

RECIPIENTS OF INSA ASSOCIATE FELLOWS 2023

1. **Dr Sandeep Anand** (19.02.1985), PhD, Associate Professor, Department of Electrical Engineering, IIT Bombay, Mumbai.

For developing power electronics technologies for electric vehicles, wide bandgap Gallium-Nitride and Silicon-Carbide-based power converters, solar inverter topologies for interfacing alternate energy sources, and modeling and improving the reliability of power electronic circuits.

2. **Dr Subhash Babu** (01.04.1984), PhD, Senior Scientist, Division of Agronomy, ICAR- Indian Agricultural Research Institute, Pusa Campus, New Delhi.

Dr. Subhash Babu has done pioneering research in the field of sustainable food production and natural resource management in the fragile Himalayan ecosystems. His work proved that the introduction of French bean in the maize fallow system significantly increased land productivity and reduced greenhouse gas intensity (GHGI) as compared to maize monoculture. He further established that the integration of crop+livestock+poultry led to substantial reduction in GHGI and significant increase in food production.

3. **Dr Nishant Chandgotia** (22.12.1987), PhD, Reader, TIFR-CAM, Sharadanagar, Bengaluru.

Dr. Chandgotia is being nominated for his several contributions in the areas of Ergodic Theory and Dynamical Systems. In recent years, he has obtained results on a variety of problems related to embeddings, homomorphisms, and mixing properties of graphs. His works have consistently been of high quality and have appeared in well-regarded fora. A recent work on large deviations principle for dimer tilings in three dimensions constitutes a breakthrough on an important problem that has attracted much attention from both the mathematics and the statistical physics community; this work required the development of new tools to go beyond dimension two.

4. **Dr Dhanya Chandrika Thulaseedharan** (31.05.1983), PhD, Professor and Associate Dean Academics (PG Research), Department of Civil Engineering, IIT Delhi, New Delhi.

Dr Dhanya's research has contributed towards enhancing fundamental scientific understanding of the hydrological extremes alongside making improvements in hydrological models by incorporating the role and extent of heterogeneity in regional hydrological modeling. She has investigated the intricacies and feedback mechanisms involved in regional hydrologic systems and has developed early warning mechanisms for hydrological extremes through novel theoretical and statistical models, for hazard management and sustainable water resources planning and management.

5. **Dr Kaustav Chatterjee** (10.04.1988), PhD, Assistant Professor, Department of Civil Engineering, Indian Institute of Technology, Roorkee.

For notable contributions to the analytical prediction of the deformation behavior of different foundation systems under seismic motion, which are important for the earthquake-resistant design of geotechnical structures.

6. **Dr Anindita Das** (26.12.1985), PhD, Assistant Professor, School of Applied and Interdisciplinary Sciences, Indian Association for the Cultivation of Science (IACS), Kolkata.

Made key contributions to crystallization-driven polymer- assembly for the synthesis of interesting luminescent 2D architectures. Developed general strategies for the construction of stimuli-responsive supramolecular polymers and functional aliphatic polyesters.

7. **Dr Ramendra Sundar Dey** (14.03.1983), PhD, Scientist- D, Institute of Nano Science and Technology (INST), Mohali.

Synthesis of advanced functional nanomaterials scaffold and their applications to energy storage and conversion, biosensing and electrochemical sensing. He synthesized single atom catalysts, framework materials, electrochemically deposited nanostructured materials and 2D materials for a variety of applications such as electrocatalysis, generation of green ammonia/green urea from waste source, water splitting and metal air battery.

8. **Dr Achintya Kumar Dutta** (20.03.1987), PhD, Associate Professor, Department of Chemistry, Indian Institute of Technology Bombay, Mumbai.

Made significant contributions to theoretical chemistry, particularly the development of new methods to study small molecules and materials. The methods developed by the nominee allow the simulation of energy, properties, and spectra of large molecules using relativistic quantum chemistry methods. He also indigenously developed a new quantum chemical software package (Bagh) which can perform highly accurate wave-function based calculations using Schrödinger and DIRAC equations.

9. **Dr Ved Prakash Dwivedi** (15.07.1984), PhD, Group Leader, Immunobiology Group, International Centre for Genetic Engineering and Biotechnology, New Delhi.

Dr Dwivedi has demonstrated focussed and productive research experience on Tuberculosis dedicated to immunopathology (focused on cellular immune response and the associated interleukin and cytokine pathways), epigenomics, novel drug development (Th cell inhibitors and phytocompound-Bergenin), therapeutics (host inhibition of Sirtuin 2- a class III histone deacetylase enzyme), and vaccine design (identification of novel miRNA which identifies a unique host evasion response, identification of novel BCG vaccine adjuvants). His research attempts to curtail and eventually eliminate the high disease burden of Tuberculosis in this country. He has authored extensively on the subject along with the demonstration of exemplary leadership skills as highlighted by the setting up of his own training unit of Immunobiology at ICGEB and from the several national and international awards and research grants.

10. **Dr Diptimoy Ghosh** (01.05.1984), PhD, Assistant Professor, Department of Physics, Indian Institute of Science Education and Research, Pune.

Dr. Diptimoy Ghosh is an outstanding young researcher who has carried out pioneering work on flavour physics and collider physics. He has also contributed significantly to the fields of astro-particle physics and cosmology, specifically related to axion-like particles and inflationary correlation functions.

11. **Dr Aditya Gopalan** (19.06.1983), PhD, Associate Professor, Department of Electrical Communication Engineering, Indian Institute of Science, Bengaluru.

For outstanding contributions to the general area of sequential decision-making, involving development of online and reinforcement learning as well as sequential inferencing algorithms. He has pioneered the development of state-of-the-art black box optimization algorithms for tuning hyperparameters in large and complex systems.

12. **Dr Mayanak Kumar Gupta** (10.01.1985), PhD, Assistant Professor, Solid State Physics Division, Bhabha Atomic Research Centre, Mumbai.

Dr Mayanak Kumar Gupta has made outstanding contributions to the structure and dynamics of materials by integrating neutron scattering experiments with quantum mechanical simulations and machine-learning methods. He extensively studied the thermodynamic and transport properties of solid-electrolytes and thermoelectric materials at the microscopic level to identify the critical descriptors for material design for energy applications.

13. **Dr Shubhasis Haldar** (18.06.1984), PhD, Associate Professor, S. N. Bose National Centre for Basic Sciences, Salt Lake City, Kolkata.

The focus of Dr Haldar's lab is to understand chaperone biology using single molecule tools. Using covalent magnetic tweezers Dr Haldar's group has examined how chaperones mechanically influence the cellular energetics and respond to mechanical force.

14. **Dr Ankit Jain** (21.09.1989), PhD, Associate Professor, Mechanical Engineering Department, IIT Bombay, Mumbai.

For proposing the theory for explaining thermal transport in low and high thermal conductivity solids. Major contribution is in the form of development of a computational tool capable of accounting for the higher-order thermal transport physics to predict the thermal transport properties of technologically relevant low and high conductivity solids. This tool has been made available to all researchers. He has also significantly contributed to the understanding of thermal transport in graphene and strongly anharmonic semiconductors.

15. **Dr Bhaskar Kanseri** (02.01.1984), PhD, Associate Professor, Department of Physics, Indian Institute of Technology Delhi, New Delhi.

Dr. Kanseri has made outstanding contributions in photonic quantum communication and statistical optics. Through his research, he recently made the first indigenous demonstration of intercity quantum secure communication using more than 100km underground telecom grade optical fiber. This has placed India in the elite group of nations having quantum communication capabilities. Over the years, he developed several experimental methods using partial coherence and polarization, provided applications in imaging, and in free space quantum communication.

16. **Dr Shyamprasad Karagadde** (24.01.1985), PhD, Associate Professor, Department of Mechanical Engineering, IIT Bombay, Mumbai.

For notable contributions to the understanding and prediction of micro- and mesoscale defect formations in materials through novel physics and data-driven computational frameworks as well as experimental techniques. His reduced-order models make it possible the solution of various material process phenomena at engineering scales, which are otherwise computationally prohibitive.

17. **Dr Mudrika Khandelwal** (26.03.1987), PhD, Associate Professor, Department of Materials Science and Metallurgical Engineering, IIT Hyderabad, Sangareddy.

For her outstanding contribution in the area of sustainable products development for female hygiene and food packaging, based on the antimicrobial properties of essential oils for hygiene, and cellulose based composites for Food packaging. The sustained drug delivery using encapsulated materials is also noteworthy.

18. **Dr Subrata Kundu** (28.09.1986), PhD, Associate Professor, School of Chemistry, IISER Thiruvananthapuram, Thiruvananthapuram.

Made outstanding contributions to the chemistry of small gaseous molecules such as NO and H₂S in biological systems. He described the molecular mechanisms of their biological processes through suitable model systems. He showed a new possible H₂S generating route from CS₂/COS metabolism mediated by dinuclear hydrolase enzymes.

19. **Dr Rahul Mangal** (02.10.1985), PhD, Associate Professor, Department of Chemical Engineering, IIT Kanpur, Kanpur.

For his outstanding contribution in the area of soft Matter and their applications, such as bio inspired adhesives and Janus Colloids with Unique properties.

20. **Dr Mayukh Mukherjee** (22.08.1985), PhD, Associate Professor, Department of Mathematics, IIT Bombay, Mumbai.

Mayukh Mukherjee has made significant contributions in the area of spectral and geometric analysis on manifolds. His work involves techniques from geometry topology and PDE. A major theme of his research concerns spectra eigenfunctions of the Laplacians in various contexts, such as Euclidean polyhedra, compact and non-compact Riemannian manifolds, homogeneous Hadamard manifolds, etc. His major contributions involve mass concentration properties of eigenfunctions, nodal sets, and complete description of the spectrum of homogeneous Hadamard and asymptotically harmonic manifolds.

21. **Dr M Muthamilarasan** (02.12.1986), PhD, Assistant Professor, Department of Plant Sciences, School of Life Sciences, University of Hyderabad, Hyderabad.

Dr. Muthamilarasan has contributed extensively to studies on millet genomics with a major focus on foxtail millet. For this crop, he has developed genomic resources such as microsatellite markers, single nucleotide polymorphism (SNP) markers, etc as well as open access databases for use of these markers by the wider scientific community. Furthermore, he has conducted functional genomics analyses to delineate the role of various stress responsive gene families in adaptation of foxtail millet to abiotic stress.

22. **Dr Pavan Kumar N** (31.08.1984), PhD, Scientist C, ICMR-National Institute for Research in Tuberculosis, Chennai.

Dr Kumar possess over 15 years of research experience primarily in the domain on immunology of tuberculosis such as establishing a major role for cytokines, chemokines, MMPs, eicosanoids, and angiogenic factors in tuberculosis progression and stratification of tuberculosis disease sites based on these factors. He has contributed in the literature extensively (with over 100 peer reviewed publications) on HIV associated inflammation during pregnancy, intestinal dysbiosis and its association on birth outcomes, kinetics and durability of humoral and T cell immunity in Covaxin recipients, immunological profiles of children with multisystem inflammatory syndrome. He has provided a rational basis for testing combined antimicrobial and anti-inflammatory therapies in diabetic patients with TB. He has several international travel and national research awards.

23. **Dr Ashutosh Pandey** (25.12.1983), PhD, Scientist, National Institute of Plant Genome Research (NIPGR), Aruna Asaf Ali Marg, New Delhi.

Dr. Pandey has made important contributions on understanding the molecular mechanism of the regulation of flavonoid biosynthesis in plants. The transgenic and genome edited plant lines developed by him are providing insights into transcriptional regulation of the biosynthesis of two classes of compounds, flavonoids and carotenoids, that are produced by plants and are important for human health.

24. **Dr Sajeev Philip** (02.10.1984), PhD, Assistant Professor, Centre for Atmospheric Sciences, IIT Delhi, New Delhi.

Dr. Sajeev Philip has done extensive work towards understanding the chemical and physical processes involved in the variability and composition of the lower atmosphere related to air quality and climate. He has used insitu observations and satellite data as well as global chemical transport models for these studies. He has made significant contributions in estimating global biospheric CO₂ fluxes, which is relevant for climate studies.

25. **Dr Rakesh Kumar Pilonia** (24.11.1986), DM, Assistant Professor, Department of Pediatrics, Advanced Pediatrics Centre, Postgraduate, Institute of Medical Education and Research Centre, Chandigarh.

Dr Pilonia has received super-specialty training in pediatric immunology and rheumatology. He has worked and published extensively on Kawasaki disease (where has developed novel CT algorithms and investigated genetic pathways and immunomodulatory mechanisms), pediatric lupus and inborn errors of immunity. He was also part of the Covid-19 vaccination in autoimmune disease (COVAD) study group which aimed to provide evidence-based guidelines for Covid-19 vaccination for patients with autoimmune disorders. Dr Pilonia has been the awardee of several national and international research fellowship and travel awards. He has guided several MD and DM student's research and has been the principal and co-investigator in many national and internationally funded research projects.

26. **Dr Amit Kumar Rai** (20.07.1984), PhD, Scientist-D, National Agri-Food Biotechnology Institute, SAS Nagar, Mohali.

Dr. Rai has contributed extensively to the characterization and further development of fermented foods of the North East that are rich in bioactive peptides and isoflavones. He has isolated a number of bacterial and yeast strains that are associated with fermented foods and identified those that have potential for development of functional foods. He has isolated microbes from unique ecological niches in the Himalayas and characterized enzymes with important characteristics that can be utilized in bioprocessing.

27. **Dr Sayan Ranu** (31.12.1984), PhD, Associate Professor, Department of Computer Science & Engineering, IIT Delhi, New Delhi.

For outstanding contributions to the general area of graph analytics, and specifically to graph approximation algorithms as well as problems of route optimization and graph generative modelling. He has been successful in devising algorithms that explain the predictions of Graph Neural Networks better.

28. **Dr Kasturi Saha** (19.09.1984), PhD, Associate Professor, Department of Electrical Engineering, Indian Institute of Technology Bombay, Mumbai.

Kasturi Saha has made outstanding contributions to the emerging area of quantum technologies using Nitrogen-vacancy (NV) centres in diamond. She developed a quantum diamond microscope (QDM) demonstrating real time-varying magnetic fields with micro-meter spatial resolution for the first time, and an image reconstruction algorithm for NV centre-based magnetic resonance imaging. These techniques lay the foundations for exciting future experiments in quantum sensing.

29. **Dr Haripada Sau** (27.04.1989), PhD, Assistant Professor, Department of Mathematics, IISER, Pune.

Dr Haripada Sau has made very significant contributions to the area of interplay between complex geometry and multi-variable operator theory. In particular his work characterizes an algebraic sub-variety of the bi-disk in terms of a tuple of operators and their joint spectrum, and also gives, for the first time, the construction of a class of Toeplitz operators on the symmetrized bi-disk.

30. **Dr Mahak Sharma** (23.04.1983), PhD, Associate Professor & Wellcome Trust-India Alliance Senior Fellow, Department of Biological Sciences, IISER Mohali, Mohali, Punjab.

For her significant contributions to the understanding of the mechanisms by which cellular cargo is delivered to lysosomes for degradation. Mahak's research group has characterized the role of a small GTP-binding protein Arl8b, in regulating the function of a multi-subunit protein complex known as the HOPS (HOmotypic fusion and Protein Sorting) complex. As a member of the Indian National Young Academy of Science (INYAS), she used her research and teaching skills to work towards building a generation of Indians, practicing science as a way of life.

31. **Dr Tarun Kumar Sharma** (08.09.1985), PhD, Associate Professor, Department of Medical Biotechnology, Gujarat Biotechnology University, Gandhinagar.

Dr. Sharma has a long experience in the field of diagnostics, aptamer technology and biosensing. He has developed aptamers that can accurately detect the pulmonary and extrapulmonary tuberculosis and aptamer-based inhibitors to block Mycobacterium tuberculosis entry in host cells. His work revealed the usefulness of an aptamer and paper-based microfluidic assay for the point-of-care detection of bites caused by poisonous and non-poisonous snakes. Most of his works were conducted in India. His leadership ability is marked with several public health-related projects supported by the national and international funding agencies.

32. **Dr Amarjeet Singh** (24.11.1984), PhD, Scientist IV, National Institute of Plant Genome Research (NIPGR), Aruna Asaf Ali Marg, New Delhi.

He pioneered the work involving global expression analyses of genes related to abiotic stress, hormone signaling and development in crop plants. His pathway analysis of differentially expressed genes provided a crucial insight into the mechanism of K⁺ deficiency tolerance in chickpea.

33. **Dr Aparna Singh** (04.11.1984), PhD, Associate Professor, Metallurgical Engineering and Materials Science, IIT Bombay, Mumbai.

For developing copper interconnects layers that are just above the transistors for 14 nm technology. Made seminal contributions in development of tough and strong nanostructured steels and graphene epoxy fibre composites. Significantly successful in developing understanding and inhouse fabrication of materials with composition-processing-microstructure-properties relationship for diverse and important applications, like in manufacturing of rails.

34. **Dr Arvind Singh** (30.06.1983), PhD, Associate Professor, Geosciences Division, Physical Research Laboratory, Ahmedabad.

Dr. Arvind Singh contributed significantly towards understanding the biogeochemical cycling in oceans. He has made quantitative estimates of carbon and nitrogen fluxes and the global carbon budget in the oceans. He demonstrated the influence of climate on the ocean biogeochemistry and enhancement of biological pump by eddies.

35. **Dr Prabhat Kumar Singh** (15.07.1983), PhD, Scientific Officer (G), Radiation and Photochemistry Division, Bhabha Atomic Research Centre, Mumbai.

Made outstanding contributions to the field of ultrafast chemical reaction dynamics, biophysical chemistry, and spectroscopy of self-assembled materials for sensing applications. His research is not only extensive but also exhibits a high degree of originality and innovation. His work on ultrafast time-resolved fluorescence study offers the first detailed account of the fluorescence sensing activity mechanism of the widely used amyloid fibril sensor, Thioflavin-T (ThT). His recent work on the aggregation of molecular rotor probes may help in devising sensing devices for a variety of clinically important analytes.

36. **Dr Arjun Srivathsa** (27.09.1988), PhD, DST INSPIRE Fellow, National Centre for Biological Science, TIFR, Bengaluru.

Dr Srivathsa made outstanding contribution in the field of carnivore ecology and conservation biology with a focus on endangered Asiatic wild dogs. He developed strategies to safeguard their population in the Western Ghats, and has substantially contributed to the understanding of inter-species interactions and human-carnivore relationships in shared landscapes.

37. **Dr M Tanveer** (18.04.1983), PhD, Associate Professor, OPTImization for MACHine Learning (OPTIMAL) Research Lab, Indian Institute of Technology Indore, Indore.

For significant contributions in developing novel shallow and deep learning algorithms for the classification, regression, and clustering problems, along with their implementation for the diagnosis of Alzheimer's disease, Brain Age Estimation, Schizophrenia, Epilepsy etc. The algorithms will be helpful for doctors to take early decisions in the diagnosis of the above-mentioned diseases and could be helpful to healthcare industries. Most of the developed software/codes are publicly available.

38. **Dr Shashank Tripathi** (10.04.1983), PhD, Assistant Professor, Emerging Viral Pathogens Lab, Centre for Infectious Disease Research, Indian Institute of Science, Bengaluru.

Dr. Tripathi's group studies virus-host interactions of human RNA viruses including Influenza, SARS-CoV-2, and Flaviviruses. His group identified prognostic markers and FDA-approved antivirals against COVID-19. Recently, his group has discovered the broad-spectrum antiviral activity of Picolinic Acid, against Influenza and SARS-CoV-2. His lab has also developed a novel Influenza reporter virus that allows live imaging of structural protein formation and trafficking in infected cells.

39. **Dr Santosh Kumar Upadhyay** (05.02.1984), PhD, Assistant Professor (Stage II), Department of Botany, Panjab University, Chandigarh.

Dr. Upadhyay has been involved in the purification and characterization of an interesting insecticidal protein from ferns and cloning of the encoding gene. This information has been used for the development of whitefly-resistant transgenic cotton. He has reported siRNA machinery in whitefly and demonstrated RNAi-mediated control of whiteflies using numerous gene targets. He has identified and characterized various defense and development-related genes in bread wheat. Further, he established CRISPR-Cas mediated genome editing in wheat and developed a freeware for target prediction.

40. **Dr Vikram Vishal** (12.07.1985), PhD, Associate Professor, Department of Earth Sciences, IIT Bombay, Powai, Mumbai.

Dr. Vishal has developed a geologic CO₂ storage potential map of India based on updated methodologies, basin specific know-hows, and experimentally determined inputs. Using coal deformation experiments with flow of liquid/supercritical CO₂, he has led efforts in resolving issues related to CO₂-enhanced coalbed methane recovery (ECBMR) in India. He has developed a new Gas shale assessment method and proposed stitching of pores for total pore assessment in shale. He has developed a State-of-the-art Computational and Experimental Geomechanics Laboratory for resolving issues surrounding geomechanics of oil and gas development. He has been instrumental in providing a scientific basis for the formulation and implementation of the national policy on incentivizing unconventional hydrocarbon recovery in India.