



Science Diplomacy Alert

A Fortnightly newsletter on S&T, Science Policy and Diplomacy

Focus

Exploring India-Mauritius S&T Cooperation



India's commitment to support Mauritius in formulating a national S&T strategy and establishing an S&T Directorate reflects a shared commitment to research and innovation-led development aligned with local development priorities. Moreover, the S&T collaboration between the two countries transcend bilateral relationships and holds regional significance. This partnership also serves as a model for South-South cooperation in S&T. Sneha Sinha writes.

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SCIENCE POLICY & DIPLOMACY

International S&T Cooperation



Brazil and Mexico Sign Framework Agreement for Agricultural Cooperation

The agreement covers key areas of mutual interest, including agricultural and livestock production, technical assistance for small and medium-sized producers, food security, animal and plant health, research and technological innovation, rural financing and insurance, as well as mechanisms to facilitate agricultural trade.

Hong Kong's ASTRI & Slovak Academy of Sciences Sign MoU to Bolster Research and Innovation

ASTRI and SAS have formalized cooperation via an MoU to enable joint research, technology application, and talent exchange, with a goal of accelerating innovation and shared solutions between Hong Kong and Slovakia.

India-Singapore Roadmap for Comprehensive Strategic Partnership

India-Singapore will also boost cooperation in emerging areas such as semiconductor R&D & resilient supply chains, space technologies (earth observation, satellite communications), and critical/emerging technologies, including AI.

Emerging Tech & Governance



Full-stack Quantum Computer Built Using Standard Silicon Chip Launched

A key part of this approach is building cryoelectronics that connect qubits with control circuits that work at very low temperatures, making it possible to scale up quantum processors greatly.

AI-based Weather Forecasting for Farmers

The Ministry of Agriculture & Farmers Welfare has launched an AI-based monsoon forecasting program, delivering SMS alerts via m-Kisan to ~3.8 crore farmers across 13 states,

up to four weeks ahead of rains and tailored to agricultural decision-making.

Breakthrough in Quantum Dot Patterning Enables Ultra-High-Resolution Display

Researchers at DGIST developed a photoresist-free lithography method using a novel crosslinker (TDBA) to pattern quantum dots at 2 μm resolution. This simplifies fabrication and boosts performance in QLEDs and transparent display technologies.

CRISPR's Efficiency Triples in Lab Tests with DNA-wrapped Nanoparticles

Scientists at Northwestern developed lipid nanoparticle spherical nucleic acids (LNP-SNAs) that wrap CRISPR tools in a dense shell of DNA. These structures enter cells up to three times more efficiently than traditional lipid nanoparticles, reducing toxicity, and improving precise DNA repair rates by over 60 per cent.

India's C-DAC and Rigetti Partner to Co-Develop Hybrid Quantum Computing Systems

The MoU aims to jointly develop hybrid quantum-classical computing technologies. The collaboration focuses on advancing superconducting quantum hardware, cryogenic electronics, and processor fabrication to boost quantum research and innovation in India.

Events & Meetings



SEMICON India 2025

SEMICON India 2025 brought together global industry leaders, unveiled indigenous innovations and announced key partnerships, reinforcing India's drive toward semiconductor self-reliance and global leadership.

Science Summit at UNGA80

Held alongside UNGA80, the Science Summit 2025 (9–26 Sept) in New York brings together scientists, policymakers, and innovators to showcase how global science partnerships can accelerate progress on the Sustainable Development Goals. It highlights the need for inclusive research ecosystems, equitable data access, and stronger policy support for science-led development.

India MedTech Expo 2025

The platform showcased India's growing leadership in the health and medical technology sectors, bringing together all the stakeholders, such as PLI participants, start-ups, MSMEs, innovative entrepreneurs, R&D facilities, incubators, as well as public and private hospitals.

INDIAN SCIENCE NEWS

Flexible, Safe and Eco-friendly Battery Technology

The battery technology uses aluminum and a water-based solution which can serve as an alternative to traditional lithium-ion batteries. It could protect from battery explosions and environmental hazards, and also reduce the power requirement of our devices.

Bamboo-based Bio-ethanol Plant Inaugurated by Hon'ble PM in Assam

Prime Minister Narendra Modi inaugurated the Assam Bioethanol Plant and laid the foundation stone for a Polypropylene Plant at Numaligarh Refinery Limited (NRL) in Golaghat, Assam, asserting that India has embarked on the path of becoming self-reliant in meeting its energy needs.

TDB Supports Antibiotic Nebulization Technology to Combat Pneumonia & AMR

The Technology Development Board (TDB) has backed Hyderabad's M/s Aodh Lifesciences for development of AONEUM-04, an indigenous antibiotic nebulization suspension aimed

at treating pneumonia and combating antimicrobial resistance.

Cholesterol-Based Nanomaterials Pave Way for Energy-Efficient Quantum and Spintronic Devices

INST Mohali have designed cholesterol-derived nanomaterials that use the natural chirality of cholesterol plus metal ions to control electron spin, enabling selective filtering and tunability of spin states. These advances could lead to more energy-efficient memory chips, bioelectronic devices, and greener technology by exploiting spintronics rather than charge-based electronics.

ISRO's Tech Transfer Agreement to Boost Indigenous Space-tech Manufacturing

ISRO, NSIL & IN-SPACe inked a Technology Transfer Agreement with Hindustan Aeronautics Limited (HAL) for the Small Satellite Launch Vehicle (SSLV), under which HAL will absorb the full SSLV tech over 24 months and begin mass production under a 10-year plan.

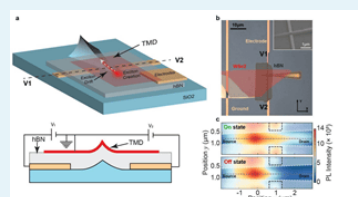
ADVANCES IN S&T

Next-generation Nanoengineered Switches can Cut Heat Loss in Electronics

The problem: Modern electronic switches (like transistors) primarily rely on electron transport, which inherently generates significant heat loss, limiting energy efficiency and scaling. This becomes a bottleneck in the development of low-power, high-performance nanoelectronics—especially in densely packed systems where thermal management is critical.

The Method: Researchers created a nanoscale switch using a monolayer of WSe₂ placed on a SiO₂ nanoridge. This structure uses excitons—energy carriers that don't generate heat like electrons—to switch signals with high precision.

Future Prospects: This low-heat excitonic switch could pave the way for ultra-efficient electronics, especially in AI, photonics, and quantum devices. It holds promise for reducing power consumption in next-generation computing systems.



New Catalyst Brings Practical Plastic Recycling Closer to Reality

The Problem: Polyolefins like polyethylene and polypropylene dominate global plastic use but are rarely recycled efficiently. Current methods require heavy sorting and often degrade the plastic, making recycling costly and limited.

The Method: Northwestern researchers developed a nickel-based catalyst that breaks down mixed plastics into useful oils and waxes. It works at lower temperatures, tolerates contamination (like PVC), and can be regenerated for repeated use.

Future Prospects: This breakthrough could enable scalable, cost-effective recycling of mixed plastic waste. It opens doors to converting unrecyclable plastics into valuable products, potentially reducing landfill use and plastic pollution.

INSIGHTS & RESOURCES

NITI Aayog Unveils 'AI for Viksit Bharat' Roadmap and Frontier Tech Repository

NITI Aayog's 'AI for Viksit Bharat: The Opportunity for Accelerated Economic Growth' roadmap outlines a strategic framework to harness artificial intelligence (AI) as a catalyst for India's economic transformation. The roadmap lays out a practical action plan to translate AI's promise into outcomes, highlighting two major levers: (i) Accelerating adoption of AI across industries to enhance productivity and efficiency; (ii) Transforming R&D with generative AI to help India leapfrog into innovation-driven opportunities. Key insights include:

- AI as a Growth Lever
 - AI adoption can bridge 30–35 per cent of the productivity gap needed to achieve sustained 8 per cent annual GDP growth.
 - Generative AI in research and development (R&D) can contribute an additional 20–30 per cent uplift by accelerating innovation.
- Sector-Specific AI Applications
 - Banking & Financial Services: Enhancing risk assessment, fraud detection, and customer service through AI-driven analytics.
 - Manufacturing: Implementing AI for predictive maintenance, supply chain optimization, and quality control.
 - Healthcare: Utilizing AI for diagnostics, personalized treatment plans, and drug discovery.
 - Agriculture: Employing AI for precision farming, crop monitoring, and yield prediction.
- Frontier Technologies for Innovation
 - Investing in AI-enabled technologies such as software-defined vehicles and advanced robotics to position India as a global leader in innovation
- Policy and Governance Framework
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 - Promoting collaboration between government, industry, and academia to foster an innovation-driven ecosystem.
- Infrastructure and Talent Development
 - Building AI research and development hubs to support innovation.
 - Investing in skill development programs to create a workforce proficient in AI technologies.

The Frontier Tech Repository showcases over 200 case studies from agriculture, healthcare, education, and national security, highlighting successful technology deployments at the grassroots level.

- Grassroots Initiatives: The 'Frontier 50' initiative will support 50 aspirational districts to implement selected technologies, aiming to improve service delivery and governance.
- Recognition and Incentives: The NITI Frontier Tech Impact Awards will honor states excelling in the use of technology to enhance governance, education, healthcare, and livelihoods.

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