Department of Science & Technology
Monthly Report
December, 2020

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

A. 6th edition of India International Science Festival 2020 (IISF):

1. The 6th edition of India International Science Festival 2020 (IISF) was organized by Department of Science and Technology (DST), Department of Biotechnology (DBT), The Council of Scientific and Industrial Research (CSIR) and the Indian Council of Medical Research (ICMR) in collaboration with Vijnana Bharati (VIBHA) during 22nd–25th December, 2020. The theme of the 6th IISF was 'Science for Self-Reliant India and Global Welfare'. This virtual event showcased to the attendees how STEM- science, technology, engineering and mathematics play a major role in providing solutions in our lives.

2. Jawaharlal Nehru Centre for Advanced Scientific Research participated in Mega Science Technology and Industry Expo category in 6th India International Science Festival 2020 held from December 22-25, 2020. On the virtual platform, JNCASR exhibited its academic programmes, research achievements and outreach activities through posters, brochures and other display materials in its virtual stall. Several students, teachers, people from industry and general public interacted over audio, video and live chat available at the stall.

3. Moderated few sessions on Water Segment from 22nd Dec to 25th Dec 2020 on Implementing water technologies in project, Entrepreneurship in Water etc. In this event, approx 25 Principle Investigators from Water Technology Initiative projects also presented the outcomes of their respective projects.

4. SEED Division, DST in collaboration with CSIR-NISCAIR & Vibha Vani organized event-cum contest "**Nav Bharat Nirman- Building of New India"** during India International Science Festival (IISF) from 23rd -24th December, 2020. During this event, six Plenary Sessions on "Igniting Young Minds for Solution centric STI Interventions" including the problem statements ("Building self-reliant SMART Villages for Inclusive Growth"; "Agriculture, Post-Harvest Technology & Rural Engineering"; "Innovative Ideas for Habitat & Water Resources Management"; "Promoting Innovative Ecosystem for Affordable Renewable and Clean Energy Solutions"; "Nature based solutions – Resource efficiency & Circular Economy";

"Strategic Climate Action plan for Sustainable Future") and two Panel Discussions on identifying the Effective Pathways for Application & Delivery of Sustainable Technologies for livelihoods Gain and Economic Re-growth" and to foster Public-Private linkages for promoting Social Entrepreneurship Ecosystem had been conducted to orient participating organizations/individuals about role of STI for Aatmanirbhar Bharat.

5. **State S&T Ministers Conclave (SSTMC)** was organized on 23rd December, 2020 during sixth **India International Science Festival (IISF**) by DST in collaboration with CSIR-NISCAIR & Vibha. The theme of this year's conclave was '**Post COVID-19 Livelihood Opportunities-Rebooting the System'** which was designed to bring out strategic action plans to create livelihood opportunities at state level. During the inaugural session, Prof. Vijayraghavan, Principal Scientific Advisor to Government of India presented the way forward for Centre-State Collaborations. The conclave was attended by Dr. Harsh Vardhan, Hon'ble Minister of Science and Technology and 7 State Ministers from Bihar, Goa, Madhya Pradesh, Puducherry, Rajasthan, Telangana and Uttar Pradesh.

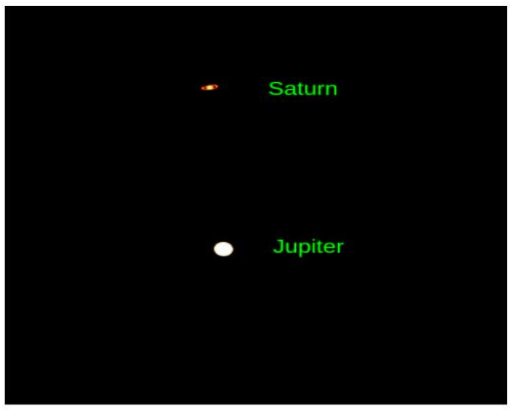
6. **Overseas Ministers & Diplomat Conclave:** Overseas Ministers and Diplomats conclave was organized virtually on 23 December, 2020 at the India International Science Festival 2020. The theme for the event was R & D Strategy in the Post COVID era as per the current need. Union Minister of Science & Technology, Earth Sciences and Health & Family Welfare Dr. Harsh Vardhan addressed Science & Technology Ministers from Afghanistan, Cambodia, Myanmar, Philippines, Sri Lanka, Uzbekistan and diplomats from Denmark, Italy, Netherlands, Switzerland, and other countries during this conclave.

   The Ministers from partner countries: Dr. Abas Basir, Minister of Higher Education, Afghanistan; Dr ChhemKiethRethy, Minister Delegate attached to the Prime Minister and Secretary of State, Ministry of Industry, Science, Technology & Innovation, Cambodia; Dr Myo Thein Gyi, Minister of Education, Myanmar; Dr Fortunato T De La Peňa, Secretary (Minister) of Science and Technology, Philippines; Dr Seetha Arrambepola, Minister of Skill Development, Vocational Education, Research Innovation, Sri Lanka; and Drlbrokhim Yu Abdurakhmonov Minister of Innovative Development, Uzbekistan attended the event virtually and shared their perspective about the theme.

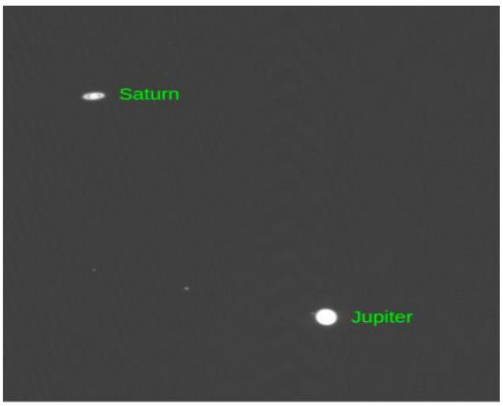
Another session was welcomed by Prof. Ashutosh Sharma. Secretary, DST. Diplomats from Russia, Italy Denmark Switzerland etc have raised their concerns and strategies about the post COVID era.

B. Science for Society

1. A one day National Webinar titled "An Overview of Climate Change over South Asia: Observations and Modelling Perspectives" was organized by Aryabhatta Research Institute of observational sciences (ARIES).
2. The Great Conjunction of Jupiter and Saturn on 21-Dec-2020 was successfully captured with ARIES telescopes (Figure 1).



I-band optical image of Jupiter - Saturn conjunction taken with the 4K x 4K CCD mounted on 1.04m Sampurnanand Telescope (ST) around 6:00 pm on 21th December 2020, at ARIES, Nainital.



r-band optical image of Jupiter - Saturn conjunction taken with the Faint-Object Spectrograph and Camera (FOSC) with 3.6m Devasthal Optical Telescope (DOT) around 6:00 pm on 20th December 2020, at ARIES, Devasthal.

3. The conjunction of Jupiter and Saturn on 21st December, 2020, was streamed live between 18:00 and 19:00 hrs from Leh, Hanle, on Indian Institute of Astrophysics YouTube channel.
4. Lectures on "*Nanotechnology and New Materials: From Energy Security to Artificial Intelligence*"; "Swiss Cheese and Rollable Displays"; and "The 'Mysterious' Brain: Wellness to Illness" were delivered by scientists of Jawaharlal Nehru Centre for Advanced Scientific Research & Centre for Nano and Soft Matter Sciences.
5. Validation of innovative agricultural plant varieties by National Innovation Foundation (NIF) revealed that farmer's soybean variety Soyashri exhibited early maturing, non-shattering attribute and yield at par with reference varieties. Similarly, paddy variety Chinni Krishna exhibited good yield, medium duration, have good tillering capacity with fine grains of good quality in comparison to locally grown check varieties.

6. From a total of 6.53 lakh ideas and innovations received for the INSPIRE Awards – MANAK 2020-21, a total of 1.53 lakh ideas were evaluated during December 2020 through an online evaluation portal by NIF.

7. Technology Information, Forecasting & Assessment Council (TIFAC) formulated a Mission proposal for Seaweeds. Considering the current COVID 19 pandemic and keeping in view strengthening the Healthcare system in India, TIFAC has initiated a study on "Current Trends in Telemedicine in India".

8. North East Centre for Technology Application and Reach (NECTAR) conducted meeting with Bamboo Utility products manufacturers regarding future possibilities of collaboration and Foundation for Innovative Packaging & Sustainability (FIPS).

9. Indian National Science Academy organized 3 symposia on Human Health and Disease: Lessons from Genomic Studies; Cyber Security in Digital Age-Introduction and Gender issues in Science.

10. Vigyan Prasar (VP) published the monthly DREAM-2047 in Hindi & English and e-circulated as per schedule. VP also produced 68 video programmes, 2 short films, Conducted 32 live programmes, 12 interviews, 68 Scripting, 68 Preview of Video programme, 98 voiceover 43 short video repurposed, 10 repackaged, 75 promos, 30 edited sotires, 20 synopsis and 68 edited shows in science channel.

11. POSHAN Awareness camp and COVID-19 awareness camp, were organized, respectively by the Varanasi and Jharkhand Chapters of the National Academy of Sciences.

12. During last (8th) week of Web Clinic series **"Science & Society Setu for Aatmanirbhar Bharat (S^{3}4ANB)"**, multi stakeholders (KOs, NGOs and Society) had deliberations on the focal themes **"Cross-sectoral area",** wherein discussions were focused on harnessing Science, Technology & Innovation (STI) to address cross-sectoral issues for improving efficiency of livelihood systems; strengthening S&T capacity of NGOs and Communities through Knowledge Institutions and improvising Scientific Social Responsibility (SSR) amongst scientific community to drive research and development towards holistic progress.

13. A **new call for proposal (CFP)** for Geospatial start-ups and knowledge Institutions of the Country **on 'Geospatial Analytics for Revival and Restoring the Economic Growth in Post COVID-19 Scenario'** has been issued **in**

Collaboration with AGNi initiative (Accelerating Growth of New India's Innovations**), Office of the Principal Scientific Adviser** to the Government of India under the Prime Minister's Science, Technology, and Innovation Advisory Council PSA office**.** The above CFP aims to strengthen the area specific geospatial analytics capabilities of the country as the COVID-19 outbreak will not have only short-term impact but also many long-term socio-economic effects as well.

14. **INSPIRE Awards-MANAK:**

    a) The massive drive, had a huge impact on the nominations received in the year 2020-21 for INSPIRE Awards-MANAK. Received **6,53,000 entries** from 36 States & UT.

    b) The entire set of 6,53,000 ideas and innovations were reviewed and adjudicated within a period less than two months, by virtue of another IT application and the involvement of nearly 400 experts spread across different parts of the country.

    c) Processed all the received entries and **53021 entries** Shortlisted for District level from 36 States & UT and uploaded on the E-MIAS for further processing.

    d) Throughout the country about 96 percentage of Districts participated, with 50.70% girls and 49.3% boys representation.

    e) Out of 124 Aspirational districts total 123 districts participated in INSPIRE – MANAK 2020-21.

15. **Vigyan Jyoti:** in Phase-II, Vigyan Jyoti Scheme has been expanded in 100 districts of the country and it is further extended for girl students of Class IX. Now onwards around 10000 meritorious girl students of Class IX to Class XII will be benefitted under Vigyan Jyoti.

16. During December, virtual lab visits of "National Institute of Science Education and Research", Kolkata and "S.N. Bose National Centre for Basic Sciences", Kolkata have been conducted. Role model interaction with Prof. Arti Kashyap, IIT Mandi was also organized.

17. **Special Online Classes:** In this month 32 online classes for Class XII students and 31 classes for Class XI students have been conducted to give them more clarity of concepts and skills to face the competitive examinations.

18. **CURIE:** Establishment of Artificial Intelligence facility in women universities is the new step under CURIE (Consolidation of University Research for Innovation

and Excellence in Women Universities) Programme to encourage young girls to harness the benefit of this new technology. An Expert Committee meeting has been conducted in December for recommendation on proposals received for establishment of AI facility. CURIE-AI major grant has been sanctioned to two (2) women universities viz. Indira Gandhi Delhi Technical University for Women, Delhi and Shri Padmavati Mahila Vishwavidyalayam, Tirupati.

19. 50 New Projects were supported for conducting the Training Program on Innovation & Entrepreneurship i.e Women Entrepreneurship Development Programme (WEDP), Technology Based Entrepreneurship Development Programme (TEDP) & Faculty Development Programme (FDP) by Academic & Engineering Institutes.

C. National Technology Mission

1. The Tripartite Agreement signed with 12 Technology Innovations Hubs (TIHs) and the initial release of Rs.159.00 crores has been made to 12 Technology Innovations Hubs (TIHs) established under **National Mission on Interdisciplinary Cyber Physical Systems** (NM-ICPS).

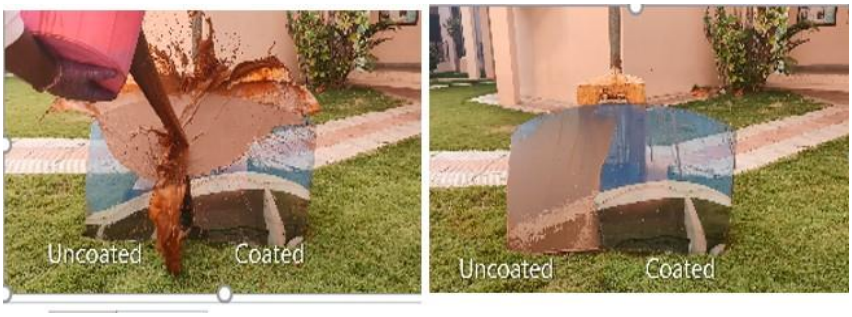
2. The Detailed Project Report (DPR) on National Mission on Quantum Technology & Application (NM-QTA) has been approved by the Competent Authority and draft of EFC has been circulated.

D. Technology Development

1. A Mini Prototype Asymmetric Pseudo-capacitor ($NiCo_2S_4//\alpha\text{-}Fe_2O_3$) with specific capacitance of 142 F/g at 1 A/g current density was demonstrated by International Advanced Research Centre for Powder Metallurgy and New Materials (ARCI).

Mini Prototype Asymmetric Pseudocapacitor

2. ARCI's easy to clean coating was demonstrated on Car Windshield Glass to an Automobile company.



Easy to clean coating developed on Car Windshield Glass in cleaning action after pouring the muddy water

3. 6 patents were granted to the innovators with the help of National Innovation Foundation (NIF) on –

   a. Herbal compositions for the prevention or control of plant pests (Patent Number - 352692)

   b. Apparatus to sterilize currency automatically in cash box and method thereof (Patent number – 353677)

   c. Castor thresher (Patent number – 322825)

   d. Cost effective electro fluorescent device (Patent number 353976)

   e. System and Method for Alerting Expiration of Medicine (Patent number 352475)

   f. Pattern perforating tool (Patent number 352413)

4. NIF transferred a grassroots innovation based technology - Tamarind de seeder and Multi seed decorticator to Odisha based farm implements sole proprietorship firm M/s Hindustan Machinery for manufacturing and distribution.

5. A Meeting held with Ministry of Coal (MoC), Central Mine Planning and Design Institute (CMPDI), Coal India Limited (CIL), Directorate General of Mines Safety (DGMS) Dhanbad and Central Institute of Mining and Fuel Research (CIMFR) to develop guidelines for implementing MoC research projects.

6. DST has strengthened the support to ongoing project WIC centre being led by IIT Kharagpur and other partnering organization IICT Hyderabad, Jadavpur University, IIT Guwahati & NIT Durgapur. The centre has completed approved objectives as per the timeline of the project, in which IIT Kharagpur has

developed two pilot scale field demonstration fluoride removal filters that were installed in Bankura, WB.

7. DST has also strengthened the support to INDO UK project “Secular Changes and Remediation of Groundwater Arsenic in the Ganga River Basin" being led by National Institute of Hydrology, Roorkee and other partnering institutes IIT Roorkee, IIT Kharagpur and MCSRC Rajasthan.

8. As part of Remedial Action, Knowledge Skimming and Holistic Analysis of COVID-19 (RAKSHAK) project undertaken under NM-ICPS TIH at IIT Jodhpur, one of the RAKSHAK projects by a team from IIT Bombay has developed Tapestry method for screening COVID-19. The Tapestry method has been shortlisted by X-prize in an open Innovation Track.

9. In order to provide technical directions, insights on heritage conservation, documentation, digital restoration and Executive Committee (EC) and Expert Advisory Committee (EAC) for futuristic technology insights for Indian Heritage and related matters has been constituted.

10. R&D support was provided for the “**Development of Landslide Early Warning System and Real Time Monitoring, Uttarakhand**” to Department of Civil Engineering, Indian Institute of Technology Indore, Madhya Pradesh.

11. R&D support was provided to Centre for Advanced Study in Geology, Punjab University, Chandigarh, for “**Development of Landslide Forewarning System for Manikaran, Himachal Pradesh**”.

12. R&D support was provided to School of Computing and Electrical Engineering, Indian Institute of Technology, Mandi, Himachal Pradesh for “**Development of A low cost MEMS-based and video based monitoring and early warning system for rainfall induced landslides**”.

13. R&D support was provided for “**Geological Geophysical investigation and Design and Development of Cyber-Physical-system for early detection of Landslide vis-a-vis Socio Economic Impact Assessment**” to Department of Geography, Jamia Milia Islamia, New Delhi, and to Department of Earth Science, IIT Roorkee.

E. International Cooperation

1. DST participated in the United Nations Global Geospatial Information Management (UN-GGIM) thirteenth online meeting of the **Working Group on**

Policy and Legal Frameworks for Geospatial Information Management held on 17th December, 2020. The main aim of the meeting was to discuss work plan and activities of the working group including Authoritative data, authority and custodianship; Geospatial data for public good and ethical use and Resources to facilitate data sharing, exchange and dissemination etc.

2. A meeting held with officials from European Commission, Innovation and Networks Executive Agency (INEA), Delegation of the European Union to India to discuss on ongoing activities and future plan on India-EU joint call on Integrated Local Energy Systems.

3. Three trans-national Research Development and Deployment (RD & D) project proposals recommended by ERA-NET under the joint call 2019 on "Energy storage solution" (MICALL19) were processed for financial concurrence. One of the projects entitled "Different Energy Vector Integration for Storage of Energy (DEVISE)" was sanctioned.

4. DST-NWO bilateral Call received 13 Indo Dutch proposals against the Cleaning Ganga and Agri Water Call. The eligibility checks has been done and peer review process has been initiated.

5. **Mega Science:** India-TMT Optics Fabrication Facility at the Centre for Research and Education in Science and Technology (CREST) campus of the Indian Institute of Astrophysics (IIA) was inaugurated by Hon'ble Vice President of India. It is a largest ground-based astronomy project in the northern hemisphere and is expected to be completed in the early 2030s.The Vice President said that participation in such mega scientific projects would provide a level playing field to Indian scientists and help the industries to build capacity in the high technology field.

6. **Technology Summit:** Dr. Harsh Vardhan, Union Minister of Science & Technology, Health and Family Welfare and Earth Sciences, Government of India, and Prof. Manuel Heitor, Minister of Science, Technology and Higher Education, Government of Portugal, addressed the inaugural session of the India-Portugal Technology Summit on 7th December, 2020 with focus on water tech, agritech, healthtech, energy, climate change, cleantech, IT, ICT, advanced technologies, and space-ocean interactions. Dr. Harsh Vardhan also inaugurated the high-technology digital exhibition on 7th December, 2020 as part of the Summit. The three days summit was attended by 2,200 delegates (200 from Portugal, 2000

from India & 64 from other countries) and had 85 speakers. Around 49 Indian industries and 11 Portugal industries showcased their technology in areas like water, health, energy, cleantech, and so on at the digital exhibition. Besides, 200 B2B meetings were held to share experiences.

7. **BRICS S&T Working Group Meeting:** BRICS Steering Committee meeting was held on 22 December, 2020 to prepare a roadmap for the implementation of agreed activities during the BRICS Science & Technology Ministerial meeting. A dedicated web portal is created for sharing the information under BRICS STI MoU. Proposal on popularization of science among BRICS Countries and the formation of an association of BRICS young scientists was also appreciated and encouraged during this meeting.

   India has assumed the BRICS Presidency from 1 January 2021. Now India will be steering the agenda and overall outcomes of BRICS STI collaboration. Accordingly, India will host several events such as the 9th BRICS STI Ministerial meeting and senior officials meeting; 6th BRICS Young Scientist Conclave; thematic Working Groups meeting of BRICS STIEP: Astronomy; New and Renewable Energy and Energy Efficiency; BRICS Academies of Science; and BRICS STI Funding Parties in the coming year.

8. **India-Russia Joint Working Group:** The eleventh meeting of the India-Russia Joint Working Group on cooperation in Science and Technology was organized through an online platform on December 17. The meeting was Co-chaired by Head-International Cooperation Division, DST from the Indian side, and Deputy Director, Department of State Scientific and Scientific-Technical Policy of Ministry of Science and Higher Education from the Russian side. Both sides discussed to prepare the road map for future cooperation. Both sides discussed and finalized Roadmap for cooperation in Science, Technology, and Innovation (STI).

9. **BRICS Call for joint COVID-19 Projects:** A total of twelve (12) joint projects were recommended for support under the BRICS call for joint COVID-19 projects. These projects are primarily targeting repurposing of drugs and vaccines for treatment and prevention of COVID-19; genomic sequencing of SARS-CoV-2 and studies on the epidemiology and mathematical modelling; of the COVID-19 pandemic. Eight funding agencies from BRICS countries are supporting this initiative including the Department of Science and Technology and Department of Biotechnology from India.

India is partnering in six projects with the lead Indian R&D laboratories: All India Institute of Medical Sciences, New Delhi; ICMR-National Institute for Research in Tuberculosis, Chennai; ICMR-Regional Medical Research Centre; National Institute of Biomedical Genomics (NIBMG), Kalyani, West Bengal; Centre for Environment, Institute of Science and Technology, JNT University, Hyderabad.

10. **Australia India Strategic Research Fund (AISRF) – Round 12 & Round 13:** A total of six projects were approved to support under the Australia India Strategic Research Fund (AISRF) – Round 12 and 13. The first three projects were supported in the areas of food processing, storage & distribution, and climate change mitigation and adaptation under the Round 12. However, the other three collaborative research projects were supported for the one-year duration in the areas of (i) antiviral coatings, other preventive technologies, (ii) data analytics, modelling, Artificial Intelligence applications, and (iii) screening and diagnostic testing. These were the priority areas for AISRF Round 13 - COVID-19 collaborative research to find the solutions against COVID-19 in a short span of time.

11. **Indo German Research Day:** Indo German Research Day was organized by DWIH, New Delhi on December 3 to discuss various opportunities for research and exchange of students through virtual mode. Director DWIH Germany and a senior official from DST have given the overview of Indo-German cooperation from German and Indian perspectives, respectively.

12. **VAIBHAV Advisory Committee meeting:** An advisory committee meeting was held on 10th December, 2020 regarding recommendations received during VAIBHAV Summit. The generic recommendations of each vertical were presented in a comprehensive manner. These recommendations include Academic Collaborative Synergy, Research Product Commercialization, VAIBHAV Excellence Centres and Policy Driven Enablement. A mechanism "Vaibhav Research Program" for the implementation of these recommendations was also presented with key details.

    Based on the discussions following was concluded: The final record of discussions with the presentation will be forwarded to the Advisory council members and the proposal will be updated based on the feedback and thereafter the documents will be sent to PMO.

F. Human Capacity Building

1. Support has been provided under capacity building programme for developing tools and techniques for integrated resource management and capacity building at various levels to National Institute of Technical Teachers Training & Research, Taramani, Chennai.

2. Support has been also provided to IIC Academy, Rushikonda, Madhuravada, IT park SEZ Layout, Vizag for conducting the 3-days- Training Programme on "Geospatial Technologies".

3. Support under the Geospatial Chair Professor Scheme has been provided to Prof. K. C. Tiwari, DTU, New Delhi for the promotion of Geo-spatial education and S&T at National and sub-national level.

4. **INSPIRE Internship**

   - Six INSPIRE Internship Science camp reports were settled.

5. **Scholarship For Higher Education (SHE)**:

   - 793 SHE scholars received their scholarship for pursing B.Sc./M.Sc. Degree course in basic and natural sciences.
   - 16 SHE scholars received their mentorship for pursing B.Sc./M.Sc. Degree course in basic and natural sciences.

6. **INSPIRE Fellowship:**

   - 762 ongoing INSPIRE Fellows received their fellowship for pursuing their doctoral degree programme.
   - 185 INSPIRE Fellows received their 1st year INSPIRE Fellowship instalment for pursuing their doctoral degree programme.
   - The Newton-Bhabha PhD placement Joint Panel meeting was held on 8th December, 2020 for finalizing the results through Video Conferencing. 10 INSPIRE SRF's + 3 UK applicants were selected/recommended for funding in current year.

7. **INSPIRE Faculty Fellowship:**

   - 153 INSPIRE Faculty Fellow's Fellowship grant was released for pursing their Post-doctoral programme.

- 36 INSPIRE Faculty Fellow's 1st Fellowship installment was released for pursing their Post-doctoral programme.

G. Scientific Infrastructure Building

1. Science and Engineering Research Board made national call to invite proposals in the area of Cryo-Electron Microscopy for Macromolecular Structures and Complexes to establish leadership in structural biology, enzymology, ligand/drug discovery, and to combat new and emerging diseases. The following four centres under Intensification of Research in High Priority Area were sanctioned:
   - North India Facility for Cryogenic-Electron Microscopy at IIT Kanpur, Kanpur
   - National Facility of Cryo-Electron Microscopy: Remotely Operable, 24x7 for Academia and Industry at IIT Madras, Chennai.
   - Acquisition of State-of-the-Art Cryo-Electron Microscopy Instrument for Developing National Facility at IIT Bombay, Mumbai (IISER Pune-led team will get 25% assured time on this machine).
   - State-of-the-Art CryoEM Regional/National Facility in Eastern Region at Bose Institute, Kolkata (IIT Guwahati-led team will get 25% assured time on this machine).
2. Central Sub-Committee on Crop Standards, Notification and Release of Varieties for Horticultural Crops notified and released grape variety Agharkar Research Institute (ARI) 516 for cultivation in Maharashtra. Central Sub-Committee on Crop Standards, Notification and Release of Varieties for Agricultural Crops, approved three soybean varieties MACS 1407, MACS 1460 and MACS 1520 and recommended for release and notification.
3. Birbal Sahni Institute of Palaeosciences (BSIP) led research in Laddakh region of India shows growing influence of southwest monsoon in recent few thousand years.
4. Genome-wide targets and DNA recognition sequence of the Arabidopsis HMG-box protein AtHMGB15 during cold stress response were identified by Bose Institute (BI).
5. Targeted delivery of curcumin in breast cancer cells was achieved via hyaluronic acid modified mesoporous silica nanoparticle to enhance anticancer efficiency by BI.

6. A dielectric-metal hybrid film with ENZ properties was designed and simulated using Wave optics module by Centre for Nano and Soft Matter Sciences (CNSMS). The antiviral activity of the nanoformulation coated mask fabric was also tested by CNSMS against Bacteriophage virus and it showed 99 % inhibition in 2 h.

7. The far-UV emission from star forming regions in the outer disks of nearby galaxies studied by Indian Institute of Astrophysics (IIA). The star formation rates are estimated and compared with star formation in the inner parts of galaxies.

8. Detailed chemical analysis of two extremely metal-poor stars HE 2148-2039 and HE 2155-2043 has been performed by IIA. Analysis shows that both the objects exhibit high abundance of carbon with [C/Fe] > 2, and neutron-capture elements are not enhanced.

9. An autoguider system for Kodaikanal Tunnel Telescope, developed and tested by Indian Institute of Astrophysics (IIA). The photometric and spectroscopic study conducted by IIA on type Ia supernova SN 2017hpa based on HCT observations indicates the supernova to be a normal type Ia with a presence of unburned carbon.

10. International Advanced Research Centre for Powder Metallurgy and New Materials (ARCI) installed and commissioned High Velocity Air Fuel (HVAF) System for advanced surface engineering applications.

High Velocity Air Fuel (HVAF) System Installed and Commissioned

11. Detailed investigation by Raman Research Institute (RRI) theorists and collaborators from International Centre for Theoretical Sciences, Bangalore of the well-known Rubin bath model, which consists of a one-dimensional harmonic chain with the boundary bath particle coupled to the Brownian particle has led to a better understanding of the motion of the particle in various temporal regimes.

12. Falling ball viscometry experiments have enabled RRI researchers to propose a mathematical model for estimating the rates of destructuring of thixotropic

suspensions due to the passage of the falling ball. Laponite, a colloidal synthetic clay that shows physical aging in aqueous suspension due to the spontaneous evolution of inter-particle electrostatic interactions was used in this study.

13. Studies of quantum chaos and spectral correlations in kicked interacting fermionic chains by RRI theorists and collaborator from University of Ljubljana, Slovenia has shown that the spectral form factor precisely follows the prediction of randommatrix theory in the regime of long chains for timescales that exceed the so-called Thoulesstime.

14. Scientists of S N Bose National Centre for Basic Sciences (SNBNCBS) studied the oxygenation of h-BN, for optimization of electronic and phonon transport properties using the state-of-the-art density functional theory (DFT) and Boltzmann transport equation.

15. SNBNCBS reported microstructural evolution and its outcome on the photo induced micro actuation effect and mechanical properties of copper doped Co-Ni-Al FSMA.

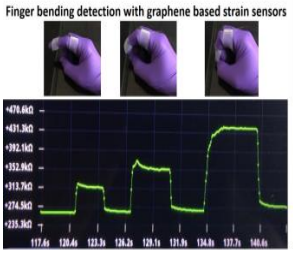
16. Wadia Institute of Himalayan Geology (WIHG) generated a glacial lake inventory of Arunachal Pradesh, using Landsat 8 Operational Land Imager (OLI) images (2016-2018), which indicates that there are 1532 (> 0.001 km^2) glacial lakes, covering an area of 93.7 km^2.

17. WIHG described a large collection of fossils *I. indirae* from Jammu & Kashmir, and apatemyid mammal *Frugivastodon cristatus* from the early Eocene Cambay Shale Formation of Vastan Lignite Mine, Gujarat. The paleobiogeographic analysis suggests that Frugivastodon dispersed from Europe into India during the early Ypresian.

18. WIHG generated a comprehensive geochemical data set of whole-rock geochemistry and mineral phases from the mantle peridotites and mafic intrusives of the Tuting–Tidding Suture Zone (TTSZ) ophiolites, eastern Himalaya, north-east India, and suggested that temperature has a better correlation with discharge for all the years as compared to the rain from the time series analysis of hydro-meteorological records at near the terminus of glaciers in Garhwal Himalaya.

19. Department of Neurosurgery performed the first successful Superficial Temporal Artery in the Scalp to deep Anterior Cerebral Artery bypass for a complex DACA aneurysm.

20. A strain sensor with tunable gauge factor of ~30 has been fabricated through spray coating with the tunability coming from the deposition parameters; Transparent Supercapacitor electrodes were made using WO3/SnO2/Al-mesh for their electrochemical studies by Centre for Nano and Soft Matter Sciences.



21. <u>Fund for Improvement of S & T Infrastructure in Universities and Higher Educational Institutions (FIST):</u>

    a. The 2nd Meeting of the different DST FIST Subject Expert Committees in seven subject Areas were organized in December 2020 towards the presentation of the short-listed proposals for consideration of support under the FIST 2020 Program for Scientific Infrastructure Building.

    b. Result of the DST FIST Logo Design Competition was declared and put up at the DST website.

22. <u>Promotion of University Research and Scientific Excellence (PURSE):</u>

    The Tenth Meeting of the Programme Management Board (PMB) on PURSE was organized in December 2020. The PMB evaluated Forty two proposals received through electronic Project Management System and shortlisted Thirteen proposals for a detailed presentation. The minutes of the meeting were finalized and approved by Secretary, DST.

23. <u>Sophisticated Analytical and Technical Help Institutes" - (SATHI):</u>

    14th meeting of SATHI Ki BAAT was organized in 2020, to review the recently supported "**S**ophisticated **A**nalytical and **T**echnical **H**elp **I**nstitutes" (SATHI) centres at three host institutes (IIT Delhi, IIT Kharagpur and BHU- Varanasi) and for discussion about the 2nd round of selection of equipment for each SATHI facility during current FY 2020-21 to strengthen the R&D infrastructure of the nation.

    Draft inputs of SATHI program were communicated for the upcoming meeting of the Working Group of Ministers on Manufacturing to review the implementation progress.

24. <u>Sophisticated Analytical Instrument Facilities (SAIF):</u>

Four webinars on Mass Spectroscopy and Nuclear Magnetic Resonance were organized in month of December by SAIF IIT Bombay.

25. **MoU** has been signed between SOI and Govt. of Andhra Pradesh on 9th December, 2020 in the presence of Hon'ble Chief Minister and Dy Chief Minister, Chief Secretary, Surveyor General of India and other senior officers for mapping of Abadi areas and re-survey of entire AP state.

26. Online meeting to review **SVAMITVA** scheme, held on 4th December, 2020. under the chairmanship of Secretary, MoPR attended by Officials of SOI and State Revenue & Panchayati Raj Department.

27. Virtual meeting on Annual General Meeting of National Water Development Agency, Govt. of India, Ministry of Jal Shakti held on 7th December, 2020 attended by Shri D.N.Pathak, Director, Survey (Air) & Delhi GDC.

28. Virtual meeting of Core Technical Advisory Group (CTAG) by MoRD, DoLR regarding Computerization of Land Records, Registration, Modern Record Room (MRR), Survey /Resurvey , Core GIS, PMU, NLRMP Cell) held on 9th, 18th, 21th December 2020 attended by DSG (Tech).

29. Virtual meeting on monitoring committee regarding Generation of high resolution DEM and GIS –ready database for part of river Ganga for NMCG held on 11th December, 2020 under the chairmanship of ED (Technical), NMCG attended by Shri Neeraj Gurjar, Deputy Director & Nodal Officer NMCG Project, SoI.

30. **Special Course on 2-D feature extraction, GCPs and Ground Validation /Attribute Collection and Data Acquisition using Drone and data processing at IIS&M, Hyderabad** from 07-12-2020 to 31-12-2020. Total 97 trainee from AP Govt. & TN Forest Department participated in the above mentioned course.

31. Online meeting to review Geospatial policies was held on 18th Dec 2020, under the chairmanship of Dr. V K Saraswat, member NITI Aayog. Surveyor General of India attended the meeting.

32. Surveyor General of India participated in Exhibition on 21st DEC 2020, for showcasing the methodology adopted for Re-survey on the Inauguration of **YSR Jagananna Shaswata Bhu Hakku mariyu Bhu Raksha** Program by Hon'ble Chief Minister of Andhra Pradesh, and launching of SoI **"SAHYOG MOBILE APP"** in Inaugural function schedule.

33. **MoU** has been signed by SOI and Govt of Chhatishgarh on 23rd Dec 2020 for Drone based large scale mapping under **SVAMITVA** scheme of Ministry of Panchayat Raj (MoPR) launched by Hon'ble Prime minister of India.

H. Solar Power Generation: In view of the enhanced focus of the Government for providing energy security and tapping the renewable energy sources, a roof top solar plant (350 KWp) was commissioned on 07 January, 2019 Technology Bhavan premises of Department of Science & Technology. The Roof Top Solar Plant generated a total of 3,75,355 electrical units (KWH) during the year 2020 (January 2020 to December 2020) with corresponding savings of Rs. 31,65,020 + Applicable takes during the period**.**