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M&S Colloquium

Modeling Biochemical Pathways

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Centre for Cellular and Molecular Biology

Wednesday, 19 October 2005, 3:00–5:00 PM
Sir C. V. Raman Auditorium, Department of Physics

Living systems are spectacular examples of spatiotemporally organized structures. Their evolution and maintenance are products of both their internal nonlinear processes operating at multiple spatial and temporal scales, and the external physicochemical and social environment that they experience. The tremendous success of modern biology has helped in obtaining detail molecular explanations of genetic and cellular processes, yet the complexity involved in studying higher levels of biological organization in detail is still prohibitive. Modeling helps in collection of details into realistic abstractions, and prediction of the effects of alterations in system dynamics that may otherwise require very difficult and tedious experimental manipulations.

Spatiotemporal organisation in biological systems can be studied at different levels, from molecular to evolutionary. The focus in this talk will be on the intra-cellular processes, specifically on networks of biochemical pathways. Different methods of modeling biochemical pathways will be described. One modeling method will be considered in detail with example pathways starting from its biology to developing and analyzing the model behaviour and their implications.

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Somdatta Sinha heads the Mathematical Modeling and Computational Biology Group at the Centre for Cellular and Molecular Biology, Hyderabad. Her area of study is theoretical biology, nonlinear dynamics and complex systems, with a view to understand the logic of biological processes. Her primary research focus is on the evolution and maintenance of spatiotemporal organization in biological systems spanning multiple spatiotemporal scales from ecological to genetic. She also has co-authored science textbooks (classes 7, 8, and 10) for the Central Board of Secondary Education, and published by the National Council for Educational Research and Training, New Delhi, India.