

Indian Academy of Sciences elects new Fellows

AGRAWAL, P. C., Space Physics Group, Tata Institute of Fundamental Research, Bombay.



Agrawal is an outstanding observational astronomer, primarily interested in the X-ray band. His early studies led to the discovery of flaring effects on the source of Cyg X-1 and Sco X-1

sources. He subsequently participated in the design of the HEAD-A2 instrument. He has extensively studied AM-Hercules-type binaries, which are powered by accretion channelled on to the poles of a magnetic white dwarf.

BABU, C. R., Department of Botany, University of Delhi, Delhi.

His 'Herbaceous flora of Dehra Dun' is a significant taxonomic work which not only provides an inventory of the diversity among the herbaceous plants but identifies the ecological niches of 1230 species. He has successfully applied the population biology approach to floristic studies. He has also made original contributions to our understanding of the evolution and conservation of wild genetic resources of Indian food legumes, notably *Phaseolus* and *Vigna*.

BANERJEE, S., Physical Metallurgy Division, Bhabha Atomic Research Centre, Bombay.



His contributions to the understanding of phase transformations, in particular to ordering reactions in alloys, are well known.

BHANDARI, N., Physical Research Laboratory, Ahmedabad.



Bhandari has used an elegant combination of cosmic ray-produced isotopes and radiation damage tracks in unshielded planetary objects like

meteorites and the Moon to deduce the evolutionary history of solar particulate emissions, meteorites and lunar surface regions. He has used these techniques to understand hydrological, glaciological and impact-cratering processes.

BOSE, S. K., Department of Mathematics, Regional Engineering College, Durgapur.



Bose has made significant contributions in the mathematical analysis of many problems of engineering importance. This includes elastic-wave propagation in seismic phenomena, discrimination between earthquakes and nuclear explosions, as well as foundation-engineering problems such as soil stiffness in relation to vibrations of columns and walls.

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DAS GUPTA, M. K., Institute of Radio Physics and Electronics, Calcutta.



Gupta, along with R. C. Jennison, set up the first intensity interferometer, which involved the design, fabrication and successful operation of the first

long base line post-detector correlation radio interferometer and measuring the angular structure of radio sources like Cygnus A and Cas A. His researches on enhancement of atmospheric noise prior to nor'westers, effect of solar eclipse on microwave line-of-sight propagation, and enhancement of the integrated field intensity of atmospheric subsequent to the explosion of megaton nuclear bombs, as well as his other studies in radio engineering, are well known.

DHAR, D., Theoretical Physics Group, Tata Institute of Fundamental Research, Bombay.



Dhar has well posed and solved a set of outstanding problems in condensed matter physics characterized by an essential complexity due to

the fractal nature of the underlying lattice, leading to new universality classes of critical behaviour. He isolated the spectral dimensionality that counts the density of low-lying excitations on a fractal and obtained exact results and equivalences for the directed percolation and the lattice animal enumeration problems. He has also solved several models of growth and roughening. His work reflects a rare convolution of power of mathematical analysis with that of computer simulation.

GADAGKAR, R., Centre for Ecological Sciences, Indian Institute of Science, Bangalore.



His work has been concentrated on insect behaviour, in particular on social behaviour in the wasp *Ropalidia*. He has made his mark in the field with many striking dis-

coveries. He has shown pre-imaginal caste determination in a primitively eusocial wasp, opening up a whole new field of study. His combination of biochemical techniques to study mating patterns and a novel experimental design to unravel the mechanism of nestmate discrimination has provided new insights into the evolution of insect sociality.

GANDHI, K. S., Department of Chemical Engineering, Indian Institute of Science, Bangalore.



Gandhi has made notable contributions in phase transformation, in particular to ordering reactions in alloys. His model for epoxies predic-

ted anomalous industrial data. He also cleared the thickening reaction controversy by demonstrating the formation of ionomeric domains. Among his other important contributions are the successful simulation of an industrial Nylon reactor and the first model for tube collapse to yield preforms.

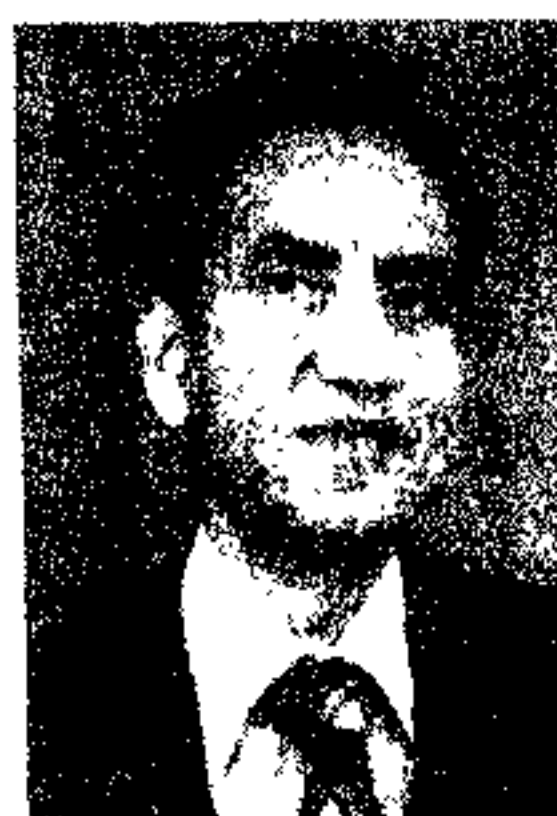
GANGAL, SUDHA G., Immunology Division, Cancer Research Institute, Bombay.



She has contributed to the field of cancer immunology, particularly cellular immunology. Her group has carefully dissected the cellular and mole-

cular events involved in T-cell hypo-responsiveness in Hodgkin's disease. Her studies on cytotoxic effector mechanisms in oral cancer are acclaimed worldwide. Her group has succeeded in producing monoclonal antibodies against tumour markers and squamous cell carcinoma antigens.

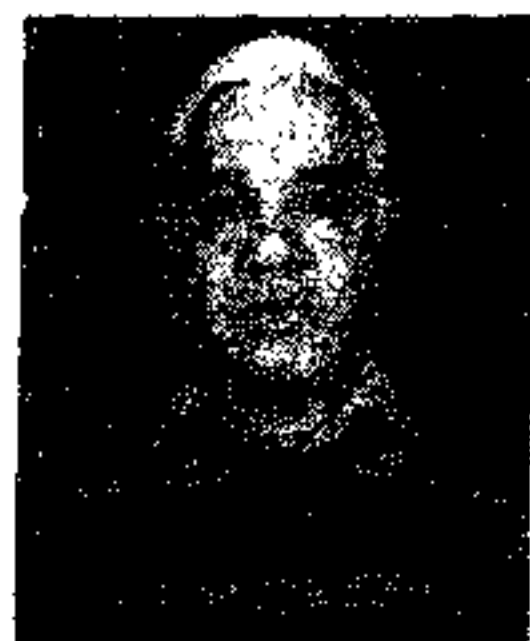
GHOSH, J. K., Indian Statistical Institute, Calcutta.



His contributions in mathematical statistics, and in particular, inference, are outstanding. Connecting invariance and sufficiency, he developed a powerful method for sequential tests

of composite hypotheses. His proof of existence of a minimal sufficient statistic in the discrete case is considered a fundamental contribution to sample survey theory. His more recent work in higher order efficiency and Edgeworth expansions has settled completely old problems in statistics.

IYENGAR, R. N., Department of Civil Engineering, Indian Institute of Science, Bangalore.



Iyengar has made important contributions to nonlinear random vibrations, stochastic stability analyses, structural reliability and statistical classification

of earthquakes. He developed two new approaches, known as Gaussian closure technique and higher order linearization, and has solved the problem of the eigenvalues of a string with stochastic mass variation.

KARTHA, V. B., Spectroscopy Division, Bhabha Atomic Research Centre, Bombay.



Kartha has made many significant contributions to high-radiation spectroscopy in combination with supersonic nozzle beams and laser techniques

such as saturation and polarization spectroscopy, semiconductor diode spectroscopy, multiphoton ionization, etc. He has applied laser spectroscopy to enrichment of isotopes.

KOCHUPILLAI, N., Department of Endocrinology and Metabolism, All India Institute of Medical Sciences New Delhi.



His studies relate to the causes of preventable mental retardation in India. He developed strategies to successfully organize a neonatal hypothy-

roid screening programme in the most socioeconomically backward endemic-goitre districts of Uttar Pradesh and showed that as much as 13% of newborns in these iodine-deficient regions stand the risk of developing mental retardation due to congenital hypothyroidism. These studies have imparted a new momentum to iodine prophylactic programmes in India.

MADYASTHA, K. M., Department of Organic Chemistry, Indian Institute of Science, Bangalore.



His area of work is bio-organic chemistry and his work on metabolic pathways to terpenoids, microbial models of mammalian metabolism, a new me-

thod for the replacement of tertiary *N*-methyl by other alkyl groups and application of this method to morphine alkaloids is well recognized. He successfully demonstrated the aromatization of α -terpineol by microbes, providing practical implications of the use of microbes in organic synthesis.

MITRA, S. K., Indian Statistical Institute, New Delhi.



Mitra has interested himself in practically all branches of statistics and has in particular contributed to estimation theory, statistical analysis of cate-

gorical data, distribution theory, linear models and sampling theory through his full grasp of methods of matrix theory and probability distributions.

MOOKHERJEE, A., Department of Geology and Geophysics, Indian Institute of Technology, Kharagpur.



His contributions to ore genesis include elucidation of the physicochemical environment of the Zawar mineral deposits, the role of metal complexes in mineral precipitation, and post-

depositional effects such as deformation, metamorphism and magmatism on very old mineral deposits.

MUTHUKKARUPPAN, V. R., School of Biological Sciences, Madurai Kamaraj University, Madurai.



His early contributions in reptilian immunology enhanced our understanding of the origin and development of the immune system in

reptiles. His researches in the immunology of leprosy and typhoid infections,

development of monoclonal antibodies to *Salmonella typhimurium* porin, and other areas of biology such as angiogenesis and Eale's disease have been well received.

RAJAMANI, V., School of Environmental Sciences, Jawaharlal Nehru University, New Delhi.



Rajamani is a brilliant young geochemist who has used quantitative chemical and isotope modelling to understand the tectonic and chemical evolution of the Kolar Schist Belt. Apart from the genesis of gold deposits in this belt, he has elucidated the parental material formation conditions and tectonic setting of the komatiite-theolite volcanic association in this belt.

RAMACHANDRAN, R., Department of Physics, Indian Institute of Technology, Kanpur.



Ramachandran has worked on a wide range of problems in high-energy physics. His early work on the Veneziano model and dual amplitudes is widely

quoted in the literature. So was his study on the $\eta=3\pi$ decay process, non-perturbative theories of monopoles, and proton decay through the Rubakov effect. He has also been working on string theory to study higher-loop corrections to scattering amplitudes using sophisticated mathematical techniques.

RAMAKRISHNAN, C., Molecular Biophysics Unit, Indian Institute of Science, Bangalore.



Ramakrishnan has made original contributions to the conformational analysis of polypeptides. His theoretical study of cyclic-peptide conforma-

tions is of value in developing structural models for an ever-increasing number of bioactive cyclic peptides. His studies of new algorithms for identification of secondary structures in globular proteins provided new insights to the conformational features of segments of polypeptide chains in proteins.

RAMASAMI, T., Central Leather Research Institute, Madras.



Ramasami has contributed significantly to the area of reactivity and mechanisms of co-ordination compounds. His work on stabili-

zation of low-valent metal oxidation states using macrocyclic ligands has received high appreciation internationally. He demonstrated the contributions of electronic matrix elements to outer-sphere electron transfer rates using experimental probes.

SARKAR, P. K., Division of Cell Biology, Indian Institute of Chemical Biology, Calcutta.



Sarkar has made original contributions in molecular neurobiology and has studied in detail the effect of thyroxin on the functional development

of brain cells. Making use of an original method to fractionate glial and neuronal cells, he showed that thyroxin promotes brain development by regulating tubulin gene expression and that the glial cells are the target for thyroxin action.

SATHYAMURTHY, N., Department of Chemistry, Indian Institute of Technology, Kanpur.



Sathyamurthy has made many significant contributions in the theoretical study of reaction dynamics of small molecules. His trajectory cal-

culations, using both classical and quantum-mechanical approaches, have led to better understanding of the role played by translational, vibrational and rotational energy in state-to state photochemistry.

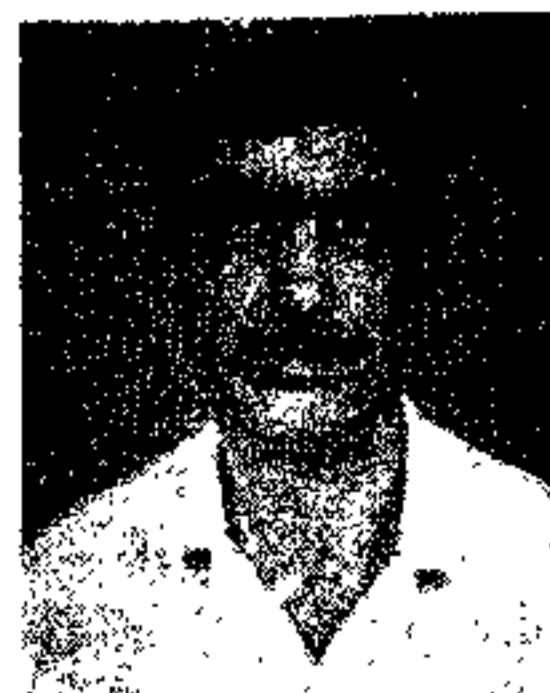
SHARMA, R. P., Biotechnology Centre, Indian Agricultural Research Institute, New Delhi.



His recent research displays unusual versatility in that it combines two rather different areas, the genetics of development in the fruit fly *Drosophila melanogaster*

and the use of mutagenesis as a tool for crop improvement. The hallmark of his *Drosophila* work has been his ability to isolate and characterize mutant genes. The best known of these is the *wingless* gene. He has also succeeded in standardizing a laboratory method for large-scale screening of germplasm and segregating populations of chickpea for *Ascochyta*-produced blight.

SIKKA, S. K., Neutron Physics Group, Bhabha Atomic Research Centre, Bombay.



Sikka has made original contributions in high-pressure physics and neutron diffraction. His work has provided new insights into the mechanisms of high-pressure phase transitions in transition metals, rare earths and silicon. His theoretical work on shock equation of state of solids is widely recognized.

SITARAMAM, V., Department of Zoology, University of Poona, Pune.



Sitaramam has observed that low gravitational fields, electrostatic fields, respiration and ATP hydrolysis dramatically enhance permeability

of biological membranes, leading to equilibration of large polyols, eg. sucrose. This is in violation of the Second Law, and offers the first-ever evidence for density fluctuations in the membrane bilayer. The discovery of osmotic compressibility of the activities of membrane proteins led to the definition and prediction of the phenotype for osmotolerance in microbes and plants.

VENKATESH, Y. V., Department of Electrical Engineering, Indian Institute of Science, Bangalore.



Venkatesh has made sustained contributions in the area of stability theory of systems and in the newer areas of image processing and vision.

His stability/instability results are the most general among those available in the literature. He has developed a new procedure for matching of images used by NASA for tracking ice flows and quadtree-based data structures for geometric operations on images.