



NEWS ALERT

Forum for Indian Science Diplomacy

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GLOBAL

[New membrane technology to boost water purification and energy storage](#)

Clean drinking water and efficient energy storage have become indispensable for human life. The most extensively used ion exchange membranes, called Nafion, are used to purify water and store renewable energy output in fuel cells and batteries. However, the ion transport channels in Nafion membranes are not well defined and the membranes are very expensive. To address this issue, scientists at Imperial College London have developed a new type of membrane that can enable better water purification and enhance battery energy storage. The team has developed a better and new ion—transport membrane technology using microporous polymers which could reduce the cost of water purification and energy

storage. This technology could contribute to the use and storage of renewable energy, and boost the availability of clean drinking water in developing nations.

Microwave treatment to clean heavy metals from treated sewage

The sewage treatment plants around the world are producing more biosolids, which are high costs or secondary pollution from the treatment process. Composting the biosolids and using them as a component in fertilizers is another option. In USA, half of all biosolids are recycled. However presence of heavy metals is an obstacle. As these potential toxics can leach into the environment it becomes necessary to extract them from biosolids. An efficient and effective method to remove toxic heavy metals from biosolids using microwaves has been developed at Florida State University. Through this method, they removed three times the amount of lead from biosolid compounds when compared with conventional means, with over 60 percent reduction in the total cost of processing. This technology can enable fertilizer production and provide clean soil and water. Removal of heavy metals by this method prevents them from becoming part of the food chain for animals or humans, and, thereby can reduce the cases of intellectual disability among children, dementia in adults and damage to organs.

INDIA

India and Sweden sign three agreements

India and Sweden signed three agreements to facilitate further co-operation in Science and Technology and to address issues in climate change and maritime. The India-Sweden High-Level Dialogue on innovation policy was organized to create a platform with key stakeholders from the government, private sector, and academia to provide strategic direction for joint innovation policy formulation. The dialogue jointly formulated and implemented short- and long-term projects in strategic areas such as, but not limited to, circular economy, digital health, artificial intelligence, sustainable energy, and future mobility. The Collaborative Industrial Research Development Programme in the area of smart grids and the 'Joint Call' in the area of digital health is to be announced in 2020.

NEC, CSIR sign MoU to Use AI, ML based Solutions for Society

Artificial Intelligence and super computing are transforming the society, at a fast pace. There is a need for capacity building and institutional interventions to cater to emerging challenges. In this context, NEC Technologies India (NECTI), a subsidiary of Japanese firm -NEC Corporation and the Council of Scientific & Industrial Research (CSIR) have signed a MoU to collaborate and jointly harness the capabilities in AI and Machine Learning to address critical problems in diverse sectors such as water, agriculture and energy. To joint centre will be set up and that will promote, inter alia, local talent development, particularly in machine learning and big data analytics.

India's first underwater drone, EyeROV Tuna

Two post graduates trained in IIT have developed India's first commercial robotic drone, named as EyeROV TUNA. As the drone can navigate up to a depth of 50 meters for taking real time video of ships and other under water structures for their repair and maintenance without the need for manual inspection by divers, which can be costly and riskier. The drone weighs light, less than 10 kgs, moves at a speed of two knots, and can be accessed and controlled when connected with a tether and linked with computer and joystick. The camera fitted with the Remotely Operated Vehicle can give live video feed for studying the harsh and critical underwater environment. The given technology can be leveraged to assess under water environment and will be a boon for countries engaged in marine related activities.

[India ranking climbs to 9th in this year's Climate Change Performance.](#)

According to Climate Change Performance Index (CCPI) released at the COP25 climate summit held at Madrid, India ranked 9th and is in the 'high category' countries. While the current per capita emission levels and energy use are low in India, India has ambitious 2030 targets and this resulted in India getting high performance rates under GHG emissions and energy use categories. The authors of the report state that only two countries among the G20, India (9th) and UK(7th) figure in the 'high category', while eight among the G20 countries are in the 'very low' category, including Australia, Saudi Arabia and USA. Since no country is already on the path to cut emissions that are compatible with the targets of the Paris Agreement, first three ranks in 'high category' are left unfilled. While China is ranked 30th, Sweden and Denmark occupy fourth and fifth rank, respectively.

[India Brazil Cross-Border Incubator programme for Agritech Startups](#)

To explore opportunities for cooperation and partnerships and to identify and exploit complementarities between the Brazilian and Indian agriculture sector, Pusa Krishi Incubator of the Indian Agricultural Research Institute (IARI) has launched 'Maitri - Indo-Brazil Agri-Tech Cross Border Incubation Programme'. The selected startups will be a part of a six-month programme in India and Brazil. The program will help agritech startups in accessing global markets and participate in workshops, networking events and mentorship opportunities, besides pitching ideas to investors and other stakeholders in both countries. There are more than 1,090 agritech startups in India, and the total funding in agritech startups has grown from USD 46.1 Million in 2017 to USD 66.6 Million in 2018.

[PSLV rocket successfully completes 50 launches](#)

Indian Space Research Organization (ISRO)'s Polar Satellite Launch Vehicle (PSLV) created a new record when it placed RISAT-2BRI, an earth observation satellite, and, nine other satellites from foreign countries (6 from the US and one each from Israel, Italy and Japan) into a 576 Km orbit on 11th December. Besides launching Chandryan -I in 2008 to Moon, and, Mars Orbiter 2013 to Mars, the PSLV had launched 50 Indian satellites and 222 foreign satellites, from 20 countries, between 1994 and 2019.

IN BRIEF

[Molecular vibrations lead to high performance laser-based on Raman effect](#)

Scientists at USC have developed a laser that is more efficient by 40% with efficient power consumption and fabricated from more sustainable materials. It is made from a glass ring on a silicon layer with a monolayer coating of siloxane molecules. This research may reduce the power needed to operate Raman lasers which are used in many fields such as defense, diagnosis and communication, and, in many other applications.

[Nanocontainer delivers proteins and gene therapies into cells](#)

A tiny, nanosized container has been created that can be placed inside cells and can deliver medicines based on protein and gene therapies of any size, including ones attached to CRISPR, a popular gene-editing tool, scientists at Johns Hopkins University have made a breakthrough in delivering proteins into cells. If this passes further tests it can provide a better method to get larger medical compounds into selected target cells. The container is made of biodegradable polymer, may be the solution scientists were looking for efficient systems for delivering biological medicines right inside the cell, so that therapies would work best properly with fewer side effects.

[A new zeolite based material for sustainable carbon dioxide capture](#)

A new material developed by scientists in Sweden has many positive features such as high capture rate, sustainable and cheaper. This is a bio-based hybrid foam, that has a significant

amount of CO2 absorbing 'zeolites'. As it is porous and has open structure it has better ability to absorb CO2. The current technology in Carbon Capture and Storage (CCS) uses 'amine' that have many draw backs. The results are important in light of the need for cheaper and sustainable solutions to reduce the quantity of CO2 in atmosphere.

RESOURCES AND EVENTS

[COP25: Key outcomes agreed at the UN climate talks in Madrid](#)

The UN climate conference, COP25 in Madrid extended by nearly two days witnessed participation by some 27,000 delegates, aiming to finalize the "rulebook" of the Paris Agreement, by settling on rules for carbon markets and other forms of international cooperation under "Article 6". They also hoped to send a signal to the wider world that the UN climate process remains relevant – and that it recognizes that much greater efforts are needed to limit warming. Civil society activists led by Greta Thunberg also urged governments to do much more. However, the talks were unable to reach consensus in many areas, pushing decisions into next year under "Rule 16" of the UN climate process. Matters including Article 6 and "common time frames" for climate pledges were all punted into 2020, when countries are also due to raise the ambition of their efforts. Though some issues can be addressed at the next Bonn inter sessional meeting in June 2020, many of the key sticking points will need to be resolved in Glasgow at COP26. The outcomes of an EU-China summit in September and the US presidential election in November could both play critical roles in climate ambition. Both the G7 and G20 summits next year are to be held by the US and Saudi Arabia respectively.

[Second round of applications opens for Ph.D fellowships for ASEAN citizens](#)

India has offered 1000 PhD fellowships (of up to 5 years duration) to be granted to Asean citizens under a scheme announced by Prime Minister Modi in January 2018 are available at <http://asean.iitd.ac.in>. Successful applicants will have the opportunity to study at renowned Indian Institutes of Technology (IITs) – India's foremost technical education centres. IITs offers a variety of courses ranging from Information Technology (IT), Engineering, Management, Economics, Psychology, and Political Science. The second round of acceptance of applications will commence from December of this year and end in March 2020. Applicants can submit their applications online at <http://asean.iitd.ac.in>.

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