

The National Academy of Sciences, India



Outstanding Research Contributions

of

those scientists, who have been elected

for the

Fellowship & Foreign Fellowship

for the year 2019

Outstanding Research Contributions of those scientists who have been elected for the Fellowship for the year 2019

1. **ADHIKARI, Satrajit** (1965), PhD, Senior Professor of Theoretical Chemistry, School of Chemical Sciences, Indian Association for the Cultivation of Science, Kolkata, for his significant contributions in developing theoretical approaches for quantum dynamics of molecules in presence of non-adiabatic coupling.
2. **AHMED, Shakeel** (1958), PhD, Chief Scientist, National Geophysical Research Institute, Hyderabad, for his significant contribution towards advancement of geo-statistical methods in hydrological studies, development of Decision Support Tools (DST) for groundwater management and mapping of aquifers.
3. **ANAND, Ruchi** (1975), PhD, Professor, Department of Chemistry, Indian Institute of Technology Bombay, Mumbai, for her outstanding contribution to probe molecular mechanisms in select biological systems. She has combined knowledge obtained from biophysical and biochemical studies and addressed two globally important issues: Antibiotic resistance and Water pollution as evident from her excellent publications. Her research has also high potential in the translational science.
4. **ASTHANA, Ravi Kumar** (1961), PhD, Professor, CAS in Botany, Institute of Science, Banaras Hindu University, Varanasi, for his significant contribution in exploring the green algae and cyanobacteria as anticancer and antibacterial compound and use of microcystin in determining potability of water.
5. **ASWAL, Dinesh Kumar** (1965), PhD, Director, National Physical Laboratory, New Delhi, for his contributions in molecular electronics, thermoelectrics and gas sensors. He has spear headed the strengthening of metrology activity at NPL in order to promote quality of products from the industries.
6. **BAL, Chandra Sekhar** (1960), MD, DSc(hc), FAMS, Professor & Head, Department of Nuclear Medicine, All India Institute of Medical Sciences, New Delhi, for his outstanding contributions in the field of nuclear medicines.
7. **BANDYOPADHYAY, Bijnan** (1956), PhD, FNAE, FIETE, FIEEE, Professor, Systems & Control Engineering, IIT Bombay, Mumbai, for his significant contribution to the theory of discrete time sliding mode control using multirate output feedback.
8. **BHATTACHARYA, Ramcharan** (1970), PhD, Professor, Molecular Biology & Biotechnology, National Research Centre on Plant Biotechnology, New Delhi, for his significant contribution in unraveling the genetic regulation of immunity genes which activate broad spectrum resistance against aphids in Indian mustard.
9. **BHATTACHARYYA, Somnath** (1962), PhD, Professor, Department of Mathematics, Indian Institute of Technology Kharagpur, Kharagpur, for his significant contributions in computational fluid dynamics. His studies incorporating inherently non-linear effects have focused on the development of advanced numerical algorithms to compute nonlinear PDEs and the results are used to validate experimental findings.
10. **CHANDAK, Giriraj Ratan** (1963), MD, PhD, FAMS, Senior Principal Scientist & Group Leader, Genomic Research on Complex Diseases, Centre for Cellular and Molecular Biology, Hyderabad, for his manifold research contributions in demonstrating the genetic and mutational heterogeneity and gene nutrient interaction in prevalent complex diseases, such as chronic pancreatitis, diabetes mellitus, neural tube defects etc. in Indians.
11. **CHANDRA, Satish** (1962), PhD, Director, Central Road Research Institute, New Delhi, for his significant research contribution in the areas of Highway Capacity and Bituminous Material Characterization.
12. **CHATTERJEE, Subhadeep** (1975), PhD, Staff Scientist V, Centre for DNA Fingerprinting & Diagnostics, Hyderabad, for his outstanding work to understand the role of cell-cell signaling factors regulating in virulence functions of Xanthomonads pathogens of rice. He has also demonstrated that a diffusible Xanthomonas signaling factor elicits plant immune responses indicating the intricate role of cell-cell signaling factors in plant-pathogen interactions.
13. **CHATTOPADHYAY, Kausik** (1974), PhD, Associate Professor, Biological Sciences Department, Indian Institute of Sciences Education & Research, Mohali, for his contribution in understanding the structure-function mechanism of action of membrane damaging Pore-forming toxins (PFTs) in the gastro-enteric pathogenic organisms *V. cholerae*.
14. **CHATTOPADHYAY, Pronobesh** (1975), PhD, Scientist E, Defence Research Laboratory, DRDO, Tezpur, for his manifold contributions in developing repellent for poisonous snakes, and other plant derived materials for safety of defense forces during operation in forests.
15. **CHATTOPADHYAY, Subhasis** (1964), PhD, Scientific Officer H, Variable Energy Cyclotron Centre, Kolkata, for his outstanding contributions to development of 'resistive plate chambers' and 'gas electron multiplier' detectors for Large Hadron Collider at CERN and the FAIR facility, Germany.
16. **CHERUKUMALLI, Srinivasa Rao** (1965), PhD, FNAAS, Director, National Academy of Agricultural Research Management, Hyderabad, for his significant contribution in the area of climate change research, soil health, carbon sequestration and green house gas mitigation for sustainable development of agriculture.

17. **CHINNASWAMY, Anandharamakrishnan** (1973), PhD, FNAAS, FRSC, Director, Indian Institute of Food Processing Technology, Thanjavur, for his manifold contributions in the field of agri-food processing and nano-scale technologies of food and bioactive ingredients.
18. **CHINTALAPATI, Venkata Ramana** (1962), PhD, Professor & Head, Department of Plant Sciences, University of Hyderabad, Hyderabad, for his extensive work on bacterial diversity and their metabolism. He made a huge collection of bacteria and developed expertise for polyphasic taxonomy. He has also developed microbial process for mass production of secondary products and transferred technology to Industry.
19. **DAVID, Justin Raj** (1969), PhD, FASc, Professor, Centre for High Energy Physics, Indian Institute of Science, Bangalore, for his contributions in 2-dimensional conformal field theory. He was the first to obtain the leading correction to entanglement entropy in systems of higher currents.
20. **DESHMUKH, Mandar Madhukar** (1974), PhD, Professor, Department of Condensed Matter Physics & Materials Science, Tata Institute of Fundamental Research, Mumbai, for his significant studies on electronic properties of graphene, metal insulator transition in VO₂ and elastic properties of nanosystems.
21. **DEY, Nrisingha** (1964), PhD, Scientist E, Institute of Life Sciences, BBSR, Odisha, for his outstanding contributions in the field of genetically-engineered plant promoters, useful to suppress plant genes constitutively and or in a tissue specific manner in crop plants.
22. **DUTTA, Shanta** (1962), MD, PhD, Director & Scientist G, National Institute of Cholera & Enteric Diseases, Kolkata, for her research focused on both applied and basic aspects involving enteric pathogens, like Shigella, Salmonella and Vibrio species.
23. **GADHE, Padmanabham** (1964), PhD, Director, International Advanced Research Centre for Powder Metallurgy & New Materials (ARCI), Hyderabad, for his significant research contributions in the fields of Materials joining, Laser Processing of Materials, and Technology Transfer & Commercialization. He successfully led several technology development projects for various industrial sectors.
24. **GHOSH, Ashish** (1966), PhD, Professor, Machine Intelligence Unit, Indian Statistical Institute, Kolkata, for his pioneering contribution in the research and development of computational models in neural, neuro-fuzzy and deep learning paradigms for pattern recognition and machine learning to handle real life decision making problems.
25. **GOVINDASAMY, Sekar** (1971), PhD, FRSC, Professor, Department of Chemistry, IIT Madras, Chennai, for his significant contributions focusing on development of new synthetic methodologies employing environmentally benign chiral homogenous and metal nanocatalyst.
26. **HASSAN, Puthusserickal Abdulrahiman** (1968), PhD, Scientific Officer H & Head, NBS, Chemistry Division, Bhabha Atomic Research Centre, Mumbai, for his significant contributions in the area of soft matter, in particular developing self assembly as a tool for the design of smart materials for bio-diagnostics and drug delivery applications.
27. **MAHAPATRA, Nitish Ranjan** (1971), PhD, Professor, Department of Biotechnology, Indian Institute of Technology Madras, Chennai, for his extensive studies using animal models and human subjects to decipher the mechanism involved in hypertension and Type 2 diabetes. He has delineated mechanism involved in genes regulating cholesterol and catecholamines metabolism. These studies provide significant inputs for rational drug-design for newer anti-hypertensive therapy.
28. **MAJEE, Manoj** (1976), PhD, Staff Scientist V, National Institute of Plant Genome Research, New Delhi, for his outstanding contribution in the area of stress and seed biology. He has dissected the molecular and biochemical mechanism involved in protein damage and repair in seeds.
29. **MALHOTRA, Pawan** (1960), PhD, Principal Investigator & Group Leader, Malaria Biology Group, International Centre for Genetic Engineering & Biotechnology, New Delhi, for his excellent contribution to the biology of *M. tuberculosis* and *P. falciparum*. His outstanding work elaborated a 'Degradosequestrome complex' in the formation of hemozoin crystals and elucidated the Methylome of malarial parasite.
30. **MENON, Gautam Iqbal** (1966), PhD, Professor H+, The Institute of Mathematical Sciences, Chennai, for his contributions to application of statistical mechanics to condensed matter systems and biosystems. He and his experimental collaborators have provided the first experimental observation of vortex glass phase.
31. **MISHRA, Prabhat Ranjan** (1970), PhD, Principal Scientist, Pharmaceuticals & Pharmacokinetics Division, Central Drug Research Institute, Lucknow, for his outstanding contribution in mechanistic understanding of targeted nano-therapeutics through ligand receptor interactions, receptor mediated endocytosis and endosomal pH responsiveness to achieve higher therapeutic index with low toxicity of drugs.
32. **MOHANAN, Parayanthala Valappil** (1962), PhD, Scientist G, Toxicology Division, Biomedical Technology Wing, Sree Chitra Tirunal Institute for Medical Sciences & Technology, Trivandrum, for his significant contributions for the development of medical device industry and medical device regulations in India.
33. **MUKHOPADHYAY, Arnab** (1972), PhD, Staff Scientist V, National Institute of Immunology, New Delhi, for his contribution to the understanding of nutrient signaling, controlling the life-span and modulating aging.
34. **MUTHALAGU, Ravichandra** (1965), PhD, Director, National Centre for Antarctic & Ocean Research, Goa, for his ocean observations through profiling floats which provided new insight about thermo-haline structure of upper ocean. He was instrumental for the development of integrated Indian ocean observing systems.

These observations were assimilated by him in Global Ocean Analyses, which are being used for the seasonal prediction of monsoon by coupled ocean-atmosphere models.

35. **NATARAJ, Neela** (1968), PhD, Professor, Department of Mathematics, Indian Institute of Technology Bombay, Mumbai, for her significant contribution to study the effects of numerical integration and boundary approximation using isoparametric finite elements; her recent research focuses on studying error estimates for Galerkin FEM to approximate non singular solutions of von Karman equations.
36. **PATHAK, Anirban** (1974), PhD, FIETE, Professor, Department of Physics and Materials Science Engineering, Jaypee Institute of Information Technology, Noida, for his contributions in Quantum Information Technology and Quantum optics.
37. **PATIL, Prabhugouda Mallanagouda** (1960), PhD, Professor & Chairman, Department of Mathematics, Karnatak University, Dharwad, for his significant contributions in Mathematical modeling aspects of fluid flow problems. These models utilize the quasilinearization technique and the results are useful for Design Engineers to control various parameters of heat and mass transfer.
38. **PRASAD, Sheo Mohan** (1959), PhD, Professor, Ranjan Plant Physiology & Biochemistry Laboratory, Department of Botany, University of Allahabad, Allahabad, for his manifold contribution in the area of Environmental Science with reference to regulation of physiological and biochemical processes of cyanobacteria and higher plants under various abiotic stresses.
39. **RAVINDRANATHAN, Thangadurai** (1969), DPhil, Professor H, Harish-Chandra Research Institute, Prayagraj, for his important contributions to various aspects of number theory; this includes the study of combinatorial constants attached to a finite abelian group, transcendental number theory and so.
40. **RAYALA, Suresh Kumar** (1976), Professor, Department of Biotechnology, Indian Institute of Technology Madras, Chennai, for his excellent contribution in the area of Cancer Biology and signaling mechanism with reference to the role P21 Activated Kinase 1 (Pak 1). His work focused on understanding the molecular mechanism by which Pak 1 contributes to the dreaded disease.
41. **SAHOO, Akhila Kumar** (1972), PhD, Professor, School of Chemistry, University of Hyderabad, Hyderabad, for his significant contributions in organic chemistry, by introducing the concept of reusable directing groups in the field of C-H activation.
42. **SARKAR, Dibyendu** (1968), PhD, Senior Principal Scientist, Institute of Microbial Technology, Chandigarh, for elucidating the mechanism by which the bacterial regulatory Protein, PhoP controls expression of virulence factors in Mycobacteria; the mechanism by which thus proteins recognize promoter elements is especially note worthy.
43. **SENGUPTA, Sharmila** (1959), PhD, Professor, National Institute of Biomedical Genomics, Kalyani, for her significant research work on human-HPV interaction and molecular distinctiveness of cervical cancer caused by HPV in its episomal form.
44. **SHARMA, G. Taru** (1965), PhD, FNAAS, Principal Scientist & Head, Division of Physiology and Climatology, ICAR-IVRI, Izatnagar, for her outstanding studies on therapeutic applications of mesenchymal stem cells in animals and a novel, innovative and efficacious three dimensional model for *in-vitro* culture of preantral follicles (PFs).
45. **SINGH, Sunil Kumar** (1971), PhD, FNA, FASc, Director, National Institute of Oceanography, Goa, for his important contribution towards understanding of the particle-water interaction and submarine groundwater discharge. In addition, he has addressed fundamental issues related to internal source, cycling and sinks of Fe, Al and Zn, their biogeochemistry and impact on oceanic budget.
46. **SRIVASTAVA, Ashwini Kumar** (1953), PhD, Former Professor, UGC-BSR Faculty Fellow, Department of Chemistry, University of Mumbai, Mumbai, for his significant contributions in the area of electro-analytical chemistry, developing electrochemical sensors, biosensors and transducers to target variety of species including metals, drugs and biomolecules.
47. **SRIVASTAVA, Rohit** (1976), PhD, Professor, Department of Biosciences & Bioengineering, IIT Bombay, Mumbai, for his pioneering translational works at IIT Bombay, innovating, developing and commercializing many techniques/products as 'urine analysis system', low cost glucometer and many more.
48. **TIWARI, Manoj Kumar** (1962), PhD, FNAE, Professor, Department of Industrial & System Engineering, Indian Institute Technology Kharagpur, Kharagpur, for his scholarly contributions in the broad areas of Logistic Science, Manufacturing Science, Production Planning and Supply Chain Management using computational intelligence.
49. **TRIPATHI, Manjari** (1968), MCh, Professor, Department of Neurology, All India Institute of Medical Sciences, New Delhi, for her immense contribution in diagnosis and treatment of various neurological disorders, like epilepsy, stroke, sleep disorders and so.
50. **VASUDEVA RAO, P.R.** (1953), PhD, FNAE, Vice Chancellor, Homi Bhabha National Institute, Mumbai, for his significant contributions on chemical aspects of fast reactors and their fuel cycle at IGCAR, DAE; in particular, dealing with actinide separation and study of third phase separation in extraction of plutonium and thorium.

In the area of 'Science & Society'

1. **RAVI, Bina** (1952), MS, FRCS, Professor of Surgery, Lady Harding Medical College, New Delhi, for her manifold scientific and societal contributions in the area of medicine, surgery and community health, especially for her work on health care of rural women.
2. **ANDEZHATH, K. Susheela** (1937) PhD, FAMS, FASc, Executive Director, Fluorosis Research & Rural Development Foundation, Delhi, for her socio-scientific work to deal with public health issues, especially for her commendable work on mitigating the problem of fluorosis in India.

Outstanding Research Contributions of those scientists who have been elected for the Foreign Fellowship for the year 2019

1. **BADYAL, Jas Pal Singh**, (1964), PhD, FRS, Professor, Chemistry Department, Durham University, Durham, England, UK, for his pioneering contributions towards functionalization of solid surfaces, deposition of functional nanolayers, and successful exploitation of these findings in electronic industry.
2. **BANERJEE, Utpal** (1957), PhD, Professor, University of California, Los Angeles, California, USA, for his outstanding contribution in the field of combinatorial signal integration mechanism at developmental enhancers, hematopoietic progenitor control during hematopoiesis and stress conditions.
3. **WADHWA, Renu** (1961), PhD, Prime Senior Researcher & Lab Head, National Institute of Advanced Industrial Science & Technology, Ibaraki, Japan, for discovering calcium responsive transcription ketosis and mortalin proteins; she has demonstrated their key role in stress, aging and carcinogenesis. She has trained more than 100 young Indian students at her laboratory through DBT- AIST collaboration and regularly delivers lectures in different universities and other institutions.