INSA MEETINGS

Several meetings were held during April 24-26, 2017 in the Academy premises. These included meetings of the different Sectional Committees for recommending names of Young Scientist Awardees to be elected by the Council of the Academy. The Advisory Boards for the various INSA Awards also met. These were followed by meetings of the Council and General Body on April 26, 2017.

INSA Medal for Young Scientists 2017

The Council at its General Body meeting on April 26, 2017 approved the award of INSA Medal for Young Scientist 2017 to 30 young researchers below the age of 35. The Academy had received 596 nominations out of which 30 were selected. The award carries a medal, a certificate and cash prize of Rs. 25,000. In addition, the recipient may be considered for research support of Rs. 5 lakh per year for three years. The awardee within five years of receipt of award will be considered for a visit abroad with full support for presenting research work at conferences, and/or participating in collaborative / training research project wherever possible. Those young scientists who have been unable to obtain suitable placement, may be considered for an Interim Fellowship (amount depending on the qualification and research experience) and contingency of Rs. 25,000/- per year.

The following 30 young scientists were selected for the INSA Medal for Young Scientists.

1. **Dr Swati Agarwal (b 24.07.1985), PhD, Solomon Snyder Department of Neuroscience, John Hopkins University, Baltimore, USA.**
   
   For elucidating the effect of Bisphenol A on neuronal progenitor and neuronal cells and the mechanism by which it affects autophagy and mitochondrial dynamics.

2. **Dr Md Mahiuddin Baidya (b 13.11.1983), PhD, Department of Chemistry, Indian Institute of Technology Madras, Chennai.**
   
   For his contributions towards development of new protocols and for the synthesis of biologically important molecules.

3. **Dr Priyoneel Basu (b 05.11.1982), PhD, Department of Zoology, Institute of Science, Banaras Hindu University, Varanasi.**
   
   For pioneering studies on the role of 5-HTP (a precursor of the neurotransmitter serotonin) in resetting phase of the circadian activity-rest rhythm in mice.

4. **Dr Sanchari Bhattacharyya (b 03.01.1983), PhD, Department of Chemistry & Chemical Biology, Harvard University, Cambridge, USA.**
   
   For designing minimal protein immunogens based on glycoprotein gp120 of HIV-1 as a potential future vaccine against HIV with reduced aggregation properties and higher stability.

5. **Dr Vashist Bist (b 21.03.1988), PhD, Texas Instruments India Pvt. Ltd., Bengaluru.**
   
   For his outstanding contribution in the area of DC motor drives for low power applications.

6. **Dr Anup Biswas (b 20.11.1983), PhD, Department of Mathematics, Indian Institute of Science Education and Research, Pune.**
   

7. **Dr Kunal Chakraborty (b 23.09.1982), PhD, ESSO-Indian National Centre for Ocean...**
Information Services (INCOIS), Hyderabad.

For his outstanding contributions on modelling of marine ecosystem variability in the Indian Ocean.

8. **Dr Swetaprovo Chaudhuri** *(b 01.09.1983)*, PhD, Department of Aerospace Engineering, Indian Institute of Science, Bengaluru.

For outstanding contributions in turbulent combustion laser diagnostics and high performance CFD computation.

9. **Dr Debraj Choudhury** *(b 21.04.1982)*, PhD, Department of Physics, Indian Institute of Technology Kharagpur, Kharagpur.

For his insights into the physics of multi-ferroics and oxide systems, and the discovery of exceptional dielectric properties in a series of compounds.

10. **Dr Srishti Dar** *(b 12.02.1987)*, PhD, Tata Institute of Fundamental Research, Mumbai.

For developing an elegant assay system of arrayed supported membrane tubes whose dimensions can be controlled to mimic the topology of tubular intermediates generated during membrane fission and for demonstrating the role of GTP hydrolysis and PH domain in membrane constriction and faster kinetics of dynamin catalyzed fission.

11. **Dr Riddhi Datta** *(b 28.12.1987)*, PhD, Dr APJ Abdul Kalam Government College, Kolkata.

For elucidating the molecular mechanisms of glutathione- salicylic acid- and ethylene interactions in plant defense signaling network.


For his significant work on asymptotic behavior of random complexes, topology of dynamic Erdős-Renyi clique complexes and asymptotics for geometric functionals of general point processes.

13. **Dr Dipak Gayen** *(b 17.09.1983)*, PhD, National Institute of Plant Genome Research, New Delhi.

For cloning the rice r9- LOXI gene and showing increased viability and storage stability of nutritional components of golden rice seeds by its down regulation through RNAi and for studying regulation of iron transport in roots by miRNA.

14. **Dr Sahana Holla** *(b 10.03.1986)*, PhD, Laboratory of Biochemistry and Molecular Biology, National Cancer Institute, National Institute of Health, Bethesda, USA.

For providing novel insights into immune evasion and survival strategies of mycobacteria.

15. **Dr Dinesh Jagadeesan** *(b 12.12.1982)*, PhD, Physical and Materials Chemistry Division, CSIR-National Chemical Laboratory, Pune.

For his approaches towards development of new catalysts and activation of CO₂.

16. **Dr Smita Kumar** *(b 24.03.1985)*, PhD, Centre of Biomedical Research, SGPGI Campus, Lucknow.

For significant contributions in understanding the molecular mechanisms involved in detoxification of heavy metals like As and S in plants.

17. **Dr Bodhisatta Nandy** *(b 14.01.1984)*, PhD, Indian Institute of Science Education and Research, Behrampur.

For comprehensive experimental evidence, using the *Drosophila* model system, for the major tenets of the theory of sexual selection and inter-sexual conflict.

18. **Dr Joe Philip Ninan** *(b 25.08.1989)*, PhD, Department of Astronomy and Astrophysics, The Pennsylvania State University, USA.

For his studies of outburst phenomena in young stellar objects, and development of necessary instruments.
19. **Dr Ashutosh Pandey** (*b* 25.12.1983), PhD, Faculty of Biology, Chair of Genome Research & CeBiTec, University of Bielefeld, Germany.

   For metabolic engineering of flavonoid and carotenoid biosynthesis in higher plants.


   For identifying novel roles of cell derived micro particles in important clinical conditions like recurrent pregnancy loss and dengue fever complications.

21. **Dr Kartik Prasad** (*b* 23.09.1982), PhD, Mechanical Behavior Group, Defence Metallurgical Research Laboratory, Hyderabad.

   For his outstanding contributions in the development of indigenous instrumentation for thermo-mechanical fatigue (TMF) crack growth experiments, its utilization for studying TMF in aerospace grade Ti and Ni alloys, and subsequently for using such knowledge in enhancing the remaining life of aeroengines.

22. **Dr Sanjay Pratihar** (*b* 01.03.1984), PhD, Department of Chemical Sciences, Tezpur University, Tezpur.

   For his outstanding contributions to multi-metal complexes, theoretical understanding, selective sensing of Hg²⁺ ions and important applications in agriculture.

23. **Dr Uday Kumar B Reddy** (*b* 10.09.1982), PhD, Department of Computer Science and Automation, Indian Institute of Science, Bengaluru.

   For his stellar work in automatic parallelization in high performance computing.

24. **Dr Aravind Kumar Rengan** (*b* 09.08.1983), PhD, Department of Biomedical Engineering, Indian Institute of Technology Hyderabad, Hyderabad.

   For devising a novel way of nano delivery using liposomes and gold nanoparticles, which is useful for both imaging and therapeutics.

25. **Dr Arnab Sen** (*b* 22.11.1982), PhD, Department of Theoretical Physics, Indian Association for the Cultivation of Science, Kolkata.

   For his outstanding contributions towards developing quantum Monte Carlo methods to probe quantum critical points.

26. **Dr Sunil Shetty** (*b* 18.09.1987), PhD, Biozentrum, University of Basel, Switzerland.

   For providing novel insights about roles of the 3GC pairs in initiator tRNA in translation.

27. **Dr Vikas Kumar Singh** (*b* 14.11.1982), PhD, Center of Excellence in Genomics, International Crops Research Institute for the Semi-Arid Tropics, Hyderabad.

   For developing large scale genetic and genomic resources, including sequencing–based mapping, for fusarium wilt resistance and sterility mosaic disease resistance in pigeon pea and for contribution to development of molecular breeding lines in rice.

28. **Dr Devanjan Sinha** (*b* 07.10.1984), PhD, Department of Zoology, Institute of Science, Banaras Hindu University, Varanasi.

   For delineating the complexity and substrate specificity of mitochondrial transport machines and for establishing their role in maintenance of mitochondrial function in diverse physiological states.

29. **Dr Jitendra Thakur** (*b* 23.06.1984), PhD, Fred Hutchinson Cancer Research, Washington, USA.

   For elucidating mechanisms of centromere and kinetochore formation in *Candida* species.

30. **Dr Vikram Vishal** (*b* 12.07.1985), PhD, Department of Earth Sciences, Indian Institute of Technology Bombay, Mumbai.
For his outstanding contributions on hydrodynamics of fluid flow in unconventional reservoirs.

**INSA Medal/Lecture Awards 2017**

The Academy announced the following 13 medal/lecture Awards for 2017.

**Subjectwise Medals/Lectures/Awards**

**(A) Medals Instituted by the Academy**

1. **Homi Jehangir Bhabha Medal** to Professor Chanda Jayant Jog, FNA, Department of Physics, Indian Institute of Science, Bengaluru.

2. **Sunder Lal Hora Medal** to Professor Mewa Singh, FNA, Distinguished Professor, Department of Psychology, University of Mysore, Mysore.

3. **Prasanta Chandra Mahalanobis Medal** to Professor Rajendra Bhatia, FNA, Distinguished Scientist, Statistics & Mathematics Unit, Indian Statistical Institute, New Delhi.

4. **Syed Husain Zaheer Medal** to Professor GD Yadav, FNA, Vice Chancellor & RT Mody Distinguished Professor, Institute of Chemical Technology, Mumbai.

5. **Kalpathi Ramakrishna Ramanathan Medal** to Professor Sulochana Gadgil, FNA, A18, Spring Flowers, Panchavati, Pashan, Pune.

**(B) Endowed Medals**

6. **Professor KP Bhargava Memorial Medal** to Professor SK Sarin, FNA, Director, Institute of Liver and Biliary Sciences, New Delhi.

7. **Professor Bhim Shanker Trivedi Memorial Medal** to Professor Kumaravel Somasundaram, FNA, Department of Microbiology and Cell Biology, Indian Institute of Science, Bengaluru.

**(C) Endowment Lectures**

8. **Professor Bal Dattatraya Tilak Lecture** to Dr Anil Kumar Tripathi, FNA, Director, CSIR-Central Institute for Medicinal and Aromatic Plants, Lucknow.

9. **Bires Chandra Guha Memorial Lecture** to Dr SC Mande, FNA, Director, National Centre for Cell Science, Pune.

10. **Professor Sadhan Basu Memorial Lecture** to Professor Anunay Samanta, FNA, School of Chemistry, University of Hyderabad, Hyderabad.

11. **Dr Yellapragada Subba Row Memorial Lecture** to Dr AC Banerjea, FNA, Emeritus Scientist, National Institute of Immunology, New Delhi.

12. **Professor Har Swarup Memorial Lecture** to Professor Amitabh Joshi, FNA, Evolutionary and Organismal Biology Unit, Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR), Bengaluru.

13. **Dr MR Das Memorial Lecture** to Dr Rajan Sankaranarayanan, FNA, Chief Scientist, Structural Biology Laboratory, CSIR-Centre for Cellular and Molecular Biology, Hyderabad.

**AWARD LECTURE DELIVERED UNDER LOCAL CHAPTERS**

**Professor K Naha Memorial Medal (2016):**
Professor VP Dimri, Formerly Director and Distinguished Scientist, CSIR-National Geophysical Research Institute, Hyderabad delivered Professor K Naha Memorial Medal Lecture on *Modeling of Complexity in Earth System using Fractals and Beyond Fractal Theory* at University of Hyderabad, Hyderabad on March 7, 2017.

**Daulat Singh Kothari Memorial Lecture (2016):**
Professor D Balasubramanian, Distinguished Scientist & Director of Research Emeritus, LV Prasad Eye Institute, Hyderabad delivered Daulat Singh Kothari Memorial Lecture on *Science and Humanities: the Twain is Beginning to Meet* at University of Hyderabad, Hyderabad on March 7, 2017.

Jawaharlal Nehru Birth Centenary Lecture (2017): Professor Sankar K Pal, Distinguished Scientist and former Director, Indian Statistical Institute, Kolkata delivered Jawaharlal Nehru Birth Centenary Lecture on *Granular Data Mining and Uncertainty Modeling: Data to Knowledge and Challenges* at Department of Geography, Savitribai Phule Pune University, Pune on July 12, 2017.

Indira Gandhi Prize for Popularization of Science (2017): Mr. Pallava Bagla, Science Editor, New Delhi Television (NDTV) and Correspondent, Science Magazine delivered Indira Gandhi Prize for Popularization of Science Lecture on *When Science Meets the Public: Are Scientists Losing the Plot?* at INSA, New Delhi on July 24, 2017.

Dr Yellapragada Subba Row Memorial Lecture (2017): Dr AC Banerjea, Emeritus Scientist, National Institute of Immunology, New Delhi delivered Dr Yellapragada Subba Row Memorial Lecture on *HIV Biology, Pathogenesis and Gene Therapy* at Biotech Centre Auditorium, DU South Campus, New Delhi on July 28, 2017.
INTERNATIONAL ACTIVITIES DURING MARCH-JULY 2017

Nominations/Election of Indian scientists for various positions at International Council for Science (ICSU) and its different Unions

- **Dr V Prakash**, Distinguished Scientist of CSIR-India at JSS-MVP, JSS Technical Institutional Area, JSS CMS, Mysore was re-nominated for the position of Vice-President, International Union of Nutritional Sciences (IUNS) for the term 2017-2021.

- Nine Indian scientists were nominated for various positions at the International Union of Pure & Applied Physics (IUPAP) Commissions.

- **Dr Ch. Mohan Rao**, FNA, CSIR-Centre for Cellular and Molecular Biology, Hyderabad has been elected as Member of International Union of Pure & Applied Biophysics (IUPAB) Council.

Workshop/Symposia/Conference supported by the Academy

- Xth IGU International Conference on Urbanization, Health & Wellbeing and Sustainable Development Goals was held at Osmania University, Hyderabad during March 17-19, 2017 under the convenership of Dr B Srinagesh, Department of Geography, Osmania University, Hyderabad.

Visit of Overseas Delegates to INSA

- **INSA Chair Awardee**
  - **Dr DS Kothari Chair Award (2016-17)**

Professor Francesco Sciortino, Dipartimento di Fisica, Universita’ di Roma “La Sapienza” Roma, Italy awardee of Dr DS Kothari Chair of INSA visited India during January 15-February 4, 2017 as distinguished overseas scientist nominated by Professor Srikanth Sastry, Theoretical Sciences Unit, JNCASR, Bengaluru. Professor Sciortino’s report on the visit is as below.

From January 15 to February 4, 2017, I had the pleasure to visit India supported by the INSA Dr DS Kothari Chair. I have visited several institutions, in three different cities: Bangalore, Hyderabad and Delhi. Professor Srikanth Sastry, JNCASR, Bangalore and Professor Sanjay Jain, Delhi University have kindly hosted me. Their hospitality was superb. In Bangalore, I have delivered talks at the Jawaharlal Nehru Centre for Advanced Scientific Research and at the Raman Research Institute. I have also visited the National Centre for Biological Sciences (NCBS) and the Indian Institute of Science. In Hyderabad, I delivered a talk at the TIFR Center for Inter-disciplinary Sciences. In Delhi, I delivered talks at Delhi University, at the Indian Institute of Technology and at Jawaharlal Nehru University.

In my talks, I have presented the researches I have been involved in the last years. Specifically, I have discussed how the experimental investigation of the collective behavior of DNA made nanoparticles can help us understand the physics of limited valence colloids, mesoscopic particles interacting with highly directional interactions. Following a long-standing tradition of exploiting colloids to test theoretical ideas, these DNA nanoparticles have allowed us to investigate among others the phase behavior of highly directional colloids and the stability of network fluids respect to crystal phases. I have also presented our very recent investigation of a DNA-particle gel that forms both on heating and on cooling, a nice example of a material with unconventional mechanical properties.

In all these institutions, I had the pleasure to meet and discuss with several colleagues and friends, learning about their most recent researches. In particular, I like to mention Professor Chandan Dasgupta and Professor Biman Bagchi (IISc-Bangalore), Professor Subir Das (JNCASR-Bangalore), Professor Madan Rao (NCBS-Bangalore), Professor Surajit Sengupta (TIFR-Hyderabad), Professor Shankar Das (JNU Delhi), Professor Ranjini Bandyopadhyay (RRI-Bangalore), Professor Sunjin Babu (IIT-Delhi) & Professor Vashia Benerjee (IIT-Delhi). I expect several collaboration to emerge from this visit. I have also had the pleasure
to meet and interact with many PhD and young Post-doc, establishing new links.

I was also fortunate to be able to participate in the first Charusita Chakravarty Memorial Lecture at the St. Stephen College in Delhi. Late Professor Charusita was among the leading women scientists of India. She gave important contributions in the area of theoretical and computational chemistry. I had the pleasure to meet and discuss with her several time at international conferences during her too short life.

Despite modern technologies having made it possible to overcome geographical distances and thus facilitating long distance interactions, human contact remains, in my opinion, the most effective and pleasant way of exchanging ideas and building contacts that can bring novel collaborations. I have no doubt that it has been a very enjoyable and productive period and I am very grateful to INSA for making this visit possible.

Overseas Visits by INSA Delegations

- Professor Indira Nath, FNA, participated in Science20 Dialogue Form organized by German National Academy of Sciences Leopoldina (GNASL) in Halle, Germany on March 22, 2017.

- Professor AK Sood, President INSA attended the Royal Society Commonwealth Science Conference-2017 held in Singapore during June 13-16, 2017.

Support for Visiting Scientists during March-July 2017

- 13 Indian scientists were supported by the Academy for attending various ICSU sponsored international conferences abroad.

- 36 Indian scientists were supported by the Academy for attending various Non-ICSU sponsored international conferences abroad.

- 26 Indian scientists visited aboard under INSA Bilateral Exchange Programme with overseas academies.

- 10 Indian scientists visited Australia and one Australian scientist visited India under the Indo-Australia Early and Mid-Career Researchers Fellowship Programme 2016-2017.

Scientific Meetings during March-July 2017

- An interactive session of Science Academies’ Summer Research Fellows and their mentors was organized at the INSA premises on June 9, 2017. The meeting was chaired by Professor Ajay K Sood, President INSA, with Professors N Mukunda, FNA, Kankan Bhattacharyya & NR Jagannathan, Vice-Presidents, INSA as panel members. During the event, Professor N Mukunda, FNA, Member, Science Education Panel, gave a brief presentation about Joint Science Education Programme following which a lecture on A physical Technique that
**Revolutionized Clinical Medicine- Magnetic Resonance** was delivered by Professor NR Jagannathan. A large number of summer research fellows, working in Delhi/New Delhi, and their mentors interacted with the panel. The fellows and mentors, while applauding the programme initiated by the three Academies viz., INSA, IASc and NASI, also discussed some problems faced by them during the period of research. Professor Kankan Bhattacharyya extended his vote of thanks to all the summer research fellows, mentors and some of the local fellows of INSA who attended the session.

- The Apex Committee for the INSPIRE Faculty Fellows met on June 9, 2017 in INSA and selected 118 candidates out of the 1113 nominations that were received during first Session (January-July 2017) of the award. This was the 12th session for the selection of INSPIRE Faculty Fellows. Out of the 1113 applications, 327 candidates were shortlisted for interviews by eight subject committees which had met during the month of May. The committees recommended 118 candidates for final consideration by the APEX Committee. The list of selected candidates along with their detailed biodata/proposals has been handed over to the Department of Science and Technology for further action.

- Annual meetings of 19 National committees and the ICSU National Committee were held on ICSU Day on July 24, 2017 at INSA premises.

- The Academy at its Council Meeting during July 24-27, 2017 recommended names of new Fellows to be elected to the Fellowship of the Academy. It also announced to institute a new endowment award named Professor Subramania Ranganathan Memorial Medal. The Medal will be awarded to an eminent scientist for outstanding contributions in any branch of Chemistry. The award carries an honorarium of Rs. 25,000/-, a bronze medal and a citation. The first medal will be awarded in 2018.

**SCIENCE & SOCIETY PROGRAMME**

**INSA-NII Joint Lectures**
The following lectures were organised by Delhi Local Chapter at National Institute of Immunology, New Delhi under the convenership of Dr Satish Kumar Gupta, Reproductive Cell Biology Laboratory, NII, New Delhi. These are:

- **HIV-1 and Influenza Immunogen Design** by Professor Raghavan Varadarajan, FNA, Molecular Biophysics Unit, Indian Institute of Science, Bengaluru on March 21, 2017.
- **Molecular Insights into Meiotic Chromosome Pairing from Single Molecule Analysis** by Professor K Muniyappa, FNA, Department of Biochemistry, Indian Institute of Science, Bengaluru on March 27, 2017.

**RECENT PUBLICATIONS OF THE ACADEMY**

*Proceedings of the Indian National Science Academy*

Volume 83, No. 1 (March 2017) issue of *Proceedings* has been published. This issue contained two commentaries, an opinion, seven review articles, six research papers and a book review besides guest editorial by Professor Raghavendra Gadagkar, FNA.

Volume 83, No. 2 (June 2017) issue of *Proceedings* has been published as a thematic issue on “Recent Antarctic Research in India: The National Committee Report to SCAR (2017)”. This issue contained 12 review articles and 10 research papers besides guest editorial by Professor Shailesh Nayak, FNA.
Indian Journal of History of Science (IJHS)

Volume 52, No. 1 (March 2017) issue of IJHS has been published. This issue includes papers on Features of the Solutions of Kuttaka and Vargaprakṛti; Ideas of Infinitesimal of Bhāskarācārya in Lilāvati and Siddhāntaśiromaṇī, Hospital Medicine through Ancient, Medieval and Colonial India; Amoebic Dysentery and Introduction of Emetine Source Carapichea ipecacacuanha into Indian Subcontinent; Discovery of X-rays and its Impact in India; Ashutosh Mukherjee’s Contribution on Nineteenth Century Modern Mathematics; GN Ramachandran: A Nobel Prize Nominee and Nominator; Udo Chand Dutt: Prominent Indian Materia Medica Promoters and Scientific Explorations and Commercial Sales of the Straw Mushroom Volvariella volvacea (Bull.) Singer in Republican China. This issue also have regular features like book review and project report.

Volume 52, No. 2 (June 2017) issue of IJHS has been published. This issue includes papers on Angular diameters (bimba) of the Sun Moon and Earth’s Shadow-cone; Proofs for Summation in the Nisrī’tardhūti; Sun-Dial for Time-keeping in Jaisalmer Fort; Edward Blyth and the Asiatic Society; Central Weaving Institute, Banaras; History of Colonial Science and Medicine in British India; Cause of Sunrise, Sunset from Jñāneśvari and its Comparison to Aryabhātiya; Allusions of Rasāyanaśastra in Telugu Literature; General Scientific Societies in British India and Syamadas Mukhopadhyay (1866-1937): A reputed Geometrician of India. This issue also includes reviews of the books, Moments of Eureka - Life & Works of Selected Indian Scientists and Jantar Mantar Observatories of Jai Singh. It also carries a project report on History of High Tin Bronze and Brass of Eastern India accomplished under the history of science programme.

Indian Journal of Pure and Applied Mathematics (IJPAM)

Volume 48, No. 1 & 2 (March & June 2017) issue of IJPAM has been published.

OBITUARY

Komaravolu Chandrasekharan

Komaravolu Chandrasekharan (b 21 November 1920; d 13 April 2017) obtained his PhD from the University of Madras, after serving as a part-time Lecturer at Presidency College during 1943-46. He then went to the Institute for Advanced Study, Princeton, USA and it was during his stay in Princeton that he was invited by Dr Homi Bhabha to join the School of Mathematics of the Tata Institute of Fundamental Research (TIFR).

Professor Chandrasekharan worked in the fields of number theory and summability. In 1950s, he authored an important monograph with S. Meenakshisundaram on Riesz’s Typical Means. While in Princeton, he worked jointly with Salomon Bochner and took number of issues on Fourier Transform Theory which he published in a well-known book with Bochner. In 1949, he moved to TIFR, worked hard to make the School of Mathematics of TIFR into a centre of excellence recognized world-wide. He established a successful method of recruiting and training of Research Scholars at TIFR, and put to use his contacts with leading mathematicians of the world, persuading many of them to visit TIFR and deliver courses of lectures. The lecture notes prepared out of these lectures and published by TIFR enjoy a great reputation in the world mathematics community to this day.

Professor Chandrasekharan was recipient of the Padma Shri in 1959, Shanti Swarup Bhatnagar Award in 1963, and the Ramanujan Medal in 1966. He served as Member of Executive Committee, International Mathematical Union (IMU) (1955-61) and Secretary (1961-66) as well as President of IMU (1971-74). He was Vice-President (1963-66) of International Council for Science (ICSU) and Secretary General (1966-70). He served as a Member of the Scientific Advisory Committee to the Cabinet, Government of
India (1961-66). He was elected fellow of the American Mathematical Society in 2012. He was an Editor of *Journal of the Indian Mathematical Society*.

Professor K Chandrasekharan was elected to the Fellowship of the Indian National Science Academy in the year 1954.

### Mihir Chowdhury

Mihir Chowdhury (*b* 15 July 1937; *d* 28 March 2017) obtained his PhD from Sadhan Basu’s laboratory at Calcutta University and did his post-doctoral research at the Pennsylvania State University and the University of Chicago, USA. On returning to India, he joined as CSIR pool officer at the Department of Magnetism (now Department of Solid State Physics), Indian Association for the Cultivation of Science (IACS), Kolkata. He then joined the Faculty of Presidency College, Kolkata to serve as Professor of Chemistry and later became Head of the Department. Subsequently, he joined IACS as Professor of Physical Chemistry and headed the Department. He was associated with postgraduate teaching programmes of Calcutta University and Presidency College in honorary capacity. After superannuation, he was appointed as Honorary Scientist of INSA and then as Senior INSA Scientist till 2006.

Professor Chowdhury made significant contributions in laser spectroscopy, excited state dynamics of cold molecules and clusters, nonlinear optics and spectroscopy, time-resolved spectroscopy in liquids, circular dichroism and magnetic field effect on chemical reactions. His noteworthy contributions are: (i) elucidation of the role of spin and magnetic field in the radical pair recombination process, (ii) circular dichroism of crystal field split components in cooled single crystals, and (iii) laser-induced fluorescence of jet-cooled large organic molecules and their hydrated clusters. He was the first to experimentally show the Mulliken’s conjecture that the CT band is polarized along the intermolecular axis, is indeed correct.

Professor Chowdhury received numerous awards and accolades including the SS Bhatnagar Award, Silver Medal of the Chemical Research Society of India, Lifetime Achievement Award of Indian Society of Radiation and Photochemical Sciences, Eminent Teacher Award of Calcutta University, Lifetime Achievement Award of Indian Chemical Society, and Gold Medal by Chemical Research Society of India. He delivered UGC National Lecture, RP Memorial Lecture at Delhi University, K Rangadhama Rao Lecture of INSA, JC Ghosh Memorial Lecture of Indian Chemical Society, Travers Memorial Lecture of the Indian Institute of Science, Bangalore, Baba Kartar Singh Memorial Lecture at Punjab University, Sadhan Basu Memorial Lecture of INSA, Mizushima-Raman Lectures, Japan. He was a Member of different Learned Societies and Professional Bodies as well as of Editorial Boards of a number of national and international journals. He was elected Fellow of the Indian Academy of Sciences, Bangalore.

Professor Mihir Chowdhury was elected to the Fellowship of the Indian National Science Academy in the year 1980 and as its Council as Member during 1991-93.

### Bhola Nath Dhawan

Bhola Nath Dhawan (*b* 1 October 1932; *d* 16 June 2017) obtained MBBS from KG Medical College of Lucknow University and following his MD in Pharmacology. He was a post-doctoral Fellow at the Department of Experimental Neuropharmacology, Medical School, University of Birmingham, UK. He became Professor of Pharmacology at MLN Medical College, Allahabad and then moved to Central Drug Research Institute (CDRI) as Head, Division of Pharmacology and developed it as a major center for Neuropharmacology and natural product research. He became Deputy Director and then Director of CDRI.
He continued there as CSIR Emeritus Scientist till 1997. He was also the Head of ICMR Centre for Advanced Studies on Traditional Remedies at CDRI.

Professor Dhawan’s major contribution was the discovery and analysis of apomorphine stereotypy in pigeon. His major area of research in Neurosciences was analysis of neurotransmitter receptors involved in central modulation of autonomic activities. He was also involved in discovery of eight new drugs and a diagnostic kit. He has published over four hundred papers, edited twenty books and holds seventy national and international patents. He organized undergraduate and postgraduate teaching and research at MLN Medical College and guided large number of students for their PhD/MD at CDRI.

Professor Dhawan was conferred with many awards including Vasvik Life Sciences Award; Ranbaxy Award, OP Bhasin Award, TWAS Prize, Shri Dhanwantari Prize, Vigyan Gaurav Award of UP Government, BK Bachhawat Life Time Achievement Award of Indian Academy of Neurosciences and Professor KP Bhargava Memorial Medal of INSA. He served as member/chairman of many committees of central agencies like DBT, ICMR, Ministry of Health, and Ministry of Earth Sciences, etc. He was also President of Indian Pharmacological Society and President of Indian Academy of Neurosciences. He was a Fellow of eight other Academies/Societies including the Academy of Sciences for the Developing World (TWAS), Collegium Internationale Neuropsychopharmacologie (CINP), National Academy of Sciences, Allahabad and National Academy of Medical Sciences.

Professor BN Dhawan was elected to the Fellowship of the Indian National Science Academy in the year 1979 and served the Council as a Vice-President in 1993 and as a Member in 1992 & 2004.

Arunugam Gnanam

Arunugam Gnanam (b 5 October 1932; d 17 May 2017) obtained his PhD in biochemistry from North Carolina State University, Raleigh, USA. He was a Fulbright research trainee under Professor Joseph S Kahn. He carried out his post-doctoral research with Professor Andre Jagendorf, at Cornell University. He along with his mentors, established the role of chloroplast genome and its relative autonomy with its own transcription and translation machinery. He was a faculty for undergraduates for nearly two years at Cornell. He administered three Universities (Bharathidasan, Madras and Pondicherry) as Vice Chancellor for nearly 15 years. He also served as the President of Association of Indian Universities (AIU) and the Chairman of National Assessment and Accreditation Council, Bangalore for three years until his superannuation. He was INSA Senior Scientist during 1997-2001.

Professor Gnanam’s research was focused on establishing the presence of chloroplast specific genome and protein synthesizing machinery that are different from those of the rest of the cell, use of appropriate vectors for transforming chloroplast genome, understanding basic nature of stress tolerance in plants and developing transgenic plants through tissue culture protocols. His pioneering contributions to understanding of the chloroplast structure, function and development have lead to many international publications. He has over 140 publications in Plant Molecular Biology. He also taught both undergraduate and graduate students at Annamalai, Cornell and Madurai Kamaraj Universities. He had established a very good school of research in photosynthesis in the country covering bio-productivity, photochemical processes, enzymology and molecular genetics of plants with special reference to the photosynthetic system.

Professor Gnanam was bestowed upon with several honours and recognitions including Rafi Ahmed Kidwai Prize, TS Sadasivhan Lecture Award of INSA and DSc and DLitt (hc) from several Indian and foreign Universities. He was also a Member/ Fellow/Advisor of several national and international professional societies and intergovernmental agencies like UNESCO and World Bank. He was elected Fellow of National Academy of Sciences, Allahabad.
Professor A Gnanam was elected to the Fellowship of the Indian National Science Academy in the year 1985 and served as its Vice-President during 1994-96.

Yash Pal

Yash Pal (b 26 November 1926; d 24 July 2017) obtained his PhD from Massachusetts Institute of Technology specialising in high-energy physics, astrophysics, communication, science policy and space technology. He served as Professor at Tata Institute of Fundamental Research, Mumbai, Director of Space Applications, Centre, Ahmedabad (1973-81), Chief Consultant of the Planning Commission (1983-84), Secretary of the Department of Science and Technology (1984-86), and Chairman, University Grants Commission (1986-91), New Delhi. He also served as president of the Indian Physics Association.

As UGC Chairman, he started many innovative programmes to improve the standards of education. One such major programme is the serial ‘Race to Save the Planet’ in collaboration with USA and Australia. He had done extensive work in theory and practice of communication for development and proposed ways of using modern technology, space technology in particular, useful for developing countries. He was also known for his regular appearances in the science programme Turning Point on Doordarshan, explaining scientific concepts in layman’s language. He was also on the advisory boards for several TV Science programmes like Bharat ki chaap.

Professor Pal made renowned contributions in the field of cosmic rays, high-energy physics, astrophysics, science education, communication and development. His work had specifically led to the first observations of negative meson, pair production of elementary particles, elucidation of the properties of k-meson and hyperons, first measure of K-K mass difference, prediction of the rise in p-p cross section, and recognition of the importance of excited states of particles in multiple meson production in high energies. He was the first to develop leady-box model of cosmic-ray propagation in the galaxy.

Professor Pal won many prestigious awards including the Macroni International Fellowship Award, GP Chatterjee Memorial Award of Indian Science Congress Association, Association of Space Explorer Award, Padma Bhushan & Padma Vibhushan, Indira Gandhi Prize for Popularization of Science, the Meghnad Saha Medal & Daulat Singh Kothari Memorial Lecture of INSA. He was also a Member of UN Advisory Committee on Science and Technology for Development, Scientific Council, International Centre for Theoretical Physics, Trieste and Executive Committee, United Nations University, Vice President, IUPAP. He was President of Indian Physics Association and has been elected Fellow of Indian Academy of Sciences, Bangalore, National Academy of Sciences, Allahabad, Gujarat Science Academy and Indian Astronomical Society.

Professor Yash Pal was elected to the Fellowship of the Indian National Science Academy in the year 1977 and served as its Council as Member during 1980-81.

Udupi Ramachandra Rao

Udupi Ramachandra Rao (b 10 March 1932; d 24 July 2017) obtained his PhD from Physical Research Laboratory (PRL), Ahmedabad to carry out research on cosmic ray time variations under the guidance of Dr Vikram Sarabhai. After completing his PhD, he joined the Massachusetts Institute of Technology, Cambridge in 1960 as a Postdoctoral Research Fellow where he carried out fundamental investigations on solar wind using Mariner-2 observations. He then joined University of Texas at Dallas in 1963 as Assistant Professor where he carried out investigations as a prime experimenter on a number of Pioneer and Explorer spacecraft. On returning to India, he joined as Professor at PRL, Ahmedabad and later took over as Chairman, Space
Commission and Secretary, Department of Space in 1984. He was conferred DSc(\textit{hc}) from over 25 universities in India and abroad.

Professor Rao initiated research on X-ray and Gamma-ray high energy astronomy using balloon, rocket and satellite borne payloads. He undertook responsibility to establish satellite technology in India in 1972. The first Indian satellite ‘Aryabhata’ in 1975, and over 18 other satellites including Bhaskara, APPLE, Rohini, INSAT-1 and INSAT-2 series of multipurpose satellites and IRS series of remote sensing satellites were designed, fabricated and launched under his guidance. The successful launch of INSAT series of satellites provided telecommunication links to remote corners of India. As Chairman of Space Commission, he accelerated the development of rocket technology resulting in the successful launch of ASLV rocket in 1992 and the operational PSLV launch vehicle in 1995. He initiated development of the geostationary launch vehicle GSLV and development of cryogenic technology in 1991. He aimed at utilization of vast benefits from space technology for development of India in the areas of ‘communication, broadcasting, education, management of national natural resources and disaster management’. He also published over 300 scientific and technical papers in various national and international journals covering cosmic rays, interplanetary physics, high energy astrophysics, space applications and satellite and rocket technology.

Professor Rao received many national and international awards. He was honoured with Padma Bhushan in 1976 and Padma Vibhushan in 2017. He also won SS Bhatnagar Memorial Award, Hari Om Vikram Sarabhai Award, VASVIK Award, PC Mahalanobis Medal of INSA, Om Bhasin Award, Meghnad Saha Gold Medal, Aryabhatan Award, Jawaharlal Nehru Award, Gujar Mal Modi Award, Life-time Achievement Award of INAE and ISRO; and AV Rama Rao Technology Award. He also received Group Achievement Award of NASA, Yuri Gagarin Medal, Allan D Emil Award, Frank J Malina Award, Vikram Sarabhai Medal by COSPAR, Von Karman Award etc. He was the first Indian space scientist to be inducted into the “Satellite Hall of fame” at Washington DC, US in 2013 and into the “International Astronautical Federation Hall of Fame” at Guadalajara, Mexico in 2016. He was a Vice President of International Astronautical Federation (1984-92), Chairman of UN Committee on Peaceful Uses of Outer Space (1997-2000) and President of UNISPACE-III Global Conference (1999). He is Fellow of several Indian Science and Engineering Academies and International Academy of Astronautics, Third World Academy of Sciences (TWAS) and World Academy of Arts & Sciences.

Professor UR Rao was elected to the Fellowship of the Indian National Science Academy in the year 1979.

Durgaprasad Roy

Durgaprasad Roy (b 29 July 1941; d 17 March 2017) obtained his PhD in 1966 from Tata Institute of Fundamental Research (TIFR), Mumbai specialising in particle physics. He was a postdoctoral Fellow at the University of California, Riverside, USA; CERN, Geneva and University of Toronto, Canada. He then worked at the Rutherford Laboratory, UK (1970-74), and as Reader at Visva-Bharati University, Santiniketan, West Bengal (1974-76). Later, he joined TIFR as Reader in 1976 and superannuated as Senior Professor in 2006. He worked at the Homi Bhabha Centre of Science Education (HBCSE), TIFR, as a DAE Raja Ramanna Fellow until 2011, and then continued working as an INSA Senior Scientist at HBCSE.

Professor Roy made pioneering contributions in the wide area of particle and astroparticle physics. He predicted and presented evidences for exotic meson (4-quark) and baryon (5-quark) states. The signature for top quark search in terms of a hard isolated lepton and jets, suggested by him, has been widely used in the top quark search at the CERN and Tevatron proton-antiproton colliders, leading to its discovery at the latter in 1995. He suggested a promising signature for the charged Higgs boson.
search in its tau lepton decay channel, using the distinctive polarization prediction for tau. This is being currently used in the ongoing search for charged Higgs boson at the Tevatron as well as the Large Hadron Collider at CERN. Likewise, the missing transverse-momentum signature for Supersymmetric particles suggested by him, is being widely used in the ongoing collider searches for these particles. The years 2000-05 have been described as the Golden Years of Solar Neutrino Physics, thanks to the three pioneering experiments. Through a series of globally acclaimed papers, his group has analysed these experimental data to finally provide a unique solution to the long standing solar neutrino puzzle in terms of neutrino oscillation with precise mass and mixing angle.

Professor Roy received Meghnad Saha Award by UGC and the S.N. Bose Medal of INSA. He was active in the National Initiative in Undergraduate Science programme of HBCSE as a mentor and the Student’s Journal of Physics published by the Indian Association of Physics Teachers as member of its National Advisory Board. He was a Member of the Governing Council of the Institute of Physics, Bhubaneswar. He was elected Fellow of the Indian Academy of Sciences, Bangalore and the National Academy of Sciences, Allahabad.

Professor DP Roy was elected to the Fellowship of the Indian National Science Academy in the year 1993.

Arun Kumar Sharma

Arun Kumar Sharma (b 31 December 1924; d 06 July 2017) obtained his DSc from the University of Calcutta and also received DSc (hc) from the Banaras Hindu University, Burdwan University and North Bengal University. After a brief stint at Botanical Survey of India (BSI), he moved to University of Kolkata where he spent his entire academic career. He served as a Lecturer, Reader, Professor, Sir Rashbehary Ghose Professor and as an INSA Golden Jubilee Research Professor (1985-90) and continued his association with the university as an honorary professor past his official retirement. He superannuated in 1990 as the Head of the department and project coordinator for the Centre for Advanced Study on Cell and Chromosome of the University.

Professor Sharma carried out significant researches in cytogenetics and cytochemistry and is credited with developing new research techniques for the study of chromosome structure of plants. He propounded the concept of speciation in asexual organisms. He developed new techniques for studying the physical and chemical nature of chromosomes, adopted all over the world for plant, animal and human systems, the latest technique being orcein banding for repetitive DNA. He also contributed to repeat DNA analysis as a measure of genetic diversity, clarification of the chemical nature of plant chromosomes through specially developed techniques, inducing division in adult nuclei through certain metabolic precursors for studying chromosomes in relation to differentiation, reorientation of angiosperm taxonomy, a new concept of dynamism of structure and behaviour of chromosomes in plant, animal and human systems. He used embryo irradiation and in vitro culture for generating variability, established the concept of dynamic DNA, and tissue culture as a means of conservation of endangered species. Sharma has shown that the chemical composition, specially proteins, of chromosomes varies during organogenesis, differentiation and reproduction, with the basic genetic skeleton being maintained.

Professor Sharma was the founder of the Centre for Advanced Study on Cell and Chromosomes and contributed to the development of the Department of Botany at the University of Kolkata into one of the finest centres of research. He has served as Chairman, Indian National Committee of IUBS-INSA (1978-81), Man and Biosphere Committee, Department of Environment (1981-89), FASAS Commission on Science and Technology for Development in Asia (1990), Co-chairman, Global Continuing Committee on Role of Scientific and Engineering Societies in Development (AAAS-INSA-ISCA) (1980-90), Birla Industrial and Technological Museum, Kolkata (1990-98), Plant Biotechnology Committee, DBT (1997), Plant Science Research Committee, CSIR (1998-2004), Chairman, Steering Committee, National Bioresource Development Board (2000-todate) and Member, Executive Committee, IUBS, Paris (1982-85), IUBS Steering Committee on Biological Monitoring of the State of Environment (1983), and Board of Trustees, International Foundation for Science, Stockholm (1984-87). He served on the Governing bodies of CSIR and other research councils. He has been Chief Editor of the journal *The Nucleus* and served on the Editorial boards of many journals including Proceedings of the Indian National Science Academy, Journal of Cytology and Genetics, Proceedings of the Indian Academy of Sciences and Indian Journal of Experimental Biology.


Professor AK Sharma was elected to the Fellowship of the Indian National Science Academy in the year 1970 and served as President during 1983-84.
ANNOUNCEMENTS

Nomination for Election of Fellows
The last date for receiving nominations for election of Fellows is October 16, 2017. Nominations received on or before October 16 will be included for consideration in the year 2018, while those received after October 16, 2017 will go for the year 2019. Nomination form can be downloaded from the INSA website www.insaindia.res.in

Nomination for Election of Foreign and Pravasi Fellows
Nominations are invited from the Fellows of INSA for election of Foreign Fellows and Pravasi Fellows for the year 2018. Nomination form can be downloaded from the INSA website www.insaindia.res.in

INSA Medal for Young Scientists - 2018
Nominations are invited for INSA Medal for Young Scientists – 2018. Those born on or after January 1, 1983 are eligible for consideration in the year 2018. The awardee shall receive a certificate, a bronze medal and cash award of Rs. 25000/-. Nominations may be proposed by a Fellow of the Indian National Science Academy or by earlier recipients of this award. Scientific societies of national standing, university faculty, post-graduate departments of research institutions may also nominate eligible candidates. The last date for receiving nominations for INSA Medal for Young Scientists is October 31, 2017. Nomination proforma can be downloaded from the INSA website www.insaindia.res.in

Proposal for Lectures in the Remote/Rural Areas
The Academy has launched a programme under which INSA Fellows, Young Scientists, Teacher Awardees & INYAS members are encouraged to deliver Popular Lectures to young students and teachers of schools and colleges in remote/rural areas in India.

Proposals are invited from Fellows, INSA Young Scientists, INSA Teacher Awardees and INYAS members with details like name and address of the school/college where they wish to deliver lectures, title/s of lecture/s, proposed dates and the quantum of required travel support. Proposals may be sent to Executive Director, INSA at esoffice@insa.nic.in and to scisoc@insa.nic.in at the earliest.
Call for Research Proposal in History of Science

The Indian National Commission for History of Science approves, under the guidance of a Research Council, Research Projects on various subjects pertaining to history of science and technology in India. Through this programme, the Investigator can take up source and theme oriented study and compilations of important sources with commentaries; translation of important technical primary sources on mathematics, astronomy, medicine, alchemy, agriculture, natural products, life sciences, scientific traditions including oral traditions of scientific nature, metals and metallurgy, architecture and irrigation technology, for critical assessment relating to ancient and medieval periods. The Commission gives equal emphasis for historical evaluation of science and technology scenario in India during the 19th and 20th centuries. Study of pioneering institutions, popular perceptions of science development, tools, techniques and how the knowledge in each area of science has grown conceptually on the basis of International perspectives, are some examples of the research areas. Themes may also be selected depending on candidates’ own aptitudes and specializations.

The last date for submitting research proposals is December 31, 2017. For all other details and application form, visit the website www.insaindia.res.in or mail at esoffice@insa.nic.in/ijhs@insa.nic.in

Nomination for INSA Awards

The last date for receiving nominations for the following INSA Awards due for the year 2018 is **October 16, 2017**:

1. Satyendranath Bose Medal (Physics)
2. Darashaw Nosherwanji Wadia Medal (Earth Sciences including Geography)
3. Golden Jubilee Commemoration Medal (Animal Sciences)
4. Vishwakarma Medal (Engineering & Technology)
5. Professor GN Ramachandran 60th Birthday Commemoration Medal (Biochemistry & Biophysics)
6. Professor Krishna Sahai Bilgrami Memorial Medal (Agricultural Sciences)
7. Professor Har Swarup Memorial Medal (for woman scientist in any branch of Science & Technology)
8. Professor Subramania Ranganathan Memorial Medal (in any branch of Chemistry)
9. Dr Nitya Anand Endowment Lecture (Biomedical Research including New Drug Development)
10. Professor Vishnu Vasudeva Narlikar Memorial Lecture (Mathematics)
11. Professor Vishwa Nath Memorial Lecture (Biochemistry & Biophysics)

Nomination form can be downloaded from the INSA website www.insaindia.res.in