

Science, Technology, Research, Innovation & DEvelopmentS

BRINGS NEWS ON S&T DEVELOPMENT FROM DST SUPPORT AND BEYOND

EDITORIAL

FROM HEAD OF DST MEDIA CELL

India's scientific community responded to the corona crisis with the development of indigenous technologies for rapid detection of infection, new approaches for increasing the speed of testing and reducing costs, biomarkers, masks, ventilators, models and simulations, sanitization systems and so on.

As the Department of Science and Technology (DST) enters its 50th year of inception, COVID 19 has tested the deep knowledge, infrastructure, and human resource built up by DST and its institutions over the years and the scientific community has risen up to the challenge with several arms to fight the pandemic. Many of these were discussed during the Technology Day Celebration and 49th Foundation Day celebration such as, the rapid testing kit by Sri Chitra Triunal Institute of Medical Science and Technology (SCTIMST), the electrostatic mask, the nanoscience applications, and the COVID 19 solutions for Divyangjan and the Elderly have featured in this newsletter. COVID KATHA, a multimedia guide on COVID 19 was also launched.

This issue of Newsletter brings a special feature on some outstanding efforts of the Technology Development Broad (TDB) and the National Science and Technology Entrepreneurship Development Board (NSTEDB) for fast-tracking the near ready technologies for COVID 19.

-DR AKHILESH GUPTA, EDITOR-IN-CHIEF

COVER STORY



INDIA IS WELL-POISED TO REBOOT THE ECONOMY THROUGH S&T: DR. HARSH VARDHAN The Union Minister

The Union Minister of Science & Technology, Earth

Sciences and Health & Family Welfare, Dr. Harsh Vardhan said today that India's fight against the Covid 19 is moving fast ahead strongly and steadily. He was addressing a Digital Conference, RE-START – 'Reboot the Economy through Science, Technology and Research Translations', organised to celebrate the National Technology Day

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DST & ITS A U T O N O M O U S I N S T I T U T I O N S ELEVATED SCIENCE AND TECHNOLOGY IN INDIA TO I N T E R N AT I O N A L

LEVELS - DR. HARSH VARDHAN

Union Minister of Science & Technology, Health & Family Welfare and Earth Sciences, Dr. Harsh Vardhan today interacted with Heads of all Autonomous Institutions (AIs) and Subordinate offices of Department of Science & Fechnology (DST) via Video Conferencing on the occasion of 49th DST Foundation Day about their S&T initiatives, particularly in relation to their endeavours for combating the COVID 19 outbreak.

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COVID NEWS HIGHLIGHTS



Fig: Oral and Nasal swabs developed by SCTIMST

Sree Chitra develops 2 types of swabs and viral transport medium for COVID 19 testing

Technologists at the Sree Chitra Triunal Institute for Medical Sciences and Technology (SCTIMST), an autonomous institute under the Department of Science and Technology, Govt of India, have developed two types of nasal and oral swabs and viral transport medium for COVID 19 testing.

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SERB approves funding for study of mathematical & simulation aspects of COVID 19

Science and Engineering Research Board (SERB), a statutory body under the Department of Science and Technology (DST), Government of India, has approved funding for II projects under MATRICS scheme for studying Mathematical modelling and computational aspects to tackle the COVID 19 pandemic.

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DST supports development of reusable N95 & N99 mask with enhanced antiviral efficiency

The Department of Science and Technology (DST) has approved support for development and upscaling of reusable N95 and N99 masks with enhanced antiviral and antibacterial property designed by Dr. Sri Sivakumar from Indian Institute of Technology, Kanpur under the Nano Mission.

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Figure 1: Schematic diagram of the proposed mask



SNBNCBS develops Nanomedicine to alter oxidative stress for better immune power to treat viral infections

including COVID 19

Scientists at S. N. Bose National Centre for Basic Sciences, Kolkata (SNBNCBS) have developed a safe and cost-effective nanomedicine that promises treatment of a number of diseases by altering oxidative stress in the body. The research may provide a ray of hope in India's fight against COVID 19, as the nanomedicine can decrease or increase reactive oxygen species (ROS) in our body, depending on the situation and cure the disease.

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Study shows that COVID 19 may affect the Central Nervous System causing loss of smell and taste

Scientists of Indian Institute of Technology IIT), Jodhpur have explored the neuroinvasive nature of the COVID 19 virus SARS-CoV-2 highlighting that loss of smell and taste of infected patients makes their entire Central Nervous System (CNS) and the underlying structures in the brain more prone to viral infection with devastating effects.

Organic-Inorganic Hybrid Nanocoatings for Disposable Masks: A formidable arsenal against pathogenic COVID-19

The Department of Science and Technology (DST) has approved support for large scale production of Organic-Inorganic hybrid nanocoatings for disposable masks developed by Dr. Viswanatha R from Jyothy Institute of Technology, Bengaluru under the DST Nano Mission.

Antiviral nano-coatings to be upscaled for making triple layer medical masks & N-95 respirator to combat COVID 19

As part of Nano Mission programme, the Department of Science and Technology (DST) has approved support for upscaling an antiviral nano-coatings developed by Professor Ashwini Kumar Agrawal of Indian Institute of Technology, Delhi for use as appropriate material for producing anti-COVID 19 Triple Layer Medical masks and

DST supports assistive tools, technologies and techniques to combat challenges faced by Divyangjan & Elderly during COVID 19 The Department of Science and Technology has taken several initiatives to mitigate the

nas taken several initiatives to mitigate the impact of COVID 19 among Divyangjan and Elderly and identified various challenges faced by them for finding technological solutions.

Knowledge Organizations focus on initiatives for socioeconomic rejuvenation and resilience using S&T during COVID 19 pandemic

Knowledge Organizations across the country have started creating scientific awareness on COVID 19 using social, print and electronic media and have started initiatives for building resilience at community level during and post lockdown period in response to the advisory issued by the Department of Science &Technology (DST) as part of their Scientific Social Responsibility (SSR).

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🔠 POPULAR SCIENCE STORIES 🐰





Fig: Diagrammatic representation of the insulin delivery mechanism

JNCASR scientists develop injectable Silk Fibroin-based hydrogel for sustained Insulin delivery in diabetic patients

Scientists at Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR), an autonomous research institute under the Department of Science and Technology, have recently developed an injectable Silk fibroin-based hydrogel for sustained insulin delivery in diabetic patients. A patent application has also been filed for this invention.

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ARI develop novel process for synthesis of Quantum Dots used in photographing cellular organelles

Researchers at the Agharkar Research Institute (ARI), Pune an autonomous institute under the Department of Science & Technology have developed a new process for the synthesis of quantum efficient and biocompatible quantum dots (QDs) used in capturing images of cellular organelles and processes within visible wavelength ranges across the electromagnetic spectrum.

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ARCIs mechanically stable antireflective coating can increase the power conversion efficiency of solar thermal systems

Scientists at International Advanced Research Centre for Powder Metallurgy & New Materials (ARCI), an autonomous R&D Centre of Department of Science and Technology (DST), Govt. of India, have developed and patented a bi-layer, scratch-resistant, anti-reflection coating on glass and silicon wafer substrates using a cost-effective dip-coating technique which can increase the power conversion efficiency of solar thermal systems.

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Antireflective coating on PV cover glass and Silicon wafer

IIA scientists find prodigal stars from first one billion years of the Universe in the milky-way

About 3621 light-years away in the Milky Way halo, scientists spotted two interesting stars. Though they have made their nest in the precincts of our Galaxy, the stars are actually alien and originated in global clusters – a collection of several million stars that were likely to have formed during the first one billion years of the Universe.

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WIHG reveals 35 thousand-year history of river erosion in Ladakh Himalayas

Mobile 2D electron gas at oxide interfaces by INST is a promising candidate in modern electronic devices

Broadcasting of correlations: a cost-effective approach to perform information processing in large quantum networks

▶ IIGs study of behavior of charged particles in magnetosphere can help design more robust space-crafts

▶ IIT Bombay Professor receives Young Career Award in Nano Science & Technology 2020 for Advanced Transistor Technologies

> JNCASR scientists fabricate energy-efficient photodetector for security application

Green Dispo eco-friendly sanitary napkin incinerators: Reaching all corners of the country

Study of flowering plant endemism of Northern Western Ghats highlights importance of plateaus in conservation plans

ARCIs breakthrough in developing a Fe-P soft magnetic alloy could help Indian automotive industry

Computer discovers two-dimensional magnets making way for efficient RAM for next-generation devices

DST INSPIRE Faculty from Bhopal develops lightweight carbon foam that can replace lead batteries

DST INSPIRE Faculty develops nanomaterials having energy storage application & optical sensors for water pollution control

DST INSPIRE fellow from NIT Calicut developing flexible materials for future electronics

Inspire fellow from Pune measuring thermal conductivities of materials to conserve waste heat

JNCASR scientists develop a natural product based Alzheimer inhibitor

JNCASR Professor elected as International Honorary Member to the American Academy of Arts and Sciences

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NEW INITIATIVES

DST launches programme on health & risk communication with focus on COVID-19

NCSTC, DST has launched a programme on health and risk communication 'Year of Awareness on Science & Health (YASH)' with focus on COVID-19.

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A moment of great pride for the nation as our Hon'ble Minister for Health & Family Welfare, Science & Technology, Earth Sciences **DR HARSH VARDHAN** got elected as chairman of Executive Board of WHO.

DST IN COVID COMBAT

SCIENTIST



Dr Neeraj Sharma He is currently heading several divisions in DST like Technology Development, Drugs & Pharmaceutical Research, National Good Laboratory Practices Compliance and Monitoring Authority (NGCMA) and has additional charge of

Secretary, Technology Development Board (TDB).

He is steering TDB to strengthen Indian's National efforts to fight the COVID 19 Pandemic in multiple ways.

Dr Sharma has demonstrated expertise in areas such as formulation of policies relating to S&T, management of R&D in S&T through technology development, commercialisation and entrepreneurship and much more.

FEATURED INSTITUTION



TDB approves technologies to augment Indias efforts to combat COVID 19

Technology Development Board (TDB), a statutory body of the Department of Science and Technology (DST), is proactively supporting the efforts of the scientists, technologists, entrepreneurs, and industrialists towards preventing and containing the spread of the COVID 19 pandemic by providing financial support for commercialization of these technologies. In addition, TDB is also scouting for novel

solutions for supporting the country's efforts in tackling the health care emergency that the world is facing.

In the last few weeks, TDB, through its evaluation process, has processed a large number of applications under various domains. Till date, TDB has approved six projects towards commercialization, which include thermal scanners, medical devices, masks, and diagnostic kits.

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DST DIVISION

CAWACH centre launched by NSTEDB identified as major announcement for MSME sector during COVID-19 crisis The National Science & Technology Entrepreneurship Development Board (NSTEDB), a division of Department of Science & Technology, is an institutional mechanism to help promote knowledge driven and technology intensive enterprises. The Board, having representations from socio-economic and scientific Ministries/ Departments, aims to convert "job-seekers" into "job-generators" through S&T interventions. NSTEDB made some major contributions during COVID-19 pandemic. The Centre for augmenting War on Covid 19 Health Crisis (CAWACH) was launched to spot, support and accelerate deployment of most promising Covid-19 market ready startup solutions from across the country and top 50 will be selected for funding. A detailed mappingof over 40 market Startups solutions from DST Incubators was undertaken. They were asked to identify the incubated and non incubated startups in covid19 area to mentor and offer support through NEB's flagship program of NIDHI-Seed support on fast track mode. Dr (Ms) Anita Gupta, Scientist- G & Head, NSTEDB played active role in the inter-ministerial Task Force on Covid 19 startup solutions.



The Minister for Science & Technology, Earth Sciences and Health and Family Welfare **Dr Harsh Vardhan** launched **"COVID KATHA"**, a multimedia guide on COVID 19 on the occasion of the celebration of **49th Foundation Day**.

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This e-newsletter created by the DST communication team at Vigyan Prasar brings you brief information on scientific achievements and activities supported by DST. Each brief, links to detailed information on DST website. If there is any DST supported popular science event which requires wider outreach please share it with us. We also welcome your feedback/suggestions at

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VIGYAN PRASAR (An Autonomous Organisation of DST)