New, Emerging & Strategic Technologies Division
Ministry of External Affairs
Government of India

TECH-PULSE

NEST NEWSLETTER

FEBRUARY 2025

Key Highlights

- *Union Budget 2025-26: Technology Announcements*
- *AI Action Summit 2025, Paris, France*
- *Green Hydrogen fueled trains in India*
- *India's first indigenous semiconductor chip to be ready for production by 2025*

I am delighted to unveil the latest edition of the NEST Newsletter, a vital resource for staying informed about technological advancements in emerging sectors, in a refreshed look. The revised edition is made more comprehensive and is aimed at providing a seamless reading experience!

Sh. Dammu Ravi
Secretary (ER), MEA

The latest edition of the NEST Newsletter is a welcome effort by team NEST towards sharing information on all technology related developments. I am confident that the new look will expand our outreach!

Sh. Periasamy Kumaran
Special Secretary (ER & DPA), MEA

It is with great pleasure that we present the refreshed NEST Newsletter. This revised edition prioritizes diverse sectors, in an engaging format to enable wider reach, ensuring that we remain updated on global advancements in emerging & strategic technologies.

Sh. Mahaveer Singhvi
Joint Secretary, NEST Division, MEA

C O N T E N T S

CONTENTS

ARTIFICIAL INTELLIGENCE

International

1. ***EU Announces AI Guidelines on Misuse and System Definitions for AI Act Compliance***

The European Union has introduced comprehensive AI guidelines under the AI Act to regulate misuse and provide clarity on system definitions. These measures aim to protect individuals from manipulative and discriminatory practices while ensuring ethical AI use across various sectors. The guidelines prohibit certain AI applications, including employer surveillance through webcams and voice recognition, AI-driven manipulative websites that coerce users into financial commitments, AI-based social scoring using unrelated personal data, and predictive policing based on unverified biometric data.

To provide further clarity, the European Commission has published non-binding guidelines to define AI systems, helping providers and stakeholders determine whether their software falls under the AI Act. These guidelines will evolve based on emerging use cases. The AI Act will be fully applicable by August 2, 2026, though certain provisions, including bans on specific AI practices, took effect on February 2, 2024. EU countries must designate market surveillance authorities by August 2, 2024, to oversee compliance. Companies violating the regulations could face fines ranging from 1.5% to 7% of their total global revenue.

The EU's approach stands in contrast to the U.S., which relies on voluntary compliance, and China, which focuses on state control. By setting strict regulations, the EU aims to establish a globally influential framework for AI governance, reinforcing safety, accountability, and ethical deployment. Link (EU Commission)

2. ***Google Introduces AI Co-Scientist: Revolutionizing Research Collaboration***

On February 19, 2025, Google unveiled the "AI Co-Scientist," an advanced multi-agent system built on Gemini 2.0, designed to collaborate with human researchers in scientific endeavours. Unlike traditional AI tools, this system actively participates in the research process by proposing novel hypotheses, synthesizing existing studies, and optimizing experimental designs. It operates through specialized agents, Generation, Reflection, Ranking, Evolution, Proximity, and Meta-Review, that work iteratively to refine research outputs, leading to increasingly novel and high-quality scientific insights.

Researchers can interact with the AI using natural language, specifying goals and providing feedback, ensuring that human expertise remains central to the research process. The system has demonstrated its effectiveness in early testing with institutions like Stanford University and Imperial College London, independently arriving at hypotheses and conclusions in a

fraction of the time typically required. Notably, it has contributed to studies on antimicrobial resistance, a significant global health concern identified by the World Health Organization.

Currently, access to the AI Co-Scientist is limited to selected researchers through Google's Trusted Tester Program, with plans for broader availability in the future. While the system offers promising advancements in research efficiency, it also raises ethical considerations regarding attribution, accuracy, and responsible AI use, particularly as it begins to generate entirely new research directions. Link (Google Research)

3. *InvestAI: EU Invests €200 Billion in AI Development*

The European Union has launched InvestAI, a groundbreaking initiative to mobilize €200 billion for artificial intelligence (AI) development, positioning Europe as a leader in the global AI landscape. A significant portion, €20 billion, is allocated for establishing AI gigafactories equipped with approximately 100,000 state-of-the-art AI chips each—quadrupling the capacity of current facilities. These gigafactories aim to democratize access to large-scale computing power, enabling companies of all sizes to develop complex AI models and drive innovation across sectors such as medicine and science.

InvestAI represents the largest public-private partnership for trustworthy AI development, emphasizing collaboration and open innovation. Funding sources include existing EU programs like the Digital Europe Programme, Horizon Europe, and InvestEU, with member states contributing through earmarked cohesion funds. This strategic investment underscores the EU's commitment to fostering a cooperative AI ecosystem that balances technological advancement with ethical considerations.

This initiative aligns with global trends, as other nations also make substantial AI investments. For instance, the United States has formed a joint venture involving OpenAI, Oracle, and SoftBank, aiming to deploy $100 billion immediately and increase investment to $500 billion over four years to bolster its AI infrastructure. Similarly, France has announced a €109 billion investment plan to enhance its AI capabilities and competitiveness.

Through InvestAI, the EU seeks to create an environment where AI serves as a force for good and growth, ensuring that even smaller companies can access the resources needed to participate in the AI revolution. This initiative not only aims to propel Europe's technological capabilities but also to establish a model of cooperative, open innovation that other regions might emulate. Link (EU Commission)

4. *South Korea Joins the Global AI Race with 10,000 High-Performance GPUs*

South Korea has announced plans to establish a massive AI computing center equipped with 10,000 GPUs, aiming to strengthen its position in the global AI race.

This initiative is part of the country's broader strategy to enhance AI capabilities, support domestic innovation, and reduce reliance on foreign AI infrastructure. The center will provide high-performance computing power to South Korean AI startups, research institutions, and enterprises, accelerating advancements in AI model training and deployment.

The South Korean government is collaborating with leading tech firms and research organizations to ensure the project's success, with a focus on developing sovereign AI capabilities. The facility is expected to boost South Korea's AI ecosystem by fostering AI research in areas such as language processing, healthcare, and autonomous systems. By investing in large-scale AI infrastructure, South Korea aims to compete with global AI powerhouses like the United States and China.

Additionally, the computing center aligns with South Korea's broader digital transformation goals and its ambition to become a leader in AI-driven industries. This initiative will also support AI safety and regulation efforts, ensuring responsible AI development. With this investment, South Korea is taking a significant step towards self-sufficiency in AI technology and enhancing its global competitiveness. Link (Reuters)

5. ***US and UK Decline to Sign Paris AI Declaration Signed by 60 Nations, Including EU, China, and India***

At the recent Paris AI Action Summit on February 11, 2025, the United States and the United Kingdom chose not to sign a global AI declaration endorsed by over 60 nations, including France, China, and India. The declaration aimed to establish an "open, inclusive, transparent, ethical, safe, secure, and trustworthy" framework for AI development. It emphasized sustainability, human rights, gender equality, linguistic diversity, consumer rights, and intellectual property protection while addressing concerns about AI's rising energy consumption and digital inequalities.

The US and UK declined to sign the declaration due to concerns over ambiguous global governance structures and potential national security risks. They also feared that excessive regulation could hinder AI innovation. US Vice President JD Vance criticized European regulatory approaches, arguing that overregulation might stifle a transformative industry. He stressed the need for a pro-growth strategy that protects national information infrastructures while avoiding reliance on subsidized technology.

Meanwhile, certain AI ethics advocacy groups criticized the UK's decision, warning that it could weaken its global leadership in AI safety. They argued that stepping away from a unified international AI framework could impact the UK's credibility in promoting responsible AI governance. The divide reflects ongoing global debates about balancing AI innovation with ethical regulation and governance. Link (BBC)

National

6. ***India is second-biggest market for OpenAI, tripled users last year: Sam Altman***

OpenAI's ChatGPT has experienced remarkable growth in India, now ranking as the platform's second-largest user base globally. This surge underscores India's rapidly expanding digital landscape and its increasing engagement with advanced AI technologies. The substantial uptick in users highlights the country's growing appetite for AI-driven solutions across various sectors, including education, business, and entertainment. This trend not only reflects India's technological advancement but also positions it as a significant player in the global AI ecosystem.

The burgeoning user base in India suggests a robust market potential for AI applications, encouraging further investments and innovations tailored to meet the unique needs of Indian consumers and enterprises. As AI continues to permeate daily life, India's engagement with platforms like ChatGPT exemplifies the nation's readiness to embrace and integrate cutting-edge technologies into its socio-economic fabric. Link (MEA)

7. ***India-France Declaration on Artificial Intelligence***

On February 12, 2025, India and France issued a joint declaration underscoring their commitment to developing and promoting artificial intelligence (AI) systems that are safe, secure, and trustworthy. This initiative aims to accelerate progress toward achieving the United Nations' 2030 Agenda for Sustainable Development. Both nations emphasized the necessity of fostering an international environment conducive to cooperation in AI capacity-building. They highlighted that adherence to international law, particularly the UN Charter, along with the respect for human rights and fundamental freedoms, is essential in the development and deployment of AI technologies.

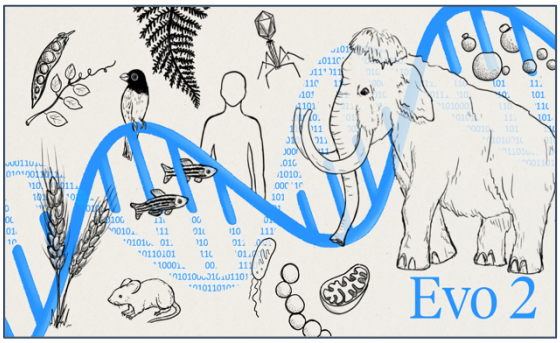
In conjunction with this declaration, India and France co-chaired the AI Action Summit on February 10-11, 2025, in Paris. The objective was to build upon milestones from previous summits held at Bletchley Park in November 2023 and Seoul in May 2024, aiming to advance global collaboration in AI governance and innovation.

The joint declaration and the summit reflect the deepening strategic partnership between India & France, particularly in critical technological domains. Both countries are actively engaging in multilateral forums to shape the future trajectory of AI, ensuring that its development aligns with ethical standards and contributes positively to global well-being. Link (MEA)

BIOTECHNOLOGY & HEALTH

International

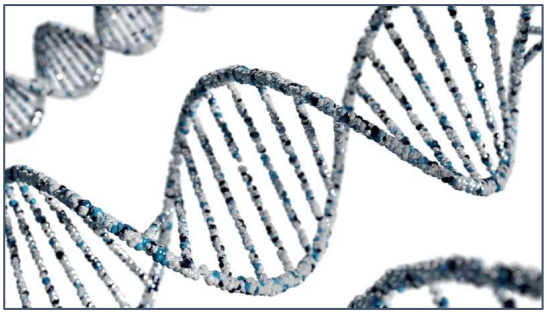
8. *AI can now model and design the genetic code for all domains of life with Evo 2*



Arc Institute develops the largest AI model for biology to date in collaboration with NVIDIA, bringing together Stanford University, UC Berkeley, and UC San Francisco researchers. It has launched Evo 2, an advanced AI model for genome design and interpretation. Expanding upon Evo 1, Evo 2 now covers complex eukaryotic sequences and metagenomic data. Trained on 9.3 trillion nucleotides from 128,000+ genomes, it can process up to 1 million base pairs in a single context window using 40 billion parameters. Built on NVIDIA's DGX Cloud with StripedHyena 2 architecture, Evo 2 achieves 90% accuracy in mutation impact prediction and excels in analyzing noncoding mutations.

The model's open-access tools, including Evo Designer and a mechanistic interpretability visualizer, enable broad scientific use in drug discovery, agriculture, and synthetic biology. Evo 2 significantly outperforms previous models and is available via NVIDIA's BioNeMo platform. Developed with $650 million in funding, it leverages 2,000 NVIDIA H100 GPUs for rapid scaling, making genome design more accessible and accelerating breakthroughs in biotechnology. Link (Arc Institute)

9. *Researchers invent method for rapid metabolite detection using DNA sequencing*



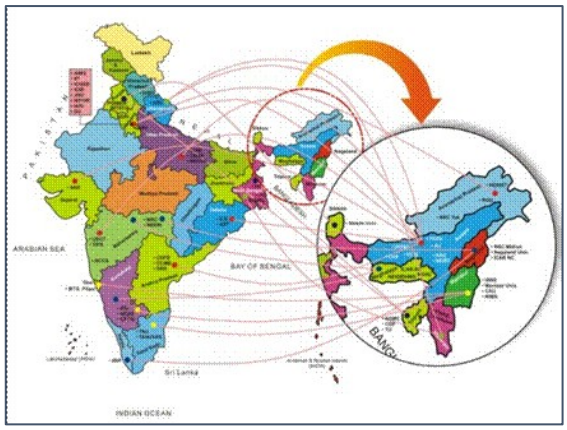
Researchers at the University of Toronto have developed a new method called "smol-seq" that utilizes DNA sequencing for rapid and precise metabolite detection. This innovative platform measures biological compounds such as sugars, vitamins, and hormones, which play a crucial role in health. Unlike traditional mass spectrometry, which is expensive and less accessible, smol-seq leverages DNA sequencing technology to analyze metabolites more efficiently. The method relies on DNA aptamers—short DNA strands engineered to bind specific metabolites—each tagged with a unique DNA barcode. When an aptamer binds to its target metabolite, it undergoes a structural change, releasing its DNA barcode. By sequencing these barcodes, scientists can identify and quantify various metabolites simultaneously.

This technique enables the measurement of hundreds or even thousands of metabolites at once, greatly expanding the scope of metabolomics research. The next step involves expanding the aptamer database to improve precision and enable machine learning models to predict new aptamer designs. Researchers aim to refine the method at the nucleic acid level for greater specificity. Smol-seq has the potential to revolutionize diagnostics and biotechnology, making metabolite

detection as fast and accessible as DNA sequencing, offering significant advancements in biomedical research and healthcare. Link (University of Toronto)

National

***10.* Biodiversity to Bioeconomy: How Biotechnology is Transforming North East India?**



India's North East Region (NER), rich in biodiversity, is undergoing a transformation through biotechnology, driving sustainable growth while preserving its natural heritage. The Department of Biotechnology (DBT) has played a key role in this shift by dedicating 10% of its budget since 2010 to specialized programs in the region. These initiatives focus on harnessing local bioresources, fostering biotech education, and promoting entrepreneurship.

Key programs include the Twinning R&D Programme, which has supported over 650 projects and 2,000 young researchers, and the establishment of 126 Biotech Hubs to enhance research infrastructure. Additionally, Biotechnology Labs in Senior Secondary Schools (BLiSS) and Visiting Research Professorship programs have expanded biotech education. Other initiatives, such as genomics training and agricultural biotechnology projects, have strengthened research and application in human health and sustainable farming.

Significant achievements include the development of a bacterial blight-resistant rice variety, a mobile app for pig disease

diagnosis, and essential oil distillation units to support local farmers. By integrating science with traditional knowledge, DBT's efforts are not only conserving biodiversity but also fostering a bioeconomy that empowers local communities and strengthens NER's role in India's biotech-driven future. Link (PIB)

11. Dedication of India's First Ferret Research Facility, Launch of GARBHINI-DRISHTI

India has taken a major step in biomedical research and innovation with the inauguration of the country's first Ferret Research Facility, the launch of the GARBH-INi-DRISHTI data repository, and a key technology transfer agreement at the Translational Health Science and Technology Institute (THSTI) in Faridabad, Haryana. Presided over by Dr. Rajesh Gokhale, Director General of the Biotechnology Research and Innovation Council, these initiatives mark a significant advancement in India's scientific and healthcare landscape.

The state-of-the-art Ferret Research Facility will play a crucial role in vaccine development, therapeutic testing, and research on infectious diseases, strengthening India's pandemic preparedness. Meanwhile, the launch of GARBH-INi-DRISHTI provides researchers with access to a vast clinical

database on maternal and neonatal health, facilitating transformative research. The platform includes data from over 12,000 pregnant women, newborns, and postpartum mothers, making it one of South Asia's largest repositories in this field.

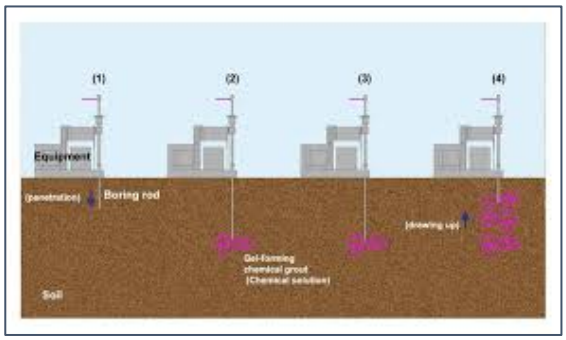
Additionally, a Technology Transfer Agreement was signed with Sundyota Numandis Probioceuticals to commercialize THSTI's Lactobacillus crispatus microbial consortium for nutraceutical applications.

These efforts collectively enhance India's position in translational research, biomanufacturing, and healthcare innovation, demonstrating a strong commitment to scientific advancement and industry collaboration for public health benefits. Link (PIB)

CLEAN TECHNOLOGIES

International

12. From waste to wonder: Revolutionary green grout for sustainable construction practices



Researchers from Japan's Shibaura Institute of Technology have developed a groundbreaking, carbon-neutral grouting material that could revolutionize soil deep into the soil while maintaining environmental safety standards. Beyond earthquake protection, CSRGF's superior water-sealing properties make it ideal for underground construction, including tunnels, subways, and flood-prone infrastructure projects.

This innovation aligns with circular economy principles, reducing industrial waste and cutting carbon emissions associated with traditional grout production. As the construction industry moves toward carbon neutrality, CSRGF presents a scalable, cost-effective solution. stabilization in construction. Grouting, a crucial technique used to reinforce soil in earthquake-prone areas, typically relies on energy-intensive silica-based materials, which contribute to high carbon emissions. The new grout, known as Colloidal Silica Recovered from Geothermal Fluids (CSRGF), is created from waste fluids generated during geothermal energy production, effectively repurposing an industrial byproduct into a high-performance construction material.

Extensive laboratory tests demonstrated that CSRGF provides 50% greater liquefaction resistance compared to conventional grouts, making it especially useful in regions susceptible to seismic activity. The material's low viscosity and controlled gelling time allow it to penetrate Researchers now aim to scale up production and conduct real-world trials, positioning this sustainable technology as a key advancement in eco-friendly construction practices. Link (Science Daily)

13. From Scraps to Sips: Everyday Biomass Produces Drinking Water from Thin Air

Researchers from The University of Texas at Austin have developed an innovative system that extracts potable water from ambient air using everyday biomass materials. By transforming natural substances such as food scraps, branches, and seashells into "molecularly functionalized biomass hydrogels," they created sorbents capable of absorbing moisture from the atmosphere. When combined with mild heat, these sorbents can harvest significant amounts of drinkable water, even under arid conditions.

Field tests demonstrated that this system could produce approximately 14.19 liters (3.75 gallons) of clean water per kilogram of sorbent daily, surpassing the typical yield of existing sorbents, which ranges between 1 and 5 liters per kilogram per day. Unlike traditional synthetic sorbents that rely on petrochemicals and high energy inputs, the biomass-based hydrogels are biodegradable, scalable, and require minimal energy to release the absorbed water. This two-step molecular engineering process imparts hygroscopic properties and thermoresponsive behavior to various biomass-based polysaccharides, such as cellulose, starch, or chitosan.

The research team is now focusing on scaling production and designing practical devices for commercialization, including portable water harvesters, self-sustaining irrigation systems, and emergency drinking water solutions. This technology holds promise for off-grid communities, emergency relief efforts, and decentralized water systems, offering a sustainable and efficient method to address global water scarcity. Link (University of Texas)

14. Scientists design novel battery that runs on atomic waste

Scientists at the Ohio State University have developed a novel battery that converts nuclear waste into electricity using light emission. The technology relies on scintillator crystals, which absorb radiation from nuclear waste and emit light, which is then converted into electrical energy using solar cells. In experiments with radioactive isotopes like cesium-137 and cobalt-60, the prototype, measuring just 4 cubic centimeters, produced 288 nanowatts and 1.5 microwatts of power, respectively. While the energy output is currently low, the innovation has potential applications in powering microelectronics, including sensors used in high-radiation environments such as nuclear waste storage facilities, space exploration, and deep-sea monitoring.

The battery itself does not contain radioactive materials, making it safer to handle compared to conventional nuclear batteries. Researchers believe that optimizing the design and size of the scintillator crystals could significantly improve energy absorption and conversion efficiency, potentially increasing power output. Although challenges remain in scaling up the technology for broader applications, the study presents a promising

new way to repurpose nuclear waste into a sustainable energy source.

Future advancements could lead to practical applications in environments where conventional power sources are not viable, making it a step toward innovative energy solutions.. Link (Ohio University)

National

15. Charting a Green Course: Hydrogen-Fuelled Trains in India; Trial run scheduled for March 2025

India's push for green hydrogen-powered trains marks a milestone in sustainable transportation. The Indian Railways, backed by government initiatives, is spearheading this transformation with indigenous technology. The home-grown hydrogen engine, developed by RDSO, is the world's most powerful, delivering 1200 horsepower.

Under the "Hydrogen for Heritage" project, ₹2,800 crore has been allocated for 35 hydrogen fuel cell trains, with ₹600 crore for hydrogen infrastructure. The first trial run is scheduled for March 2025 on the Jind-Sonipat route in Haryana.

Despite high initial costs, hydrogen trains promise long-term savings by reducing reliance on fossil fuels. With dedicated hydrogen production and refueling facilities, including an electrolyzer plant in Jhajjar, Haryana, India is building the necessary infrastructure for large-scale adoption. The initiative aligns with the National Green Hydrogen Mission, which aims to achieve energy independence by 2047 and net-zero emissions by 2070.

Globally, hydrogen trains are gaining traction, with operational models in Germany, France, Italy, and Canada. Successful trial runs have taken place in other countries like Saudi Arabia, Austria, the Netherlands, Poland, and Sweden, indicating a shift towards cleaner rail transport.

India's adoption of this technology is expected to revolutionize rail transport, reducing carbon emissions and dependence on electrification. Successful trials could set a global benchmark, positioning India as a leader in green hydrogen-powered rail travel. Link (DD News)

QUANTUM & PHOTONICS

International

16. A completely new type of microscopy based on quantum sensors

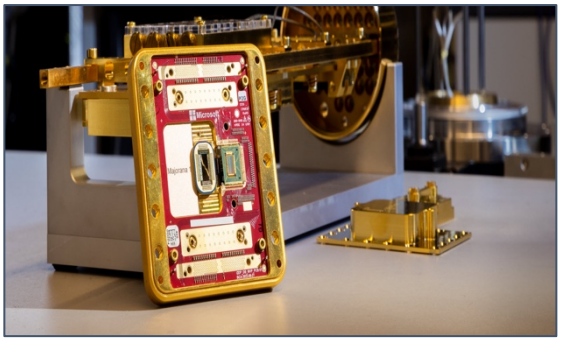
Researchers at the Technical University of Munich (TUM) have pioneered a groundbreaking field of microscopy, nuclear spin microscopy. This innovation allows visualization of nuclear magnetic resonance (NMR) signals at an unprecedented microscopic scale using

quantum sensors. Unlike conventional MRI, which images organs and tissues, this new technique enables high-resolution optical imaging of microscopic structures by converting magnetic resonance signals into light. The key component of this system is a specially engineered diamond chip that acts as a quantum sensor, detecting MRI magnetic fields and generating fluorescent signals when exposed to laser light. These signals are then captured by a high-speed camera, producing detailed images with resolutions as fine as ten-millionths of a meter, making individual cells visible.

This revolutionary technology holds immense potential across various scientific fields. In cancer research, it can help analyze individual cells to better understand tumor growth. In pharmaceuticals, it could optimize drug formulations at a molecular level. Additionally, materials science could benefit from its ability to analyze chemical compositions of thin-film materials and catalysts. The team has already applied for a patent and aims to refine the technology further, paving the way for its use in The chip is part of Microsoft's broader vision to build a fault-tolerant quantum computer that can perform complex calculations beyond the capabilities of classical supercomputers. Microsoft has also integrated the Majorana-1 chip with Azure Quantum Elements, allowing researchers to experiment with quantum algorithms and simulations using cloud-based quantum services.

By achieving a milestone in topological quantum computing, Microsoft aims to accelerate advancements in fields such as materials science, cryptography, and artificial intelligence. The Majorana-1 chip represents a major step toward commercializing quantum computing, with the potential to revolutionize industries that require vast computational power. This breakthrough underscores Microsoft's long-term commitment to leading the medical diagnostics, research, and beyond. Link (University of Munich)

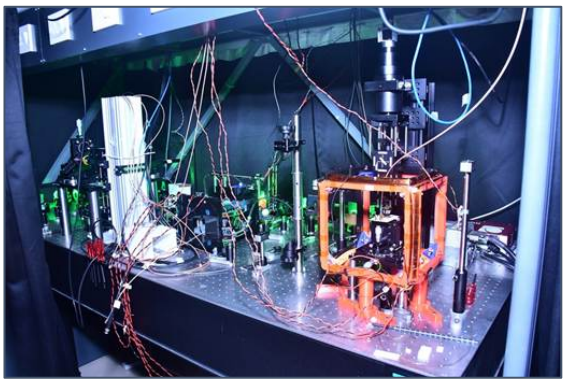
17. Microsoft's Majorana 1 chip carves new path for quantum computing



Microsoft has unveiled the Majorana-1 chip, a significant breakthrough in quantum computing, marking a shift towards scalable and stable quantum systems. Unlike traditional superconducting qubits, the Majorana-1 chip leverages topological qubits, which are inherently more stable and less prone to errors. This development is expected to overcome one of the biggest challenges in quantum computing - error correction, by significantly reducing the number of physical qubits needed for reliable computations.
quantum revolution and bridging the gap between experimental quantum research and practical, real-world applications. Link (Microsoft)

National

18. Journey of NQM's Quantum Sensing and Metrology Hub with lab grown technologies at IIT Bombay



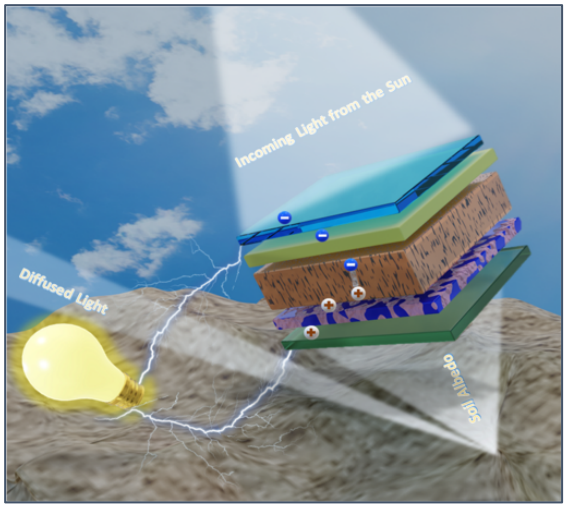
The Photonics and Quantum Sensing Technology Lab at IIT Bombay is advancing quantum sensing with cutting-edge innovations, laying the foundation for the newly established Quantum Sensing and Metrology Hub (Qmet Tech Foundation) under the National Quantum Mission (NQM). Led by Prof. Kasturi Saha, the team is developing breakthrough technologies like the quantum diamond microscope and portable magnetometer, essential for precision metrology, imaging, and sensing applications.

Prof. Saha's research focuses on nitrogen vacancy (NV) centers in diamonds, which act as ultra-sensitive magnetic field and temperature sensors. The quantum diamond microscope, utilizing NV centers, enables high-resolution magnetic field mapping in semiconductor chips and biological sensing. It holds potential for tracing neuronal activity at the single-neuron level, offering new possibilities in neuroscience.

Additionally, her team is collaborating with Indian diamond companies to develop indigenous lab-grown diamonds for quantum applications. Beyond microscopy, IIT Bombay's team is also working on a portable magnetometer, which could be miniaturized into chips for drone-based surveillance. Their research extends to magnetic materials, exploring their viability as quantum materials. Under NQM, the team aims to push quantum sensing to its fundamental limits, commercializing quantum technologies and bridging theoretical research with real-world engineering applications. Link (PIB)

19. *Durable and Transparent: Researchers Develop High-Efficiency Bifacial Perovskite Solar Cells*

Researchers at IIT Dharwad have developed advanced bifacial perovskite solar cells using a novel NiO/Ag/NiO (NAN) transparent electrode, significantly enhancing efficiency, durability, and infrared transparency. Unlike conventional solar cells, bifacial perovskite cells generate electricity from both direct sunlight and reflected light, improving overall power output. The newly introduced NAN electrode, fabricated using low-energy physical vapor deposition, offers low electrical resistance and high visible light transmittance, optimizing solar energy capture.



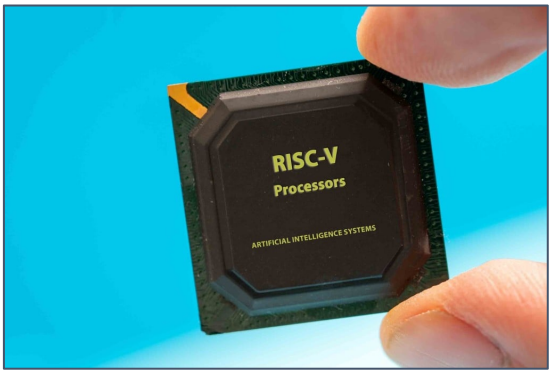
The solar cells demonstrated impressive power conversion efficiencies (PCE) of 9.05% and 6.54% when exposed to light from different sides, with a bifaciality factor of 72%, indicating their strong ability to utilize light from both directions. Additionally, they exhibited excellent durability, retaining 80% efficiency for over 1,000 hours without encapsulation. Their high near-infrared transparency also makes them ideal for applications in thermal windows, optoelectronics, and agrivoltaics.

With a thin profile of less than 40 nm, these solar cells hold promise for integration into building materials, automotive applications, and tandem solar cells. According to Prof. Dhriti Sundar Ghosh, this breakthrough provides a strategic design for transparent electrodes, paving the way for next-generation solar energy solutions and sustainable energy innovations. Link (Research Journal)

SEMICONDUCTORS

International

20. *Hong Kong embraces RISC-V open-source chip design to secure spot in China semiconductors*

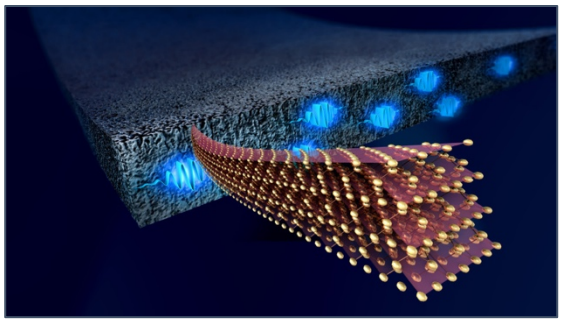


Hong Kong is embracing the RISC-V open-source chip architecture to strengthen its role in China's semiconductor industry amid rising US chip restrictions. Finance Secretary Paul Chan Mo-po emphasized the city's commitment to AI and open-source research, particularly RISC-V, during his 2025 budget speech. Unlike proprietary chip architectures such as Intel's x86 and Arm, RISC-V offers an open-source alternative that China is increasingly adopting to reduce reliance on foreign technology.

The Chinese Academy of Sciences (CAS) recently announced plans to release its RISC-V-based XiangShan CPU, which has already been adapted to support DeepSeek-R1, a popular large language model. China is hosting multiple RISC-V conferences this year, with major events in Shanghai and Beijing, indicating a strong push for the technology. US lawmakers have expressed concern over China's RISC-V advancements, but regulatory limitations make imposing restrictions difficult.

Hong Kong aims to position itself as a key player in RISC-V development by attracting talent, investment, and international partnerships. Additionally, the city is developing its first production line for gallium nitride (GaN) wafers, a next-generation semiconductor material with fewer US restrictions. Experts believe these efforts will help Hong Kong contribute to China's semiconductor ambitions while enhancing its own status as a global technology hub. Link (South China Morning Post)

21. *Mesoporous silicon: Semiconductor with new talents*



Researchers at Helmholtz-Zentrum Berlin (HZB) have achieved a breakthrough in lithium-ion battery technology by developing an innovative electrode material that significantly enhances battery performance. The team used niobium and tungsten oxides, which offer higher conductivity and faster ion mobility compared to conventional graphite anodes. These materials enable rapid charging and improved cycle stability, addressing key limitations of current lithium-ion batteries.

Through advanced spectroscopy and computational modeling, the scientists discovered that these oxides create an open, highly conductive structure that allows lithium ions to move more efficiently. This results in faster charging times and longer battery lifespans, making the technology particularly suitable for applications requiring quick energy replenishment, such as electric vehicles and portable electronics. The research team believes that with further

optimization, this material could be integrated into commercial battery production, reducing reliance on scarce raw materials like cobalt and enhancing the sustainability of lithium-ion battery technology. The discovery marks a significant step toward next-generation energy storage solutions. Link (HZB)

National

22. Shri Ashwini Vaishnaw announces India's first indigenous semiconductor chip to be ready for production by 2025

Union Minister Shri Ashwini Vaishnaw addressed the Global Investors Summit 2025 in Bhopal via video conferencing, announcing that India's first Made in India semiconductor chip will be ready for production by 2025.

Two electronic manufacturing clusters have been approved in Bhopal and Jabalpur, with 85 companies already engaged in the sector. To support this growth, the government will train 20,000 engineers under the Future Skills Program in Madhya Pradesh. The electronics manufacturing industry has seen unprecedented expansion, now valued at ₹10 lakh crore, with exports reaching ₹5 lakh crore. India's semiconductor sector is also advancing rapidly, with five manufacturing units under construction and 85,000 engineers being trained in semiconductor and electronics production.

A new IT campus spanning 1 lakh square feet has been inaugurated in Bhopal, featuring advanced facilities for manufacturing IT hardware, drones, and robotics. The ₹150 crore investment is expected to generate 1,200 jobs over six years. HLBS, a key technology company in Bhopal, is leading innovation in electronics, ensuring affordability and high-quality production for domestic and global markets. Link (PIB)

SPACE & DEFENCE

International

23. Scientists simulate asteroid collision effects on climate and plants

Researchers from the IBS Center for Climate Physics (ICCP) at Pusan National University in South Korea have conducted climate modeling studies to assess the potential global impact of a medium-sized asteroid collision, focusing on an asteroid similar in size to Bennu, which measures approximately 500 meters in diameter. Bennu has an estimated 1-in-2,700 chance of impacting Earth in September 2182.

Using the IBS supercomputer Aleph, scientists simulated scenarios where such

an asteroid injects 100 to 400 million tons of dust into the upper atmosphere. The findings indicate that this massive dust injection would lead to significant climatic disruptions over a span of three to four years. Specifically, a scenario involving 400 million tons of dust could result in global surface temperatures dropping by up to 4 degrees Celsius and a 15% decrease in average global rainfall. Additionally, there would be a severe depletion of the ozone layer by approximately 32%, with regional variations potentially exhibiting even more pronounced effects.

These climatic changes would adversely affect terrestrial and marine ecosystems. Terrestrial photosynthesis is projected to decline by 20-30%, potentially disrupting global food security. Conversely, marine ecosystems, particularly phytoplankton, might experience a rapid recovery within six months, followed by unprecedented growth. This unexpected marine response is attributed to the iron-rich dust from the asteroid, which would fertilize iron-deficient ocean regions, leading to significant algal blooms. These blooms could enhance marine productivity and partially offset the decline in land-based food production.

The study underscores the profound and complex environmental consequences of potential asteroid impacts, highlighting the need for comprehensive preparedness strategies to mitigate such global threats. Link (IBS)

24. Türkiye's first homegrown short-range ballistic missile completes new test

Türkiye has successfully conducted another test of its domestically developed Tayfun missile. The launch carried out under strict security measures, took place near Rize-Artvin Airport. The short-range missile hit its target with pinpoint accuracy. This marks the third successful test of the missile, following previous tests in 2022 and 2023.

Developed and produced by Roketsan, Tayfun is currently considered Türkiye's longest-range missile. The missile weighs 2,300 kilograms and has a length of 6.5 meters. According to Anadolu Agency, the missile has an effective range of 280 kilometres and a maximum range of 800 kilometres. Link (Republic of Türkiye)

National

25. DRDO lab working to safeguard Gaganyaan astronauts from space radiation

As India advances toward its inaugural human spaceflight endeavor, the Gaganyaan Mission, the Defence Research and Development Organisation's (DRDO) Institute of Nuclear Medicine & Allied Sciences (INMAS) is spearheading efforts to protect astronauts from space radiation. Recognizing the significant risks posed by cosmic radiation, INMAS hosted an international conference from February 27

to March 1, 2025, uniting experts to address these challenges.

The conference emphasized an interdisciplinary approach, bringing together radiobiologists, physicists, engineers, and medical researchers to develop comprehensive biomedical countermeasures. Key discussions centered on identifying biomarkers of radiation exposure, understanding chronic effects such as carcinogenesis, and employing mathematical modeling to predict radiation outcomes. Innovative strategies, including targeted cellular and molecular interventions, are being explored to mitigate muscle and bone loss along with other degenerative effects associated with prolonged space travel.

These technological advancements are crucial not only for the current Gaganyaan mission but also for future long-duration missions, including potential endeavors to

Mars. By proactively addressing the hazards of space radiation, India aims to ensure the safety and well-being of its astronauts, marking a significant milestone in the nation's human space exploration efforts. Link (PIB)

26. IN-SPACe unveils Rs 500 crore technology adoption fund to boost India's space startups and innovation

The Indian National Space Promotion and Authorization Centre (IN-SPACe), an arm of the Department of Space (DoS), has launched the Technology Adoption Fund (TAF) with a ₹500 crore corpus to boost India's space startup ecosystem. This initiative aims to reduce reliance on imported space technology by accelerating indigenous research, fostering innovation, and strengthening collaboration between government agencies and private enterprises.

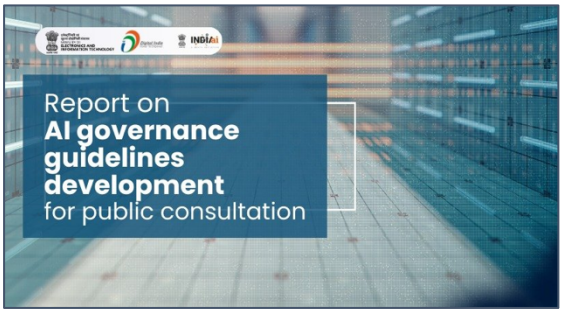
TAF will fund up to 60% of project costs for startups and MSMEs and 40% for larger industries, with a maximum cap of ₹25 crore per project. According to Dr. Pawan Goenka, Chairman of IN-SPACe, the fund is designed to bridge the gap between early-stage technology development and commercialization, enabling companies to refine production processes and scale innovations for both domestic and global markets.

Beyond financial support, TAF will help startups transition space technologies into commercially viable products, develop intellectual property, and drive future R&D. It will also provide technical mentoring and guidance to ensure smooth product development and market integration.

Welcoming the initiative, Lt. Gen. AK Bhatt (retd.), Director General, ISpA, emphasized its role in accelerating India's growing space sector and empowering startups to develop groundbreaking solutions, reinforcing India's position as a global space technology leader. Link (DD News)

REPORTS/POLICY DOCUMENTS

27. *Govt. seeks feedback on AI governance guidelines*



India is taking significant steps to develop a robust AI governance framework that balances innovation with accountability. Recognizing both the potential and challenges of AI, an Advisory Group, chaired by the Principal Scientific Advisor, has been established to formulate an 'AI for India-Specific Regulatory Framework.' Under its guidance, a Subcommittee on 'AI Governance and Guidelines Development' was created to provide actionable recommendations for AI governance. The Subcommittee conducted a gap analysis of existing regulations and proposed a comprehensive approach to ensure AI systems' trustworthiness and accountability. Its report emphasizes a coordinated, whole-of-government approach to AI governance, addressing compliance, ethical considerations, and risk mitigation.

To ensure inclusivity, the Ministry of Electronics and IT (MeitY) published the report for public consultation, inviting feedback to shape India's AI regulatory landscape. The consultation process, which concluded on February 27, 2025, aimed to create a governance framework that aligns with India's diverse socio-economic landscape while fostering responsible AI innovation. These efforts underscore India's commitment to developing an AI ecosystem that supports economic growth, safeguards public interests, and enhances India's global leadership in AI governance. Link (IndiaAI)

28. *India @2047: Transforming India into a Tech-Driven Economy by Bain & Company and NASSCOM*

The report, presents a strategic roadmap to position India as a high-income, developed economy with a projected GDP of $23–$35 trillion. Achieving this goal requires sustained annual growth of 8%–10%, sectoral transformation, and technological advancements. Key to this shift is India's transition from a net importer to a globally competitive, export-driven economy, particularly in electronics, energy, chemicals, automotive, and services, sectors identified as strategic growth levers. By 2047, services are expected to contribute 60% to GDP, while advancements in manufacturing could establish India as a global hub.

Technology will play a critical role in driving this transformation. AI-enabled chip design, touchless manufacturing, and biodegradable components can position India as a leader in electronics. Smart grids, green hydrogen, and nuclear technologies will support energy diversification. AI-driven molecular design and bio-based production could enhance sustainability in the chemicals sector. The automotive industry will be propelled by EV advancements and autonomous technology,

while AI, blockchain, and cloud computing will revolutionize services.

Challenges such as infrastructure deficits, workforce skill gaps, and reliance on imports must be addressed through a tech-driven approach. Public-private partnerships, increased R&D investment, and global collaborations in areas like quantum technology and trade diversification can strengthen India's global competitiveness.

By aligning growth with sustainability and inclusivity, India can achieve its ambition of becoming a global economic and technological powerhouse by 2047. Link (Report pdf)

TECHNOLOGY EVENTS/MEETINGS

29. Union Budget 2025-26: Key Technology Provisions announced

The Union Budget 2025-26 underscores India's commitment to technological innovation and digital transformation as key drivers of economic growth. A Centre of Excellence in AI for Education will be established with ₹500 crore, alongside a Deep Tech Fund of Funds to support AI, quantum computing, and advanced materials startups. Additionally, 50,000 Atal Tinkering Labs will be set up in government schools over the next five years to foster innovation among students. The government is also expanding digital infrastructure, with BharatNet extending broadband connectivity to rural schools and health centers. The PM Gati Shakti digital platform will integrate geospatial technology to modernize land records and infrastructure planning.

To boost R&D and innovation, ₹20,000 crore has been allocated for private-sector-led research, and the PM Research Fellowship will support 10,000 scholars in IITs and IISc. The semiconductor industry will receive fiscal incentives for chip fabrication and research, strengthening India's global positioning in electronics manufacturing.

In clean energy, the Nuclear Energy Mission has been launched with ₹20,000 crore to develop Small Modular Reactors (SMRs), targeting 100 GW of nuclear power by 2047. The government is also supporting clean tech manufacturing for solar PV cells, EV batteries, electrolyzers, and wind turbines.

Other initiatives include a National Geospatial Mission and AI-driven research in healthcare to enhance genomics, drug discovery, and digital health solutions. The budget also prioritizes skill development, establishing five National Centres of Excellence for advanced training and expanding IIT capacity to accommodate 6,500 more students. The startup ecosystem will benefit from an additional ₹10,000 crore Fund of Funds, while Micro Enterprises will gain access to ₹5 lakh credit cards to foster digital entrepreneurship.

India's global tech ambitions are reflected in the launch of an Export Promotion

Mission, supported by the BharatTradeNet digital trade platform, and an Investment Friendliness Index to enhance state-level innovation ecosystems. These measures position India as a global leader in AI, semiconductors, clean energy, and digital infrastructure, ensuring economic transformation, job creation, and stronger global competitiveness. Link (PIB), Ministry of Finance

30. *Prime Minister co-chairs AI Action Summit in Paris*

Prime Minister Narendra Modi co-chaired the AI Action Summit in Paris alongside French President Emmanuel Macron. The summit, which began with Science Days on February 6-7 and a Cultural Weekend on February 8-9, culminated in a High-Level Segment attended by global leaders, policymakers, and industry experts. The event commenced with a dinner hosted by President Macron at the Élysée Palace on February 10, bringing together Heads of State, international organization leaders, and CEOs of major AI companies.

During the Plenary Session, Prime Minister Modi, in his opening address, highlighted AI's transformative impact on politics, economy, security, and society. He stressed the need for global cooperation in AI governance to uphold shared values, manage risks, and ensure trust. Emphasizing democratization of AI, he called for making AI accessible to all, particularly the Global South, and leveraging AI to achieve Sustainable Development Goals. He also lauded the India-France sustainability partnership and its role in fostering responsible AI innovation.

Prime Minister Modi underscored India's leadership in building Digital Public Infrastructure and announced India's efforts in developing its own Large Language Model. He reaffirmed India's commitment to inclusive AI development and announced that India will host the next AI Summit. The summit focused on key themes such as AI infrastructure access, responsible AI, AI for public interest, and safe governance. Link (MEA)

31. *India - U.S. Joint Statement during the visit of Prime Minister of India to US*

President Donald Trump hosted Prime Minister Narendra Modi for an official visit in Washington, D.C., on February 13, 2025, reaffirming the strength of the U.S.-India Comprehensive Global Strategic Partnership. They launched the U.S.-India COMPACT initiative to advance defense, trade, and technology cooperation. In defense, the leaders committed to a new ten-year framework for their Major Defense Partnership, expanding co-production and procurement, including Javelin missiles and Stryker combat vehicles. They announced the Autonomous Systems Industry Alliance (ASIA) for AI-driven defense technologies.

On trade, the leaders set an ambitious "Mission 500" goal to double bilateral trade

to $500 billion by 2030, initiating negotiations for a Bilateral Trade Agreement (BTA). They pledged to reduce trade barriers and expand market access for agricultural and industrial goods. Energy security was emphasized, with commitments to enhance hydrocarbon production, strengthen strategic petroleum reserves, and advance U.S.-India civil nuclear cooperation, including reactor localization.

The leaders also launched the U.S.-India TRUST initiative for collaboration in AI, semiconductors, and critical minerals. They announced plans for AI infrastructure development and partnerships in space exploration. Strengthening Indo-Pacific security, counterterrorism, and people-to-people ties were also key agenda points, reinforcing India-U.S. cooperation in global stability and economic growth. Link (PIB)

32. *India Energy Week 2025: Driving Global Energy Innovation and Collaboration for a Sustainable Future*

India Energy Week (IEW) 2025, held from February 11 to 14 at Yashobhoomi Convention Centre, New Delhi, emerged as a key global platform for energy innovation, collaboration, and investment. Organized under the patronage of the Ministry of Petroleum and Natural Gas, the event has grown into the world's second-largest energy conference, attracting participants from over 120 countries. It facilitated high-level discussions, strategic partnerships, and showcased cutting-edge technologies driving sustainable energy solutions.

The key focus areas of IEW 2025 included India's energy transition, emphasizing green hydrogen, biofuels, and flex-fuel vehicles, with a goal of producing 5 MMT of green hydrogen annually by 2030. The launch of the Open Acreage Licensing Program (OALP) Round X aimed to boost oil and gas exploration, while strengthened India-U.S. energy cooperation focused on LNG supply partnerships. The event also recognized energy startups through the Avinya'25 and Vasudha challenges, fostering innovation in CO_2 capture, renewable energy, and AI-driven solutions.

Nine thematic zones highlighted advancements in hydrogen, biofuels, renewables, LNG, petrochemicals, city gas distribution, digitalization, and energy innovation. Aligning with India's "Panchamrit" climate pledge, IEW 2025 reinforced India's commitment to sustainability, positioning the country as a global leader in energy security, clean technology, and economic growth.

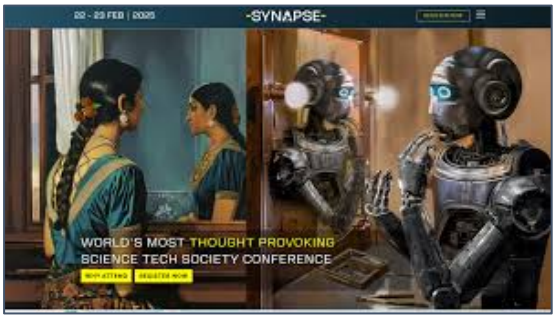
The fourth edition of India Energy Week is scheduled to take place in Goa in 2026. Link (PIB).

33. *FICCI Forum of Parliamentarians - Interactive session on AI and New and Emerging Technologies*

FICCI Forum of Parliamentarians organized an industry interaction for Hon'ble Members of Parliament on Artificial Intelligence & Emerging Technologies.

JS (NEST) participated in the roundtable, which covered discussions on the transformative potential of AI on sectors like healthcare & biotechnology, critical-minerals, semiconductors, robotics, investment & banking, architecture, cybersecurity etc.

34. SYNAPSE Conclave 2025



The Synapse Conclave, held on February 22-23, 2025, in Gurugram, organised by Shiv Nadar Foundation, brought together a diverse group of thinkers and innovators from various fields. The conference aimed to bridge the gap between science, technology, and society by fostering meaningful discussions and debates.

The event featured an impressive lineup of speakers, including David Hanson, inventor of Sophia, the world's first digital citizen, and Nick Bostrom, a renowned transhumanist and author. Sessions were curated to explore critical themes such as the impact of AI on society, ethical considerations of emerging technologies, and how these advancements are reshaping human futures.

The conclave also delved into pressing issues like climate action and synthetic biology, providing a comprehensive platform for attendees to engage with these topics. The sessions encouraged dialogue and challenged perspectives by bringing together experts from different disciplines, It created a unique space for collaboration and innovation, setting the stage for future discussions on the intersection of technology and society. The event underscored the importance of interdisciplinary dialogue in navigating the complexities of emerging technologies. JS (NEST) and Director (NEST) participated in the Synapse Conclave.

35. National Science Day 2025: Celebrating the Spirit of Scientific Innovation

National Science Day, celebrated annually on February 28, commemorates Sir C.V. Raman's discovery of the 'Raman Effect,' for which he received the Nobel Prize in 1930. Since its first observance in 1987, the day has promoted scientific awareness across India. The 2025 theme, "Empowering Indian Youth for Global

Leadership in Science & Innovation for Viksit Bharat," highlights the role of young minds in India's scientific progress, aligning with the Viksit Bharat 2047 vision.

India has made remarkable strides in science and technology. In 2024, it ranked 39th in the Global Innovation Index and 6th in global Intellectual Property filings. The launch of the Anusandhan National Research Foundation (ANRF) has fostered research and inclusivity, supporting young scientists and driving innovation in electric vehicles and AI. The National Quantum Mission (NQM) and National Supercomputing Mission (NSM) have expanded India's capabilities in quantum

computing and high-performance computing. The BharatGen initiative is advancing India's AI research through a multimodal, multilingual Large Language Model (LLM).

India is also strengthening gender inclusion in STEM through programs like WISE-KIRAN and Vigyan Jyoti. As India advances towards Viksit Bharat 2047, investment in science, technology, and research will be crucial for global leadership and sustainable development. Link (PIB)

36. IMC Bharat Calling Conference

Union Minister for Commerce and Industry, Shri Piyush Goyal, inaugurated 'Bharat Calling Conference 2025' organized by IMC Chamber of Commerce and Industry in Mumbai on 27th February 2025. The Union Minister Shri Piyush Goyal was the keynote speaker in the conference which had the theme 'Path to Viksit Bharat 2047: Pioneering Prosperity for All'.

Quality Management and Handholding of Small Business, Sustainability, Inclusive Growth, Skill Development, Competitiveness and Efficiency was highlighted to be enablers for Viksit Bharat 2047 by the Minister.

Shri P Kumaran Special Secretary (ER&DPA), Ministry of External Affairs delivered special address on Global Shifts: New Opportunities for Collaboration & Path to Viksit Bharat 2047 Pioneering Prosperity for All .

The conference highlighted how India stands at the forefront of global economic growth, offering unparalleled opportunities for investment across diverse sectors. With a robust and resilient economy, a large and dynamic consumer market and a Government committed to fostering business-friendly policies, India is poised to become one of the world's leading investment destinations. Link (PIB)

37. Second Meeting of the India-EU Trade and Technology Council, New Delhi

The second meeting of the India-EU Trade and Technology Council (TTC) was held in New Delhi on February 28, 2025, co-chaired by India's External Affairs Minister, Commerce and Industry Minister, and Minister for Electronics and IT, alongside European Commission representatives. The TTC, established in April 2022, aims to strengthen collaboration in trade, technology, and security. Both sides reaffirmed their commitment to a rules-based international order, enhancing digital transformation, and ensuring supply chain resilience.

The meeting focused on three key working groups. In Strategic Technologies and Digital Governance, both sides emphasized cooperation in AI, semiconductors, and digital public infrastructure.

The IndiaAI Mission and the European AI Office agreed to enhance collaboration on responsible AI. A memorandum was signed between the Bharat 6G Alliance and the EU 6G Smart Networks Association to align research and innovation.

In Clean and Green Technologies, both sides agreed to joint research on battery recycling, marine plastic litter, and waste-to-hydrogen projects, with an estimated budget of €60 million. The discussions also covered cooperation in hydrogen safety standards, EV interoperability, and waste-to-energy solutions.

On Trade, Investment, and Resilient Value Chains, India and the EU emphasized strengthening pharmaceutical, agri-food, and clean energy supply chains. They reaffirmed commitments to WTO reforms and discussed mitigating the impact of the EU's Carbon Border Adjustment Mechanism (CBAM) on Indian businesses. Both sides committed to continuing dialogue on investment screening and trade decarbonization while working towards finalizing a Free Trade Agreement. The next TTC meeting is scheduled within a year. Link (MEA)

WHAT'S UPCOMING?

38. *Raisina Dialogue 2025 (March 17-19)*

The Raisina Dialogue is India's premier conference on geopolitics and geoeconomics committed to addressing the most challenging issues facing the global community. Every year, leaders in politics, business, media, and civil society converge in New Delhi to discuss the state of the world and explore opportunities for cooperation on a wide range of contemporary matters. The Dialogue is structured as a multi-stakeholder, cross-sectoral discussion, involving heads of state, cabinet ministers and local government officials, who are joined by thought leaders from the private sector, media and academia.

The conference is hosted by the Observer Research Foundation in partnership with the Ministry of External Affairs, Government of India. This effort is supported by a number of institutions, organisations and individuals, who are committed to the mission of the conference. Link (ORF)

39. *AI Bharat Expo (March 19-21)*

The AI Bharat Expo 2025 is scheduled to take place from March 19-21, 2025, at Bharat Mandapam in New Delhi, it will be co-located with the Convergence India Expo, one of India's largest technology showcases. This event is expected to attract over 55,000 attendees from around the world, including industry leaders, tech

entrepreneurs, innovators, researchers, and government bodies.

The expo will highlight India's advancements in AI across various sectors such as healthcare, agriculture, education, and finance. It will also promote discussions on the ethical and responsible use of AI, addressing issues like bias, privacy, and transparency.

Key features include an AI showcase, conferences, demos, and a dedicated AI zone featuring interactive exhibits on advanced algorithms and AI-driven solutions. Additionally, the event will provide a platform for emerging startups to showcase their innovations in areas like neural networks and autonomous systems. By fostering partnerships and collaborations, AI Bharat Expo aims to empower India with AI, revolutionizing industries and enhancing the country's technological leadership. Link (aibharatexpo)

The New, Emerging and Strategic Technologies (NEST) Division was set up in 2020 to engage in technology diplomacy and deal with the foreign policy and international legal aspects of new and emerging technologies.

The Division enables active participation of India in global forums in the area of technology governance and promoting our national interests in that context. In an interconnected and rapidly evolving world, no single country can independently navigate the complexities of technological advancement and its geopolitical influence. In this context, the NEST Division within the Ministry of External Affairs serves as a nodal point for the Ministry in keeping it up to date and coordinating with domestic stakeholders and collaborating with foreign partners in dealing with the changing global scenario amidst the rising importance of new and emerging technologies such as 5G, 6G, Artificial Intelligence, Biotech, Semiconductors, Clean and Sustainable Technologies, Quantum among others. Additionally, the division also builds capacity on new and emerging technologies within the Ministry that will enable India's Diplomacy to effectively navigate the intersection of technology and international relations, addressing the challenges and opportunities technology presents on the world stage and foster international cooperation to address these challenges and evolve India's position on the global tech governance.

40. Global Technology Summit (April 10-12)

The Global Technology Summit - Carnegie India's annual flagship event, co-hosted with the Ministry of External Affairs, Government of India.

It brings together industry experts, policymakers, scientists, and other stakeholders from all over the world to deliberate on the changing nature of technology and geopolitics.

Its aim is to create a new framework of engagement that addresses concerns of all stakeholders without hindering technological progress and innovation.

The ninth edition of the Global Technology Summit, themed "Sambhavna," is set to take place in New Delhi from April 10-12, 2025. Link (Carnegie)

THE TECH SHOWCASE! (ANNEXURE)

Compilation of Technology Innovations by premier research institutions of India. The details are shared in the Annexure.

Council of Scientific and Industrial Research (CSIR)

- CSIR-NCL Zeolite Rejuvenation Technology for Oxygen System in MiG-29 Fighter Aircraft

IIT Roorkee

- A method for automatically selecting process parameters for an additive manufacturing (AM) process
- Pulsed laser-deposited Ti-based MXene thin films and method thereof
- Development of a bio-based adhesive binder sourced from modified linseed oil for printing ink application
- A recombinant gene, its encoded recombinant protein and a system comprising the recombinant protein
- Nitrogen dioxide (NO_2) gas sensing composite sensor and process for preparation thereof
- A graphene assisted surface plasmon resonance based refractive index sensor
- Synergistic plant-based formulation as an alternative of antibiotics for poultry and its method of preparation
- Ru-based electrocatalysts for hydrogen evolution reaction and its method of synthesis
- A robust fault isolation method for inverter dominant hybrid microgrid system using novel dual overcurrent relay characteristics
- Light-driven synthesis of 3-Aryl/Alkyl-1-indanone derivatives from Indan-1,3-diones and boronic acids via *N*- sulfonyl hydrazones

ICAR – Central Institute of Agricultural Engineering, Bhopal

- Insulating material from crop residue

For suggestions/feedback, please reach out to us on –
nestsection@mea.gov.in

The New, Emerging, and Strategic Technologies (NEST) Division, established in 2020 under the Ministry of External Affairs (MEA), focuses on technology diplomacy and the international aspects of critical, strategic and emerging technologies. It enhances India's participation in global forums, shaping technology governance and safeguarding national interests. As technology has become central to economic and geopolitical agendas, the Division coordinates with domestic and international stakeholders on advancements like Artificial Intelligence, Quantum Technology, 5G/6G, Biotechnology, Green energy, Semiconductors, and others. NEST also builds internal capacity within MEA, facilitates policy engagement, and assesses foreign policy implications. It plays a key role in shaping India's stance on global tech governance and cooperation.

New, Emerging & Strategic Technologies Division
Ministry of External Affairs
Government of India