

Government of India  
Ministry of Science and Technology  
Department of Science and Technology  
(CDN Section)

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Technology Bhawan,  
New Mehrauli Road  
New Delhi-110016  
Dated: 15.03.2022

**OFFICE MEMORANDUM**

Subject: Monthly Summary to the Cabinet for the month of February, 2022.

The undersigned is directed to enclose herewith a copy of the Monthly Summary of important policy decisions taken and major achievements of the Department of Science & Technology for the month ending 28.02.2022 for information.

2. This has already been approved by Secretary, DST.

(Pulok Sen Gupta)  
Under Secretary to the Govt. of India

To,

All Members of the Council of Ministers (as per Annexure-I)

Copy with enclosures, forwarded to:-

- i. Vice Chairman, NITI Aayog, NITI Bhawan, New Delhi. (vch-niti@gov.in)
- ii. The Chairman, Union Public Service Commission (chairman-upsc@gov.in)
- iii. Chief Executive Officer, NITIAayog, NITI Bhawan, New Delhi (ceo-niti@gov.in)
- iv. The Principal Secretary to the Prime Minister, Prime Minister Office, South Block, ND (pkmishra.pmo@gov.in)
- v. All members of NITI Aayog, NITI Bhawan, New Delhi. (vk.saraswat@nic.in, rc.niti@gov.in, vinodk.paul@gov.in)
- vi. Secretary to the President of India. (secy.president@rb.nic.in)
- vii. Secretary to the Vice-President of India. (secyvp@nic.in)
- viii. Principal Scientific Advisor to the Govt. of India. (vijayraghavan@gov.in)
- ix. All Secretaries to the Government of India (secy-goi@lsmgr.nic.in)
- x. The Principal Director General, Press Information Bureau, Ministry of Information and Broadcasting. (pdg-pib@nic.in)
- xi. The Director, Cabinet Secretariat, New Delhi. (cabinet@nic.in)
- xii. Dr. Rabindra Kumar Panigrahy, Sc. 'E', DST for uploading the Monthly Summary on DST's website. (rabindra.p@gov.in)
- xiii. PSO to Secretary, DST. (anuj.tripathi@nic.in)
- xiv. AD (OL), DST for Hindi Translation (kn.singh65@gov.in)



**Department of Science & Technology**  
**Monthly Report**  
**February, 2022**

I. Important policy decisions taken and major achievements during the month:

**A. Science for society**

1. National Innovation Foundation (NIF), Ahmedabad facilitated granting of 4 patents to its grass root innovators on:
  - a. Improved paddy transplanter.
  - b. Low cost braking arrangement for a power generating wind turbine.
  - c. A device for scraping.
  - d. Herbal composition for therapeutic management of obesity and associated disorders and process of preparation thereof.
2. Aligned with the objectives of the program "VigyanSarvatraPujyate (विज्ञानसर्वत्रपूज्यते)" of showcasing science, technology & innovation from every part of our country, NIF has exhibited grassroots innovations, student creativity based innovations and outstanding Traditional Knowledge based products at three locations - New Delhi, Dehradun and Bhubaneswar.
3. Sree Chitra Tirunal Institute for Medical Sciences and Technology, (SCTIMST), Trivandrum is selected as an ICMR Specialty Centre for Clinical Trials (SCCT) and will be part of the "Indian Clinical Trial & Education Network (INTENT)". SCTIMST will focus on clinical trials in the domains of cardiology and neurology.
4. Two major projects of NECTAR, conceptualised on value addition of Banana Pseudostem-waste to wealth and organic farming implemented by NECTAR under the new scheme Prime Minister's Development Initiative for North-East (PM DevINE) which was launched specifically to carry out development activities in North East.
5. **Technology Development Board** felicitated Team Botlab for putting up a mesmerising show at the Beating the Retreat ceremony held on 29<sup>th</sup> January, 2022 at Rajpath.
6. Secretary, Technology Development Board launched 'NASO95' at IIT Delhi. The nasal filter developed by Nanoclean Global is the world's smallest wearable air purifier, which sticks to the nose and prevents entry of harmful air pollutants.
7. TDB participated in Amrit Mahotsav Science Showcase titled 'विज्ञानसर्वत्रपूज्यते' exhibition held on 22<sup>nd</sup> - 28<sup>th</sup> February, 2022 at JLN Stadium, New Delhi in which more

than 50 Departments/ Ministries participated. The showcase put on display our scientific legacy and technology prowess that have helped find solutions to problems in Defense, Space, Health, Agriculture, Astronomy, and others.

8. National Science Day 2022 was celebrated on the theme, "Integrated Approach in S&T for Sustainable Future" at a function organized at Vigyan Bhawan on 28 Feb 2022. Hon'ble Minister of State for Science and Technology & Earth Science (Independent Charge) Dr. Jitendra Singh conferred National Awards in Science Communication for 2021 and AWSAR awards upon the selected persons.
9. 29<sup>th</sup> National Children's Science Congress (NCSC -2021) was organized in virtual mode on focal Theme, "Science for Sustainable Living" which was hosted by Gujarat Council on Science & Technology during 15-18 February 2022.

## **B. Technology Development**

1. National Innovation Foundation (NIF), Ahmedabad has undertaken design improvement of five technologies (Tennis ball for blind, laddu making machine, sola wood sheet making machine, monkey repellent, wrist joint for spinal cord injury patients).
2. 62 Nos of stainless steel cylindrical capsules (300 mm height x 25 mm diameter) with a high corrosion resistant coating were successfully fabricated by International Advanced Research Centre for Powder Metallurgy and New Materials (ARCI), Hyderabad for the demonstration of a highly durable thermal energy storage system (1kW) applications.
3. Nanoparticle coated masks exhibiting self-disinfection, biodegradable, antiviral and anti-bacterial properties have been prepared and demonstrated at ARCI, Hyderabad and tested by CCMB, Hyderabad for their efficacy against SARS CoV2. Large scale production of 7000 masks have been done by the industry partner, Resil Chemical Ltd, Bangalore.
4. Following technologies **developed by** Technology Innovations Hub (TIH) established at IISc, Bangalore under NM-ICPS Scheme:
  - a. **Avtaar Robotics:** An emotive robotic nurse 'Asha' that captures the skills of a human nurse remotely. With the use of 5G and Wifi 6, one can connect avatar robots to remote human workflows that would help underdeveloped countries create jobs. This technology developed by **ARTPARK, IISc, Bangalore.**
  - b. **Project Eklavya:** It is an **AI & Robotics for a more Modern, Inclusive and Personalised education system developed by ARTPARK, IISc, Bangalore.** Millions of Indian school children and those from impoverished countries who do not have access to reputable schools and laboratories would benefit from remote learning labs.

c. I-STAC.DB: Indian Space Technologies and Applications Consortium Design Bureau, is a consortium launched by TIH at IIT Madras, IITM Pravartak Technologies Foundation and five other entrepreneurial start-up companies in deep tech and engineering domain. The consortium will focus on building an end-to-end Atmanirbhar ecosystem for space technologies from on-demand access to space including rapid launch capability, satellites, sensors, future generation communication such as 6G, satellite data and its applications.

### C. International Cooperation

1. **10<sup>th</sup> Foundation Day of GITA:** The 10th Foundation Day of GITA was celebrated on 17th February 2022 on the virtual platform on the theme -- Collaborate & Create for a Sustainable Future. Dr. S Chandrasekhar, Secretary Department of Science & Technology, Govt. of India, stressed on focusing on gaining from lead expertise of different countries for taking forward collaborative initiatives. He also highlighted the need to take the success stories to the masses and proper propagation of the technologies throughout the length and breadth of the country for societal benefits. One of the projects which had developed a mechanism by which the refrigeration water cooling systems would consume 25% of less electricity and power sources was appreciated as it will directly help us to reach carbon neutrality and minimize global warming. The GITA Global Technology Development Awards 2021 were also presented to seven companies on the occasion. The daylong event was a multi-stakeholder platform to exchange ideas along with a special 'Fireside Chat' with Dr. VK Saraswat, Member, NITI Aayog. There were 6 Country Sessions with Israel, the Republic of Korea, the United Kingdom, Sweden, Italy, and Canada and Panel Discussion on Global Perspectives 'Collaborate and Create for a Sustainable Future' in which Taiwan, Israel, Canada, Sweden, and United Kingdom participated.
2. **Launch of 'Paired Early Career Fellowships in Applied Research (PECFAR)':** Indo-German Science and Technology Centre (IGSTC) launched a program titled 'Paired 'Early Career Fellowships in Applied Research (PECFAR) to facilitate the exchange of early-career Indian and German researchers on February 01, 2022.
3. **Result announcement of India-Russia call for joint proposals:** An India-Russia Joint call for proposals with the Russian Science Foundation (RSF) in the areas of (i) Smart transport and telecommunications, (ii) Smart healthcare and medicine, (iii) New Materials, (iv) Plant and Animal Bio-Technology, (v) Clean Energy, (vi) Artificial Intelligence and (vii) Safe Food was advertised in March 2021. RSF and DST has decided to support 26

proposals out of the total 293 proposal received against the joint call, the final result of which was announced on the DST website on 17th February 2022.

4. **Inauguration of the Indo-German Science and Technology Centre (IGSTC) new office:** The new office of the Indo-German Science and Technology Centre (IGSTC) at Technology Bhawan, New Delhi was inaugurated by Dr. S. Chandrasekhar, Secretary, DST and German Ambassador to India, Mr. Walter J. Lindner on 21<sup>st</sup> February 2022. The new office would create more visibility and help in improving networking with the number of scientific organizations.

#### **D. Human Capacity Building**

1. “2nd Advanced Training Program on Water Resource Management, Glacier Monitoring & Climate Change Studies”, an online capacity building program, 29<sup>th</sup> Jan – 18<sup>th</sup> February 2022 was organized by Centre of Excellence (CoE) on Water resources, Cryosphere, and Climate Change Studies established at Department of Geology, Sikkim University under the **National Mission for Sustaining Himalayan Ecosystem (NMSHE)**. Around 25 M.Sc./M.E./M.Tech. /Ph.D. students in relevant discipline of Geoscience/Environmental Science/Civil Engineering, Geography/ Glaciology/Remote Sensing selected for the programme benefitted from the course.
2. **International Day of Women and Girls in Science:** The Department of Science and Technology has celebrated International Day of Women and Girls in Science on 11 February, 2022 under the banner of Azadi ka Amrit Mahotsav. WISE-KIRAN Division has conducted number of the activities on the Day under its various programmes:

Role model was organized on the occasion of “International Day of Women and Girls in Science” on 11<sup>th</sup> February, 2022. The event saw the release/launch of the Vigyan Jyoti Logo and the Vigyan Jyoti Portal by Dr. S. Chandrasekhar, Secretary, DST, followed by the release/launch of the Vigyan Jyoti E-Brochure and Science Festival by Dr. Tessy Thomas, Director General, Aeronautical Systems, DRDO.

**3-day Science Festival** for Vigyan Jyoti scholars was organized in collaboration with AIF and Science Utsav (Bangalore) through virtual mode on 11<sup>th</sup>, 12<sup>th</sup> and 14<sup>th</sup> February, 2022.

**Sparkle Series:** After the successful inauguration of the Sparkle Series for Vigyan Jyoti Scholars in January 2022, three sessions were held in the month of February, 2022. The sessions conducted by Prof. Manish Jain, Principal Coordinator, Center for Creative Learning (CCL), IIT-Gandhinagar and his team were aimed at the teaching of curriculum-based topics on Science, Math, and Computational Thinking through storytelling, experiential sessions, and discovery of fun facts.

**Special Classes:** Total 128 special classes have been conducted for Class XI-XII girls under Vigyan Jyoti.

### 3. **Gender Advancement for Transforming Institutions (GATI):**

- NIT Rourkela has organized a 5 days webinar on "Gender equity towards achieving the sustainable goals of India" and also conducted a 5 day webinar on "STEMM-Present, future and Challenges" under GATI.
- Panel discussion on "Voice Matters: Women, Science and Academia" was organized by IIT Delhi under GATI initiative.
- IISER Mohali organized "Women in Astronomy" a panel discussion focusing on the journey of women in Science under GATI.
- NIT Durgapur organized one day webinar on "Women in STEMM-Breaking the Glass Ceiling" under GATI.
- M S University of Baroda organized webinar on "Breakthrough Barriers and achieve your goals under the umbrella of GATI".
- NIPER Hyderabad organized Webinar on "GATI: Catalyzing Change".
- Wild Life Institute of India organized an online workshop on "समानता, विविधता और समावेशन:महिलासशक्तिकरण केतीनस्तम्भ " under the aegis of DST-GATI.

4. Under the “**Vigyan Ustav**” programme, 23 State/UT Science & Technology Councils have organized the programmes on the February month’s specific theme “**Science Communication and Popularization**” to highlight science communication and popularization as a factor of STI ecosystem to augment self-reliance at State level.

5. As a part of “**Azadi Ka Amrit Mahotsav**”, “**Techनीव@75**” programme was organized on 11<sup>th</sup> and 25<sup>th</sup> February,2022 in collaboration with the Ministry of Earth Sciences (MoES). Padma Shri awardee Dr. Sharad P. Kale, (Head, Technology Transfer and Collaboration Division, Bhabha Atomic Research Centre, Mumbai) and Prof. S.P. Gon Chaudhuri (Solar Man), President, NBIRT, West Bengal graced the event and discussed the role of STI to nurture and strengthen the local innovations.

### **E. Scientific Research**

1. Scientists from Aryabhata Research Institute of Observational Sciences (ARIES), Nainital developed a new technique to reveal the dynamic structures in the solar corona in

coronagraph images as well as do much faster processing of the images. The recent study of Pluto's atmospheric pressure using observations from ARIES telescopes received wide media coverage.

2. Crude drug authentication service rendered to academia and industry by MACS-Agharkar Research Institute (ARI), Pune.
3. In a study conducted by Indian Association for the Cultivation of Science (IACS), Kolkata sequential sensitization of TiO<sub>2</sub>-B nanowire photoanodes via CdS Q-dots impregnation and further by N3 dye molecules adsorption improves the light harvesting, facilitates efficient photo-carrier generation, prevents interfacial charge recombination, and their cumulative electron injection has been assimilated in superior photovoltaic performance via novel 'CdS-Q-dots & N3-dye co-sensitization to TiO<sub>2</sub>-B NWs' in Q-dots-co-sensitized Dye Sensitized Solar Cell.
4. Analysis of broadband X-ray data from multiple telescopes by astronomers at the Raman Research Institute (RRI), Bengaluru has led to a better understanding of the accretion properties of a specific class of a white dwarf – late main sequence star binary. The study has placed tighter constraints on the mass of the white dwarf compared to earlier constraints.
5. Using quantum Langevin equations and Greens function method, theorists at RRI have derived exact expressions for steady-state electrical, thermal, and spin current at the junctions between a system and leads in various open quantum systems whose systems and leads/baths are made of topological superconductors, semiconductors, and metals. The study has resulted in new thermoelectric and spin transport findings in various two-terminal geometries beneficial to the present challenges in probing the emergence of Majorana quasi-particles in experiments.
6. Institute of Advanced Study in Science and Technology (IASST), Guwahati discovered a next generation probiotic bacterium *Lactobacillus plantarum* JBC5 from a dairy product that shows great promise in promoting healthy aging. This probiotic bacterium demonstrated a 27.81% increase in the life span of the model organism *Caenorhabditiselegans* accompanied by the hallmarks of healthy aging by providing improved immunity against pathogenic infections, increased learning ability and memory, gut integrity, and oxidative stress tolerance. In contrast, it significantly reduced the accumulation of body fat and inflammation. Furthermore, the team also developed a yoghurt using this next-generation probiotic strain to derive all health benefits. A patent has been filed for "A Method for Preparation of Functional Curd with Anti-ageing property and High Shelf Life".



7. The researcher at Indian Institute of Astrophysics (IIA), Bengaluru studied soft x-ray (0.3-10 keV) emission from a 40 arcmin segment of the southern limb of the <200b>Cygnus loop Cygnus S-I, and find an unusually high abundance of the elements Sc and V. IIA, now looking at an adjoining segment, to search for variations in temperature, ionization state, abundance and other thermodynamic parameters in the southern projection of the Cygnus loop. The aim is to investigate if the southern limb, which deviates significantly from the near-spherical morphology, is a younger SNR in same line line-of-sight, or if the ejecta has run in to a locally lower density region.
8. The temperature dependent single crystal X-ray diffraction study was carried out by S N Bose National Centre for Basic Sciences (SNBNCBS), Kolkata in the range 100 - 370 K and it is established that the reflection conditions are consistent with a primitive monoclinic cell with the only possible P2(1)/n space group. Basing on the data on magnetization and the hierarchy of exchange interaction parameters a model of Cu<sub>9</sub>O<sub>2</sub>(SeO<sub>3</sub>)<sub>4</sub>Cl<sub>6</sub> magnetic structure is suggested.
9. A combination of dielectric and magnetic experimental signatures on Mg<sub>x</sub>Fe<sub>3-x</sub>O<sub>4</sub> nano-hollow spheres (NHSs) magnetic semiconductor system presented by SNBNCBS, Kolkata. An excellent electromagnetic wave absorbing efficiency with reflection loss (RL)= - 53.8 dB in the 1-20 GHz range is achieved by utilizing high room temperature dielectric and magnetic loss, and the hollow interior of Mg<sub>0.3</sub>Fe<sub>2.7</sub>O<sub>4</sub> NHSs, opening up interesting possibilities in lightweight shielding devices, and waveguides for microwave applications.
10. Wadia Institute of Himalayan Geology (WIHG), Dehradun constructed and validated glaciers and glacier lakes inventory of the Subansiri River Basin in the Brahmaputra catchment using Landsat satellite data and WIHG also estimated equilibration temperature (436°C - 626°C) and log<sub>f</sub>O<sub>2</sub> (-31.9 to -19.5) of the ilmenite-titanomagnetite assemblage of Garhwal Lesser Himalaya sequence, and explained as due to hydro thermal alteration and low-grade metamorphism.
11. *Ervatamiacoronaria*, a popular garden plant in India and some other parts of the world though known traditionally for its anti-inflammatory and anti-cancer properties, molecular bases of these functions remain poorly understood. The anti-CRC activity of an alkaloid-rich fraction of *E. coronaria* leaf extracts (AFE) and associated underlying mechanism was reported by Bose Institute (BI), Kolkata. This study provides a logical basis for consideration of AFE in future therapy regimen to overcome the limitations associated with existing anti-CRC chemotherapy.
12. Recently an inter-specific hybrid between basally branched indeterminate cultivated *Sesamum indicum* genotype and wild *S. prostratum* with no branching yet synchronous pods on the shoot has been developed by BI. This is important as determinacy is a desirable trait in sesame, an important oilseed crop. The hybrid and a few exotic sesame

germplasms were successfully screened with a determinacy (dt) gene-based DNA marker. In-silico translation of the partial coding sequences of the dt gene from the two contrasting parent genotypes revealed an SNP (V159A) in *S. prostratum*. The predicted cytoplasmic dt protein showed a high resemblance with flowering protein *centroradialis*.

## **F. Scientific Infrastructure Building**

### 1. Fund for Improvement of S & T Infrastructure in Universities and Higher Educational Institutions (FIST):

- DST approved support to 76 departments of various institutes.
- 76 new proposals (Level 0: 8, Level 1: 45, Level 2: 23 and Level 3: Nil) amounting to Rs 112.24 Crores, where DST share of ₹ 98.00 crores (87.0%) and Other than Govt. or Private share of ₹14.24 crores (13.0%) were recommended for support.
- The quantum of funds approved across different FIST levels is - Level 0: Rs 7.95 Cr (7.10%), Level 1: Rs 63.92 Cr (56.9%), Level 2: Rs 40.37 Cr (36.0%) and Level 3: Nil] were recommended for support.

### 2. Promotion of University Research and Scientific Excellence (PURSE):

Cryogenic Transmission Electron Microscopy (Cryo-TEM) facility established at Jamia Hamdard under the aegis of PURSE is inaugurated by Hon'ble Minister of State (Independent Charge) of the Ministry of Science and Technology & Earth Sciences.

### 3. Sophisticated Analytical Instrument Facilities (SAIF):

*The SAIF Program is being implemented through a 2-tier mechanism in which the Apex Committee is the "Steering Committee" chaired by the Secretary, DST and is assisted by the Facility Management Committee (FMC) of each SAIF Centre. The Steering committee meeting was conducted on 8th Feb 2022 through virtual mode. The Committee recommended new research facilities to Eleven SAIF centres, including grants under recurring Head to SAIFs located in North Eastern region i.e. NEHU Shillong and Guwahati University, Guwahati, for upkeep of the facilities and the centres.*

### 4. Synergistic Training program Utilizing the Scientific and Technological Infrastructure (STUTI)

- a. The STUTI 2021 was awarded to 13 Institutes/ Universities against the Advertisement released in the month of November, 2021. These Institutes (Project Management Units,

PMUs) have been sanctioned funds for organization of 'Awareness and Training programs' under the STUTI program.

- b. The Awareness programs were organized by the STUTI PMUs from 22nd-28th February 2022, the week designated to the MoS&T by the Ministry of Culture under the 'Azadi ka Amrit Mahotsav' festivities. Special emphasis was given for participation of Girl students and students belonging to the disadvantaged sections of the society.

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