The 45th Indian Biophysical Society Meeting

National Centre for Biological Sciences
Tata Institute of Fundamental Research

27th-29th March, 2023

This is the short version of the booklet.
Full abstracts with all authors, references, and figures can be found at:
https://www.ncbs.res.in/

Contents

About

The Indian Biophysical Society

The Indian Biophysical Society (IBS), founded in 1965 and registered under the Act XXVI of 1961 at Kolkata with its office at Saha Institute of Nuclear Physics (SINP), has grown over the years. Presently, it is holding over 1000 Life-members from all parts of the country. The interdisciplinary nature of the society attracted scientists from not only Phyiscs, Chemistry and Biology, but also from other related areas too such as Biotechnology, Bioinformatics and Medicine.

The first IBS Executive Council (EC) comprised of Dr. D. M. Bose as its first President, N. N. Dasgupta and B. Mukherjee as Vice-Presidents, N. N. Saha as the Secretary, B. D. Nagchaudhuri as the Treasurer, and A. K. Saha, M. N. Rao and S. N. Chatterjee as Members of the Council.

IBS gives many awards to young and established scientists to promote biophysics in India. In addition to eight poster awards and one young scientist award (please see details on the abstract page), IBS gives two travel awards to cover partial expenses for attending the IUPAB International Biophysics Congress held once every three years and the Asian Biophysics Association (ABA) meeting, which is held once in two years. These awards are: Prof. J. C. Bose award for senior scientists above 35 years of age and Prof. G. N. Ramachandran award for younger scientists below 35 years of age.

The 45th IBS Meeting

The 45th Indian Biophysical Society Meeting will be held at the National Centre for Biological Sciences (TIFR), Bangalore, between March 27-29, 2023. The 2023 IBS meeting aims to highlight conceptual ideas and foundational aspects of biophysical phenomena across scales and will bring together a wide range of scientists.

The meeting will be comprised of multiple plenary and themed invited talks and poster sessions. Further, in addition to the established and prestigious G.N. Ramachandran Lecture, we will have the inaugural Simons Lecture at this meeting, hosted by the Simons Centre for the Study of Living Machines at the NCBS-TIFR. This lecture will highlight seminal contributions in the use of the quantitative sciences in investigating biological phenomena.

Organizing committee

Shashi Thutupalli (NCBS, ICTS)
Madan Rao (NCBS)
Ranabir Das (NCBS)
Vinothkumar Kutti Ragunath (NCBS)

Timetable

TS: Tutorials, MS: Mini Symposia (Parallel Sessions), PS: Plenary Session
Locations for the sessions

Day -1: Saturday, 25 March, 2023

9:00–17:00	TS	**Tutorial Session 1** Vinoth, Ruchi Anand, Ranabir Das	Microscopy, Cryo-EM
9:00–17:00	TS	**Tutorial Session 2** Pramod Pullarkat, Bidisha Sinha, Karthik Mahesh, Rama Koti	Mechanobiology
9:00–17:00	TS	**Tutorial Session 3** Vijay Krishnamurthy, Shaon Chakrabarti, Sundar Naganathan	Quantitative Biology/Machine Learning

Day 0: Sunday, 26 March, 2023

9:00–17:00	TS	**Tutorial Session 1** Vinoth, Ruchi Anand, Ranabir Das	Microscopy, Cryo-EM
9:00–17:00	TS	**Tutorial Session 2** Pramod Pullarkat, Bidisha Sinha, Karthik Mahesh, Rama Koti	Mechanobiology
9:00–17:00	TS	**Tutorial Session 3** Vijay Krishnamurthy, Shaon Chakrabarti, Sundar Naganathan	Quantitative Biology/Machine Learning
14:30–19:00	**Registration**		

Day 1: Monday, 27 March, 2023

7:30–9:15	**Registration**		
9:15–9:30	**Welcome remarks: Madan Rao, President of IBS and Organisers**		
Plenary Session - 1.1 (Venue: **Dasheri**)		**Chair: Jayant Udgaonkar** IISER, Pune	
9:30–10:00	PS	**Rama Ranganathan** Chicago, USA	No Title
10:00–10:30	PS	**Satyajit Mayor** NCBS Bangalore	Cells integrate mechanical and chemical inputs at the cell membrane by building active emulsions
10:30–11:00	PS	**Joan Emma Shea** UCSB, Santa Barbara	Self-Assembly of the Tau Protein: Liquid-Liquid Phase Separation and Fibrillization
11:00–11:30	**Coffee**		
Mini Symposium - 1.1 (Venue: **LH1, Haapus**)		**Biomolecular Structure and Function (Membrane proteins)** Chair: Ruchi Anand, IIT Bombay	
11:30–11:50	MS	**Appu K Singh** IIT Kanpur	Cryo-EM illuminates new biology of orphan receptors
11:50–12:10	MS	**Aravind Penmatsa** IISc Bangalore	Insights into mechanisms of GABA uptake and transport inhibition by antiepileptic drugs
12:10–12:30	MS	**Aditi Borkar** University of Nottingham	Structure probing of native RNA-protein complexes using Mass Spectrometry and Molecular Modelling
Mini Symposium - 1.2 (Venue: **Dasheri**)		**Cell Membrane Biophysics** Chair: PB Sunil Kumar, IIT Madras	
11:30–11:50	MS	**Thomas Pucadyil** IISER Pune	Mechanistic analysis of membrane fission and discovery of novel fission proteins
11:50–12:10	MS	**Durba Sengupta** NCL Pune	Specificity and Flexibility of Protein-Lipid Signatures
12:10–12:30	MS	**Tripta Bhatia** IISER Mohali	Alpha-amylase and Lipid Membrane Interaction
12:50–13:50	**Lunch**		
Mini Symposium - 1.3		**Cellular Organization and Dynamics** Chair: Minhaj Sirajuddin, InStem Bangalore	

10:30–11:00	MS	**Roop Malik** IIT Bombay	A Force at the Edge : Lipids and Motors at Membrane Contact Site
14:10–14:30	MS	**Pramod Pullarkat** RRI, Bangalore	Tension buffering mechanisms in axons
14:30–14:50	MS	**Bibhu Ranjan Sarangi** IIT-Palakkad	Active particles in soft confinement
Mini Symposium - 1.4		**Biomolecular Assemblies** Chair: Neelanjana Sengupta, IISER Kolkata	
13:50–14:10	MS	**Shachi Gosavi** NCBS, Bangalore	Understanding how conformational transitions can modulate the folding of proteins
14:10–14:30	MS	**Raghavan Varadarajan** IISc, Bangalore	Probing protein stability and gene function using saturation mutagenesis
14:30–14:50	MS	**Tanweer Hussain** IISc, Bangalore	Yeast eukaryotic initiation factor 4B remodels the mRNA entry site on the small ribosomal subunit
15:00–17:00	**Poster Session / Executive Committee Meeting**		
17:00–18:00	PS	**Vendor and Sponsor Talks**	
19:00 Onwards	**Dinner + Career Sessions**		

Day 2: Tuesday, 28 March, 2023

Plenary Session - 2.1		**Chair: Madan Rao, NCBS Bangalore**	
9:30–10:30	PS	**David Baker** Institute of Protein Science	No Title
10:30–11:00	PS	**Oskar Hallatschek** Universität Leipzig	Microfluidic Island Biogeography - Jam and Conquer
11:00–11:30	**Coffee**		
Mini Symposium - 2.1		**Biomolecular Processing and Dynamics** Chair: Matthew MK, NCBS Bangalore	
11:30–11:50	MS	**Ranjith Padinhateeri** IIT Bombay	Predicting coarse-grained chromatin polymer properties from nucleosome-level contact data
11:50–12:10	MS	**Shivprasad Patil** IISER Pune	Dynamic Atomic Force Microscope for Viscoelasticity of Single Folded Domains of Proteins
12:10–12:30	MS	**Hema Chandra Kotamarthi** IIT, Madras	Probing protein degradation by ATP-dependent proteases and proteasomes using single-molecule force spectroscopy
Mini Symposium - 2.2		**Biophysical processes in the Nucleus** Chair: Bidisha Sinha, IISER Kolkata	
11:30–11:50	MS	**Dimple Notani** NCBS, Bangalore	Understanding the enhancer code in regulation of transcription
11:50–12:10	MS	**Mahipal Ganji** IISc, Bangalore	Single-Molecule Analysis of DNA Base-Stacking Energetics Using Patterned DNA Nanostructures
12:10–12:30	MS	**Shovamayee Maharana** IISc Bangalore	RNA-RBP condensates sense cellular RNA and buffer immune response
12:50–13:50	**Lunch**		
Mini Symposium - 2.3		**Tissue Mechanics and Geometry** Chair: Arnab Gupta, IISER Kolkata	
13:50–14:10	MS	**Mandar Inamdar** IIT, Bombay	Active mechanics of epithelial monolayers
14:10–14:30	MS	**Tamal Das** TIFR-H, Hyderabad	Unravelling the mechanobiology of cell competition during cancer initiation
14:30–14:50	MS	**Prerna Sharma** IISc, Bangalore	Enhanced mixing and inversion of vortex flow around confined microalgae

Mini Symposium - 2.4		**Systems Biophysics** Chair: Gopalakrishnan Bulusu, IIIT, Hyderabad	
13:50–14:10	MS	**Rahul Siddharthan** IMSc, Chennai	How transcriptions factors associate in 3D chromatin
14:10–14:30	MS	**Shaon Chakrabarti** NCBS, Bangalore	Inferring principles of cell fate control from correlated cancer cell lineages
14:30–14:50	MS	**Shankar Mukherji** WUSTL, St. Louis	Building the cell from unreliable parts: coordinating stochastic organelle biogenesis with cellular growth
15:00–17:00	**Poster Session**		
Plenary Session - 2.2		**Chair: Maitreyi Narasimha** TIFR, Mumbai	
17:00–17:30	PS	**GV Shivashankar** ETH, Zurich	Mechano-Genomics of Cell-State Transitions
17:30–18:00	PS	**Hiroshi Hamada** Kobe University	Biophysical basis of left-right symmetry breaking in vertebrates
19:00 Onwards	**Gala Dinner + Career Sessions**		

Day 3: Wednesday, 29 March, 2023

Plenary Session - 3.1		**Chair: Mukund Thattai** NCBS	
9:30–10:30	PS	**Manu Prakash** Stanford University	Recreational Biology: Topological Puzzles in cell biology
10:30–11:00	PS	**Dapeng Max Bi** Northeastern University, Boston	Fluidity and rheological response in confluent epithelial tissues
11:00–11:30	**Coffee**		
Mini Symposium - 3.1		**Biomolecular Aggregates in function and disease** Chair: Deepak Sinha, IACS Kolkata	
11:30–11:50	MS	**Sudipta Maiti** TIFR, Mumbai	Extra-receptor signalling: how the lipid bilayer transduces neurotransmitter signals
11:50–12:10	MS	**Hagen Hofmann** Weizmann Institute	no Title
12:10–12:30	MS	**Markus Zweckstetter** MPI, Göttingen	A tale of Tau: Associations and Phase Separation
Mini Symposium - 3.2		**Systems Biology** Chair: R Swaminathan, IIT Guwahati	
11:30–11:50	MS	**Vijay Krishnamurthy** ICTS Bangalore	No title
15:10–15:30	MS	**Kavita Jain** JNCASR	Polygenic adaptation in large finite populations
12:10–12:30	MS	**Sandeep Krishna** NCBS, Bangalore	Structural determinants of relaxation dynamics in a class of ligation-cleavage chemical reaction networks
12:50–13:50	**Lunch**		
Mini Symposium - 3.1		**Organismal Biophysics** Chair: Vidyanand Nanjundiah, ICTS Bangalore	
13:50–14:10	MS	**Vishu Guttal** IISc, Bangalore	Physics-inspired data-driven models of collective motion.
14:10–14:30	MS	**Karen Alim** TU, Munich	Lesson from smart slime: How active flow networks process information for complex behaviour
14:30–15:45	**Poster Sessions**		
15:45–16:00	**Break**		
Plenary Session		**Patterns in Biology** Chair: Shashi Thutupalli	
16:00–16:30	PS	**Ratna Phadke Lecture Speaker**	TBA

16:30–17:00	PS	**Online - Michel Milinkovitch** University of Geneva	The Unreasonable Effectiveness of Reaction-Diffusion in Vertebrate Skin Colour Patterning
17:00–18:00	**General Body Meeting**		
18:00–18:30	**Closing Session: Poster Awards + Thank yous**		