



## National Science Day 2025

(Ministry of Science & Technology)

26<sup>th</sup> February, 2025

### Celebrating the Spirit of Scientific Innovation



National Science Day is celebrated every year on 28<sup>th</sup> February to commemorate the discovery of the '**Raman Effect**' made by the eminent physicist Sir C.V. Raman while working in the laboratory of the Indian Association for the Cultivation of Science, Kolkata. For this discovery, he was awarded the Nobel Prize in 1930. On National Science Day, theme-based science communication activities are carried out all over the country. The first celebration took place on February 28, 1987, marking the beginning of a tradition that continues to inspire generations. The theme for this year is "*Empowering Indian Youth for Global Leadership in Science & Innovation for VIKSIT BHARAT.*" It emphasizes the role of young minds in driving India's scientific and technological progress, aligning with the vision of Viksit Bharat 2047, which aims for a developed and self-reliant India.

#### Objectives

The basic objective of the observation of National Science Day is to spread the message of the importance of science and its application among the people. It is celebrated as one of the main science festivals in India every year with the following objectives:

To widely spread a message about the significance of scientific applications in the daily lives of people.

To display all the activities, efforts, and achievements in the field of science for the welfare of human beings

To discuss all the issues and implement new technologies for the development of science

To encourage the people as well as popularize science and technology.

## Key advancements in Science and Technology: 2024 Highlights

### India's Global Standing in Innovation and IP

India has made remarkable progress in the global science and technology landscape, securing the **39th rank in the Global Innovation Index 2024** and **6th position in global Intellectual Property (IP) filings**, as per the WIPO report. The **Network Readiness Index (NRI) 2024** also marked India's rise to **49th place from 79th in 2019**, showcasing advancements in ICT infrastructure and digital transformation.

### Anusandhan National Research Foundation (ANRF): Pioneering Research & Inclusivity

Launched under the **ANRF Act 2023**, the **Anusandhan National Research Foundation (ANRF)** is accelerating India's research and development ecosystem. Several key programs have been introduced:

- **PM Early Career Research Grant (PMECRG)** supports young researchers, providing them with the resources to pursue independent research.
- **EV Mission** aims to foster innovation in **electric vehicle technology**, making India self-reliant in sustainable mobility.
- **Partnerships for Accelerated Innovation and Research (PAIR)** follows a **Hub and Spoke model**, ensuring institutional collaboration in scientific research.
- **Inclusivity Research Grant (IRG)** provides financial support to researchers from **Scheduled Castes (SC) and Scheduled Tribes (ST)**, promoting equal opportunities in frontier research fields.

### National Quantum Mission (NQM): India's Leap in Quantum Technology

With an investment of **₹6003.65 crore over eight years**, the **National Quantum Mission (NQM)** is positioning India as a leader in **quantum computing, communication, sensing, and materials**.

- A total of **152 researchers from 43 institutions across 17 states and 2 Union Territories** are contributing to this mission.
- NQM has also laid out **guidelines for startup support**, ensuring robust mentorship, funding, and resource allocation.

### National Supercomputing Mission (NSM): Expanding India's Computational Power

India's supercomputing infrastructure has significantly expanded, reaching **32 PetaFlops** with the addition of **5 PetaFlops in 2024**. The **largest supercomputing system**, commissioned at the **Inter-University Accelerator Centre (IUAC), New Delhi**, boasts **3 PetaFlops of computing power**. Additional supercomputers at **NCRA-Pune and SN Bose Institute-Kolkata** further strengthen computational research.

- The future roadmap includes adding **45 more PetaFlops**, pushing India's supercomputing capabilities to **77 PetaFlops** using indigenous technology.



## Artificial Intelligence & Cyber-Physical Systems: BharatGen and Beyond



Under the **National Mission on Interdisciplinary Cyber-Physical Systems (NM-ICPS)**, the **BharatGen initiative** has been launched, focusing on the development of **India's first multimodal, multilingual Large Language Model (LLM)** for Generative AI (GenAI).

- The **I-HUB Quantum Technology Foundation, IISER Pune**, has selected **eight startups** for funding, accelerating research in **quantum communication, computing, and sensing**.
- Plans are underway to **upgrade four top-performing Technology Innovation Hubs (TIHs) into Technology Translation Research Parks (TTRPs)**, boosting commercialization efforts.

## Geospatial Science: Expanding Spatial Thinking and Innovation

Geospatial technology adoption has increased through **Spatial Thinking Programs in Schools**, covering **116 schools across seven states** and reaching **6205 students**. Additionally, **575 participants** have received training in **geospatial science** through **Summer/Winter Schools**. Future plans include expanding the program to **five additional states** and organizing a **national event** to showcase research and innovation in this field.

## Climate Research and Risk Mapping for Disaster Preparedness

India has intensified its efforts in **climate resilience**, launching **four new Centres of Excellence** focused on **risk mapping for floods and droughts**. These initiatives aim to enhance **disaster preparedness and climate adaptation strategies** across the country.

## Technology Development Board (TDB): Funding Innovation for Future Growth

The **Technology Development Board (TDB)** has provided **₹220.73 crore** in funding across **seven key projects**, accelerating advancements in **critical technological sectors**. This initiative ensures that startups and innovators receive the necessary financial and infrastructural support to scale their ideas.

## Innovation in Science Pursuit for Inspired Research (INSPIRE): Nurturing Scientific Talent



The **INSPIRE** program, a flagship initiative of the **Department of Science & Technology (DST)**, aims to attract and support young talent in science and research. It fosters innovation across disciplines, including **engineering, medicine, agriculture, and veterinary sciences**, strengthening India's **S&T and R&D ecosystem**.

### Key Achievements in 2024:

- **34343** INSPIRE Scholars, **3363** INSPIRE Fellows, and **316** INSPIRE Faculty Fellows received financial support to pursue higher education and research in Science & Technology.
- **9** INSPIRE Fellows showcased their research at the 15th JSPS-HOPE Meeting in Kyoto, Japan (Feb 26 - Mar 1, 2024).
- **INSPIRE** Faculty Fellowship intake increased from **100 to 150 per year** to support more postdoctoral researchers.
- The **11th** National Level Exhibition and Project Competition (NLEPC) was held in **September 2024** at Pragati Maidan, New Delhi, attracting **10,000 students**. The Winners Felicitation Ceremony honored **31 students from 350 finalists** at Vigyan Bhavan, New Delhi.
- A record-breaking **10,13,157 nominations** were received for **INSPIRE-MANAK**, marking a milestone of **one million entries** from schools in 2024-25.
- A new initiative, "**Exposure Visit of Japanese School Students to India**," was launched under INSPIRE-MANAK. In August 2024, 10 Japanese students and 2 supervisors visited India to explore advancements in **science, technology, industry, and culture**.

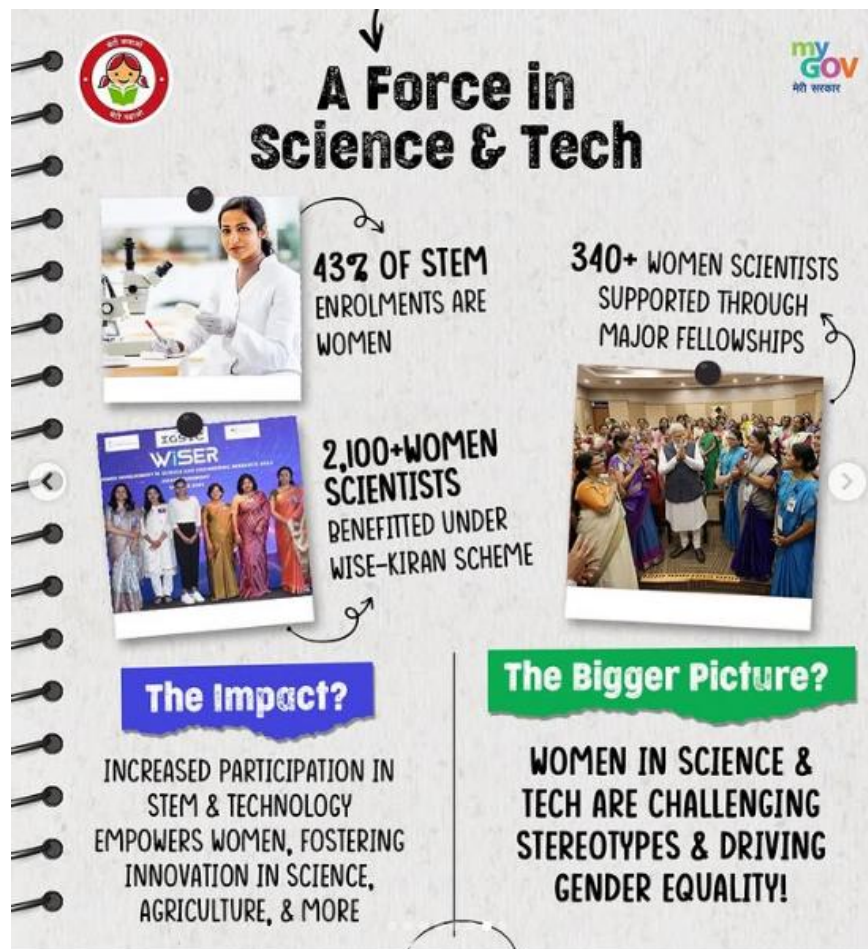
### Future Vision for 2025:

From **2025 onwards**, the **INSPIRE-MANAK** scheme will **expand its reach to Class 11 and 12 students**, ensuring that more young minds are engaged in scientific innovation at a crucial stage of their education. This initiative is expected to **strengthen India's scientific workforce and global leadership in research and development**.

## Bridging the Gender Gap: Empowering Women to Lead in Science

India has taken significant steps to promote gender parity in STEM. The **Department of Science and Technology (DST)** has recently implemented the **WISE-KIRAN (Women in Science and Engineering-KIRAN) scheme**, a comprehensive program designed to support women at various stages of their scientific careers.

### Key Initiatives:



- **WISE-PhD and WISE-Post Doctoral Fellowship (WISE-PDF):** Encourages women to pursue research in basic and applied sciences. More than 340 women scientists have been selected under 3 major fellowship programmes namely, WISE-PhD, WISE-PDF and WIDUSHI to carry out research in Basic and Applied Sciences.
- Launched two new programmes namely, Women's International Grants Support (WINGS) for research training in international labs and Women Leadership Programme for early and mid-level women scientists.
- **Vigyan Jyoti Program:** Encourages female students to pursue higher education and careers in STEM (Science, Technology, Engineering, Mathematics, and Medicine). Under Vigyan Jyoti, more than 29,000 girls of Class IX-XII from 300 Districts of 34 States/UTs of the country benefitted through various activities and interventions.

- Under the CURIE (Consolidation of University Research for Innovation and Excellence) Programme, 22 Women PG Colleges have been selected to establish state-of-the-art research facilities.

## The Glorious Heritage

Ancient India was a land of sages and seers as well as a land of scholars and scientists. Research has shown that from making the best steel in the world to teaching the world to count, India was actively contributing to the field of and technology centuries long before modern laboratories were set up.



**Ancient India's Contributions to Global Science**

**The Idea of Zero**  
Aryabhata introduced the symbol for zero, enabling modern arithmetic operations.

**The Decimal System**  
India developed the decimal system, revolutionizing arithmetic calculations.

**Numeral Notations**  
Indian numeral system, adopted by Arabs and later the West, became "Arabic numerals."

**Fibonacci Numbers**  
The Fibonacci sequence was first recorded in India through Sanskrit prosody.

**Binary Numbers**  
Pingala introduced the concept of binary numbers in his work on poetic meters.

**Chakravala Method of Algorithms**  
Brahmagupta devised an early algorithm to solve quadratic equations.

**Ruler Measurements**  
Harappan rulers had precise calibrations used in ancient architecture.

**Theory of Atom**  
Kanad proposed an atomic theory centuries before John Dalton.

**Heliocentric Theory**  
Aryabhata described Earth's rotation and revolution around the Sun.

**Wootz Steel**  
High-quality Indian steel was renowned worldwide for its strength and pattern.

**Smelting of Zinc**  
India pioneered the distillation process for zinc production.

**Seamless Metal Globe**  
Mughals created seamless metal globes using lost-wax casting.

**Plastic Surgery**  
Sushruta developed advanced surgical techniques, including rhinoplasty.

**Cataract Surgery**  
Sushruta performed the first recorded cataract surgeries.

**Ayurveda**  
Charaka laid the foundation for holistic medicine and preventive healthcare.

**Iron-Cased Rockets**  
Tipu Sultan developed iron-cased rockets, influencing modern warfare.

## Driving Innovation for a Brighter Future

National Science Day celebrates India's scientific progress and commitment to innovation. With advancements in quantum computing, AI, geospatial technology, and climate research, alongside initiatives fostering inclusivity and young talent, India is shaping a future driven by science and technology. As the nation moves towards *Viksit Bharat 2047*, continued investment in research and innovation will be key to global leadership and sustainable growth.

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