

INDIAN NATIONAL SCIENCE ACADEMY
Bahadur Shah Zafar Marg, New Delhi 110002

Minutes of the Annual General Meeting of the Indian National Science Academy held on 12 September, 2023 in INSA premises in hybrid mode.

The following Fellows attended the meeting:

(online)
Fellow

1. Professor Ashutosh Sharma, President
2. Dr Madhu Dikshit, Vice-President
3. Dr Amit Ghosh, Vice-President
4. Professor Nahid Ali
5. Professor DJ Bagyaraj
6. Professor H Balaram
7. Professor RNK Bamezai
8. Professor DM Banerjee
9. Professor SS Banga
10. Dr Nita Bhandari
11. Professor SV Bhat
12. Professor Shinjini Bhatnagar
13. Professor Tirthankar Bhattacharyya
14. Dr PK Chakraborti
15. Dr Subhra Chakraborty
16. Professor N Chandrakumar
17. Professor Samar Kumar Das
18. Professor CS Dey
19. Professor Anupama Gadiyara Chakrapani
20. Dr BL Deekshatulu
21. Dr NZ Ehtesham
22. Professor Ganesh
23. Professor A Ghosh
24. Professor Subrata Ghosh
25. Professor B Gopal
26. Professor Srubabati Goswami
27. Professor Yashwant Gupta
28. Professor KVS Hari
29. Professor SE Hasnain
30. Professor Neeraj Jain
31. Professor JB Joshi
32. Professor D Kanjilal
33. Professor SK Khanduja
34. Dr Sanjeev Khosla
35. Professor Gopal Krishna
36. Professor Anil Kumar
37. Dr GC Kundu
38. Professor Sandeep Kunnath

39. Professor Indranil Manna
40. Professor G Marimuthu
41. Professor Gadadhar Misra
42. Professor Sushmita Mitra
43. Professor Sunil Mukhi
44. Professor Janardhan Padmanabhan
45. Professor Sourav Pal
46. Professor Sunil K Palakurissi Balagopal
47. Professor Mallayan Palaniandavar
48. Professor Sudhakar Panda
49. Dr Pradip
50. Professor BLS Prakasa Rao
51. Dr Gangan Prathap
52. Professor AS Raghavendra
53. Professor MV Rajam
54. Professor Subramanyam Rajagopal
55. Professor C Siva Ram Murthy
56. Professor Kalidas Sen
57. Professor Shobhona Sharma
58. Professor Shyam
59. Professor Ajit Iqbal Singh
60. Dr Kulinder Pal Singh
61. Dr Sneh Lata Singla-Pareek
62. Dr SK Subbarao
63. Professor Qudsia Tahseen
64. Professor BK Thelma
65. Professor P Tharmalingam
66. Dr VM Tiwari
67. Dr Pradeep Kumar Tripathi
68. Professor Prabodh Kumar Trivedi
69. Professor Anupam Varma
70. Dr Paluru Vijayachari

Foreign Fellow:

Professor Alexei Starobinsky

In Person

1. Professor Narinder K Mehra, Vice-President
2. Professor Spenta Wadia, Vice-President
3. Professor TK Adhya
4. Professor Sanghmitra Bandyopadhyay
5. Professor Niranjana Chakraborty
6. Professor P Kar
7. Professor BD Malhotra
8. Professor Ranjan K Mallik
9. Dr Shekhar C Mande
10. Professor V Nagaraj
11. Professor Sandeep Sen
12. Professor Maithili Sharan

13. Professor Anurag Sharma
14. Professor Subrata Sinha

Note: Some Fellows who joined the meeting with different names (reflected in the list like.... Arun's iPhone, Readme, iPhone (2)).

Dr Brajesh Pandey, Executive Director, Mr Sunil Zokarkar, Deputy Executive Director, Finance & Admin. (online) and Dr (Mrs) Brotati Chattopadhyay, Assistant Executive Director (Council) attended the meeting.

President, INSA welcomed all the Fellows those who joined online as well as in person in the Annual General Meeting. Thereafter, the regular agenda items were taken up.

1. Condolence at the passing away of the distinguished Fellows.

The sad demise of Dr VS Arunachalam, Professor KR Parthasarathy, Professor Guruswamy Rajasekaran, Dr CR Rao, Professor MRS Rao, Dr Vinodini Reddy, Dr APB Sinha, Dr Bikash Chandra Sinha, Fellows of the Academy were reported. The obituary notes were read by the President, INSA and everyone present stood in silence for a minute as a mark of respect to the deceased.

2. Confirmation of minutes of General Body Meeting held on 9 May, 2023.

The minutes of the General Body Meeting held on 9 May, 2023 were presented by Dr Madhu Dikshit, Vice-President, INSA. The minutes were already uploaded on the INSA website. No comments were received. Thereafter, the minutes were confirmed.

3. Announcement of result of voting papers for election of Officers and Members of the Council for the year 2024.

Dr Madhu Dikshit, Vice-President (Fellowship Affairs) announced names of those who were elected as members of the Council 2024. The list is attached at ***Annexure-I.***

4. Announcement of result of voting papers for election of Fellows and Foreign Fellows for the year 2024.

Dr Madhu Dikshit, Vice-President (Fellowship Affairs) announced names of those who were elected as members of the Council 2024. The list is attached at ***Annexure-II.***

5. Announcement the name of recipients of the INSA Distinguished Lecture Series 2023.

Dr Madhu Dikshit, Vice-President (Fellowship Affairs) announced the names of **recipients of the INSA Distinguished Lecture Series 2023.** The list is attached at ***Annexure-III.***

6. Announcement of name of recipients of the INSA Associate Fellows 2023.

Dr Madhu Dikshit, Vice-President (Fellowship Affairs) announced the names of **recipients of the INSA Associate Fellows 2023**. The list is attached at **Annexure-IV**.

7. Announcement of names of representatives of Cooperating Academies and the Govt. of India on the Council of INSA for the year 2024.

The names of Professor Anurag Sharma, Professor R Ramaswamy, Professor GD Yadav, Dr. Kamal Bujarbaruah, Dr Deepak Tempe, Professor GU Kulkarni as representatives of the National Academy of Sciences (India), the Indian Academy of Sciences, Bengaluru, the Indian National Academy of Engineering, National Academy of Agricultural Sciences, National Academy of Medical Sciences and The Govt. of India, Department of Science & Technology respectively, announced.

8. Submission of the list of Fellows corrected up-to-date.

Dr Madhu Dikshit, Vice-President (Fellowship Affairs) informed that the live number of INSA Fellows as on 12 September, 2023 stood at 997.

9. To read as required under Rule 40(c) the name of nominees for election as INSA Fellow / Foreign Fellow.

Dr Madhu Dikshit, Vice-President (Fellowship Affairs) read the names of those whose nominations were received for election as INSA Fellow/ Foreign Fellow from 1 May, 2023 to 25 August, 2023.

10. Annual Report of the Academy for the year 2022-23.

Dr Madhu Dikshit presented the highlights of the annual report for the year 2022-23.

11. Review of work of the Academy by the President, INSA.

During the presentation of review of work of the Academy, President, INSA informed the members about reforms of the INSA Guidelines/ various forms have been made through a committee especially constituted for this purpose. Members of the committee are: President INSA (Chair), Dr Madhu Dikshit (Co-Chair), Professor Spenta R Wadia, Dr Amit Ghosh, Professor Chitra Sarkar, Dr Anil Kumar Gupta and Dr. Srubabati Goswami, (Members).

He continued, the new initiatives like INSA Distinguished Lecture Series and INSA Associate Fellows have been initiated by the Academy. President, INSA further intimated the fellowship that, to recognize the scientific leadership in diverse areas and empowerment of the fellowship, the earlier new category fellowship (i) has been renamed as **Science in Translation**, and the scope of

this category will be enlarged to include extraordinary contributions to utilization and empowerment of scientific knowledge.

This will increase INSA's reach and visibility to a great extent by being inclusive to the other major stakeholders of science in addition to the knowledge creators.

The components under this category will be as follows:

- (a) Scientific leadership in Science-Based Innovation
- (b) Scientific leadership in Industrial R & D
- (c) Scientific leadership in Technology Missions of National importance and
- (d) Scientific leadership in the Management of Scientific Institutions

The existing new category (ii) has been renamed as **Science for Society**.

These two new categories will elect Fellows who can serve to the society more effectively. He requested the Fellows to propose new programmes/ activities to be initiated by the Academy.

President, mentioned about the following new initiatives:

Leadership Development Program in Science & Technology (LEADS) 2023 was conducted by the Academy 12-18 July, 2023 jointly with National Centre for Good Governance (NCGG). The programme was very successful.

INSA-ACS Faculty Leadership Summit, November 3-5, New Delhi, India

ACS Outreach Summit, 6-8 November, New Delhi, India

Taylor and Francis Workshop will be organized this year.

President informed the Fellows that S20 Science Communiqué has been released. It is a policy paper. The link has been sent to all Fellows and uploaded on INSA website.

Resource Management Committee has been renamed as Resource Generation and Management Committee.

12. Any other item.

President, INSA emphasised that INSA Local Chapter may be activated and as far as possible, more active Fellows may be inducted as the Convener of the Chapters.

During discussing the Remote Area lecture, President, INSA informed the Fellows about the Lectures by INSA Fellows/ Young scientist awardees/ Teacher awardees / Indian National Young Academy of Science (INYAS) members to young students and teachers of schools and colleges in the remote /rural areas. Fellows were further requested to deliver more lectures in the remote areas (T2, T3 Cities) and nearby schools.

President added, since Executive Director, INSA is involved in Vigyan Bharti activities, this type of organizations may be leveraged by INSA in order to have much larger reach in society and conduct lectures and science awareness programs.

Executive Director has been given the responsibility to write a letter to all Fellows to encourage them for delivering the lecture to school /colleges students. Also, it was advised that letters will be sent to the State Government, School Education Departments informing that INSA has such provision to support the lecture by scientists without any cost to them. The Education Department may identify list of schools to host these lectures.

President informed the Fellows, Council approved to increase the INSA Fellowship number 50 to 100 (among the total 100 Fellows, 20 Fellows will be elected from the two new categories Science in Translation and Science for Society, 10 each). Remaining Ten sectional committees will now elect up to Eighty Fellows annually within the upper limit of total number of fellows i.e. 1500. The modified Rule 6 (b) will be sent for voting to all Fellows.

Executive Director, INSA informed that first lecture under the INSA Public Lecture series will be delivered by Shri S Somnath on 26th September, 2023 in INSA.

The meeting ended with a vote of thanks to the Chair.

COUNCIL 2024

President: Professor Ashutosh Sharma, Kanpur (2023-25)

Vice-Presidents:

Professor Madhu Dikshit, Lucknow (2023-25)
Professor Indranil Manna, Kharagpur (2024-26)
Professor Narinder K Mehra, Gurugram (2022-24)
Professor Sanjay Puri, New Delhi (2023-25)
Dr VM Tiwari, Hyderabad (2024-26)
Professor SR Wadia, Bengaluru (2022-24)

Members:

Dr Amit Prakash Sharma, New Delhi (2022-24)
Dr Anirban Basu, Manesar (2023-25)
Dr Anil Kumar Gupta, Kharagpur (2024-26)
Professor Arup Bose, Kolkata (2023-25)
Professor Chitra Sarkar, New Delhi (2022-24)
Dr A Ajayaghosh, Thiruvananthapuram (2024-26)
Professor Maithili Sharan, New Delhi (2022-24)
Professor Sanghamitra Bandyopadhyay, Kolkata (2023-25)
Professor Dipshikha Chakravorty, Bengaluru (2024-26)
Professor Maneesha Shreedhar Inamdar, Bengaluru (2024-26)
Professor Sriram R Ramaswamy, Bengaluru (2023-25)
Professor Srivari Chandrasekhar, Hyderabad (2022-24)
Dr Srubabati Goswami, Ahmedabad (2023-25)
Dr Navin Chandra Khanna, New Delhi (2024-26)
Professor Sudeshna Sinha, Mohali (2022-24)
Professor Sunil Kumar Singh, Goa (2023-25)
Professor Prabodh Kumar Trivedi, Lucknow (2024-26)
Professor Qudsia Tahseen, Aligarh (2024-26)
Professor Sanjay Mittal, Kanpur (2024-26)
Professor Vidita Ashok Vaidya, Mumbai (2022-24)

**Fellows elected
(Effective from January 1, 2024)**

1. Abraham, Priya (b 27.10.1963), PhD, Senior Professor, Department of Clinical Virology, Christian Medical College, Vellore.

Dr Abraham is one of India's leading virologists and has made significant contributions to HPV and other viral diseases in India. She has led the NIV team that standardized COVID real-time PCR, confirmed the very first virus cases; guided the nation-wide COVID laboratory network; isolated SARS-CoV-2 in cell-culture under Biosafety Level 4; visualized the coronavirus with electron microscopy; developed the first indigenous COVID KAWACH IgG ELISA; and continued whole genome sequencing and characterization of SARS-CoV-2 variants. Her contributions to the development of the whole virion inactivated vaccine Covaxin™, is of critical importance. She and her team provided virus cultures, conducted pre-clinical investigations in hamsters and macaques, and showed rapid virus clearance from respiratory samples following virus challenge in these animals, collaborating with the Bharat Biotech International Ltd. until the Phase III Clinical Trial was completed.

2. Anand, Ruchi (b 29.06.1975), PhD, Professor, Department of Chemistry, Structural Biochemistry Lab, Indian Institute of Technology Bombay, Mumbai.

Dr. Ruchi Anand has made outstanding contributions in the area of Structural Biology by using a variety of techniques including X-ray crystallography and Cryo-EM. Her work focuses on understanding the mechanistic basis of antibiotic resistance in bacteria as well as enzymatic recognition of aromatic pollutants. Both these works have tremendous implications for combating widespread drug resistance and developing biosensors, respectively.

3. Ateeq, Bushra (b 26.07.1976), PhD, Associate Professor and Joy Gill Chair Professor, Molecular Oncology Lab, Department of Biological Sciences & Bioengineering, Indian Institute of Technology Kanpur, Kanpur.

Dr Bushra Ateeq is a Cancer molecular biologist who has made outstanding contributions in understanding the biology of prostate and other cancers. Her research contributions are in the genetic and epigenetic changes that are important that initiate cancer progression and the molecular events that drive resistance to chemotherapeutic drugs. Noteworthy contribution was on the role of a peptidase inhibitor, SPINK1 in the progression and drug resistance of Cancer"

4. Bal, Chandrasekhar (b 22.10.1960), MBBS, MD, DSc, Professor & Head, Department of Nuclear Medicine, All India Institute of Medical Sciences, New Delhi.

The pioneering research work led by Dr Bal at AIIMS, New Delhi in the field of thyroid cancer lead to the change in clinical practice all over the world. The research outcome saved patients from unnecessary high amount of whole-body radioiodine exposure, and prevented environmental hazard from excess radioactive iodine going to sewerage, and most importantly, patients did not require hospitalization. Dr Bal's

research brought the optimal dose of radioiodine to just 30 mCi for remnant thyroid cancer ablation. This work is now accepted in 2015 ATA Guidelines for the management of DTC. Dr Bal's other research work is focused on the alternative to second surgery (completion thyroidectomy) and pediatric thyroid cancer where he has contributed significantly by translating his research to clinical practice. He has significant contribution in the field of neuroendocrine tumor imaging and therapy making India in the forefront of research in this domain.

5. Bandyopadhyay, Bijnan (b 23.08.1956), PhD, Visiting Professor, Department of Electrical Engineering, Indian Institute of Technology-Jodhpur, Jodhpur.

For his significant and outstanding contributions to control systems theory and applications, specifically to discrete time sliding mode control, multi-rate output feedback approach, higher-order sliding mode control and event triggered sliding mode control, as well as significant applications of these advances in power electronics.

6. Barik, Saroj Kanta (b 12.04.1965), PhD, Professor, Department of Botany, North-Eastern Hill University, Shillong.

Has pioneering and trend setting work in disturbance ecology, climate change biology and biodiversity conservation.

7. Bhatia, Sabhyata (b 07.03.1964), PhD, Staff Scientist-VII, National Institute of Plant Genome Research, New Delhi.

Dr. Sabhyata Bhatia has made extensive and novel contributions towards genomics analysis and development of molecular markers in legumes such as chickpea, lentil and minor pulses. She has performed quantitative trait analysis and genome wide association studies to identify genomic loci involved in controlling seed yield (seed size, weight and number) and seed quality (protein content) in chick pea and lentil. Based on these studies, allele specific molecular markers have been developed for application in marker assisted selection for trait improvement.

8. Bhowmik, Santanu Kumar (b 21.04.1966), PhD, Professor, Department of Geology & Geophysics, Indian Institute of Technology Kharagpur, Kharagpur.

Dr. S.K. Bhowmik systematically developed thermo-tectonic modeling using metamorphic rocks of different ages in the Indian Shield as a natural laboratory and explained the evolution of plate tectonics from the Early Earth to the Present. His work demonstrates versatility in integrating mineral transformation processes at varied spatial scales (nano-scale to plate tectonics scale) through a new tool of sequential diffusion, developed in-house. His work now enables detailed elucidation of temporal evolution of complex high-temperature metamorphic systems. This was not possible before his contribution.

9. Biju, Sathyabhama Das (b 09.05.1962), PhD, Senior Professor, Department of Environmental Studies, University of Delhi, Delhi.

Made seminal contributions to taxonomy, systematics, evolution, biogeography and conservation of amphibians. He described 116 new amphibian taxa.

10. Bisht, Naveen Chandra (b 01.02.1978), PhD, Scientist V, National Institute of Plant Genome Research, New Delhi.

Dr. Bisht has made outstanding contributions to our understanding of the biology of glucosinolates which function as important plant defense compounds and which also affect the quality of Indian mustard. In the process he has identified genes that are involved in the transport of these glucosinolates into seeds and in their regulation. He has used this knowledge to develop mustard lines that have reduced glucosinolate levels in the seed without affecting susceptibility of the rest of the plant to pests and pathogens.

11. David, Justin Raj (b 12.12.1969), PhD, Professor, Centre for High Energy Physics, Indian Institute of Science, Bengaluru.

Prof. David has made significant contributions to the microscopic understanding of black holes in string theory and contributed extensively towards holography in two-dimensional conformal field theories. He has discovered universal corrections to entanglement entropy in these theories, used them to test holography and provided important insights towards understanding the space of three-dimensional conformal field theories.

12. Daya Sagar, Behara Seshadri (b 24.02.1967), PhD, Professor (HAG) and Former Head, System Science and Informatics Unit, Indian Statistical Institute-Bengaluru Centre, Bengaluru.

Professor Daya Sagar has made significant contributions by developing mathematical morphology-based spatial algorithms that address a range of questions of fundamental importance to geosciences, geospatial data sciences, and remote sensing. Integrating ideas from mathematical morphology with the concepts from fractals, geometry, and chaos, he developed path breaking approaches to analyze river basins, networks, terrestrial surfaces, and identifying spatial clusters. Prof Daya Sagar has also significantly contributed to simulating behavioral phases that various geomorphologic systems traverse via interplay between numerics and graphics. He is one of the best-known mathematical earth scientists.

13. De, Swades (b 20.01.1969), PhD, Professor, Department of Electrical Engineering, Indian Institute of Technology-Delhi, New Delhi.

For prolific contributions to cross-layer design, analysis, and resource optimization of wireless and sensor networks and radio frequency energy transfer that have had an impact on green, energy sustainable wireless communications.

14. Deshmukh, Mandar Madhukar (b 20.10.1974), PhD, Professor, Department of Condensed Matter Physics and Materials Science, Tata Institute of Fundamental Research, Mumbai.

Prof. Deshmukh has established a vibrant experimental research group at TIFR to probe condensed matter physics of low-dimensional systems. He has made highly original and significant contributions to experimental physics of quantum Berry phases and Hall states, mesoscale electron transport, electron correlations and nanoscale mechanics of low-dimensional systems.

15. Dimri, Ashok Priyadarshan (b 14.11.1970), PhD, Director, Indian Institute of Geomagnetism, Navi Mumbai.

Dr. A. P. Dimri has made important contributions towards understanding the dynamics of the Indian winter precipitation system and its linkages with the Himalayan Glaciers and associated water/hydrological budget. He used multi-scale models and observations to elucidate processes that lead to the Western Disturbances, their relationship with topography, along with a physical understanding of associated extreme weather events.

16. Ganguli, Ashok Kumar (b 25.01.1961), PhD, Professor & Deputy Director, Department of Chemistry, Indian Institute of Technology-Delhi, New Delhi.

Professor Ashok Kumar Ganguli has made seminal contributions to developing synthetic approaches to design functional nanostructures of specific size, shape and composition with multifarious applications in capacitors, photocatalysis, superconductors, electrocatalysis and efficient field emitters.

17. Ghose, Debasish (b 16.05.1960), PhD, Professor (HAG), Department of Aerospace Engineering, Indian Institute of Science, Bengaluru.

For his very significant contributions to guidance and control for aerospace applications which include autonomous systems and algorithms for obstacle/collision avoidance, swarm intelligence, multi-agent systems and load partitioning for distributed computing.

18. Ghosh, Probir Kumar (b 13.12.1962), PhD, Founder Director and Vice-Chancellor, ICAR-National Institute of Biotic Stress Management, Raipur, Chhattisgarh.

Dr. PK Ghosh has contributed significantly to understanding carbon sequestration potential and sustainability in cereal based cropping systems. He developed a new methodology for soil quality index for maintaining sustainability in the rice-wheat cropping system. His work on improvement of rice system has had a significant impact in sustaining natural resources. Dr. Ghosh has also played an important role in the development of improved agronomic practices in pulse based cropping system.

19. Guchhait, Prasenjit (b 21.10.1967), PhD, Professor, Regional Centre for Biotechnology, Faridabad.

Dr. Prasenjit Guchhait did excellent work on the human vascular disease, with special focus on the mechanism of thrombosis. His work has identified several biomarkers to develop therapeutics. Many of his studies on synthetic peptides gave

an understanding on how these can be used for prevention. His basic works covers crosstalk between platelet and immune cells in hemolytic microenvironment, activation of thrombosis/inflammation in lungs of SARS-CoV-2-infected animals. Based on his findings he has proposed a clinical trial to use dietary- α KG as therapeutics against COVID-19 patients.

20. Gupta, Neena (b 24.11.1984), PhD, Professor, Theoretical Statistics and Mathematics Unit, Indian Statistical Institute, Kolkata.

To paraphrase János Kollár regarding “On Zaviskis’ Cancellation Problem....” these are elegant and powerful combination of previous methods with new insights that addresses a major open problem.

21. Krishna, Sandeep (b 01.09.1976), PhD, Professor, TIFR-National Centre for Biological Sciences, Bengaluru.

Prof. Krishna has done pioneering work on the nonlinear dynamics of biological systems, encompassing feedback control in gene networks, synchronization and entrainment in cells, symmetry breaking in ecosystems, and the emergence of life on Earth. His work has enhanced the understanding of the complex behavior of such far-from equilibrium systems.

22. Kumar, Arvind (b 21.09.1966), PhD, Deputy Director General-Research, International Crops Research Institute for Semi-Arid Tropics (ICRISAT), Patancheru.

Dr. Arvind Kumar carries with him more than 30 years’ of experience in crop improvement and trait discovery for drought tolerance, disease insect resistance, etc. He has to his credit more than 65 varieties that have been released and are being cultivated in 10 different countries of Asia and Africa. Dr. Arvind Kumar has identified 7 of the ten known genes for resistance against rice gall midge, QTLs for grain yield under drought, QTLs for grain yield related traits under dry direct seeded situation, QTLs for tolerance to rice root knot nematode and QTLs for high Fe, high Zn. His work has great practical value for Indian farmers.

23. Kumbhar, Pramod Shankar (b 02.06.1964), PhD, President and Chief Technology Officer, Praj Matrix - R&D Center, Praj Industries Ltd, Pune

Dr Kumbhar and his team at Praj, Pune are the architect of the first cellulose biomass to ethanol (2nd Generation Ethanol) plant in India process right from upstream fermentation to downstream separation and basic engineering of the manufacturing plant. Ethanol from biomass is a very strategic technology for India since the Government has already announced a policy of 25 % mix of ethanol in gasoline from 20a5 to reduce India’s dependence on imports of oil. The 2G ethanol technology is critical to India’s self-sufficiency in automotive fuels. In addition, Dr Kumbhar, has contributed to innovative concepts in industrial biorefinery and a host of catalytic processes in chemical industry, some of which are in commercial practice.

24. Kurpad, Anura Viswanath (b 08.05.1959), MBBS, MD, PhD, Professor, Department of Physiology, St John's Medical College, Bengaluru.

Dr. Anura Kurpad has emerged as the leading nutritional scientist in India, investigating the contribution of dietary nutrients to human body composition, nutritional status, and physical performance. Towards this end he has perfected contemporary reference techniques for measurement of protein digestibility, measurement of human amino acid requirements, measurement of lean body mass and fat body mass, and measurement of vitamin B12 absorption. These techniques have optimized currently available techniques to non-invasively assess these variables. In the process, his work has defined protein requirements for Indians, and his laboratory has served as reference laboratory for assessment of several nutritional programs in the community.

25. Lakshminarayan, Arul (b 25.03.1967), PhD, Professor, Department of Physics, Indian Institute of Technology-Madras, Chennai.

Prof. Lakshminarayan has done pioneering works on the interplay between quantum information, random matrix theory, and quantum chaos in few and many-body integrable and nonintegrable quantum systems which is recognized internationally. His research on extreme-value-theory, products of random matrices, elliptic functions, and constructions of absolutely maximally entangled states have had a lasting impact.

26. Luthra, Kalpana (b 27.07.1965), PhD, Professor, Department of Biochemistry, All India Institute of Medical Sciences, New Delhi.

Prof Kalpana Luthra has made seminal contributions in the field of HIV, particularly coevolution of HIV-1 Infection and host immune responses. Her contributions include isolation of a human broadly neutralising antibody which has therapeutic potential and is being taken forward as a potential passive immunotherapeutic agent. She has had a consistently productive high impact work on HIV immune response,

27. Mahapatra, Nitish Ranjan (b 09.01.1971), PhD, Professor, Department of Biotechnology, Indian Institute of Technology Madras, Chennai.

Dr. Mahapatra has studied several molecular pathways in cardiovascular pathological conditions that help in the diagnosis and clinical management. His major works is his significant contribution in the management of cardiometabolic disease states such as hypertension, type 2 diabetes and dyslipidemia. He has also discovered and characterized many functional genetic variations that enhance the risk for cardiometabolic diseases. His studies also provided novel therapeutic candidates for hypertension and atherosclerosis.

28. Mandal, Lolitika (b 15.01.1971), PhD, Professor, Indian Institute of Science Education and Research (IISER) Mohali, Mohali.

Dr. Mandal has made seminal contributions which have been pivotal in understanding stem cell niche during development.

29. Mandal, Prantik (b 02.02.1965), PhD, Chief Scientist and Activity Incharge, Seismological Imaging Group, CSIR-National Geophysical Research Institute, Hyderabad.

Dr. Prantik Mandal has made outstanding contributions towards understanding genesis of earthquakes in India and the structure of Indian lithosphere and stresses. He delineated the three dimensional seismic velocity structure of Kachchh, Gujarat, discovering mafic pluton-induced crustal seismicity. He elucidated salient causes of fluid-triggered seismicity on the Main Himalayan Thrust in Uttarakhand and carried out seismic risk estimation in the Himalayas by mapping out three NNE-SSW trending lithospheric transverse features in the Uttarakhand Himalaya. He also developed a nucleation model for moderate size reservoir triggered earthquakes at Koyna. His work has also shown that the Eastern Indian Cratonic crust primarily formed via vertical tectonics in the Archean.

30. Mandal, Swadhin K (b 15.08.1973), PhD, Professor, Department of Chemical Sciences, Indian Institute of Science Education and Research-Kolkata, Nadia.

Professor Swadhin Mandal has developed several remarkable strategies to accomplish C-C cross coupling reactions with metal-free catalysts enabling the development of key chemical transformations with low cost, non-toxic reagents having a low carbon footprint.

31. Mande, Sharmila Shekhar (b 05.07.1962), PhD, Distinguished Chief Scientist, TCS Research, Delhi.

Dr. Sharmila Mande was of the early big data scientists in India and collaborative efforts are a hallmark of her work. She developed many algorithms and analysis tools, especially for microbiome and metagenomics, compression/archival of genomic data, RNA decoding, and community structure in environmental samples. She has been highly productive including over 60 patents, indicating the practical applicability of much of her work.

32. Mukhopadhyay, Nilay Krishna (b 05.08.1962), PhD, Professor in Physical Metallurgy, Department of Metallurgical Engineering, Indian Institute of Technology (BHU), Varanasi.

For his original scientific contributions to discover Quasicrystalline materials having quasiperiodic or aperiodic structures with lack of translational symmetry and with 5-fold rotational symmetry and to establish inverse Hall-Petch relationship, through his extensive Nanoindentation studies. His recent research on multicomponent high entropy alloys for hydrogen storage has been equally noteworthy.

33. Mukhopadhyay, Samrat (b 14.02.1975), PhD, Professor, Indian Institute of Science Education and Research (IISER) Mohali, Mohali.

Dr Samrat Mukhopadhyay has made important contributions to understanding mechanisms of liquid-liquid phase separation amyloid formation, coacervation and co-aggregation of intrinsically disordered proteins, and its implications for understanding physiological function and disease.

34. Mylavarapu, Sivaram Venkata Satya (b 16.01.1974), PhD, Associate Professor, Laboratory of Cellular Dynamics, Regional Centre for Biotechnology, Faridabad.

Dr. Mylavarapu has made important contributions that shed light on novel molecular mechanism involved in cell division.

35. Pandey, Ashok (b 01.01.1956), PhD, Distinguished Scientist, Centre for Innovation and Translational Research, CSIR- Indian Institute of Toxicology Research, Lucknow.

Contributed significantly to the growth of industrial and environmental biotechnology in India, which includes second generation biofuels and commercially important enzymes.

36. Raghavan, Sathees Chukkurumbal (b 10.05.1970), PhD, Professor, Department of Biochemistry, Indian Institute of Science, Bengaluru.

Dr. Sathees Raghavan has made important contributions in the area of DNA repair, genomic instability, and cancer therapeutics.

37. Raychaudhuri, Pratap (b 13.12.1971), PhD, Senior Professor (I), Department of Condensed Matter Physics and Materials Science, Tata Institute of Fundamental Research, Mumbai.

Prof. Pratap Raychaudhuri has made outstanding contribution in the area of low-dimensional and disordered superconductors. This work elucidated the pseudogap state in disordered conventional superconductors, thus unravelling the hexatic vortex state in very weakly pinned superconducting thin films and identifying the BKT transition in thin superconducting films.

38. Reddy, Dumbala Srinivasa (b 10.04.1971), PhD, Director, CSIR-Indian Institute of Chemical Technoogy, Hyderabad.

Dr Dumbala Srinivasa Reddy has used his unique skill for the total synthesis of biologically active molecules and their derivatives for the application to the discovery of several drug candidates for a number of diseases with an insight on their structure activity relationship.

39. Reddy, Maddika Subba (b 06.02.1978), PhD, Staff Scientist-VI & Group Leader, Centre for DNA Fingerprinting and Diagnostics, Hyderabad.

Dr. Reddy has made original contributions by investigating multiple cellular processes involved in signaling.

40. Sarkar, Dibyendu (b 01.05.1968), PhD, Chief Scientist, CSIR-Institute of Microbial Technology, Chandigarh.

Dr. Sarkar's laboratory has delineated mechanisms underlying the virulence of *Mycobacterium tuberculosis* (Mtb), especially the role of phoP-phoR two-protein regulatory system, which is required for multiplication of the bacilli in host cells. His work has uncovered mechanisms governing the functioning of these multicomponent higher-order complexes and identified novel signalling cascades that can be targeted for therapeutic purpose.

41. Saxena, Nitin (b 03.05.1981), PhD, Professor, Indian Institute of Technology-Kanpur, Kanpur.

Dr Saxena has developed novel techniques for understanding algebraic independence over fields of small characteristics; and consistently brought in techniques from several areas to attack the most important problems in algebraic complexity.

42. Shivaprasad, Padubidri V (b 11.07.1974), PhD, Associate Professor and Associate Dean of Faculty, National Centre for Biological Sciences, Tata Institute of Fundamental Research, Bengaluru.

Dr. Shivaprasad has made original contributions towards microRNA biogenesis, the role of micro RNA in crop domestication and plant development and evolution.

43. Tyagi, Avesh Kumar (b 25.06.1964), PhD, Director, Chemistry Group, Bhabha Atomic Research Centre, Mumbai.

Dr Avesh Kumar Tyagi has developed many multifunctional materials and technologies like highly selective and stable inorganic ion-exchangers for the separation of useful radio-isotopes from nuclear waste contributing to structure-function evaluation of solid state materials with a clear understanding of the principles of structure determination, crystallography and functional aspects.

44. Varma, Manik (b 18.12.1976), DPhil, Partner Researcher, Microsoft Research India, Bengaluru.

For being the pioneer of extreme multi-label classification area in Machine Learning and Artificial Intelligence, where any data point must be assigned a label from amongst millions of labels. This has created significant academic interest and high industry impact, with some of his algorithms generating hundreds of millions of dollars in revenue for Microsoft.

45. Vasu, Sheeba (b 17.03.1973), PhD, Associate Professor, Jawaharlal Nehru Centre for Advanced Scientific Research, Bengaluru.

Made important contributions on the evolution and the underlying circuitry of circadian clocks and shown the role of circadian neuropeptide signals to sleep centres through its cognate receptors.

Foreign Fellows elected

(Effective from January 1, 2024)

1. **Ajayan, Pulickel Madhavapanicker** (b. 15.07.1962), Benjamin M. and Mary Greenwood Anderson Professor of Engineering, Rice University, 6100 Main Street, Houston, Texas 77005, USA.

For his significant contributions to the understanding of electromechanical properties of such nanostructured materials and pioneering work in the template assisted synthesis of engineered hybrid nanostructures and interface engineered nanomaterials. Professor Ajayan also done pioneering work on nanocomposites, starting with carbon nanotube polymer composites, providing insights into multifunctional nanocomposite materials

2. **Bond, John Richard** (b. 15.05.1950), University Professor, CITA, McLennan Labs, 60 St. George St., University of Toronto, Toronto ON M5S 3H8, Canada.

For his pioneering work in the field of Cosmology. Professor Bond has demonstrated that slight variations in the cosmic microwave background radiation (CMB) contain precious information regarding the shape, size, age and composition of the Universe. In 1991, the COBE satellite did indeed reveal slight variations lending great support to Bond's early results. Professor Bond and his colleagues used the Boomerang results to demonstrate that the Universe has a planar geometry providing strong observational support to the Inflationary model of the early universe.

3. **Malik, Harmit Singh** (b. 03.01.1973), Professor of Basic Sciences & HHMI Investigator, 1100 Fairview Avenue N., A2-025, Seattle WA 98109, USA.

Professor Malik studies the causes and consequences of genetic conflicts that take place between different genomes or between components of the same genome. He is interested in understanding these "molecular arms races" and how they drive recurrent genetic innovation, from the perspective of both evolutionary biology and human disease. He also showed that intense competition for meiotic success can result in 'centromere' drive' which can lead the rapid evolution of centromeric DNA and proteins, a process that ultimately leads to reproductive isolation between species.

4. **Poor, Harold Vincent** (b. 02.10.1951), M.H. Strater University Professor of Electrical Engineering, Department of Electrical and Computer Engineering, Princeton University, Princeton N.J. 08544, USA.

Professor Poor is among the world's foremost researchers and educators in communications and information theory. His research has focused on wireless networks, energy systems and, more recently, social networks. He pioneered advanced methods for detecting data corruption, information privacy and distributed algorithms for state estimation and control of the grid. In the area of social networks, his work has focused on understanding and modelling the connectivity of small-world networks and on the role of social interaction on collaborative sensing and decision-making.

5. **Venkat Narayan, KM** (b. 14.09.1956), Executive Director, Emory Global Diabetes Research Center, Rollins School of Public Health, 1518 Clifton Road NE, Atlanta, 30322, USA.

Professor KM Venkat Narayan's research has focused on the etiology, pathophysiology, and epidemiology of type 2 diabetes. He anchored large national and international observational and intervention studies to prevent and control diabetes, and has worked to translate science into practice and policy. Known for his interdisciplinary work, he is currently exploring intriguing differences in beta cell function in the pathophysiology of type 2 diabetes globally.

6. **Venkatesan, Thirumalai Venky** (b. 19.06.1949), Director of CQRT and Professor of Physics and ECE, Center for Quantum Research and Technology, Lin Hall, University of Oklahoma, Norman OK 73019.

Professor TV Venkatesan is inventor of the pulsed laser deposition process and is a pioneer in its application to thin films of complex oxides and related multi component materials, which has transformed research on films/heterostructures globally. He was a pioneer in recognizing the possibility of oxide based superlattices, formation of hetero junctions of different functional materials and led the way in developing techniques for electric field modulation of electronic and magnetic properties of materials.

**Recipients of INSA Distinguished Lecture Series
(for the year 2023)**

Sectional Committee - I : Mathematical Sciences: Applied Mathematics, Pure Mathematics, Theoretical Computer Science, Statistics and Operations Research

Dr Manjunath Krishnapur, Associate Professor, Department of Mathematics, Indian Institute of Science, Bengaluru.

Dr Manjunath Krishnapur is one of the leading probabilists in the country, who has been recognized world wide for his work on random analytic functions, arithmetic random waves, stochastic operators and other related areas. Manjunath Krishnapur's research contributions are deep and elegant, and those are published in topmost international journals in the field. He is also a good speaker capable of conveying technical ideas to a broad audience. His lectures will be of interest to a wide audience.

Sectional Committee - II : Physics:

Astronomy, Astrophysics, Nuclear and High Energy Physics, Atomic, Molecular and Optical Physics, Statistical Physics, Theoretical Physics, Mathematical and Computational Physics, Condensed Matter including Soft, Liquids and Nano Materials, Cosmic Radiation, Cosmology, Space Physics, Basic Planetary Sciences, Lasers and Optoelectronics, Plasma Physics, Solar Physics, Atmospheric Physics

Professor Aswini Ghosh, FNA, JC Bose National Fellow, School of Physical Sciences, Indian Association for the Cultivation of Science, Kolkata.

Prof. Aswini Ghosh (FNA, FASc) has made outstanding contributions on the understanding of ion dynamics and relaxation dynamics, and their correlation with the structure in super-ionic glasses, glass-nanocomposites, oxide ion conductors and polymer electrolytes. Prof. Ghosh is a world leader in the field of charge carrier dynamics and relaxation mechanisms in energy storage materials. He made significant contributions in the understanding of ion dynamics in microscopic level via studying the conductivity and dielectric spectra of several glass systems in the framework of linear response theory and derived microscopic parameters. He developed a new scaling model for the microscopic length for ion dynamics in these materials. His scaling model has been widely accepted and referred to as *Ghosh scaling model* in the literature by the scientists working in this and related areas.

Sectional Committee - III :Chemistry:

Analytical Chemistry, Inorganic Chemistry, Organic Chemistry, Physical Chemistry, Theoretical and Computational Chemistry, Structural Chemistry, Chemistry of Materials, Medicinal and Pharmaceutical Chemistry, Bio-organic, Bio-inorganic and Bio-physical Chemistry

Professor Asit Kumar Chakraborti, FNA Mahananda Apartment, Block A, Flat No. 4, 5A Green Row, Kolkata.

The committee recommends Professor Asit Kumar Chakraborti, FNA for his outstanding contributions to synthetic organic and medicinal chemistry and developing new concepts in drug discovery process. He has made original contributions to the understanding of the role of water in accelerating organic reactions as potential green chemistry approaches and applications of ionic liquids in chemical reactions. His work on C-H/Br/O activation by heterobimetallic nanoparticles led to the development of novel and selective COX-2 inhibitors.

Sectional Committee - IV : Earth & Environmental Sciences:

Surface and Solid Earth Science, Applied Atmospheric Chemistry and Physics, Climate Sciences, Meteorology, Geo Engineering, Ocean Sciences, Geo Sciences and Applied Planetary Sciences

Professor Anil Bhardwaj, FNA, Director, Physical Research Laboratory, Ahmedabad.

Prof. Anil Bhardwaj is well-known for his contributions in Planetary Science. He was the Principal Investigator (PI) of SARA experiment on Chandrayaan-1, and MENCA experiment on the Indian Mars Mission, which have yielded significant new findings. He is the PI of currently running XSM and CHASE-2 experiments on Chandrayaan-2 orbiter, and CHASTE and APSX experiments on Chandrayaan-3 lunar Lander and Rover, respectively. His team PI-led experiment ASPEX would be flying on the upcoming solar mission Aditya-L1. He has provided exceptional scientific leadership for plans of future Indian planetary missions. During his tenure as the Director of SPL-VSSC, he nurtured the planetary research group. As Director of PRL, he has introduced other contemporary research areas, and innovative public outreach programs. For all his outstanding contributions to Science, he has been awarded with the Fellowship of the three Science Academies of India, the J. C. Bose fellowship, S. S. Bhatnagar, and Infosys prizes.

Sectional Committee - V : Engineering & Technology:

Electrical Engineering, Telecommunication Engineering, Electronics and Optoelectronics, Chemical Engineering, Civil Engineering, Environmental Engineering, Mechanical Engineering, Aeronautical Engineering, Metallurgical Engineering, Computer Science and Engineering including Software and Data science, Information Science and Technology, Advanced Materials (such as Bio-materials, Hybrid Materials and Nano Materials), Polymer Science & Engineering

Professor GD Yadav, FNA, Emeritus Professor of Eminence, Institute of Chemical Technology, Mumbai.

Professor GD Yadav, Emeritus Professor of Eminence, is a distinguished chemical engineer of national and international repute. Over the decades, he has made critical contributions in several areas of national interest such as, Green Chemistry and Technology, Catalytic Science and Engineering, Biotechnology, and in the 'Net Zero Goal' - encompassing - Hydrogen economy, Carbon dioxide refineries, Biomass and Plastics Valorization into Fuels, Chemicals and Materials.

Sectional Committee - VI : General Biology:

Taxonomy, Structure, Ecology, Environmental Biology, Evolution and Behaviour of Plants, Animals and Microbes including Unicellular Eukaryotes

Professor PP Majumder, FNA, Distinguished Professor and Founder, National Institute of Biomedical Genomics, Kalyani.

Prof Partha Majumder has made outstanding contributions to human genetics and evolution using statistics, molecular genetics and anthropological methods. He devised innovative paradigms and statistical methods for solving biological problems related to modes of inheritance of complex human traits and mapping genes underlying such traits. His work on genetic diversity of ethnic Indian populations has resulted in a clear reconstruction of the processes of peopling of the Indian subcontinent, which had major impact on the design of studies for mapping disease genes.

Sectional Committee - VII : Molecular and Cellular Biology:
*Cell Biology, Physiology, Development, Genetics, Genomics and other Omics of Plants,
Animals and Microbes including Unicellular Eukaryotes*

Professor Appa Rao Podile, FNA, Senior Professor, Department of Plant Sciences, School of Life Sciences, University of Hyderabad, Hyderabad.

For his pioneering work on the use of pathogen-derived molecules like harpin and chitoooligosaccharides (COS) to induce plant immunity and to reduce the use of synthetic agrochemicals in agriculture. He worked extensively on chitinolytic plant growth promoting rhizobacteria (PGPR) targeting cell wall of fungal pathogens, besides promoting the growth and yield as PGPR.

Sectional Committee - VIII : Biomolecular, Structural Biology and Drug Discovery:
*Biochemistry, Biophysics, Molecular Biology, Pharmacology, Structural Biology,
Bioinformatics, Computational Biology, System Biology*

Professor Amitabha Chattopadhyay, FNA, CSIR Bhatnagar Fellow, CSIR-Centre for Cellular & Molecular Biology, Hyderabad.

Prof. Chattopadhyay's work is focused on understanding organization, dynamics, function, and lipid-protein interactions in biological membranes in healthy and diseased conditions using a judicious combination of biophysical, biochemical, cell biological and computational approaches. His work has helped unravel the molecular mechanism underlying membrane cholesterol sensitivity of G protein-coupled receptors (GPCRs) and its implications in health and disease.

Sectional Committee - IX : Health Sciences:
*Basic and Clinical Medical Sciences—Communicable and Non-communicable Diseases,
Epidemiology, Anthropology, Psychology, Cognitive and Neurosciences, Medical Genetics
and Genomics, Public Health, Nutrition, Immunology*

Professor Subrata Sinha, FNA, Professor and Head, Department of Biochemistry, All India Institute of Medical Sciences, New Delhi.

Prof (Dr.) Subrat Sinha in his distinguished career has made significant contributions in precision medicine with his efforts directed towards identifying novel genetic alterations allowing for not only differentiating between apparently similar pathologies but also how these alterations affect tumor behaviour. His work has primarily focused on neuropathology, familial dyslexia, and recombinant human antibodies. He and his team have also contributed in identifying novel drug combinations to rescind hypoxia induced chemoresistance. His work has led to 4 patents being granted (4 India and 3 USA) in areas of transcriptional gene silencing and recombinant antibodies and novel tumour specific gene therapy.

Sectional Committee - X : Agricultural Sciences:
*Agriculture, Horticulture, Forestry, Fisheries, Food Science, Veterinary Science, Pathogen
Biology and Host Pathogen Interaction Both Plant and Veterinary Importance*

Professor TK Adhya, FNA, School of Biotechnology, Kalinga Institute of Industrial Technology (Deemed University), Bhubaneswar.

Prof. Adhya's research has been on paddy. He has done outstanding work on sustainable management of tropical soils through use of ecofriendly technologies for maintaining higher levels of productivity with minimal environmental impacts. His current research focus is on valorization of plant biomass and food waste and the circular bioeconomy for carbon and nitrogen.

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

Dr. Sajeep 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 gene 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.