



BIOENGINEERING

Annual Student Research Symposium 2015

Interdisciplinary Bioengineering Programme

Indian Institute of Science-560 012

January 24, 2015, Saturday, 10:15-11:00 AM

Venue: MRDG Seminar Hall, First Floor, Biological Sciences Building

Prof. Sanjay K Biswas Memorial Lecture

Speaker: Prof. Madan Rao | TIFR-NCBS and RRI, Bangalore

Title: Mechanics of Information Processing in the Cell

Abstract: The living cell translates physical and chemical processes, often driven by energy consumption, into the management of information. We have been studying, both theoretically and experimentally, the organization and dynamics of a large class of molecules on the surface of living cells that are potentially involved in information processing. We find that these molecules are under the active control of the thin layer of actin-myosin juxtaposed with the cell membrane. This active composite cell surface drives a dynamic molecular architecture with implications to information processing in cells. To this end, we pose a generic information processing problem of identifying the optimal strategy for distributed protein receptors to faithfully "read" an incoming ligand signal that varies in space-time. The actomyosin driven dynamic molecular architecture emerges as an optimum strategy of this information processing problem.

Biosketch: Prof. Rao did his PhD in the Dept of Physics at IISc, and after a brief post doc joined the Institute of Mathematical Sciences, Chennai. He moved to Raman Research Institute and National Centre for Biological Sciences in 1999. He has worked on a variety of topics in nonequilibrium statistical physics, soft and biological matter and material science. His current research interests are in membrane-cytoskeleton interactions, organelle biogenesis, nuclear organization, cell and tissue mechanics and its implication to information processing, computation and control, and in soft and hard matter driven out of equilibrium.



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<http://www.be.iisc.ernet.in/news.html>

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Time	Speaker	Title
10:00-10:15 AM Welcome		
10:15-11:00 AM Prof. Sanjay K Biswas Memorial Lecture	Prof. Madan Rao TIFR-NCBS and RRI, Bangalore	Mechanics of Information Processing in the Cell
11:00-11:20 AM Tea/Coffee Break		
11:20-01:00 PM Session I Presentation by BE III year Students		
11:20-11:40 AM	Gowri Balachander	Study of Breast Cancer cells in 3D Tissue Engineering Scaffolds
11:40-12:00 AM	Pradeep Sathyanarayana	Biochemical and functional analysis of Ecoli Cyotysin A Pore Forming Toxin
12:00-12:20 AM	Puneet Singh	Investigations of synergies in control of natural movements
12:20-12:40 PM	Rajeev Mudakavi	Development of functional antimicrobial coatings on nanoparticles for targeting intravacoular pathogens
12:40-01:00 PM	Sreenath Balakrishnan	Response of liver cells to mechanical stimuli
01:00-02:00 PM Lunch Break		
02:00-03:15 PM Session II Biomaterials		
02:00-02:15 PM	Shilpee Jain	Medical microrobots for hyperthermia therapy
02:15-02:30 PM	Yashoda Chandorkar	Biodegradable, biocompatible polyester for sustained, in situ delivery of salicylic acid in tissue engineering applications
02:30-02:45 PM	Nitu Bhaskar	Nanotoxicity of Hydroxyapatite-40 wt.% Barium titanate: long term in-vivo study in mice model
02:45-03:00 PM	Sai Balaji	Nano-capsule based drug delivery for targeting breast cancer stem cells
03:00-03:15 PM	Sumit Bahl	Nanostructured surface modification of metallic materials for enhanced performance in orthopedic applications
03:15-03:30 PM Tea/Coffee Break		
03:30-04:15 PM Session III Biomechanics & Bio-design		
03:30-03:45 PM	Ravi Kumar K	Bioelectric stress induced cell deformation in an electric field stimulated medium
03:45-04:00 PM	Ankur Kulkarni	Mechanobiology in confined spaces
04:00-04:15 PM	Chandrasekhar M. Sakode	Complete regression of tumors by automated optimal Therapy
04:15-04:30 PM Tea/Coffee Break		
04:30 -05:15 PM Session IV Neuro-engineering & Computational Bioengineering		
04:30-04:45 PM	Pramod RT	Computational models of perceptual space
04:45-05:00 PM	Ratan Murty	How does the brain recognize objects across 3d views?
05:00-05:15 PM	Atul Gopal	Reading Intentions through the Eyes
05:15-05:30 PM Closure		