESKAPE bacteria colonies including Enterococcus, Staphylococcus, Klebsiella, Acinetobacter, Pseudomonas and Enterobacter, which are antibiotic-resistant. The study has shown that the anti-bacterial gel is a hundred times more effective at inhibiting growth of microorganisms and formation of biofilms than other well-known drugs based on silver.

INDIA

India’s moon rover completes walk, put into ‘sleep mode’

India’s moon rover has been put into Sleep mode after completing its walk on the lunar surface two weeks after its historic landing near the lunar south pole, ISRO has said.The Chandrayaan-3 lander and rover were expected to operate only for one lunar day, equal to 14 days on Earth. ISRO hopes that the rover may reawaken for another set of assignments when the next lunar day starts on September 22. Last week, the space agency said the moon rover confirmed the presence of sulfur and detected several other elements. The rover’s laser-induced spectroscope instrument also detected aluminium, iron, calcium, chromium, titanium, manganese, oxygen and silicon on the surface, it said.

Aditya L1 Launched by ISRO

Aditya L1 was launched from the Satish Dhawan Space Centre in Sriharikota on September 2. The spacecraft, weighing 1,472 kg was carried into space by the Polar Satellite Launch Vehicle (PSLV) in ‘XL’ configuration. The primary objective of the Aditya L1 mission is to study the Sun's upper atmospheric layers, specifically the chromosphere and corona. The mission will also examine coronal mass ejections (CMEs), large expulsions of plasma and magnetic fields from the Sun’s corona, and analyse the corona’s magnetic field, the driver of space weather. Aditya L1 carried seven payloads, including the Visible Emission Line Coronagraph (VLEC) to study the solar corona, the Solar Ultraviolet Imaging Telescope (SUIT) to capture the UV image of the solar photosphere and chromosphere, and the Solar Low Energy X-ray Spectrometer (SoLEXS) and High Energy L1 Orbiting X-ray Spectrometer (HEL1OS) to analyse X-ray flares. Aditya L1 has successfully performed the second Earth-bound manoeuvre.

Optically Active Flexible Biodegradable Polymer-nanocomposite Film Fabricated

A research group from physical sciences division of the Institute of Advanced Study in Science and Technology (IASST), Guwahati, fabricated a biodegradable PVA-CuO nanocomposite film using a facile solution casting technique, where Cu salt used as a precursor for the in-situ CuO nanoparticles formation under different heat treatment. The tests have proved superior optical, mechanical, and antimicrobial properties of the nanocomposite films under different heat treatments. The formation of the CuO nanoparticles inside the polymer matrix under heat treatment is confirmed by different spectroscopic and microscopic techniques. The evaluation of mechanical properties validated the formation of a highly flexible and robust nanocomposite film with tensile strength as high as 39 MPa and flexibility of 169 per cent with copper chloride loading.

Technology Development Board to Support Aloe Ecell for LiFE

The Technology Development Board (TDB) announced its collaboration with M/s Aloe Ecell Pvt. Ltd. on the project, "Commercialization of Eco-friendly-1.5V AA size Aloe Vera-based batteries." With a project valuation of Rs. 2.98 crores, TDB's substantial contribution is Rs. 1.91 crores. The start-up's approach entails the creation of an eco-friendly 1.5V AA size battery, which may help in departure from conventional counterparts laden with heavy metals and toxic chemicals. Leveraging the inherent properties of Aloe Vera, Aloe Ecell has formulated an electrolyte that not only matches the performance of established market standards but also of environmental responsibility. The company will create facilities for commercial production of primary batteries.

IISER Helps Build Solar Wind Spectrometer for Aditya L1

The Aditya Solar Wind Particle Experiment (ASPEX), one of the seven scientific instruments onboard the Aditya L1 mission was developed by scientists from IISER Pune and Physical Research Laboratory, Ahmedabad. The ASPEX will carry out the in-situ multi-directional measurements of the slow and fast solar wind. It will observe the proton and alpha particle composition of the solar wind to understand its origin as well as supra-thermal and energetic particles. The ASPEX has two subsystems- Solar Wind Ion Spectrometer (SWIS) and Supra-Thermal and Energetic Particle Spectrometer (STEPS). Two techniques have been used to construct the particle spectrometers which cover the entire energy range.

Device for Good Indoor Air Quality Developed

Indian Institute of Technology Jodhpur researchers have developed a novel Cold-plasma Detergent in Environment 'CODE' device for good indoor air quality. The device has been tested extensively which deactivates more than 99.99 percent of harmful pathogens and provides quality indoor air. Based on this technology, Indoor Air Sterilizers are being developed by Divya Plasma Solutions Pvt. Ltd. - A Startup Company Incubated at IIT Jodhpur Technology Innovation and Start-up Centre (TISC). The concept is based on non-equilibrium cold plasma in combination with nano-technology. This Novel CODE device produces optimum concentrations of negative ions having cold-plasma detergent ions as well as positive ions in an environment similar to mother nature.

Potential treatment route for Alzheimer's disease

Scientists from Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR) have found that highly abundant naturally occurring plant-based polyphenols (PPs) like tannic acid

found in twigs of trees like Chestnut and Oak can modulate the ferroptosis-AD axis to yield a safe, cost-effective strategy for combating Alzheimer's disease (AD) and reduce the societal burden of this debilitating neurodegenerative disorder.The study presents a new dimension for drug development including new and derivatives of natural compounds to enhance therapeutic efficacy against AD.The research not only addresses specific neurological challenges but also contributes to scientific knowledge, validating new disease mechanism, global health, and the well-being of dementia patients while inspiring researchers to seek this alternative axis for therapeutic avenues for neurodegenerative diseases.

G-20 AND GLOBAL CHALLENGES

G20 on DPI Definition, Framework, and Principles.

The Digital Economy Ministers' Meeting reached agreement on how to effectively shape digital public infrastructure (DPI) of the future. It focused broadly in three key areas – Digital Public Infrastructure, Cybersecurity and Digital Skills said Minister of State for Electronics & IT, Rajeev Chandrasekhar. India has entered into eight Memorandums of Understanding (MoUs) with countries such as Armenia, Sierra Leone, Suriname, Antigua, Barbados, Trinidad and Tobago, Papua New Guinea, and Mauritius, offering them the India Stack and DPI at no cost and with open-source access. These nations now have the opportunity to adopt and utilize these resources within their borders, further developing their unique innovation ecosystems. On cybersecurity, the G20 digital economy ministers have had wide-ranging discussions on why it is important for businesses to be protected. Cybersecurity is an important issue for all countries in the world because the digital economy is becoming an increasingly larger component of economic progress and the global economy. Digital skills are increasingly needed in this post-COVID digital world. India's talents are focused on creating digital skills for youth. Many countries are interested in partnering with each other and with India to create digital-ready, future-ready skill talent to deal with the ongoing challenges in the coming years.

Conference on Transnational Grid Interconnections

In the run-up to the 18th G20 Summit, a day-long conference on "Transnational Grid Interconnections for One Sun, One World, One Grid (OSOWOG)" was held in New Delhi, on 6th September, 2023. Minister for Power and New & Renewable Energy Shri R. K. Singh said that OSOWOG will enable all nations to reap the benefit of energy from the sun with cheapert round-the-clock renewable energy. It will thus bring down the cost of electricity for the general population and will help in energy transition. The World Bank said that the Pan Arab Electricity Market (PAEM) will enable interregional grids' integration between South Asia via GCC, EU & Africa, and trade with 5 regional electricity markets. The ASEAN representative saud that energy resources of SAARC, BIMSTEC and ASEAN countries can be utilized through transnational interconnections. In the recently concluded G20 Energy Transitions Ministerial in Goa, recognized the role of grid interconnections, resilient energy infrastructure and regional/cross-border power systems integration, where applicable, in enhancing energy security, fostering economic growth, and facilitating universal energy access for all, in affordable, reliable and sustainable manner.

Global Biofuels Alliance (GBA) launched at G20 Summit

Prime Minister Shri Narendra Modi announced the launch of Global Biofuels Alliance (GBA) on the sidelines of the G20 Summit on 10 September. 19 countries and 12 international organisations have agreed to join the alliance. GBA is an India-led Initiative to develop an alliance of Governments, International organizations and Industry to facilitate adoption of biofuels. Bringing together the biggest consumers and producers of biofuels to drive biofuels development and deployment, the initiative aims to position biofuels as a key to energy transition and contribute to jobs and economic growth. The GBA will strengthen global biofuels trade & best practices and bolster the transformation of farmers with an additional source of income. GBA will support worldwide development and deployment of sustainable biofuels by offering capacity-building exercises across the value chain, technical support for national programs and promoting policy lessons-sharing. It will facilitate mobilizing a virtual marketplace to assist industries, countries, ecosystem players and key stakeholders in mapping demand and supply, as well as connecting technology providers to end users. It will also facilitate development, adoption and implementation of internationally recognized standards, codes, sustainability principles and regulations to incentivize biofuels adoption and trade.The initiative will be beneficial for India at multiple fronts.

India-Middle East-Europe Economic Corridor (IMEC) launched

Prime Minister Shri Narendra Modi and the President of USA, H.E. Mr. Joe Biden co-chaired a special event on Partnership for Global Infrastructure and Investment (PGII) and India-Middle East-Europe Economic Corridor (IMEC), on 9 September 2023 on the sidelines of the G20 Summit in New Delhi. The event aimed at unlocking greater investment for infrastructure development and strengthening connectivity in its various dimensions between India, Middle East and Europe. Leaders of the European Union, France, Germany, Italy, Mauritius, UAE and Saudi Arabia, as also the World Bank, participated in the event. PGII is a developmental initiative aimed at narrowing the infrastructure gap in developing countries as well as help towards accelerating progress on SDGs globally. The IMEC comprises of an Eastern Corridor connecting India to the Gulf region and a Northern Corridor connecting the Gulf region to Europe. It will include a railway and ship-rail transit network and road transport routes.An MOU on IMEC was signed by India, USA, Saudi Arabia, UAE, European Union, Italy, France and Germany.

G-20 Summit adopts New Delhi Leaders Declaration

In a surprise early breakthrough and success for India's Presidency, G-20 members adopted the G20 New Delhi Leaders Declaration, forging consensus on the contentious "Ukraine paragraphs", and also accepted the membership of the African Union into the grouping on 9 September. The final document marks a shift in the position taken by the U.S., the European Union and G-7 countries, and dilutes the harsh criticism of Russia contained in last year's Bali G-20 statement. The final breakthrough followed a proposal by Indonesia-India-Brazil-South Africa that was negotiated. The development was announced directly by Prime Minister Narendra Modi, who stopped proceedings during the second session of the Summit on day 1. The New Delhi Declaration refers to differing "national positions" of the various G-20 members on the "war in Ukraine", with a generic reference that "all states must refrain from the threat or use of force to seek territorial acquisition against the territorial integrity and sovereignty or political independence of any state." The declaration of 83 paragraphs included 8 paragraphs on the Ukraine war and its resultant economic impact, contained many agreements as a part of the

Finance Track.These included an agreed plan to strengthen multilateral development banks, a way forward for regulating crypto currencies and the use of digital public infrastructure for financial inclusion, and a faster debt distress plan for vulnerable countries, On climate change, the declaration included a "quantum jump" in climate financing from billions of dollars to trillions of dollars, noting the need for "$U.S. 5.8.-5.9 trillion in the pre-2030 period for developing countries as well as $U.S. 4 trillion per year for clean energy technologies by 2030 to reach net zero by 2050". PM Modi also announced the G-20 decision to include the 55-nation African Union, the second regional bloc to join the G-20 after the European Union.

IN BRIEF

Recycling of used lithium-ion batteries

A team from the Institute of Chemistry of the Chinese Academy of Sciences (ICCAS) and the University of Chinese Academy of Sciences (UCAS) has now developed a novel approach for the recovery of lithium from used Lithium-ion batteries (LIBs). The process uses aprotic organic solutions to recover lithium from anodes. The solutions consist of a polycyclic aromatic hydrocarbon (PAH) and an ether as the solvent. Certain PAHs can take up a positively charged lithium ion from the graphite anode together with one electron. Under mild conditions, this redox reaction is controlled and very efficient. With the PAH pyrene in tetraethylene glycol dimethyl ether, it was possible to dissolve the active lithium from the anodes almost completely. An additional advantage is that the resulting lithium-PAH solutions can be used directly as reagents, for example, in adding lithium to new anodes in preprocessing or in regenerating spent cathodes. The PAH/solvent system can be varied to optimize it for the material being treated. This recovery process is efficient and inexpensive, reduces safety risks, avoids waste, and opens new prospects for the sustainable recycling of lithium-ion batteries.

New ribozyme to modify RNA molecules in living cells

Researchers from Julius-Maximilians-Universität (JMU) Würzburg have found ribozyme called SAMURI (S-adenosylmethionine-analogue utilising ribozyme) that can precisely modify other RNA molecules. Such ribozymes can be used to label RNA with dyes and make it visible, enabling the pathways of RNA in the cell and its interactions with other molecules to be studied even better. The new ribozyme SAMURI modifies other RNA molecules at a precisely defined site of a specific adenine. There it attaches molecules to which, in turn, dyes or other molecules can easily be clicked in. Such reactions are known as click chemistry. SAMURI also has the advantage that it is active under the same physiological conditions that prevail in living cells. This is not the case with other synthetic ribozymes.

Recovering high-purity silicon from expired solar panels

Scientists from Nanyang Technological University, Singapore (NTU Singapore) have devised an efficient method of recovering high-purity silicon from expired solar panels to produce lithium-ion batteries.The NTU researchers used a new extraction method using phosphoric acid, which had a higher recovery rate and purity than present silicon recovery technologies. The NTU approach involves first soaking the expired solar cell in hot diluted phosphoric acid for 30 minutes to remove metals (aluminium and silver) from their surfaces. This process is repeated using fresh phosphoric acid to ensure complete removal of the metals, resulting in pure silicon wafer at the end of another 30 minutes. Using advanced spectroscopic analyses to evaluate the

elemental content of the recovered wafer, researchers found that their sample achieved a recovery rate of 98.9 per cent with a purity of 99.2 per cent -- comparable results to silicon recovered through currently available methods. When the recovered silicon was upcycled into a lithium-ion battery anode and tested for efficiency, it performed similarly to new, commercially bought silicon. This method could help the development of EV batteries. The researchers are seeking industry collaborators to explore market applications.

RESOURCES & EVENTS

Threats of Invasive Alien Species reviewed

The tenth session (28 August – 2 September 2023, in Bonn, Germany) of the Intergovernmental Science Policy Platform on Biodiversity and Ecosystem Services (IPBES) Plenary (IPBES 10) issued a new report on invasive alien species (IAS) the threats posed and their control. At least 37,000 alien species have been introduced by human activities and have become established in new areas. Around 10% of them rapidly reproduced and outcompeted native species, having devastating impacts on native biota and landscapes, and spurring extinctions. These constitute IAS, with the proportion of established alien species known to be invasive ranging from 6% of all alien plants to 22% of all alien invertebrates. The meeting agreed to prepare an assessment on biodiversity-inclusive spatial planning and ecological connectivity. It discussed engagement with the Intergovernmental Panel on Climate Change. It took decisions on the midterm review of the 2030 rolling work programme and of the task forces, and on further work up to 2030. The IPBES role is growing in supporting the CBD, but also other biodiversity-related conventions and multilateral environmental agreements

Six of 9 planetary boundaries have been breached because of human activities

The world has breached six of the nine planetary boundaries necessary to maintain Earth's stability and resilience, according to a new study. The six boundaries include climate change, biosphere integrity (genetic diversity and energy available to ecosystems), land system change, freshwater change (changes across the entire water cycle over land), biogeochemical flows (nutrient cycles), and novel entities (microplastics, endocrine disruptors, and organic pollutants). The findings are an update to the planetary boundaries framework, which was first launched in 2009, to define the environmental limits within which humanity can safely operate. This is the third iteration of the framework carried out by 29 scientists from eight different countries.The researchers first identified the processes in the Earth's ecosystem that have been important for maintaining favourable conditions for humans in the last 12,000 years. This period is known for its stable and warm planetary conditions.Next, they assessed how much humans are changing them and identified the level at which human activities raise the risk of potentially dramatic and irreversible changes in the overall conditions on Earth. They used performed computer simulations in their research.Their results showed humans caused a breach in our planet's safe climate and land system in 1988 and are now facing a risk of approaching systemic disruption.The researchers set the planetary boundary for atmospheric carbon dioxide concentration and radiative forcing (represents the size of the energy imbalance in the atmosphere) at 350 parts per million (ppm) and 1 Watts per square meter (Wm^{-2}), respectively. Currently, this has reached 417 ppm and is 2.91 W m^{-2}. As for land system change, the team looked at the global area of forested land as the percentage of the original forest cover boundary. This was estimated at 75 per cent. The current value is beyond the safe limits. The global value

was found to have dropped to 60 per cent. Stratospheric ozone depletion, aerosol loading and ocean acidification were found to be within the planetary boundary.

Scientists call for regulation of gain of function research

Scientists with the American Society for Microbiology, or ASM, called for standardized practices, greater public transparency and more in a new report on gain-of-function research, studies where microbes are given characteristics that don't exist in nature and, in some cases, could make them more dangerous. The White House is considering a regulatory framework for gain-of-function research proposed in January by the National Science Advisory Board for Biosecurity or NSABB. Long controversial, gain-of-function research on pathogens has gained new notoriety thanks to the COVID-19 pandemic. Scientists have called for action to address transparency, communication and biosecurity around gain-of-function research. At the same time, scientists have also warned not to overstate the risks, as studies on organisms with pandemic potential—which fall under a subtype called "gain-of-function research of concern" and, more specifically, enhanced potential pandemic pathogen research—are essential to heading off emerging disease. They also make up only a fraction of gain-of-function studies. Other applications include cancer treatments, crop preservation and even faster computers, to name a few.At a high level, the scientists suggest creating clear definitions of terms like "gain of function" and "enhanced potential pandemic pathogen" as well as establishing international standardized biocontainment practices and frameworks for deciding under what circumstances it's safe to conduct research on dangerous pathogens. They also called for strengthening reporting systems for lab workers to better track accidents, including whistleblower protections.The scientists also vouched for more transparent communication with the public about exactly what gain-of-function research entails, including clear language that "recognizes uncertainties," the report said. Recent high-profile conversations have been dominated by discussions around the risks and dangers of such studies, with much less said about why they're necessary or the precautions already being taken.While studies of potential pandemic-causing pathogens may continue, there are some experiments that should not be performed, the report said. It remains to be seen how those decisions should be made and who should make them, which will require further conversations.

SCIENCE POLICY AND DIPLOMACY

Prime Minister at ASEAN-India and East Asia Summits

Prime Minister Modi attended the 20th ASEAN-India Summit and the 18th East Asia Summit (EAS) in Jakarta on 7 September 2023. Prime Minister presented a 12-point proposal for strengthening India – ASEAN cooperation covering connectivity, digital transformation, trade and economic engagement, health, disaster resilience, maritime security, etc. Two Joint Statements, one on Maritime Cooperation, and the other on Food Security were adopted. At the 18th East Asia Summit (EAS), Prime reiterated the importance of EAS mechanism and reaffirmed our support to further strengthening it. Prime Minister underlined India's support for ASEAN centrality and called for ensuring a free, open and rules based Indo-Pacific. He highlighted synergies of visions for Indo-Pacific between India and ASEAN, and underscored that ASEAN is the focal point of Quad's vision.

U.K. rejoins Horizon Europe

After years of Brexit-induced uncertainty and despair, the United Kingdom and the European Commission reached agreement on the UK rejoining the European Union's €95 billion Horizon Europe programme in 2024. The move gives U.K. scientists access to a major source of grants they had benefited from before their country pulled out of the EU in early 2020. U.K. scientists and science groups welcomed the announcement with relief. The U.K. will rejoin Horizon Europe as an associated country, paying €2.6 billion per year for access to the scheme. The U.K. will also rejoin Copernicus, the EU's Earth observation program. But it will not rejoin the fusion program Euratom, instead pursuing a £650 million "domestic alternative,".Under the newly negotiated deal, the U.K. will not pay into Horizon for the 3 years it has not been part of the scheme. And it will be able to recoup funding if U.K. scientists receive "significantly less money" than the U.K. 's annual contribution. The deal still needs approval by EU member states. This agreement could be a model for other associated countries.

Draft UN plastics treaty and options for action

Governments will soon debate whether to set a global target to reduce the production of plastics after negotiators put it on the agenda for plastics treaty talks in November. The first draft of the new United Nations plastics treaty contains options where governments commit either to stop their plastic production rising above a certain level or to commit to a global target. Another option is for governments to promise to "take the necessary measures" to cut plastic production, without committing to a target.The three options will be discussed at Nairobi in November, for the third set of talks on setting up the new treaty.The draft says the targets could be met through regulation, the removal of subsidies for plastics and "market-based measures" like taxes. As well as polluting land and sea, plastics are responsible for an estimated 3% of global greenhouse gas emissions through their lifecycle.The European Union and a group of nations including India calling themselves the "high ambition coalition" support targets while major oil and gas producers like the US and Saudi Arabia are keeping quiet.The plastics industry is lobbying to keep the focus of the treaty on recycling and waste management, not limiting production.The draft also offers two options for the objective of the treaty. One is to "protect human health and the environment from plastic pollution". The more radical option is to "end plastic pollution". The draft says a fund will be set up to help developing countries tackle plastic pollution. This will either be an entirely new fund or a fund "within an existing financial arrangement".

India and Saudi Arabia Agreement in Energy Sector

India and Saudi Arabia have signed a Memorandum of Understanding on cooperation in the field of energy in New Delhi on 10th September, 2023. According to the MoU, India and Saudi Arabia will cooperate in - Renewable Energy, Energy Efficiency, Hydrogen, Electricity and Grid Interconnection between the two countries, Petroleum, Natural Gas, Strategic Petroleum Reserves and Energy Security, Promoting digital transformation, innovation and cyber-security and artificial intelligence in the field of Energy.The MoU will develop a stronger partnership between India and Saudi Arabia in the field of energy and support India's efforts for energy transition and transformation of global energy system towards combating climate change.

Joint Statement from India and the United States

During the visit of United States President Joseph R. Biden, Jr., to India an India-US Joint statement was issued, reaffirming the close and enduring partnership between India and the

United States and continue the work of transforming the India-U.S. Strategic Partnership across all dimensions of a multifaceted global agenda.India will host the next Quad Leaders' Summit in 2024. India welcomed the U.S. decision to co-lead the Indo-Pacific Oceans Initiative Pillar on Trade Connectivity and Maritime Transport, further to the U.S. decision to join IPOI in June 2023. President Biden reaffirmed his support for a reformed UN Security Council with India as a permanent member, and, in this context, welcomed once again India's candidature for the UNSC non-permanent seat in 2028-29. Both sides reaffirmed technology's defining role in deepening the strategic partnership and lauded ongoing efforts through the India-U.S. Initiative on Critical and Emerging Technology (iCET) to build open, accessible, secure, and resilient technology ecosystems and value chains. President Biden congratulated Prime Minister Modi and the scientists and engineers of the Indian Space Research Organisation (ISRO) on Chandrayaan-3's historic landing at the south polar region of the Moon, as well as the successful launch of India's first solar mission, Aditya-L1. The leaders welcomed efforts towards establishment of a Working Group for commercial space collaboration under the existing India-U.S. Civil Space Joint Working Group. Determined to deepen partnership in outer space exploration, human space flight cooperation and planetary defence. The leaders reiterated their support for building resilient global semiconductor supply chains, noting in this respect a multi-year initiative of Microchip Technology, Inc., and Advanced Micro Devices announcement as well as by Micron, LAM Research, and Applied Materials. Two Joint Task Forces have been set up on collaboration in the field of Open RAN and research and development in 5G/6G technologies. A Quantum Entanglement Exchange platform will facilitate international quantum exchange opportunities. An Implementation Arrangement has been signed between the U.S. National Science Foundation (NSF) and India's Department of Biotechnology to enable scientific and technological research collaborations in biotechnology and biomanufacturing innovations. NSF and India's Ministry of Electronics and Information Technology are supporting collaboration in semiconductor research, next generation communication systems, cyber-security, sustainability and green technologies, and intelligent transportation systems. An MoU has been signed between Indian universities, represented by the Council of Indian Institutes of Technology (IIT Council), and the Association of American Universities (AAU) to establish the India-U.S. Global Challenges Institute, with a combined initial commitment of at least US$10 million for collaboration in sustainable energy and agriculture, health and pandemic preparedness, semiconductor technology and manufacturing, advanced materials, telecommunications, artificial intelligence, and quantum science. Negotiations have begun for a commercial agreement between GE Aerospace and Hindustan Aeronautical Limited (HAL) to manufacture GE F-414 jet engines in India.A second Master Ship Repair Agreement has been signed by the U.S. Navy and Mazgaon Dock Shipbuilders, Ltd., in August 2023 for the maintenance and repair of forward-deployed U.S. Navy assets and other aircraft and vessels. India-U.S. Renewable Energy Technologies Action Platform [RE-TAP] was set up in August 2023 to advance renewable energy enabling technologies.

We welcome your comments and valuable suggestions. Please write to us for receiving publications, updates and notices regarding seminars, conferences etc. Contact us at science.diplomacy@ris.org.in

NOTE TO OUR READERS AND STAKEHOLDERS:

RIS Science Diplomacy Programme (fisd.in) is glad to present a new version of Science Diplomacy News Alerts, following India's assumption of the Presidency of the G20. A new section G20 and global challenges has been added. We request your cooperation to review the Alerts and improve its content. For this purpose, please complete the form at https://forms.gle/o4d869FxaM9t3KNw7, and submit it. Your support and cooperation is appreciated.