MINISTRY OF EXTERNAL AFFAIRS

NEW, EMERGING & STRATEGIC TECHNOLOGIES (NEST) DIVISION

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A) ARTIFICIAL INTELLIGENCE:

1. IIT Delhi and IAF join hands for AI-powered research on aviation textiles:

 IIT Delhi and HQ Maintenance Command of the Indian Air Force, Nagpur, have signed an MoU to collaborate on developing innovative aviation textiles, particularly for parachutes and safety equipment. This partnership focuses on R&D in obsolescence management, self-reliance, upgrades, and digitization of aviation-grade textiles through indigenization. Key areas include selecting raw materials for parachutes, creating modern textile testing technologies, and using AI and robotics for quality checks. The collaboration will also involve machine learning to enhance the imaging of parachute systems for maintenance, design, reliability, and life-extension studies. IIT Delhi highlighted the potential of combining IIT's research with the IAF's practical expertise to support India's defense needs for indigenized solutions.

https://www.outlookbusiness.com/news/iit-delhi-iaf-join-hands-for-ai-powered-research-on-aviation-textile

2. AI's Next Frontier: System 0 and the Future of Human Thought:

 Researchers from the Universita Cattolica del Sacro Cuore, Italy, introduced System 0" which is an emerging cognitive tool powered by AI that enhances human intuition and analysis, promising to improve complex decision-making and problem-solving. This framework complements the existing cognitive models—System 1 (intuitive thinking) and System 2 (analytical thinking)—and introduces a new layer of cognitive complexity. However, careful management is required to prevent overreliance on AI and maintain ethical standards. Researchers highlight the importance of retaining human autonomy in decision-making, as AI lacks the ability to assign intrinsic meaning to the data it processes. The potential benefits of System 0 include efficient data processing and support in addressing complex issues. Still, it poses risks such as loss of critical thinking and potential bias in AI outputs. To harness System 0 effectively, the authors advocate for ethical guidelines, transparency, and public education to promote responsible interaction with AI and safeguard human cognitive abilities.

https://scitechdaily.com/ais-next-frontier-system-0-and-the-future-of-human-thought/

3. S. Korea opens national AI research lab to boost competitiveness:

 South Korea launched its National Artificial Intelligence (AI) Research Lab in Seoul, aiming to establish itself as a leading global power in AI by 2028. The government plans to invest 94.6 billion won ($68.2 million) in the lab to support joint research projects with international partners, develop AI talent, and create a connected AI ecosystem. The lab will facilitate collaborations with scientists from various countries on projects like neural scaling law and robot models. Additionally, the government is working on initiatives to enhance AI competitiveness, including establishing an AI safety research institute and legislative efforts to support the AI industry through a proposed AI Act.

https://www.daijiworld.com/news/newsDisplay?newsID=1239240

4. Meta builds an AI search engine to cut Google and Bing's reliance:

 Meta Platforms is developing its own AI-powered search engine to reduce reliance on Google and Microsoft's Bing, intensifying competition in the AI search market. Meta's AI chatbot, accessible on WhatsApp, Instagram, and Facebook, will use a new web crawler to provide real-time, conversational answers on current events. Meta currently relies on Google and Bing for news and sports information. Meanwhile, Google is incorporating its AI model, Gemini, into search to improve user interaction, and OpenAI depends on Microsoft's Bing for web search capabilities.

https://indianexpress.com/article/technology/tech-news-technology/meta-builds-ai-search-engine-to-cut-google-bing-reliance-report-9643379/

5. Meta partners with IT ministry to set up the Centre for Generative AI at IIT Jodhpur:

 Meta, in partnership with India's Ministry of Electronics and Information Technology (MeitY), has launched a Center for Generative AI at IIT Jodhpur named Shrijan. Supported with an initial funding commitment of ₹7.5 crore over three years, this center will focus on generative AI research tailored to healthcare, education, and mobility. The collaboration, part of the larger "IndiaAI" initiative, aims to advance open-source AI

development in India, emphasizing ethical and responsible AI applications to meet the country's specific needs. Alongside Shrijan, Meta and MeitY introduced the YuvaAI program, which will provide AI training to 100,000 young people across India, targeting practical applications in sectors such as smart cities and financial inclusion. This skilling initiative will include hands-on projects, hackathons, and workshops to build a strong foundation of AI skills among India's youth, supporting the country's vision of becoming a global AI leader.

https://economictimes.indiatimes.com/tech/technology/meta-partners-with-it-ministry-to-set-up-centre-for-generative-ai-at-iit-jodhpur/articleshow/114628091.cms?from=mdr

6. Nvidia doubles down on India with Hindi language model and major partnerships:

Nvidia has announced key partnerships with major Indian firms and launched a Hindi-language AI model to expand in India, a major tech market. Significant developments include a partnership with Reliance Industries to build AI infrastructure and collaborations with Yotta and Tata Communications to enhance India's computing power, projected to increase 20-fold by year-end. Nvidia introduced the Nemotron-4-Mini-Hindi 4B language model, deployable on its hardware, with Tech Mahindra developing its Project Indus 2.0 based on it. The company is also partnering with Infosys, Wipro, and TCS to train 500,000 developers in AI applications. This expansion aligns with Nvidia's search for new growth regions amid slowing global growth. According to industry experts, this shift presents significant opportunities for Nvidia and other tech players.

https://www.cnbc.com/2024/10/24/nvidia-boosts-india-push-with-hindi-language-model-and-parnterships.html

7. Hong Kong Launches First AI Governance Framework to Guide Financial Institutions:

Hong Kong introduced its first guidelines for the responsible use of artificial intelligence (AI) in the financial sector during FinTech Week. These guidelines aim to help financial institutions leverage AI while ensuring data privacy and cybersecurity. The government emphasizes the importance of an AI governance strategy, requiring institutions to adopt a risk-based approach and maintain human oversight. Collaborations with local universities and

continuous regulatory updates will support this initiative. As AI adoption rises, with companies like HSBC exploring its potential, the guidelines reflect a commitment to innovation balanced with security and public education, positioning Hong Kong as a leader in responsible AI integration.

https://thecyberexpress.com/hong-kong-unveils-ai-guidelines/

8. Google DeepMind, BioNTech Unveil AI Lab Assistants to Revolutionize Scientific Research:

Google DeepMind and BioNTech introduced AI-powered lab assistants to transform scientific research. DeepMind's model, led by Demis Hassabis, aims to act as a research assistant, aiding interdisciplinary work and predicting experimental outcomes. BioNTech's AI, Laila, assists with routine lab tasks, allowing scientists to focus on complex issues, particularly cancer research. These initiatives signify a strategic pivot for DeepMind and BioNTech as they focus on enhancing research productivity and innovation through AI.

https://www.benzinga.com/general/biotech/24/10/41139262/google-deepmind-biontech-unveil-ai-lab-assistants-to-revolutionize-scientific-research

B) SEMICONDUCTOR:

1. Terahertz Pulses Are Revolutionizing Semiconductor Switching:

Scientists from the Helmholtz-Zentrum Dresden-Rossendorf (HZDR) have advanced the speed of semiconductor switching in 2D materials using terahertz pulses, enabling rapid shifts between excitons and trions particles involved in electronic and optical processes. This technique, achieved through intense terahertz bursts, allows much faster control of particle states within picoseconds than traditional methods. Potential applications include optical data processing and advanced sensor technologies, utilizing the quick response of atom-thin materials to create compact, efficient modulators and detectors.

https://scitechdaily.com/quantum-leap-how-terahertz-pulses-are-revolutionizing-semiconductor-switching/

2. NXP India Hosts Indo-German Roundtable to Strengthen Semiconductor & EV Collaboration:

NXP India organized an Indo-German technology roundtable focused on strengthening collaboration in the semiconductor sector, particularly in electric vehicles (EVs), AI, and 6G technologies. The event gathered industry leaders and policymakers from both nations, highlighting Germany's role as a key partner for India in these fields. German Vice-Chancellor Robert Habeck and Indian officials signed a joint declaration making Germany a partner country for ELECRAMA 2027, signaling support for India's electronics and technology growth. Discussions emphasized how Germany's automotive expertise could complement India's EV ambitions, fostering R&D, efficient manufacturing, and affordable electric mobility in India. NXP's CTO underscored the importance of global partnerships in advancing sectors like EVs. The roundtable also featured technology demonstrations, showcasing EV motorbikes, smart manufacturing, AI, and 6G advancements, with contributions from emerging Indian and Asian startups. These collaborations aim to drive innovation and scalability in EVs and other Industry 4.0 applications.

https://www.mobilityoutlook.com/news/nxp-india-hosts-indo-german-roundtable-to-strengthen-semiconductor-ev-collaboration/

C) QUANTUM & PHOTONICS:

1. Quantum computing and photonics discovery potentially shrink critical parts by 1,000 times:
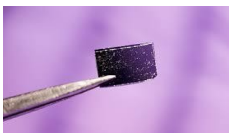
A recent breakthrough in quantum photonics by Nanyang Technological University (NTU) researchers could drastically miniaturize components in quantum computing. By using a thin crystalline material, niobium oxide dichloride, just 1.2 micrometers thick, researchers achieved photon entanglement without bulky optical equipment, allowing them to generate entangled photon pairs essential for quantum computing. This setup is around 1,000 times smaller than previous configurations, making it feasible for chip integration and potentially revolutionary for fields such as quantum information processing and secure communication. The entanglement of photons enables them to function as quantum bits (qubits) that perform calculations far more efficiently than classical bits. Unlike traditional setups that require complex, millimeter-thick crystals and optical gear, NTU's method involves a simple arrangement of thin flakes. This reduces device size and complexity,

potentially accelerating the development of compact, scalable quantum computers that can handle enormous datasets, complex simulations for climate modeling or drug discovery, and advanced secure communication applications.

https://phys.org/news/2024-10-quantum-photonics-discovery-potentially-critical.html

2. Edge Superconductivity Unlocks New Paths in Quantum Computing:
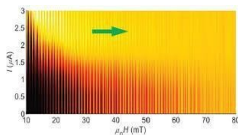
Research on molybdenum telluride ($MoTe_2$) reveals edge superconductivity, distinct from bulk properties, with promising applications in quantum computing. $MoTe_2$'s unique electron behavior at edges could enable error-resistant quantum processing by stabilizing anyons, exotic particles valuable in quantum information. By combining $MoTe_2$ with niobium, researchers observed enhanced oscillations in edge currents, demonstrating the material's potential in managing superconducting states. This finding could significantly advance stable, energy-efficient quantum technologies.

https://scitechdaily.com/edge-superconductivity-unlocks-new-paths-in-quantum-computing/

3. Toward Quantum Advantage: Qunova's HiVQE Algorithm Transforms Quantum Chemistry:

Qunova Computing has achieved a major advance in quantum chemistry with its HiVQE algorithm, reaching "chemical accuracy" on multiple NISQ quantum computers. This hardware-agnostic method achieves results up to 1,000 times faster than traditional methods, offering a realistic path to quantum advantage with 40-60 qubits. Qunova demonstrated success on various quantum devices, solving complex chemical problems with high efficiency. This progress hints at significant quantum applications for industries like chemistry and pharmaceuticals.

https://scitechdaily.com/toward-quantum-advantage-qunovas-hivqe-algorithm-transforms-quantum-chemistry/

4. Harnessing Light: Quantum Materials Supercharge Data Transmission:
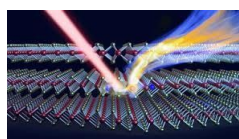
This breakthrough in semiconductor technology uses a tungsten di-selenide (WSe_2) device capable of unprecedented manipulation of light to enhance data processing efficiency. Traditionally,

telecommunications require data signals to be converted from light to electrical signals for processing, which consumes energy and causes delays. The new WSe_2-based device processes data directly through light within optical fibers, bypassing this need and thus promising faster, more energy-efficient data transmission. The technology harnesses excitons, bound pairs of electrons, and holes created when light excites electrons within the semiconductor. These excitons interact with unpaired charges, inducing a strong nonlinear optical response that changes the light's properties, like shape and frequency, for effective data handling. Researchers have demonstrated that this nonlinear response is exceptionally strong in a two-dimensional, three-atomic-layer WSe_2 structure. By applying a voltage, they can tune this response to efficiently process signals using minimal photons, making the device ideal for telecommunications and even secure quantum communication. This groundbreaking work, facilitated by the Quantum Material Press (QPress) at Brookhaven National Laboratory, showcases the potential of two-dimensional materials in revolutionizing data transmission and reducing energy needs across telecommunications networks.

https://scitechdaily.com/harnessing-light-quantum-materials-supercharge-data-transmission/
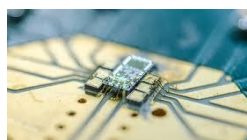
5. Scientists build the smallest quantum computer in the world:

Taiwan's Tsing Hua University scientists have developed the world's smallest quantum computer, compact enough to fit on a desk and operate at room temperature. This machine utilizes a single photon as a qubit within an optical fiber, bypassing the extreme cooling required by other quantum systems. It achieves 32 computational dimensions and is efficient for operations like prime factorization. The device could be adapted for future quantum communication networks, utilizing light-based data transmission.

https://www.livescience.com/technology/computing/scientists-build-the-smallest-quantum-computer-in-the-world-it-works-at-room-temperature-and-you-can-fit-it-on-your-desk

6. U.S. Department of Energy Launches $30 Million Program for Quantum-Powered Chemistry and Materials Science Simulations:

The U.S. Department of Energy has launched a $30 million initiative, the Quantum Computing for Computational Chemistry (QC[3])

program, to advance quantum computing applications in chemistry and materials science. This program seeks breakthroughs in industrial catalysts and battery chemistry, aiming to improve energy efficiency and reduce emissions. Project teams will focus on optimizing quantum algorithms to outperform classical methods, achieving significant performance gains in scalable quantum solutions.

https://quantumcomputingreport.com/u-s-department-of-energy-launches-30-million-program-for-quantum-powered-chemistry-and-materials-science-simulations/

D) SPACE & EARTH:

1. A Hong Kong University Launched the World's First Large-Scale AI Model Earth Observation Satellite:

The Chinese University of Hong Kong (CUHK) launched Hong Kong's first university-developed satellite, the "Hong Kong Youth Scientific Innovation" satellite, in partnership with ADA Space. This Earth observation satellite will collect environmental data to aid disaster response and smart city development across Hong Kong and the Greater Bay Area. It marks a significant milestone in CUHK's aerospace research and the region's technological progress, supported by the Hong Kong government and China's space authorities. This initiative also aims to inspire young researchers and expand interdisciplinary aerospace education.

https://www.focus.cuhk.edu.hk/en/20241009/debut-satellite-begins-new-chapter-of-hong-kong-aerospace/050-science-engineering-technology-en/

2. ISRO wins 'World Space Award 2024' for Chandrayaan-3:

ISRO Chief Dr. S. Somanath received the prestigious 2024 World Space Award from the International Astronautical Federation (IAF) for the successful Chandrayaan-3 mission, a milestone achievement in India's space exploration. Presented during the 75th International Astronautical Congress in Milan, this award honors the Chandrayaan-3 mission for becoming the first to land near the lunar South Pole on August 23, 2023. This mission underscores India's technological prowess and innovation, marking the country as one of the few nations to achieve a soft lunar landing alongside the United States, Russia, and China. The award recognizes ISRO's contribution to advancing lunar exploration and celebrates India's cost-effective and ambitious approach to space science.

Chandrayaan-3's achievements, including its exploration of the Moon's composition and geology via the Vikram lander and Pragyan rover, received acclaim as a "global testament to innovation," emphasizing the mission's potential for future discoveries.

https://economictimes.indiatimes.com/tech/technology/isro-chief-somanath-wins-world-space-award-2024-for-chandrayaan-3/articleshow/114222476.cms?from=mdr

3. SpaceX successfully catches Flight 5 Starship Super Heavy rocket booster on landing:

SpaceX achieved a significant milestone by successfully catching its Flight 5 Super Heavy booster with the Mechazilla "Chopsticks" tower, marking the first-ever attempt to catch a 250-ton rocket booster mid-air. This precise capture, conducted after re-igniting the booster's engines, prevented the booster from relying on grid fins, enhancing its reusability. The achievement signals major progress in SpaceX's reusable rocket technology, with the next Starship test anticipated following regulatory approval.

https://www.teslaoracle.com/2024/10/13/spacex-succesfully-catches-flight-5-super-heavy-rocket-booster-on-landing-video/

E) CLEAN TECHNOLOGIES:

1. A new and unique fusion reactor comes together due to global research collaboration:

Princeton Plasma Physics Laboratory (PPPL) and the University of Seville are collaborating to build the SMART fusion reactor, aiming to make fusion energy viable. SMART, the first spherical tokamak with "negative triangularity," is designed to better confine plasma and handle high heat levels, improving stability and efficiency. PPPL provides simulation, diagnostics, and engineering expertise to support SMART's design, including plasma-shaping systems and diagnostics that monitor plasma temperature and composition, which are essential for long-term use in fusion research.

https://phys.org/news/2024-09-unique-fusion-reactor-due-global.html

2. Scientists Have Synthesized a Diamond-Like Nitrogen Structure That Could Redefine Energy Storage:

A research team at the Hefei Institutes of Physical Science, part of the Chinese Academy of Sciences, has synthesized cubic gauche nitrogen (cg-N) at atmospheric pressure, showing its stability up to 760 K. This new approach, using plasma-enhanced chemical vapor deposition (PECVD) with potassium azide (KN3) as a precursor, is significant for advancing high-energy-density materials. CG-N, a nitrogen-based material with N-N single bonds resembling a diamond's structure, decomposes into nitrogen gas. It is promising for high-energy applications due to its energy density and stability. This method bypasses previous limitations, avoiding the need for carbon nanotube containment, and was informed by first-principles simulations of cg-N stability under different conditions. The successful synthesis and characterization at atmospheric pressure mark a key step in developing practical methods for producing cg-N and similar high-energy materials.

https://scitechdaily.com/scientists-have-synthesized-a-diamond-like-nitrogen-structure-that-could-redefine-energy-storage/

3. Japan has just "hacked" hydrogen: They have been producing it non-stop for 3,000 hours with this material:

Japan has continuously produced hydrogen for over 3,000 hours using a novel method that reduces the reliance on iridium by 95%. Researchers at the Riken Center utilized a manganese oxide catalyst, allowing for efficient electrolysis without significant degradation. This breakthrough could enhance the viability of green hydrogen production as part of global decarbonization efforts. The team aims to scale this technology for real-world applications, with optimism for its potential impact by 2030.

https://www.ecoticias.com/en/japan-hacked-hydrogen-3000-hours/7296/

4. L&T locks key contract for the world's largest nuclear fusion project in France:

Larsen & Toubro (L&T) has secured a significant contract for the ITER project, France's world's largest nuclear fusion initiative. Although the contract's exact value is undisclosed, it falls within the range of ₹1,000 to ₹2,500 crore. L&T will focus on deploying advanced welding technologies and collaborating on the assembly of complex components for the vacuum vessel of the ITER Tokamak. This project involves a global partnership among 35 countries, aiming to develop sustainable fusion energy

https://www.business-standard.com/companies/news/l-t-locks-key-contract-for-world-s-largest-nuclear-fusion-project-in-france-124102500777_1.html

F) TELECOMMUNICATIONS:

1. Advanced RAG Techniques for Telco O-RAN Specifications Using NVIDIA NIM Microservices:
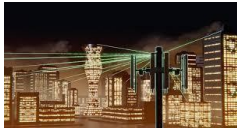
 NVIDIA discussed the advanced techniques for implementing retrieval-augmented generation (RAG) in telecommunications, specifically for Open Radio Access Network (O-RAN) specifications. It outlines how NVIDIA's NIM microservices and generative AI can streamline the processing of complex technical documents, enhancing chatbot interactions. The challenges with basic RAG methods introduce improvements through advanced retrieval strategies like Advanced RAG and HyDE RAG, demonstrating significant enhancements in response accuracy and relevance.

https://developer.nvidia.com/blog/advanced-rag-techniques-for-telco-o-ran-specifications-using-nvidia-nim-microservices/

2. IMC 2024 Focus on Digital Innovation and Global Collaboration:

 The India Mobile Congress (IMC) 2024, held at Bharat Mandapam in New Delhi, from 15-18 October 2024. Inaugurated by Prime Minister Narendra Modi on October 15, the event attracted over 3,000 industry leaders, policymakers, and tech experts from more than 190 countries. This year's focused on India's innovation ecosystem, showcasing advancements in various fields such as quantum technology, 6G, cloud computing, the Internet of Things, semiconductors, cybersecurity, green technology, SATCOM, and electronics manufacturing. IMC 2024 featured over 400 exhibitors, approximately 900 startups, and participation from over 120 countries, highlighting over 900 technology use cases. The final day emphasized collaboration among stakeholders to accelerate digital transformation and innovation. Dignitaries engaged in discussions on artificial intelligence governance, exploring strategies for future AI regulation and policy. The IMC has established itself as a significant global platform for showcasing innovative solutions and services.

https://www.newsonair.gov.in/imc-2024-concludes-with-focus-on-digital-innovation-and-global-collaboration/

3. ITU-WTSA 2024' establishes India as a key player in the telecommunications industry:

 The ITU-WTSA 2024 event held on October 14-24, 2024, in New Delhi positioned India as a key player in global telecommunications. The event highlighted India's contributions, including groundbreaking resolutions on Digital Public Infrastructure and AI standardization. The event saw record attendance, with 3,700 delegates from over 160 countries and India's leadership, with increased representation in ITU-T study groups and notable gender equity initiatives. The focus on collaboration aims to bridge the digital divide and promote equity. The event also emphasized the importance of aligning with security, dignity, and innovation principles for a shared digital future.

https://www.sarkaritel.com/itu-wtsa-2024-concludes-india-leads-the-charge-for-shaping-the-future-of-telecommunications-ict/

G) DEFENCE:

1. France Offers Advanced Materials and Metallurgy Collaboration for AMCA Jet's 110kN Engine Development with India:

 France has recently offered India a significant opportunity for collaboration in developing advanced materials and metallurgy as part of the engine development for India's Advanced Medium Combat Aircraft (AMCA). The collaboration focuses on co-developing a 110kN thrust engine with Safran, a prominent French aerospace company, leading alongside India's Defence Research and Development Organisation (DRDO). The partnership aims to enhance India's indigenous defense capabilities, particularly in producing high-performance jet engines for advanced aircraft. The agreement emphasizes joint intellectual property rights, allowing India to retain ownership of the engine technology, which can be exported without restrictions, strengthening India's global aerospace market position. This collaboration is part of a broader strategy to foster defense industrial cooperation between the two countries, with additional ventures in areas such as heavy-lift helicopters under the Indian Multi-Role Helicopter (IMRH) program.

https://defence.in/threads/france-offers-advanced-materials-and-metallurgy-collaboration-for-amca-jets-110kn-engine-development-with-india.10541/

H) BIOTECHNOLOGY and HEALTH:

1. CRISPR-Cas13 emerges as a game changer in RNA-targeted therapies:

The article mentions the promising role of CRISPR-Cas13 in RNA-targeted therapies, highlighting its ability to precisely edit RNA, which could lead to new treatments for various diseases, including neurological and ocular conditions. Unlike traditional gene-editing tools, Cas13 focuses on RNA rather than DNA, potentially minimizing off-target effects and enabling more flexible therapeutic strategies. The technology is expected to revolutionize the development of personalized medicine by allowing for targeted interventions based on specific RNA profiles.

https://www.news-medical.net/news/20240925/CRISPR-Cas13-emerges-as-a-game-changer-in-RNA-targeted-therapies.aspx

2. Tiny New Invention Diagnoses Heart Attacks in Minutes, Could Save Lives on the Spot:

A new blood test developed at Johns Hopkins University can diagnose heart attacks in 5 to 7 minutes, significantly improving current methods that take hours. Utilizing biophotonics, the test identifies biomarkers associated with heart attacks on a nanostructured chip. This rapid and accurate diagnosis could be used by first responders or at home, enhancing patient outcomes by facilitating immediate medical intervention. The technology also holds potential for detecting other diseases, such as cancer and infections.

https://scitechdaily.com/tiny-new-invention-diagnoses-heart-attacks-in-minutes-could-save-lives-on-the-spot/

3. DBT And ISRO Sign Framework MoU to Propel Space Biotechnology in India:

The Department of Biotechnology (DBT) and ISRO have signed a Memorandum of Understanding (MoU) to advance space biotechnology in India. This collaboration aims to enhance research in biomanufacturing and bioastronautics, supporting initiatives like the Gaganyaan human space mission. The BioE3 Policy aims to boost India's bioeconomy to $300 billion by 2030, while a Biotechnology Experiment and Technology Demonstration Rack will facilitate microgravity research at the

upcoming Bharatiya Antariksh Station. This partnership is expected to foster innovation and opportunities for startups in the biotech sector.

https://www.etvbharat.com/en/!technology/dbt-and-isro-sign-framework-mou-to-propel-space-biotechnology-in-india-enn24102506886

4. Inauguration of BRIC-NABI: A New Era for Indian Agri-Tech:

The inauguration of the BRIC-NABI (Biotechnology Research and Innovation Centre - National Agri-Business Incubator) in India represents a pivotal step forward in the agricultural technology landscape. This initiative aims to enhance innovation and support startups by bridging the gap between research and commercial application in agri-tech. With a strong focus on sustainable practices, the BRIC-NABI seeks to leverage advanced technologies like AI and IoT to improve productivity and address challenges such as climate change and food security. The project underscores the Indian government's commitment to transforming agriculture through technology and fostering collaboration among various stakeholders in the sector.

https://opengovasia.com/2024/10/30/inauguration-of-bric-nabi-a-new-era-for-indian-agri-tech/

I) OTHERS:

1. Biden-Harris Administration to Invest up to $100 Million to Accelerate R&D and AI Technologies for Sustainable Semiconductor Materials:

The Biden-Harris Administration plans to invest up to $100 million to accelerate research and development in sustainable semiconductor materials using artificial intelligence. This initiative, part of the CHIPS for America program, aims to foster university-led collaborations that enhance semiconductor manufacturing while addressing environmental challenges. The funding will promote faster development of new materials and processes, emphasizing sustainability and safety in the industry.

https://www.commerce.gov/news/press-releases/2024/10/biden-harris-administration-invest-100-million-accelerate-rd-and-ai

2. Carnegie India's 2-day Global Technology Summit Innovation Dialogue:
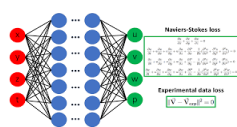

In Bengaluru, Carnegie India co-hosted the inaugural Global Technology Summit (GTS) Innovation Dialogue with the Ministry of

External Affairs, Government of India, on October 8 & 9, 2024. This dialogue marked a significant expansion of engagement with thriving technology ecosystems by bringing together tech-focused discussions on Digital Public Infrastructure (DPI) and Artificial Intelligence (AI). The discussions focused on how these technologies can support sustainable development, improve governance, foster inclusive growth, and create international partnerships. Government representatives, industry professionals (product, policy, and engineering teams), the startup community, venture capitalists, legal scholars, academics, and others were all present at the GTS Innovation Dialogue. There were both public and closed-door sessions during the two-day event. Key topics, including global adoption of DPIs, private sector innovation on top of DPIs, and approaches to AI safety, growth, acceleration of innovation through DPI, and the changing landscape of open-source AI and AI regulation, were all covered in detail and cooperatively through the discussions.

https://www.aninews.in/news/world/asia/carnegie-indias-2-day-global-technology-summit-innovation-dialogue-concludes20241010022047/

J) Noble Prizes 2024:

1. Physics - Trained artificial neural networks using physics:

The 2024 Nobel Prize in Physics was awarded to John Hopfield and Geoffrey Hinton for their foundational contributions to machine learning through artificial neural networks. Hopfield developed an associative memory model that reconstructs patterns from incomplete data, while Hinton advanced this concept with the Boltzmann machine, enabling the recognition of patterns in data. Their work utilizes principles from physics and has significantly impacted various fields, including material science.

https://www.nobelprize.org/uploads/2024/10/press-physicsprize2024.pdf

2. Physiology or Medicine - The discovery of microRNA and its role in post-transcriptional gene regulation:
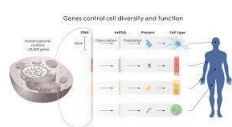
The 2024 Nobel Prize in Physiology or Medicine was awarded to Victor Ambros and Gary Ruvkun for discovering microRNA and its role in post-transcriptional gene regulation. Their research revealed how gene expression is precisely regulated, enabling the development of diverse cell types despite identical genetic information. Their findings highlighted the significance of microRNAs in cellular processes and their implications for diseases

like cancer and diabetes. The award honors a fundamental advancement in understanding gene regulation essential for multicellular life.

https://www.nobelprize.org/uploads/2024/10/press-medicineprize2024-2.pdf

3. Chemistry - Computational Protein Design and Protein Structure Prediction:
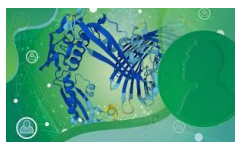
The 2024 Nobel Prize in Chemistry has been awarded to David Baker for his work designing new proteins and jointly to Demis Hassabis and John Jumper for developing AlphaFold2. This AI model predicts protein structures. Their contributions are significant for understanding protein functions and have broad applications, including pharmaceuticals and environmental science.

https://www.nobelprize.org/uploads/2024/10/press-chemistryprize2024-2.pdf

K) NEST Division's Engagement:

1. The "Cross border Data Transfers - Workshop on Global CBPR Framework:

NASSCOM organized an event on CBPR with the MEA's NEST Division, MeitY, and DSCI and held a technical workshop on September 21, 2024. The Joint Secretary, Shri Mahaveer Singhvi of the NEST Division, Ministry of External Affairs, delivered a special address on "Geopolitics, Trade, and Sovereignty in the Digital Age," which explored how digital developments impact global geopolitics and trade. He emphasized that digital technologies and data have become central to national security. Trade now depends on data flows, but localization efforts pose challenges to open trade as countries prioritize data sovereignty. This digital sovereignty is reinforced by privacy laws like the EU's GDPR and India's DPDP Act, underscoring digital space's strategic role in international relations.

2. The Global Digital Public Infrastructure (DPI) Summit:

At the 2024 Global DPI Summit in Cairo, held from October 1–3, 2024, the Joint Secretary, Shri Mahaveer Singhvi of the NEST Division, Ministry of External Affairs, participated in a panel discussing AI's transformative role in Digital Public Infrastructure (DPI). He highlighted AI's potential to improve citizen services in healthcare, education, public safety, and governance by enabling better data analysis for welfare distribution, resource allocation, and anticipating service needs. Panelists addressed AI's security

challenges, stressing the need for encryption, data anonymization, and multi-factor authentication to build public trust. To promote equitable development, panelists also emphasized that AI must be accessible to all nations, especially in the Global South. They underscored the importance of international collaboration, transparent governance, and responsible AI to create a secure and inclusive digital future.

3. The Eighth Edition of India Mobile Congress (IMC) 2024:

At IMC 2024, held from October 15-18, 2024, at Bharat Mandapam in New Delhi, the Joint Secretary, Shri Mahaveer Singhvi of the NEST Division, Ministry of External Affairs, delivered a keynote titled "From Telco to Techno: Adoption of AI and Automation in Telecom." He presented a forward-looking vision for companies evolving from traditional telecom providers into technology-driven enterprises. He emphasized using AI-driven insights to expand infrastructure in underserved areas, close the digital divide, and create affordable data plans for low-income users. As networks become increasingly automated and complex, he prioritized data privacy, security, and cybersecurity. The address also highlighted the importance of workforce upskilling for an automated future and digital inclusion through literacy initiatives. This comprehensive strategy positions telecom companies as innovators and drivers of societal progress, fostering connectivity and opportunity, especially for underserved communities.

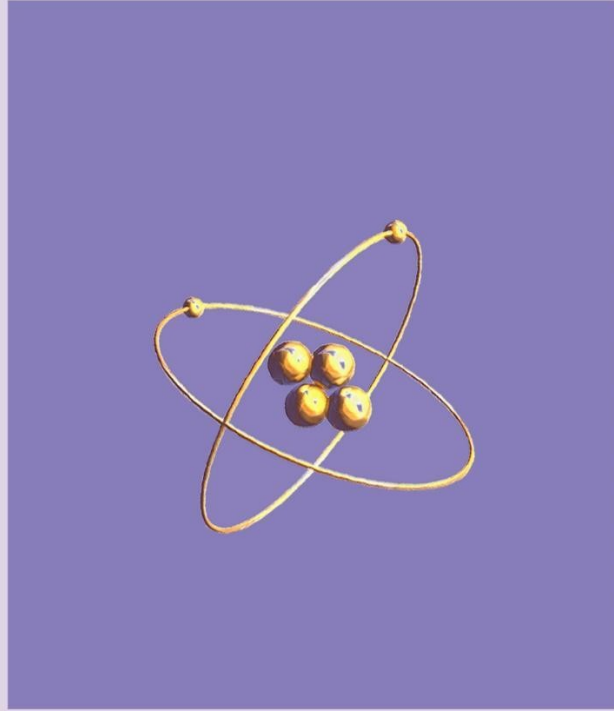## 4. AI for Good Impact India – ITU:

The Joint Secretary, Shri Mahaveer Singhvi of the NEST Division, Ministry of External Affairs participated in a panel during AI for Good Impact India, part of the International Telecommunication Union's WTSA regional series, which took place from October 15-24, 2024, at Bharat Mandapam in New Delhi. The panel focused on the crucial policies and governance frameworks necessary for guiding AI technologies to benefit humanity and promote inclusivity. In his remarks, he emphasized that despite progress in global AI governance, there is an urgent need to tackle the unique challenges faced by the Global South. Developing countries continue to be underrepresented in AI governance forums, which limits their ability to influence international AI standards, even as they engage in dialogues like the G20 and GPAI. Furthermore, the Global South grapples with significant technical expertise, infrastructure, and AI education

gaps, leaving these regions less equipped for AI-driven progress. Initiatives like India's "AI for All" are promising, but bridging the North-South readiness gap requires greater global support to build infrastructure and address social biases, or the Global South risks being left behind in the AI revolution.

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NEW, EMERGING & STRATEGIC TECHNOLOGIES (NEST) DIVISION

MINISTRY OF EXTERNAL AFFAIRS
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