

## **NEST Newsletter (January 2022)**

### **Indian Efforts in Combating Covid-19**

#### **Updates from Vigyan Prasar e-Newsletter – January 2022**

##### **IIT**

> Researchers from the Indian Institute of Technology (IIT) Kanpur have made N95 and N99 masks with enhanced antiviral/antibacterial property. These N95 face masks are based on nanofibres made from polymers (Polyacrylonitrile PAN), Nylon 6 (PA6), and Polyethylene Terephthalate (PET) and Polyvinyl Fluoride (PVF) possessing antiviral/bacterial agents.

> Researchers from Chemical Engineering Department, IIT-Guwahati have developed 3D printed bio-degradable polymer-based face masks and nano-fabric respirators have been made via electrospinning technique.

##### **DST**

> A team of scientists from Centre for Nano and Soft Matter Sciences, Bangalore, (under Department of Science and Technology (DST)), came up with unique face masks called Tribo E Mask which holds electric charges and is expected to restrict the entry of infections but without any external power.

> International Advanced Research Centre for Powder Metallurgy and New Materials (ARCI), in collaboration with the Centre for Cellular & Molecular Biology (CSIRCCMB) and M/s. Resil Chemicals Pvt. Ltd., Bengaluru developed a Nanoparticle Copper-coated Antiviral Face Mask (COP-Mask), that is self-disinfecting, under the Department of Science and Technology's nano-mission project to fight against the COVID-19 pandemic.

##### **CSIR**

> The Indian Council of Medical Research (ICMR) has approved a kit that will be used to detect Omicron. The kit is manufactured by Tata Medical and Diagnostics and is named OmiSure.

**For more information, please follow the URL below to access Vigyan Prasar's e-Newsletter for January 2022:**

<https://vigyanprasar.gov.in/wp-content/uploads/vp-Covid-Newsletter-Jan2022.pdf>

##### **Developments Abroad**

Sorrento Therapeutics STI-9167 nAb is a potentially "Best-in-Class" nAb against the Omicron variant of SARS-CoV-2 and the first reported nAb with high potency against Omicron (+R346K

mutation) and has demonstrated highly potent neutralization activities in for all of its variants of concern (VOCs).

[https://finance.yahoo.com/news/sorrento-therapeutics-announces-covishield-sti-120000476.html?guccounter=1&guce\\_referrer=aHR0cHM6Ly9lbWVpbC5nb3YuaW4v&guce\\_referrer\\_sig=AQAAAHGAG3CoYGyAgtxFzGSmmja04PvDJvEYr\\_rprCGoQ1BnEWZKzypn3a1KWshW8ja66zfRETml730XLqIMfkHctllfFH0UGybKX-zW7tBuHdofpKLknkUGpCiswPikE6buCqC-mjYJCqiHYEEu-TE4OzEUUyg9V3rxG\\_xD8FKZQZ0](https://finance.yahoo.com/news/sorrento-therapeutics-announces-covishield-sti-120000476.html?guccounter=1&guce_referrer=aHR0cHM6Ly9lbWVpbC5nb3YuaW4v&guce_referrer_sig=AQAAAHGAG3CoYGyAgtxFzGSmmja04PvDJvEYr_rprCGoQ1BnEWZKzypn3a1KWshW8ja66zfRETml730XLqIMfkHctllfFH0UGybKX-zW7tBuHdofpKLknkUGpCiswPikE6buCqC-mjYJCqiHYEEu-TE4OzEUUyg9V3rxG_xD8FKZQZ0)

## **GENERAL UPDATES**

### **MeitY**

Ministry of Electronics and Information Technology (MeitY) has sought applications from 100 R&D organizations, startups and MSMEs under its Chips to Startup (C2S) Programme, that aims to train 85,000 engineers in Very large-scale integration (VLSI), Embedded System Design, 175 ASICs (Application Specific Integrated Circuits), Working Prototypes of 20 System on Chips (SoC) and IP Core repository over a period of 5 years.

<https://www.pib.gov.in/PressReleaseDetailm.aspx?PRID=1790350>

MeitY in association with India Cellular & Electronics Association (ICEA), released a 5-year roadmap and Vision Document for the electronics sector today, titled “\$300 bn Sustainable Electronics Manufacturing & Exports by 2026.” This roadmap is the second volume of a two-part Vision Document – the first of which titled “Increasing India's Electronics Exports and Share in GVCs” was released in November 2021.

<https://www.pib.gov.in/PressReleaseDetailm.aspx?PRID=1792189>

Industry experts, researchers, start-ups and enterprises are set to come together to identify challenges, opportunities, and develop market-ready tech-based solutions in Environment, Social, and Corporate Governance (ESG) practices at 2<sup>nd</sup> edition of the Enterprise Innovation Challenge (EIC) organized by NASSCOM Centre of Excellence (CoE) for IoT & AI, in collaboration with MeitY.

<https://www.eetindia.co.in/nasscom-coe-and-meity-launch-2nd-eic-for-developing-esg-use-cases/>

### **DoT**

Telecommunication Engineering Centre (TEC), under Department of Telecommunications, Ministry of Communications, releases ‘Code of Practice for securing consumer Internet of Things (IoT)’. These guidelines to help in securing consumer IoT devices & ecosystem as well as managing vulnerabilities.

<https://www.pib.gov.in/PressReleaseDetailm.aspx?PRID=1787727>

Union Budget 2022-23 has proposed to launch a scheme for design-led manufacturing to build a strong ecosystem for 5G as part of the Production Linked Incentive (PLI) Scheme. The required spectrum auctions will be conducted in 2022 to facilitate rollout of 5G mobile services within 2022-23 by private telecom providers.

<https://www.pib.gov.in/PressReleaseDetailm.aspx?PRID=1794158>

## **IIT**

Department of Electrical Engineering, IIT (BHU) developed a new technology for on-board charger for EV, which costs about half of the current on-board charger technology. Using this will reduce the cost of EVs in country.

[https://twitter.com/IITBHU\\_Varanasi/status/1485490218136662018?cxt=HHwWhMDTIfTewp0pAAAA](https://twitter.com/IITBHU_Varanasi/status/1485490218136662018?cxt=HHwWhMDTIfTewp0pAAAA)

Defense and aerospace electronics major Data Patterns (India) Ltd has become a member of the consortium of space sector companies incubated by IIT Madras.

[https://twitter.com/ians\\_india/status/1488038992692256768](https://twitter.com/ians_india/status/1488038992692256768)

Researchers from IIT Jodhpur have developed a new Artificial Intelligence (AI) solution that can learn abnormalities present in the chest X-ray images to differentiate between a Covid-19 affected lung and a non-Covid affected lung.

<https://twitter.com/iitjodhpur/status/1487253027400519681>

Researchers at IIT Kharagpur have developed a new highly accurate, portable, yet user-friendly, affordable and non-invasive device for detecting oral cancer in resource-constrained clinical settings.

<https://www.telegraphindia.com/edugraph/news/iit-kharagpur-makes-a-breakthrough-in-screening-oral-cancer/cid/1848828>

Researchers from IIT Delhi have developed a technology for chemotherapy applications using the red blood cell membrane, which will help in personalised therapy and also reduce side-effects.

<https://twitter.com/iitdelhi/status/1483294961936175107>

Researchers at IIT Guwahati have manufactured 3D printed urban furniture using local industrial waste to make construction materials. They have also developed cementitious mix compositions, amenable for 3D printing. This innovation is said to be able to cut down concrete use by 75%.

<https://twitter.com/IndiaDST/status/1485847120452386817>

Larsen & Toubro Infotech (LTI) has tied up with IIT Madras, for joint research on 5G technology. They will work towards developing a low-cost and low-frequency 5G network setup for better connectivity in rural areas.

[https://www.techcircle.in/2022/01/27/l-t-infotech-iit-madras-partner-for-5g-research?utm\\_source=twitter&utm\\_medium=Social+Media&utm\\_campaign=L%26T+Infotech,+IIT+Madras+partner+for+5G+research](https://www.techcircle.in/2022/01/27/l-t-infotech-iit-madras-partner-for-5g-research?utm_source=twitter&utm_medium=Social+Media&utm_campaign=L%26T+Infotech,+IIT+Madras+partner+for+5G+research)

IIT Kanpur has approved the first-of-its-kind department in India to bring together engineers, astronomers & planetary scientists to meet the growing requirement of education and research in some vital areas of space research.

<https://twitter.com/karandi65/status/1482680470995628033>

Researchers at the IIT Roorkee, have identified the role of white blood cell markers in sepsis-related complications which will help in detecting stages of sepsis and deciding appropriate treatment.

<https://twitter.com/iitroorkee/status/1482223482893402114>

A Mega Drone Show displaying 1000 drones at the Republic Day Beating Retreat ceremony was executed by IIT Delhi based startup Botlab Dynamics.

<https://twitter.com/mygovindia/status/1487431787768795136>

## **DRDO**

BrahMos supersonic cruise missile, with increased indigenous content and improved performance, was successfully test-fired by Defense Research and Development Organization (DRDO) from Integrated Test Range, Chandipur off the coast of Odisha.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1791199>

DRDO successfully flight-tested the final deliverable configuration of Man-Portable Anti-Tank Guided Missile (MPATGM).

<https://twitter.com/prodefkohima/status/1481232912636731398>

DRDO has successfully test-fired an advanced sea-to-sea variant of the BrahMos supersonic cruise missile. The missile, launched from the Indian Navy's recently commissioned stealth guided missile destroyer INS Visakhapatnam.

[https://twitter.com/MIB\\_India/status/1484487343033634818](https://twitter.com/MIB_India/status/1484487343033634818)

## **CSIR**

> Bharat Petroleum Corporation Limited (BPCL) signs Memorandum of Agreement with CSIR - Indian Institute of Chemical Technology, Hyderabad to develop innovative Bio-reactor design to produce Compressed Bio-Gas from agricultural waste residues, such as wheat straw, rice straw, sugarcane bagasse, etc.

> ICPURE (India) in technical collaboration with the Council of Scientific and Industrial Research's Indian Institute of Chemical Technology (CSIR-IICT) has created India's first immunity booster alkaline water ionizer.

<https://www.csir.res.in/sites/default/files/01%20To%2005%20January%20%202022.pdf>

> A polymer named long fiber thermoplastic that is widely used in the packaging industry, and is presently imported, will soon be made indigenously using a novel technique developed by scientists of CSIR-National Chemical Laboratory (NCL).

<https://www.csir.res.in/sites/default/files/11%20To%2015%20January%20%202022.pdf>

> CSIR-Centre for Cellular & Molecular Biology (CCMB) scientists in collaboration with CSIR-NCL announced that they have made progress towards developing a non-toxic bio-drug derived from turmeric through a 'gene silencing approach' to treat cancer.

> Rail India Technical and Economic Service (RITES) entered into a Memorandum of Understanding (MoU) with CSIR-Central Road Research Institute (CRRI) to explore opportunities for cooperation in the infrastructure sector.

> A team of researchers at the CSIR-National Institute for Interdisciplinary Science and Technology (NIIST) has developed a process to address the issue of perchlorate contamination of water sources in the country.

Union Minister of State (Independent Charge) Science & Technology Dr Jitendra Singh said that CSIR- CSIO's (Central Scientific Instruments Organization) newly developed Disinfection technology is being installed to combat pandemic in railway coaches, AC buses, closed spaces etc.

<https://www.csir.res.in/sites/default/files/16%20To%2020%20January%20%202022.pdf>

> France's Institut Pasteur and CSIR signed a MoU at a hybrid signing ceremony on 25th January 2022 aimed at making both our countries prepare for health challenges. The MoU includes collaboration in important areas including Genomics of Inherited Diseases, Personalized Medicine, Infectious Diseases, Antimicrobial Resistance, and Development of New Models for Drug Screening.

> The CSIR – Central Drug Research Institute's (CDRI) scientists have developed an indigenous RT-PCR kit called 'Om' for testing the omicron variant.

<https://www.csir.res.in/sites/default/files/21%20To%2025%20January%20%202022.pdf>

> CSIR-CDRI and Aveta Biomics, USA, joined their hands and announced the exclusive licensing to Aveta Biomics of CDRI's patented technology of Caviunin-based drug compositions for further clinical development and commercialization.

<https://www.csir.res.in/sites/default/files/26%20To%2031%20January%20%202022.pdf>

### **Ministry of New and Renewable Energy**

India's Ministry of New and Renewable Energy (MNRE) has signed a Strategic Partnership Agreement with International Renewable Energy Agency (IRENA) in a virtual ceremony. The Agreement will usher a new era of cooperation between India and IRENA in the field of renewable energy, including green hydrogen.

<https://twitter.com/IndembAbuDhabi/status/1482772234070601736>

The Cabinet Committee on Economic Affairs, chaired by the Prime Minister Shri Narendra Modi, approved the equity infusion of INR 1500 crore in Indian Renewable Energy Development Agency Limited (IREDA). This equity infusion will help in employment generation of approximately 10200 jobs-year and CO2 equivalent emission reduction of approximately 7.49 Million Tonnes CO2/year.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1790943>

### **MoEF&CC**

The Union Ministry of Environment, Forest and Climate Change (MoEF&CC) has released the final list of the coal thermal power plants and their categorization in line with the ministry's April 2021 notification.

[Source: Arun Duggal Centre of Excellence for Research in Climate Change and Air Pollution  
Indian Institute of Technology Delhi Newsletter for January  
2022 [https://cerca.iitd.ac.in/uploads/Letter/1641287148CERCA%20IITD%20Newsletter%20\\_%20January%202022.pdf](https://cerca.iitd.ac.in/uploads/Letter/1641287148CERCA%20IITD%20Newsletter%20_%20January%202022.pdf)]

## **Department of Space**

Scientists from two premier laboratories of Department of Space (DOS), viz. Space Applications Centre (SAC) and Physical Research Laboratory (PRL), have jointly demonstrated quantum entanglement based real time Quantum Key Distribution (QKD) over 300m atmospheric channel along with quantum-secure text, image transmission and quantum-assisted two-way video calling.

<https://www.isro.gov.in/update/31-jan-2022/department-of-space-demonstrates-entanglement-based-quantum-communication-over>

High Thrust VIKAS Engine for Gaganyaan programme has successfully undergone qualification test for a duration of 25 seconds at ISRO Propulsion Complex (IPRC), Mahendragiri, Tamil Nadu. Further, three more tests are planned for a cumulative duration of 75 seconds under varying operating conditions and another high thrust Vikas engine will undergo a long-duration test for 240 seconds to complete the Vikas engine qualification for Gaganyaan Programme.

<https://www.isro.gov.in/update/20-jan-2022/qualification-testing-of-vikas-engine-gaganyaan-programme>

## **Ministry of Road Transportation and Highways**

Ministry of Road Transport & Highways (MoRTH), IIT Madras and MapmyIndia have signed a MoU for collaboration on driver and road safety technologies, and jointly launched India's best and free-to-use navigation app service.

<https://www.constructionweekonline.in/business/mapmyindia-morth-iit-madras-sign-mou-to-make-road-travel-safer>

## **IISc**

Associate Professor at the Indian Institute of Sciences (IISc), Bengaluru, has developed several voice technology using Artificial Intelligence (AI), Machine Learning (ML), and Augmented Reality (AR).

<https://yourstory.com/2022/01/techie-tuesday-iisc-prasanta-kumar-ghosh-speech-recognition-ai-ml/amp>

## **UPDATES FROM STATES**

### **Karnataka**

The State government has given administrative approval designing and launching of nano-satellite by government school students at an estimated cost of INR 1.9 crore.

<https://www.thehansindia.com/karnataka/karnataka-state-approves-design-launch-of-nano-satellite-by-govt-school-students-725687>

The Govt of Karnataka's Department of Electronics, IT & BT has launched the AVGC Center of Excellence (Animation, Visual Effects, Gaming, and Comics CoE), considered as a pioneering high technology digital media hub.

<https://timesofindia.indiatimes.com/home/education/news/karnataka-govt-launches-avgc-center-of-excellence-in-bengaluru/articleshow/89019506.cms>

### **Andhra Pradesh**

National Institute of Technology Andhra Pradesh has signed a MoU with LinkedIn that will facilitate collaborative research and development in the niche area of intelligent cloud computing and in fostering research to address industry relevant problems by the academia.

<https://indiaeducationdiary.in/national-institute-of-technology-andhra-pradesh-inks-an-mou-with-linkedin/>

### **Puducherry**

Prime Minister Narendra Modi inaugurated a Technology Centre of the MSME Ministry the focus on the Electronic System Design and Manufacturing (ESDM) Sector.

<https://telanganatoday.com/pm-modi-inaugurates-technology-centre-of-msme-ministry-in-puducherry>

## **DEVELOPMENTS ABROAD**

### **USA**

Twist is an MIT-developed programming language that can describe and verify which pieces of data are entangled to prevent bugs in a quantum program.

<https://news.mit.edu/2022/new-language-quantum-computing-twist-0124>

A team at the National Ignition Facility (NIF) at Lawrence Livermore National Laboratory (LLNL) in California has reported achieving burning plasma condition using an approach called inertial-confinement fusion, where the high temperatures and pressures needed to initiate fusion in a fuel of hydrogen isotopes are produced by intense pulses of laser light. A significant step to achieve nuclear fusion.

<https://www.scientificamerican.com/article/u-s-project-reaches-major-milestone-toward-practical-fusion-power/#>



A package of 49 Starlink satellites that rode a Falcon 9 rocket into orbit from Florida included the 2,000th spacecraft to launch into SpaceX's broadband internet network.

<https://spaceflightnow.com/2022/01/19/spacex-launches-2000th-starlink-satellite/>

## **Uruguay**

Quantum-South releases quantum computing based air cargo optimization application ready to execute proofs of concept. The software aims to bring efficiency in logistics, helping companies to improve revenues and reduce costs.

<https://quantum-south.com/airlinescargo/air-cargo-load-optimization-leveraged-by-quantum-computing/>

## **Netherlands**

Dutch Prime Minister Mr. Mark Rutte's government has put forward a proposal for a €35bn climate and transition fund, with €15bn specifically for the development of 'advanced renewable energy carriers', including green hydrogen and e-fuels.

<https://www.energymonitor.ai/tech/hydrogen/netherlands-puts-its-money-where-its-mouth-is-on-green-hydrogen>

## **South Korea**

South Korea's AI-based defense technologies for the three high-tech areas have reached about 93 percent of the level of comparable US technologies, the Korea Research Institute for Defense Technology Planning and Advancement, said.

<http://www.koreaherald.com/view.php?ud=20220126000783>

## **DEVELOPMENTS IN THE PRIVATE SECTOR**

### **Reliance**

Mukesh Ambani-led Reliance Retail has acquired a 54 per cent stake in domestic robotics company Addverb for \$132 million (about ₹ 983 crore)

<https://www.ndtv.com/business/reliance-retail-buys-54-pc-stake-in-addverb-tech-for-usd-132-mn-2714520>

Jio inks partnership with Finnish university to accelerate 6G research, standardization

[https://economictimes.indiatimes.com/industry/telecom/telecom-news/jio-inks-partnership-with-finnish-university-to-accelerate-6g-research-standardization/articleshow/89020510.cms?utm\\_source=contentofinterest&utm\\_medium=text&utm\\_campaign=cppst](https://economictimes.indiatimes.com/industry/telecom/telecom-news/jio-inks-partnership-with-finnish-university-to-accelerate-6g-research-standardization/articleshow/89020510.cms?utm_source=contentofinterest&utm_medium=text&utm_campaign=cppst)

Reliance Industries Ltd (RIL) on Thursday pledged to invest a massive ₹6 trillion (\$80 billion) in Gujarat over 10 to 15 years for its clean energy businesses, as India's largest fossil-fuel refiner seeks to extend its dominance amid a global shift to renewables.

<https://www.livemint.com/companies/reliance-industries-pledges-80-billion-for-gujarat-green-projects-11642099862160.html>

### **Adani Group**

The diversified Adani Group is investing more than Rs 4,600 crore in two data centre projects in Uttar Pradesh.

[https://www.business-standard.com/article/companies/adani-to-invest-rs-4-600-crore-in-two-data-centre-projects-in-uttar-pradesh-122012400033\\_1.html](https://www.business-standard.com/article/companies/adani-to-invest-rs-4-600-crore-in-two-data-centre-projects-in-uttar-pradesh-122012400033_1.html)

### **Trash to Treasure**

Indian startup Trash to Treasure turns 1000 tonnes of waste plastic into fabric. "The process takes one or two days but the fabric produced is stronger than regular cotton and is more durable." – Aditya Banger, Founder, Trash to Treasure

<https://www.youtube.com/watch?v=fgaJwaTvBaY>

## **ARTICLES/ EVENTS OF INTEREST**

### **Gateway House**

*India in the Second Space Age – (Article by CHAITANYA GIRI)*

"The concept of astro-political blocs as an extension of geopolitical blocs remains unexplored, especially from an Indian perspective. As the scope of international cooperation in space expands into soft science diplomacy, the advent of the second space age creates opportunities for India to step up its space program."

<https://www.gatewayhouse.in/india-in-the-second-space-age-of-interplanetary-connectivity/>

### **Observer Research Foundation**

*India's Semiconductor Pursuit – (Article by RAJESWARI PILLAI RAJAGOPALAN)*

Prime Minister Narendra Modi's address at the Indian Mobile Congress highlighted Indian ambitions, with the prime minister saying that "From 5G technology to artificial intelligence, virtual reality, cloud, internet of things and robotics, the world looks towards India with optimism to provide technology enabled solutions that are affordable and sustainable."

<https://www.orfonline.org/research/indias-semiconductor-pursuit/>

*Emerging and Critical Technologies: New Frontiers for an Aspirational India – (Article by RAJESWARI PILLAI RAJAGOPALAN & TRISHA RAY)*

"India is seen as a bridging power that can narrow the divide between the developed and developing countries through the use and regulation of new and emerging technologies."

<https://www.orfonline.org/expert-speak/emerging-and-critical-technologies-new-frontiers-for-an-aspirational-india/>

### **The Galileo Project**

The Galileo Project, an initiative launched by Harvard University's astrophysicist Prof Avi Loeb will search for extraterrestrial equipment near Earth. It has two branches. The first aims to identify the nature of interstellar objects that do not resemble comets or asteroids. The second branch targets Unidentified Aerial Phenomena (UAP) or popularly known as UFOs, similar to those of interest to the U.S. Government. The search may lead to new discoveries including special materials such as metamaterials.

<https://www.space.com/2022-turning-point-study-ufos-uap>

### **Analytics Insight**

How is Quantum Computing Impacting the Cybersecurity Industry?

"Quantum computing has a significant and game-changing impact on cybersecurity. Quantum computing holds immense promise in a range of sectors, including AI technology, health research, and weather prediction, to name a few. It does, however, pose a severe threat to cybersecurity, mandating a shift in how we protect our data. Regardless of the fact that quantum computers cannot yet crack most types of security, security apparatus of governments must stay ahead of the curve and build quantum-proof technologies as quickly as possible.

<https://www.analyticsinsight.net/how-is-quantum-computing-impacting-the-cybersecurity-industry/>

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