

# STRIDES

SCIENCE, TECHNOLOGY, RESEARCH, INNOVATION & DEVELOPMENTS

Showcasing DST achievements in S&T and innovation

## Editorial

The year 2023 has been quite a rewarding and successful year for the Department of Science and Technology (DST) with expansion of its role in changing India's S&T landscape.

There have been some major disruptive programmes launched and implemented during the year, some of them in mission mode, promising to bring significant impact on the science technology and innovation ecosystem in India.

A National Quantum Mission was launched to accelerate Quantum Technology led economic growth, nurture the ecosystem in the country and make India one of the leading nations in the development of Quantum Technologies & Applications. Some major initiatives were also launched to strengthen the Innovation and Entrepreneurship ecosystem of the country.

The implementation of the National Geospatial Policy approved in 2022 was initiated targeting to transform the way spatial data is used and shared for the benefit of all. The year also saw a major boost in technologies through the proactive implementation of missions co-ordinated by DST like the National Mission on Interdisciplinary Cyber Physical Systems (NM-ICPS), the National Supercomputing Mission. Climate Change program initiatives of DST were also escalated through the implementation of the National Mission for Sustaining the Himalayan Ecosystem (NMSHE) and National Mission on Strategic Knowledge for Climate Change (NMSKCC). Important initiatives were also taken up as part of Clean Energy Technology Development, STI Policy Research and by DST autonomous institutes like the Science and Engineering Research Board.

2023 witnessed one of India's one of most transformative initiatives in last several decades. India launched an Anusandhan National Research Foundation (ANRF) to provide high level strategic direction for research, innovation and entrepreneurship in the fields of natural sciences including mathematical sciences, engineering and technology, environmental and earth sciences, health and agriculture. The long-term vision of ANRF is to make India a global S&T leader.

Standing at the horizon the New Year, the department resolves to consolidate its previous efforts into major big-ticket programmes that can create impact at the National level. Some of the areas the department looks forward to take up as part of its future initiatives include, precision agriculture; indigenous biomedical devices; 6 G Semiconductor, intelligent transportation, hydrogen energy, research in automobile sector, etc.

DST wishes a very happy new year to all.

**“DST ushers in the new year resolving to intensify its efforts to promote S&T in the country, facilitate R&D activities of our scientific communities and reach its benefits to people for ensuring a better life for all.”**

Prof. Abhay Karandikar  
Secretary, DST, GoI

Editor-In-Chief: Dr. Akhilesh Gupta

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विज्ञान और प्रौद्योगिकी विभाग  
DEPARTMENT OF  
SCIENCE AND TECHNOLOGY

सत्यमेव जयते





## Tripartite MoU paves way for Centre of excellence (Pilot) to foster the Geospatial Technology, Innovation and Solutions

India will soon have a Centre of excellence to foster the Geospatial Innovation & Research and to cater to emerging technology solution requirements of the Geospatial domain in the country.



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## Climate Resilient Development in Indian Himalayan Region discussed at Indian side event at CoP 28

Impacts and implications of Climate Change Vulnerability in the Himalayan Region and ways of creating 'Climate Resilient Development in Indian Himalayan Region by making mountain communities green and resilient were discussed the side event hosted at the India pavilion at the UN Climate Conference COP 28 on December 3, 2023.



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## Purple revolution to bring NE saffron to the market & benefit farmers from 4 states

Purple flowers of saffron plant are now blooming in Arunachal

Pradesh, Meghalaya, Mizoram, and Sikkim - thanks to identification of suitable sites with the geographical and climatic parameters of Pampore region of Kashmir as standard reference for the plant using Geospatial techniques.

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## Milli-second burst detected by AstroSat in new high magnetic field neutron star can help understand such stellar entities

AstroSat, India's first multi-wavelength space-based observatory, has detected bright sub-second X-ray bursts from a new and unique neutron star with ultrahigh magnetic field (magnetar), which can help understand the intriguing extreme astrophysical conditions of magnetars.



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## Perovskite self-powered broadband photodetector with reduced lead toxicity can help sustainable energy

Indian scientists have indigenously developed organic-inorganic halide perovskite self-powered broadband photodetector with partial substitution of lead by magnesium which can be useful for solar energy generation.

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## Tracking a solar burst with multiple telescopes gives clues about source region

## characteristics affecting space weather

Scientists probing the evolution of an eruption (PE) that occurred from the west-limb of the Sun in 2013 using several different ground and space-based telescopes have traced the source of the solar burst. This could help in better understanding of what makes space weather tick.

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## New highly fluorescent material brings non-enzymatic approach for detection of anticancer drug Methotrexate known for toxicity at high dosage

A new highly fluorescent material with exceptional optical properties has been developed using phosphorene, cystine, and gold (Ph-Cys-Au) which can be used as a visual sensing platform for detecting anti-cancer drug MTX overdose of which has toxic effect on lungs, stomach, and heart.

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## Study of virus causing hemorrhagic disease in elephants might help in the development of diagnostics & therapeutics

Probing the haemorrhagic disease (HD) among Asian elephant population a new study assessed the circulation of the elephant endotheliotropic herpesvirus subtypes (EEHV) responsible for the recent rise in the disease, as well as its pathogenesis. The research on the patho-epidemiology or the study of the determinants, occurrence, and distribution of the disease can help develop sero-diagnostics, vaccines and therapeutics against the disease.



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## DST Inspire Faculty Fellow synthesising earth-abundant metal complexes as mimics for enzymatic processes and to catalyze industrially significant organic transformations

Dr. Muniyandi Sankaralingam, a DST Inspire Faculty Fellow has synthesised and explored the activity of several earth-abundant metal complexes like amine and imine-based copper (II) complexes using tridentate NNO donor ligands as mimics to various enzymes like phenoxazinone synthase, and lytic polysaccharide monooxygenases.



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## New research provides efficient approach for early diagnosis of cancer

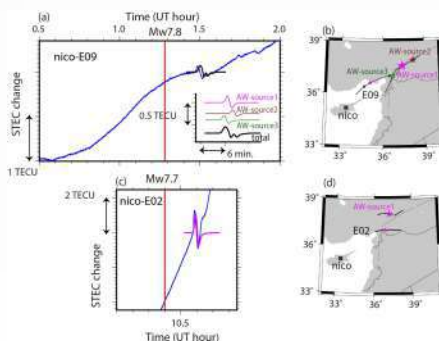
Scientists have taken a step towards an improved approach towards early diagnosis of cancer, especially cancers that start as a growth on the inner lining of the colon or rectum.

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## Reflection of Earthquake Source Process in the Ionosphere could pave way for deciphering

## earthquake precursors using space based observations

Earthquake processes, even relatively smaller ones, have their reflection in the ionosphere, as they influence the amplitudes and periods of coseismic ionospheric perturbations (CIP) along with factors such as geomagnetism and line-of-sights geometry, according to a novel study.



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## Experts in Quantum technology discussed potential of quantum materials to propel technological progress

Scientists from diverse national institutions, working on thin films and crystals essential to the field of quantum technology, discussed the potential of such quantum materials to propel technological progress and pave the way for prosperous commercial ventures, at the national conference centred around "Crystals for Quantum Technology".



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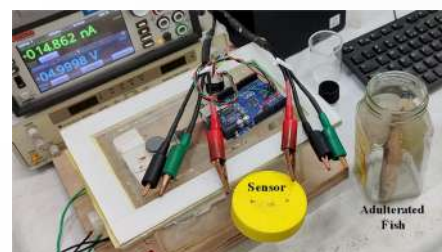
## combat COVID-19 and other viral infections

Natural anti-infective, antiviral, anti-inflammatory, and antithrombotic products derived from a wide range of easily sourced mushrooms and their bioactive molecules have the potential to combat covid, according to a new paper.

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## New non-invasive formaldehyde sensor can detect adulterated fish at room temperature

A new low-cost sensor made of metal oxide nanoparticles reduced graphene oxide composite can detect formalin adulteration in fishes at room temperature in a non-invasive way. The sensor shows long-term stability with a low detection limit.



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## What's New

**Call for  
proposal  
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Programme**



**India witnessing unprecedented transformation in National STI Ecosystem**

- India continues to maintain globally 3rd position in number of science & engineering publications, number of PhDs, number of startups and unicorns
- India improved ranking in Global Innovation Index, Resident Patent filing, Network Readiness Index and Quality of science publications

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**Anusandhan National Research Foundation Act Formalised**

- A transformational step towards achieving global R&D leadership and making India Atmanirbhar
- Provides high level strategic direction for research, innovation, and entrepreneurship
- Estimated budget is ₹50,000 crores for five years (2023-28)

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**National Mission on Interdisciplinary Cyber-Physical System (NM-ICPS) being implemented proactively**

- 25 Technology Innovation Hubs (TIHs) established
- 351 cutting-edge technologies & 610 innovative technology products developed
- 129 global partnerships to promote knowledge exchange
- Generated over 85,000 skilled professionals & created 13,000 jobs

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## DST support policies & mission mode programmes transforming India's S&T landscape




**India launches National Quantum Mission**

- Launched at Rs. 6003.65 crore, NQM spans eight years to boost R&D in Quantum Technology
- Aims to make India a leader in Quantum Technologies, with a focus on Quantum Computing; Communication; Sensing & Metrology; Quantum Materials & Devices
- Seeks to create an innovative ecosystem, fostering economic growth through transformative Quantum Technologies & Applications

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**DST begins implementation of National Geospatial Policy, 2022**

- Policy to position India as global Geospatial leader, emphasizing self-reliance & open data standards
- National Data Registry (NDR), a unified platform built on open standards, enabling data providing agencies to publish standardized datasets created
- 14 State Spatial Data Infrastructures fostered through cost-sharing, delivering State Geospatial Data Products and Services

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**National Supercomputing Mission (NSM) boosts India's computing power**

- NSM boasts 28 operational supercomputers nationwide, ranging from 7 PF to 50 TF systems dedicated to training
- Users have executed 74 million computing codes, with 6,072 experts utilizing the systems for solving complex challenges

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