

DST selects 2020 SwarnaJayanti Fellows

A total of 21 scientists associated with innovative research ideas in the areas of life sciences, chemical sciences, mathematics, earth and atmospheric, physical sciences, and engineering and the potential of making an impact on R&D have been selected for the SwarnaJayanti fellowship. Scientists selected for the award will be allowed to pursue unfettered research with freedom and flexibility in terms of expenditure as approved in the research plan.

The Swarnajayanti Fellowships' scheme was instituted by Govt. of India to commemorate India's fiftieth year of Independence, provides special assistance and support to a selected number of young scientists with a proven track record to enable them to pursue basic research in frontier areas of science and technology.

Under the scheme, the awardees are given support by the Department of Science & Technology, GOI, which will cover all the requirements for performing the research and will include a fellowship of Rs. 25,000/- per month for five years. In addition to this, DST supports the awardees by giving them a research grant of 5 lakh Rupees for 5 years. The fellowship is provided in addition to the salary they draw from their parent Institution. In addition to fellowship, grants for equipments, computational facilities, consumables, contingencies, national and international travel, and other special requirements, if any, is covered based on merit. The fellowships are scientists' specific and not institution-specific, very selective, and have close academic monitoring.

Prof Ashutosh Sharma, Secretary, DST said, "As a new policy measure starting this year, it was decided to support much larger number of young scientists under the SJF in order to recognize, motivate and empower them to work at their highest potential."

A list of 21 Scientists selected for the 2020 fellowship through a rigorous three-layered screening process is given in **Annex-I**.

Annex-I

List of scientists selected for the Swarnjayanti Fellowships

1. **Dr. Anup Biswas**, Associate Professor of Indian Institute of Science Education and Research-Pune, focuses on probability and control theory. Through his research, he aims to do analysis of nonlinear nonlocal partial differential equations from a probabilistic viewpoint. **Research Area:** Mathematical Science
2. **Dr. Rajesh V. Nair**, Associate Professor Department of Physics at Indian Institute of Technology-Ropar, delves into Nanophotonics, Quantum Photonics, photonic crystals, nanolasers, and bio-inspired photonic structures. His current work focuses on studying the spectral and temporal modification of spontaneous emission of solid-state defects using resonant photonic structures. **Research Area:** Physical Science
3. **Dr. Gopaljee Jha**, Scientist, National Institute Of Plant Genome Research, New Delhi, is interested in understanding the mechanisms by which pathogens cause disease and plants to defend themselves is an interesting area of research in modern biology. He aims to enhance sheath blight disease tolerance in rice through his proposed work. **Research Area:** Life Science
4. **Dr. Suryasarathi Bose** Associate Professor Indian Institute of Science, Bengaluru. His research interests include Polymer processing, Polymer Blends, Carbon nanotubes, and Graphene-based polymer nanocomposites, Structure-property relationships. Through his present work, he proposes to develop large-area 'printed' desalination membranes derived from external stimulus aligned graphene oxide liquid crystals. **Research Area:** Engineering Science
5. **Dr. Angshuman Nag** Associate Professor, Indian Institute of Science Education and Research-Pune. He focuses on developing functional inorganic materials using solution-processed semiconductor nanocrystal modules. His work involves material design, photophysics, and prototype device fabrication. Through his proposed work, he aims to develop a lanthanide-doped perovskite semiconductor, a new class of material. **Research Area:** Chemical Science
6. **Dr. Vijayakumar S. Nair** Scientific Investigator, Space Physics Laboratory, Vikram Sarabhai Space Centre, Thiruvananthapuram. His research interests include Aerosol Climate interactions. Through his proposed work, he aims to understand what compensates the masking effects of aerosols on global warming to assess the role of cloud forcing, atmospheric moistening, and long-term change in climate sensitivity of aerosol forcing in future warming trend. **Research Area:** Earth & Atmospheric Science
7. **Dr. Basudeb Dasgupta**, faculty member in the Department of Theoretical Physics, Tata Institute of Fundamental Research, Mumbai, is interested in cosmology and astroparticle physics. He is working on the physics of supernova neutrinos, high-energy neutrinos

from GRBs, AGNs, etc. and the impact of neutrinos in cosmology. Through his proposed project, he aims to understand the basic physics of how the quantum state of the neutrino evolves, the astrophysics of how neutrinos affect the exploding star, and how we can experimentally detect these neutrinos and decode the information they carry with them. **Research Area:** Physical Science

8. **Dr. Dibyendu Das**, Assistant Professor Indian Institute of Science Education and Research- Kolkata, is interested in Chemical Evolution of Life, Amyloid based functional soft materials, Materials for Photothermal Therapy. Through his proposed project on 'Sustained Autonomy in Out of Equilibrium Supramolecular Materials', he is working to explore autonomous systems where more than one cycles of fuel to waste conversion and waste to fuel regeneration will be achieved, thus resulting in a sustained autonomy for longer periods using a systems chemistry approach. **Research Area:** Chemical Science
9. **Dr. R. Mahalakshmi** Associate Professor Indian Institute of Science Education and Research-Bhopal. Her areas of interest include Membrane Protein Folding and Function, Membrane Protein Regulation in Cancer and Neurodegeneration, molecular Experimental Biophysics. Through her proposed work, she aims to deliver biosimilars as definitive treatment strategies for progressive biomedical diseases such as cancer that presently have no cure, with scope for inter-institutional collaborative ventures aimed at targeted drug design. **Research Area:** Life Science
10. **Dr. Rejish Nath**, Associate Professor, Indian Institute of Science Education and Research-Pune, is interested in Ultracold atoms and Many-body physics. Through his proposed work, he aims to engineer Quantum matter, and Quantum states in dipolar systems towards Quantum technological applications to provide a scalable yet locally controllable platform for quantum technological applications using quantum systems. **Research Area:** Physical Science
11. **Dr. Chandra Shekhar Sharma** Associate Professor, Indian Institute of Technology- Hyderabad. His research interests are Carbon-based hierarchical materials, Nature-inspired polymer functional surfaces, Electrospun polymer, carbon nanofibers, and Carbon-MEMS. He proposed to develop a working prototype of Metal (M)-CO₂ battery technology to explore the feasibility of this technology in the Mars mission, particularly with respect to surface landers and rovers by using the abundantly available CO₂ (95.3%) in its atmosphere. **Research Area:** Engineering Science
12. **Dr. Biman B. Mandal**, Professor, Indian Institute of Technology- Guwahati, is interested in His research area is Tissue Engineering, Biomaterials, and Regenerative Medicine. He has proposed exploiting *in vitro* 3D bioprinted liver construct to understand the pathology and physiology of native human liver for its potential application in liver tissue engineering applications. **Research Area:** Life Science
13. **Dr. Hariharan Narayanan**, Assistant Professor, Tata Institute of Fundamental Research Mumbai. Dr. Hariharan's research interests include manifold learning, randomized

algorithms. Through his proposed project, he aims to provide Provable guarantees for machine learning, with a focus on manifolds and Lie theoretic symmetries. **Research Area:** Mathematical Science

14. **Dr. Vanchiappan Aravindan**, Assistant Professor, Indian Institute of Science Education and Research-Tirupati, is interested in the development of high-performance electrodes and electrolytes for Li-ion batteries (LIB) & beyond and the hybridization of batteries and supercapacitors. He is working to develop a new kind of cost-effective charge storage system with beyond one-electron reaction, high power capability, and exceptional safety features than a state-of-the-art Lithium-ion battery. **Research Area:** Physical Science
15. **Dr. P. Anbarasan**, Associate Professor, Indian Institute of Technology-Madras, is interested in devising and executing new synthetic methodologies and applying them in the synthesis of various complex molecules of biological relevance and day-to-day problems. He aims to develop new classes of C_2 -symmetric chiral cyclopentadiene/cyclopentadienone and apply them in various transition metal-catalyzed asymmetric transformations. **Research Area:** Chemical Science
16. **Dr. Sandeep Eswarappa**, Assistant Professor Indian Institute of Science, Bengaluru, is interested in studying the Mechanism of physiological and pathological angiogenesis and Translational regulation of gene expression in endothelial cells. Through his proposed project aims to devise a new strategy for the treatment of Duchenne Muscular Dystrophy caused by non-sense mutations. The strategy can be extended to treat other genetic diseases caused by nonsense mutations. **Research Area:** Life Science
17. **Dr. Sambuddha Misra** Assistant Professor, Indian Institute of Science, Bengaluru. His areas of interest include Climate Change (Past and Present), Chemical Oceanography, Chemical Weathering Low-temperature Geochemistry, Environmental Tracers. Through his proposed work titled 'Role of CO₂ in Amplifying Glacial-Interglacial Climate Cycles,' he aims to quantify the role of CO₂ in glacial-interglacial climate change by creating a globally distributed record of atmospheric CO₂ concentration over periods of transition between glacial to interglacial and interglacial to glacial. **Research Area:** Physical Science
18. **Dr. Sanjib Kumar Agarwalla**, Associate Professor, Institute of Physics (IOP), Bhubaneswar. His area of research is High Energy Particle Physics with main emphasis on exploring the fundamental properties of massive neutrinos. Through his proposed project, he aims to explore the landscape of Beyond the Standard Model (BSM) Physics at very high (TeV-PeV) energies using astrophysical neutrinos coming from cosmic distances and at low (MeV-GeV) energies using accelerator and atmospheric neutrinos travelling terrestrial distances. **Research Area:** Physical Science
19. **Dr. Mahesh Kakde**, Professor, Department of Mathematics from the Indian Institute of Science, Bengaluru, is interested in number theory. His research is motivated by conjectures on special values of L-functions(function on the complex plane, associated to one out of several categories of mathematical objects), more precisely, by the Bloch-Kato

conjectures. In the proposed project titled ‘Special Values of L-functions,’ he presents a comprehensive strategy to build on this expertise to tackle further long-standing conjectures on special values of L-functions. **Research Area:** Mathematical Science

20. Dr. Prabhu Rajagopal Associate Professor at Indian Institute of Technology-Madras. His areas of interest include guided ultrasonic inspection, modeling of elastic wave phenomena and analysis of wave scattering, understanding wave Phononics in complex media, and the discovery of several new waveguide Phononic modes and sensing tools. He plans to study a novel concept for achieving single phonon sources, with the design goal of fabrication and operation with current technologies and scalability for practical use under the proposed project. **Research Area:** Engineering Science

21. Dr. Ekambaram Balaraman Assistant Professor, Department of Chemistry, Indian Institute of Science Education and Research- Tirupati. His research interests are focused on the catalyst development for sustainable catalysis and C-1 Chemistry. Through his proposed work titled ‘Non-innocent Ligands for Catalysis with Earth-Abundant Metals,’ he aims to design and develop non-innocent ligands based 3d-transition metal (Mn and Fe) chiral complexes and their applications in sustainable chemical synthesis and pharmaceuticals. **Research Area:** Chemical Science