FELLOWS ELECTED 2021
(Effective from January 1, 2022)

1. Athreya, Siva Ramachandran (*b* 07.01.1971), PhD, Professor, Indian Statistical Institute, Bengaluru.

Professor Siva Athreya is a leading probabilist who has made very significant contributions to various areas of current interest in probability theory. These include - properties of measure-valued branching processes, martingale problems associated with interactive super-Brownian motion, strong existence and uniqueness for stable stochastic differential equations with distributional drift, invariance principle for random walks on trees. He has also made significant contributions in the interplay of probability theory with statistical physics and population biology.

2. Bakhshi, Sameer (*b* 13.09.1969), MD, Professor, Department of Medical Oncology, Dr BRA Institute Rotary Cancer Hospital, All India Institute of Medical Sciences, New Delhi.

Professor Bakhshi is a leading paediatric oncologist and has been running a bone marrow transplant program at AIIMS, New Delhi and his major research interest is in childhood leukemias, mainly acute lymphoblastic leukemia of B cell origin. His work on acute myeloid leukemia (AML) showed the role of proliferating and apoptotic markers in AML and revealed that inherited mitochondrial variations can have prognostic significance. He has also contributed immensely on retinoblastomas, bone tumours and sarcomas and has initiated and conducted number of clinical trials.

3. Basak, Soumen (*b* 15.12.1974), PhD, Staff Scientist VI, National Institute of Immunology, New Delhi.

Dr Basak has spearheaded the use of systems-modelling analysis to probe the molecular basis of key biological pathways in immune homeostasis, host-virus interactions and cancer deregulation. Importantly, he has made seminal contributions in understanding the cross-talk between distinct NFκB signalling pathways and their implications for inflammation in disease.

4. Basu, Bikramjit (*b* 15.09.1973), PhD, Professor, Materials Research Center, Indian Institute of Science, Bengaluru.

A path breaking work of Professor Basu is on the use of electric/ magnetic field stimulation of multifunctional biomaterials as an effective bioengineering strategy to modulate the cell functionality on engineered surfaces. The research of Professor Bikramjit Basu has led to development of new materials and technologies. The development of the piezo-bio composites with bone-mimicking functional properties, patient-specific biomedical prototypes for total hip joint replacement surgery, dental reconstruction/ restoration, cranioplasty, and urological applications are perceived as a paradigm shift at the frontiers of biomaterials science.

5. Bhat, Navakanta (*b* 29.04.1968), PhD, Professor and Chair, Centre for Nano Science and Engineering, Indian Institute of Science, Bengaluru.

Professor Navakanta Bhat has a long list of major contributions to electronic devices. This includes his work on sensors using novel materials such as electrochemical biosensors that led to a point of care diagnostic device (now the basis of a start-up) and highly sensitive gas detectors based on his own work on 2D devices. In device engineering, his major contributions are low resistance ohmic contacts for graphene and MoS2 leading to 6X reduction of contact resistance, a process to enable high RF inductor performance in Zinc Ferrite, use of a buried channel transistor to generate high performance normally-off transistors for GaN, etc.

6. Bhattacharyya, Aninda Jiban (*b* 09.10.1968), PhD, Amrut Modi Chair Professor, Solid State and Structural Chemistry Unit, Division of Chemical Sciences, Indian Institute of Science, Bengaluru.

He has designed and tested many unique multifunctional materials controlling their length, time and energy scales systematically to modulate their applications in diverse electrochemical systems and processes of relevance to energy harvesting and high-performance energy storage devices.

7. Chakraborty, Subhra (*b* 25.09.1964), PhD, Director, National Institute of Plant Genome Research, New Delhi.

Dr Chakraborty is an leading expert is in the area of nutritional and stress genomics particularly in plants. She is recognized internationally for her proteomic discoveries with implications for biotic stress signaling. In addition, she has contributed immensely in translational research in relation to plant health and human nutrition, with about 100 publications in respected journals and with 18 international patents.

8. Chandak, Giriraj Ratan (*b* 07.06.1963), PhD, MD, Chief Scientist (Scientist G) and Professor, CSIR-Centre for Cellular and Molecular Biology (CSIR-CCMB), Hyderabad.

Dr GR Chandak has made outstanding contributions in understanding the genetic basis and gene-nutrient interaction in complex human genetic disorders. His studies have proved genetic basis of tropical calcific pancreatitis and mutational and genetic heterogeneity by identify novel genes and different spectrum of mutations in Indians. He has also provided evidence of novel genetic factors while establishing the role of various genes in complex diseases like type 2 diabetes between Indians and Europeans. He has also established causal role of micronutrients like B12 in the developmental programming of obesity and insulin resistance which predict future susceptibility to cardiometabolic syndrome.

9. Chandra, Nagasuma (*b* 16.05.1965), PhD, Professor, Department of Biochemistry, Indian Institute of Science, Bengaluru.

Professor Nagasuma Chandra has provided leadership to the development of systems biology research in India. Through integration of bioinformatics and structural biology into systems biology, and by devising novel algorithms she has made path-breaking contributions on understanding disease mechanisms and on reversing drug-resistance in MDR and XDR strains of *Mycobacterium tuberculosis*.

10. Chandran Leela, Sunil (*b* 22.04.1974), PhD, Professor, Department of Computer Science and Automation, Indian Institute of Science, Bengaluru.

Professor Sunil Chandran Leela is a leading expert on the geometric representation of graphs, including his recent work on representation of cubic graphs as the contact graph of axis-parallel rectangles. Professor Sunil Chandran's investigations of various aspects of the notion of boxicity of graphs, through several works spread over more than a decade and a half, have led to the development of important upper and lower bounding techniques; these have attracted new interest in this parameter. Professor Chandran-Leela is also well recognised for his several works connecting various parameters of graphs; these works address and make progress on some deep open problems in graphs theory, including the famous Hadwiger's conjecture.

11. Chauhan, Manmohan Singh (*b* 05.01.1960), PhD, Director, ICAR- Central Institute for Research on Goats, Mathura.

Dr Chauhan has made major contributions in the field of Reproductive Biotechnology of Livestock. Has developed several assisted reproductive technologies like, IVF, Ovum Pick-up, Stem-Cell and animal cloning for generating superior livestock. Produced many cloned buffalo-calves using hand guided cloning; the first and only person to practice that in India. This successful teamwork brought to him the prestigious Rafi Ahmad Kidwai award.

12. Dhurandhar, Sanjeev Vishnu (*b* 29.11.1951), PhD, Emeritus Professor, Inter-University Centre for Astronomy and Astrophysics (IUCAA), Pune.

Sanjeev Dhurandhar is a pioneer of gravitational wave research in India and has contributed outstandingly in this area in the last three decades. He and his group made original contribution to the development of foundational techniques and methods for extracting gravitational wave signals from gravitational wave detector data.

13. Ehtesham, Nasreen Zafar (*b* 28.03.1959), PhD, Director-in-Charge, National Institute of Pathology, Safdarjung Hospital Campus, New Delhi.

Dr Nasreen Zafar Ehtesham has made significant contributions in the areas of (A) Nutrition and metabolic disorders; (B) The intricate triangle of infection-inflammation and unfolded protein response (UPR), and (C) Understanding the pathogen that causes Tuberculosis (TB). While her work has been well cited in all these areas, her contributions in the area of Infection-inflammation and UPR can be considered outstanding. Her pioneering work conclusively showed that human resistin is functionally different from mouse resistin. This established the role of human resistin as a chaperone protein involved in UPR.

14. Gahalaut, Vineet Kumar (*b* 26.09.1966), PhD, Senior Principal Scientist, CSIR-National Geophysical Research Institute, Hyderabad.

Dr Vineet Gahalaut has been the key Indian contributor for sustained and large-scale GPS measurements towards quantifying the tectonic plate motions, studies on large earthquakes and the process of strain build-up along major plate boundaries and fault zones within and around India. His work has elucidated seismic hazard due to plate movements in the Himalaya, the Burmese arc and the Andaman subduction zone with novel results of inter-seismic locking of major faults. These form the basis of complete understanding of the Sumatra 2004 earthquake. He also used crustal deformation arising from seasonal variation of water storage to monitor the impact of climate change on water resources.

15. Govindarajan, Rama (*b* 26.08.1962), PhD, Senior Professor and Dean Academic, International Centre for Theoretical Sciences, Tata Institute of Fundamental Research, Bengaluru.

Professor Rama Govindarajan has contributed over many different aspects of fluid mechanics, including the important fields of instabilities in viscous and stratified flows and the ubiquitous multiphase flows involving the dynamics of bubbles and drops in immiscible continuous medium in different regimes. She is a researcher par excellence in terms of depth, originality, creativity and the overall impact of her work. It is difficult to imagine the contemporary literature without her contributions.

16. Hari, KVS (*b* 10.05.1962), PhD, Professor, Department of ECE, Indian Institute of Science, Bengaluru.

Professor KVS Hari has seminal contributions to Multiple-Input-Multiple-Output (MIMO) communications, such as his classic work on root-Music algorithm for Direction of Arrival estimation, his major role in the Stanford University Interim models for wireless channels that became a part of IEEE 802.16 standards, and his contributions to spatial modulation in MIMO systems, sparse signal processing, neuroscience, etc., which show his exceptional versatility.

17. Kant, Rama (*b* 18.01.1963), PhD, Professor, Department of Chemistry, University of Delhi, Delhi.

He is a pioneer in theoretical electrochemistry. He has developed phenomenological theories to provide an in-depth understanding of electric double layers, electrochemical response, and electrode kinetics of rough and fractal electrodes.

18. Kolthur-Seetharam, Ullas (*b* 30.07.1974), PhD, Professor, Department of Biological Sciences, Tata Institute of Fundamental Research, Mumbai.

Dr Ullas Kolthur used systems level approaches to dissect molecular machineries involved in metabolic sensing and maintenance of physiological homeostasis. These sensing mechanisms are derailed in several human diseases with diabetes, cancer, neurodegeneration being some examples. His research gives novel and deep insights on mitochondrial functions, cellular energy sensing and their crosstalk with nuclear gene expression. The implications for organismal physiology, metabolic and age-related diseases are clear.

19. Kulkarni, Giridhar Udapi Rao (*b* 22.07.1963), PhD, President, Jawaharlal Nehru Centre for Advanced Scientific Research, Bengaluru.

He has made pioneering contributions in the areas of Materials Chemistry covering mesoscalar organizations of metal and semiconductor nanocrystals, direct-write patterning of nanomaterials, twisted graphene as well as fabrication of nanodevices. His unique approach has led to translation of lab-level inventions into demonstrable prototypes and realising technology leads.

20. Kumar, Vinod (*b* 14.11.1956), PhD, Professor, Department of Zoology, University of Delhi, Delhi.

Professor Vinod Kumar has contributed to the understanding of how in a shared ecological niche, a self-sustained timekeeping system sensitive to multiple environmental cues, enables individuals and species to schedule their behavioral activities in the most profitable way. The fundamental concept that the endogenous circadian clock mediating seasonal responses in migratory birds is flexible to the photoperiod environment was conceptualized and experimentally proved in his laboratory.

21. Maiti, Prabal Kumar (*b* 25.03.1969), PhD, Professor, Department of Physics, Indian Institute of Science, Bengaluru.

For his pioneering contributions in understanding (i) the unusual translational and orientational dynamics of water confined in nanotubes/nanorings, (ii) DNA-based nanostructures, (iii) unzipping and melting of DNA strands, (iv) DNA packaging, (v) phase transition in surfactant bilayers and (vi) the structure of dendrimers, using novel techniques of computer simulations and analytical tools.

22. Majumder, Gobinda (*b* 26.02.1967), PhD, Professor (H), Tata Institute of Fundamental Research, Mumbai.

Dr Gobinda Majumder has played major roles to select and design the CMS electromagnetic calorimeter, essential in the discovery of Higgs boson in gamma-gamma channel and led the design and construction of the CMS outer hadron calorimeter at CERN. He has played a key role in SUSY searches and probing QCD predictions at LHC, heavy quark sector studies at CLEO and rare B-meson decays at BELLE. He developed the INO simulation and reconstruction program for the ICAL detector, used by the entire INO collaboration.

23. Mallik, Roop (*b* 02.03.1970), PhD, Professor, Department of Biosciences and Bioengineering, Indian Institute of Technology Bombay, Mumbai.

Professor Roop Mallik, an internationally highly recognized mechanobiologist, demonstrated how in cells opposite-directed motor proteins exert tug-of-war like forces. These biophysical forces coordinate intracellular cargo motions to guide cellular processes like phagosome trafficking to lysosomes or lipid vesicle movement within hepatocytes. His contributions are seminal, very unique in combining intensive biophysical and cell biology tools to address basic biology questions with high translational opportunities.

24. Mandal, Prabhat (*b* 01.11.1959), PhD, Professor (H), Condensed Matter Physics Division, Saha Institute of Nuclear Physics, Kolkata.

For high standard research in the field of transition metal oxides and topological systems. For building-up a world class laboratory for growing extremely good quality single crystal which is capable of producing high quality research as evident from the fact that many of his observations were for the first time and later reproduced by others.

25. Mukherjee, Prasun Kumar (*b* 18.10.1963), PhD, Scientific Officer H, Professor and, Head, Environmental Biotechnology Section, Nuclear Agriculture and Biotechnology Division, Bhabha Atomic Research Centre, Mumbai.

Dr Mukherjee made seminal contributions in biocontrol of plant diseases by understanding the basic biology and genetics of *Trichoderma* spp. He discovered novel gene clusters for secondary metabolism in *Trichoderma* and developed formulations which are widely used in agriculture and biomass waste management.

26. Parida, Swarup Kumar (*b* 26.05.1979), PhD, Scientist IV, National Institute of Plant Genome Research, New Delhi.

Dr Swarup made outstanding research contributions in designing genetic markers and devising strategies for integrated genomics-assisted breeding for genetic improvement of rice and chickpea. His work has led to effective delineation of superior trait-associated genes and their alleles for producing high-yielding crop varieties. Two chickpea genotypes developed by him are in advanced stages of testing in All India trials of ICAR

27. Patil, Nitin Tukaram (*b* 22.05.1975), PhD, Associate Professor, Department of Chemistry, Indian Institute of Science Education and Research (IISER) Bhopal, Bhopal.

He has made outstanding contributions in gold catalyzed carbophilic activations and cross-coupling reactions. The methodologies developed by him are of importance in natural product synthesis and have promising applications in material science and biology.

28. Prabhakaran, Dorairaj (*b* 22.08.1961), MD, DM, Vice President (Research and Policy) and Director, Centre for Control of Chronic Conditions, Public Health Foundation of India, Gurgaon.

Dr Dorairaj Prabhakaran has made seminal contributions in the area of epidemiology of cardiovascular disease that helps in understanding and mitigating cardiovascular health issues in the community. His work relates to house hold clustering of chronic disease risk factors, which helps in understanding how different mechanisms both environmental and genetic can interact with each other to give rise to risk factors for non- communicable diseases. Beyond his scholarly contributions he has been an effective mentor having trained a large number of youngsters, and has also played an important role in science advocacy and in policy.

29. Raghuram, Anantharam (*b* 16.01.1971), PhD, Professor, Department of Mathematics, Indian Institute of Science, Education and Research, Pune.

Professor A Raghuram is a leading expert on the special values of automorphic L-functions. He has extensively used dedeep geometric methods from the cohomology of arithmetic groups, and analytic methods from the Langlands program, to give a cohomological interpretation to an analytic theory of L-functions, thus paving the way to study rationality properties of their special values. In his foundational work, in collaboration with Günter Harder, Raghuram systematically studied Eisenstein cohomology of locally symmetric spaces attached to GL(N) over a totally real number field, and applied this machinery to prove rationality results of special values of Rankin—Selberg L-functions. Raghuram has made important developments in the study of p-adic interpolation of L-values for GL(2n) to give a purely arithmetic proof of nonvanishing results for central L-values that are entirely in the realms of analytic number theory.

30. Rao, Thota Narayana (*b* 15.08.1969), PhD, Group Head, Clouds and Connective Systems Group (CCSG) and Scientist-SG, National Atmospheric Research Laboratory, Gadanki (Andhra Pradesh).

Dr TN Rao's research on rain microphysics and spatio-temporal variability of precipitating systems has revealed that evaporation and collision-coalescence processes during the descent of rain drop dictate their drop size distribution and thereby determine surface rain in arid and semi-arid regions. His research has direct application in improving estimates of precipitation using radar and satellite measurements. In a novel approach, he combined radar observations with isotopic analysis to explain puzzling short-term variations of heavier isotopes in precipitation. Most importantly, he has led the indigenous development and establishment of UHF wind profiler and X-band dual-polarization radar at NARL.

31. Saha-Dasgupta, Tanusri (*b* 12.11.1966), PhD, Senior Professor and Dean (Academic), Department of Condensed Matter Physics and Materials Science, SN Bose National Centre for Basic Sciences, Kolkata.

Tanusri Saha-Dasgupta has developed a novel method of modeling and computation of electronic structure of complex functional compounds with strong correlation effects. This led to understanding of the complicated physical processes and in particular of the microscopic processes that come about from strong correlation effects coupling with system-specific degrees of freedom.

32. Sharma, Dinesh Kumar (*b* 02.05.1950), PhD, Adjunct Professor, EE Department, Indian Institute of Technology Bombay, Mumbai.

Professor Dinesh K Sharma has made outstanding contributions to teaching and research in electrical engineering over a distinguished career at IIT Bombay. In addition to his remarkable scientific and engineering contributions to the field of semiconductor devices, he has put his knowledge to practical use in a number of instances. Most notably so, as a technical expert for the development of electronic voting machines (EVM), which have a continuing impact on the ability to carry out successfully the mammoth exercise of conducting elections in the world's largest Democracy such as ours, with a high degree of trust among the people. This contribution makes his nomination particularly worthy of election in this special category.

33. Singh, Inderjit (*b* 24.12.1963), PhD, Professor, Department of Environmental Studies, University of Delhi, Delhi.

Professor Inderjit Singh has excelled in ingeniously dissecting the otherwise complex ecological process of plant invasions, into simple yet impressive principles. His work on invasion ecology stands out from the rest in: (a) formulating logical hypotheses to explain why some species are successful as invaders, and (b) testing these hypotheses by a range of experiments that stretch from lab to landscape. Using a combination of ecological and evolutionary theoretical framework, he has demonstrated that the plants that invade a new ecosystem do so by manipulating the soil microbiota and thence the biochemical niche that favors its establishment at the cost of native flora. Owing to the new path he has treaded in the field of invasion ecology, his work is globally recognized resulting in a wide range of collaboration across several countries.

34. Singhal, Rekha Satishchandra (*b* 07.02.1962), PhD, Professor of Food Technology and Dean (Research, Consultancy and Resource Mobilization), Institute of Chemical Technology, Mumbai.

Dr Singhal developed methods for supercritical fluid extraction of industrially important food constituents and new carbohydrate-based biomaterials from indigenous sources as import substitutes for fermentative production of biomolecules and additives in food processing. Her work on hydrocolloids to reduce oil uptake in deep fried foods has made a major impact on food industry.

***35. Srinivasan, Narayanaswamy** (*b* 01.04.1962), PhD, Professor and Chair, Molecular Biophysics Unit, Indian Institute of Science, Bengaluru.

Professor Srinivasan has contributed significantly to the development of new approaches to recognize 3-D structures, functions and interaction properties of proteins, and their applications in contexts of protein phosphorylation, infectious diseases. He has also worked on several projects with applied interests, for example, the repurposing of drugs to combat host-pathogen interactions.

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36. Sriram, Mayasandra Subrahmanya (*b* 04.11.1950), PhD, Professor, Professor KV Sarma Research Foundation, Chennai.

Professor Sriram worked in Dept. of Theoretical Physics, University of Madras for about 30 years, getting interested in History of Science in the latter part of his tenure. Through a large number of scholarly volumes which serve as source of crucial, scientific information on the early development of Astronomy and Mathematics in India and various other publications in journals as well as invited articles in encyclopedias, Prof. Sriram has been able to bring to light, in an authentic manner, without an iota of hyperbole, some of the remarkable contributions made by Indians to Astronomy and Mathematics, which had remained only partially known, or totally unknown for long and for this reason he is highly suited for election under this special category.

37. Tiwari, Virendra Mani (*b* 05.11.1968), PhD, Director, CSIR- National Geophysical Research Institute, Hyderabad.

Dr VM Tiwari, using gravity and magnetic data has contributed to the understanding of crustal structure and geodynamics of the Indian lithosphere. His works on determination of effective elastic strength of Indian lithosphere, the extent of under-thrusting of Indian crust and crustal eclogitation under Himalayan collision zone, models on localization of large thrust earthquakes in Sunda-Andaman Subduction zone, and numerical simulations of present-day tectonic stress across Indian subcontinent have provided important insights on Indian lithospheric geodynamics. Using GRACE (Gravity Recovery and Climate Experiment) satellite data, he has made a pioneering contribution towards understanding of temporal and spatial variations of the water storage in Indo-Gangetic alluvial tract and demonstrated that it suffers from extreme water loss ascribed to over exploitation.

38. Venkataraman, Chandra (*b* 03.06.1963), PhD, Professor, Department of Chemical Engineering, Indian Institute of Technology Bombay, Mumbai.

Professor Venkatraman Chandra's contributions towards understanding aerosol processes within multi-scale atmospheric phenomena are widely acclaimed. Her research combined with experimental studies of polluting particles, data-driven energy-emission modelling, and atmospheric model simulations have changed conventional concepts on the origin of atmospheric absorption over South Asia. Her work on the origin of black carbon emissions in India led to the development of an Indian emissions inventory for the assessment of air pollution and climate change. She provided compelling evidence for aerosol influences on rainfall suppression and heat-wave enhancement in the Indian region.

39. Verma, Akhilesh Kumar (*b* 01.09.1968), PhD, Professor, Department of Chemistry, North Campus, University of Delhi, Delhi.

He has made significant contribution towards development of methodologies using alkynes and transition metal reagents for the synthesis of N-heterocycles – valuable intermediates of medicinal importance.

40. Vijayachari, Paluru (*b* 10.05.1962), MD, PhD, Scientist G & Director, Regional Medical Research Centre (ICMR), Department of Health Research, Ministry of Health & FW, Port Blair.

Dr P Vijayachari is a leader in the field of leptospirosis. As a member of expert advisory group to the WHO Director General, he along with other members estimated the global disease burden of leptospirosis. As a head of WHO collaborating Centre on leptospirosis, he was instrumental in establishing reference laboratories across India, Sri Lanka, Indonesia, Nepal and Bhutan. He isolated a new strain of Leptospira that is associated with severe form of haemorrhagic fever in Andaman Islands. Recently, he organized a world congress on leptospirosis in Port Blair and developed a road map for prevention and control of leptospirosis.