ICTS Seminar

Title : Emergent behaviors of complex chemical systems

Speaker : Sumantra Sarkar (Center for Nonlinear Studies at the Los Alamos National Laboratory, USA)

Date : Wednesday, 10th February 2021

Time : 09:30 am (IST)

Abstract : Biological systems, such as cells, grow, proliferate, and respond to stimuli; behaviors that give them their "lifelike" qualities. These macroscopic behaviors emerge out of complex interactions between chemicals inside a cell, the details of which remain poorly understood. Most importantly, microscopic changes, such as expression of proteins, are not averaged out and they directly affect the emergent behaviors. Therefore, a comprehensive understanding of the macroscopic behavior is only possible through a comprehensive understanding of its emergence from myriads of microscopic interactions. In this talk, I shall describe two systems where I have investigated biological and bio-inspired systems using such an approach. In the first half, I shall describe how self-replicating entities emerge in a nonbiological chemical system. I shall describe a paradox that had plagued this field over three decades and how we resolved it and, in the process, discovered a general design principle for self-replicating materials. In the second half, I shall describe my investigations of cell signaling systems, where I have discovered the impact of spatial heterogeneity on emergent kinetic laws of chemical reactions. Finally, I'll highlight the impact of these discoveries for future studies of biological and bio-inspired systems.

Venue : Please click on the below link to join the seminar

https://zoom.us/j/96591492485?pwd=TEEvUXBVcjc5SEQwcDZTUVFpM1BnZz09
Meeting ID: 965 9149 2485
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