

STRIDES

SCIENCE, TECHNOLOGY, RESEARCH, INNOVATION & DEVELOPMENTS

Showcasing DST achievements in S&T and innovation

EDITORIAL

A 'dream come true' moment for India this month created a milestone in the history of science when the Indian lander Vikram set foot on the moon marking the success of Chandrayaan 3 and adding a feather in the cap of Indian scientists. Not only was it the occasion for taking pride in the world's first touchdown on the South Pole of the Moon, but it was also the triumph of the low cost indigenous science and technologies which Indian researchers have painstakingly developed for years. It is this expertise in frugal indigenous innovations and technologies that has not only made India's moon missions one of the most economical in the world, but also made S&T benefits like health and agricultural technologies accessible to people.

The occasion could be one for spotlighting some of the indigenous technologies supported by DST, especially in the month that also celebrated the 76th year of Indian independence. This newsletter gives a glimpse of how such technologies are helping Independent India to become self-reliant.

Such indigenous efforts in S&T will now see acceleration with the enactment of the Anusandhan National Research Foundation (ANRF) Act to promote research and development (R&D) and foster a culture of research and innovation across universities, colleges, research institutions, and R&D laboratories bringing in its wake a country where S&T will be a fulcrum development for the Nation and better life for its people.

Editor-In-Chief: Dr. Akhilesh Gupta

COVER STORY



DST celebrates India's landing on the moon along with the entire scientific community. Congratulations to ISRO & all involved in the success of Chandrayaan 3



Parliament passes the Anusandhan National Research Foundation (NRF) Bill, 2023 with the Rajya Sabha adopting the Bill by a voice vote.

Union Minister for Science & Technology Dr Jitendra Singh said here today that "Anusandhan National Research Foundation" will define the stature of India at 2047.



1. Editorial & Cover Stories

2. Scientific Stories

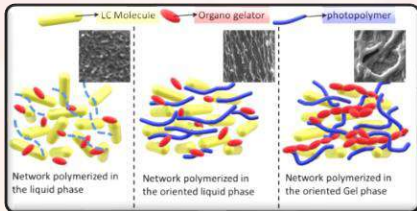
INSIDE THE E-NEWS LETTER

3. Indigenous Technologies

4. Anusandhan National Research Foundation

Scientific Stories

Low - energy - consuming switchable smart windows developed based on novel architecture for confining liquid crystals



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Low-cost perovskite solar cells with superior thermal and moisture stability developed indigenously by Indian scientists

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Organic nanogenerator that harvests light energy can power wearable devices on the go

A new nanogenerator device developed for harvesting light energy using organic material has the potential to power wearable devices on the go. The device can generate current and voltage from minute amounts of heat or light that fall on it.

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Novel features spotted on radiation emitted from atoms falling into a black hole could help understand unification of quantum theory with gravity

This investigation of atoms falling into a black hole could throw new light on the efforts of scientists towards unification of quantum mechanics and the general theory of relativity propounded by Einstein which is applicable at the largest cosmological scales.

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New algorithm to quantify terrestrial RFI in space for earth orbiting radio astronomy experiments

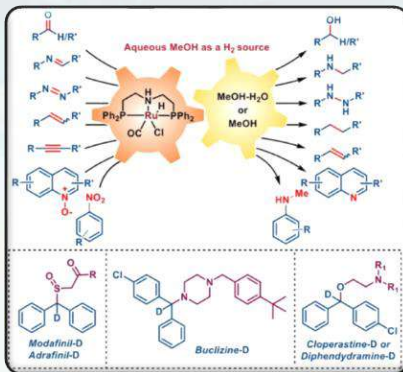
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3 new lakes may form in Parkachik Glacier in Ladakh due to glacial retreat

The Parkachik Glacier in Ladakh is likely to have three lakes of different dimensions due to subglacial over-deepening -- a characteristic of basins and valleys eroded by glaciers, shows a new study.

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New catalytic process of producing hydrogen offers sustainable method of manufacturing the green fuel



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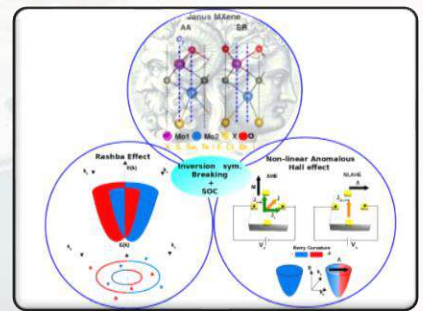
DNA-based tools suggest re-classification of Capers, an important natural component of Liv 52 medicine

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Scientists design first-ever 2D composite quantum material useful for spintronic devices like transistors & diodes.

Using some 2-D carbides or nitrides of transition metals, a team of scientists have computationally

designed a new composite quantum material that exhibits an exotic quantum property called Rashba splitting, in colossal scale, in a metallic environment. This material can help interfacing with other substrates (2D substrates like graphene) in spintronic devices like spin transistors, spin diodes, and spin filters that take advantage of electron spin, a quantum property of electrons, to achieve higher performance.



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ANRF signifies a higher level of priority & commitment to research and innovation: Secretary of SERB



He underlined that while Science and Engineering Research Board's (SERB) transition to NRF represents a significant shift in priority of research funding in India, several significant initiatives like doubling private sector R&D investment, increasing the number of full-time researchers, promoting women's participation, and National repository of STI Data are under consideration to foster innovation and research in the country.

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Indigenous Technologies

Independence to Self-Reliance

Country's first Dimethyl Ether fuelled tractor ushers a new era of clean fuel applications



India's first 100% Dimethyl Ether (DME) -fuelled tractor/ vehicle for on- and off-road applications has been developed, initiating a new chapter in the crusade for a sustainable alternate fuel-based transport system.

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New low-cost technology reduces textile effluent pollution significantly



A textile and apparel industry, located in the Hanumakonda district, of Telangana has been able to treat its textile wastewater at a very reasonable cost.

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Bunch of new Placenta in chip devices can help making pregnancies safe

A bunch of devices mimicking the placenta at various stages of pregnancy can help in drug discovery, study of toxicity of chemicals like caffeine, and understanding the effects of conditions such as preeclampsia and diabetes mellitus during

pregnancy.

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New technology developed to transport of radio frequency (RF) through optical methods could improve digital & satellite communication

A newly designed prototypes in the Next-Generation Photonic Analog-to-Digital Converters (NG-PADC) project which can carry out instantaneous frequency measurement, generation and transport of Radio Frequency (RF) through optical methods could revolutionize various sectors, enabling faster digital communication, improved satellite communication, better medical imaging, and Photonic radars.

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Newly synthesised cathode materials for sodium ion batteries promises cost-effective and sustainable energy storage

The newly developed cathode materials can provide high capacity and prolonged battery life, enabling longer-lasting and more powerful sodium ion batteries.

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Affordable smart windows with energy storage capability can replace traditional ones in modern structures

Indian scientists have developed a cost-effective polymeric electrochromic smart window which can store energy using hybrid transparent electrodes, as well as carry out transparency switching. It has the potential of

replacing the costly traditional smart windows in modern structures.

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Cost-effective, supercapacitor with high capacity to store charge developed by Indian scientists

Indian Scientists have developed a high-energy density aqueous supercapacitor with a wide electrochemical window, high stability as well as high energy retention.

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WHAT'S NEW?

- [DST-Water Technology Cell \(WTC\)Project Proposals Call 2023](#)
- [Call for Proposals under WISE Fellowship for Ph.D. \(WISE-PhD\)](#)
- [Funding Announcement Opportunity 2023 for RD&D in the area of CCUS](#)
- [Call for Proposals under WISE-SCOPE Fellowship](#)



Anusandhan National Research Foundation

“National Research Foundation is a major step in the context of the new education policy, which will empower research, innovation, and provide opportunities for our youth to lead the world through new initiatives and capabilities.”

- Hon'ble Prime Minister
Shri Narendra Modi

ANRF WILL CREATE A VIBRANT GLOBALLY COMPETENT SCIENTIFIC ECOSYSTEM

- Enhance India's National research infrastructure, knowledge enterprise & innovation potential for scientific pursuit
- Create an interface mechanism for participation & contribution of industries and State governments in addition to the scientific and line ministries
- Give full expression to opportunities for all & engender cutting edge scientific research
- Augment abilities of government institutions, universities, higher educational institutions as well as private sector organisations

PARLIAMENT PASSES THE ANUSANDHAN NATIONAL RESEARCH FOUNDATION BILL 2023

- ANRF, an apex body will provide high-level strategic direction of scientific research in the country
- A historic step, this would lead to rationalisation and democratization of human resources and research funding
- This will prepare India for a global role as India takes lead in addressing global challenges

Anusandhan National Research Foundation Bill to strengthen research eco-system in the country

- Fostering a culture of research and innovation throughout India's universities, colleges, research institutions, and R&D laboratories
- Forging collaborations among industry, academia, government departments & research institutions
- Providing high level strategic direction for research, innovation & entrepreneurship in the country
- Leading to rationalisation & democratization of human resources & research funding

ANUSANDHAN NATIONAL RESEARCH FOUNDATION BILL TO PROMOTE, MONITOR & PROVIDE SUPPORT FOR R&D THROUGH S&T INTERFACES OF HUMANITIES & SOCIAL SCIENCES

- It will bring strategic direction for research, innovation and entrepreneurship & strengthen research ecosystem in the country
- Total estimated allocation of Rs. 50,000 crores during five years (2023-28)
- DST will be the administrative Department of ANRF which will have a Governing Board & an Executive Council chaired by PSA
- Prime Minister will be ex-officio President of Board & Union Minister of Science & Technology & Union Minister of Education will be ex-officio Vice-Presidents

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