ME Seminar

MECHANICAL ENGINEERING
INDIAN INSTITUTE OF SCIENCE

Planktonic Active Matter

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ABSTRACT

Planktonic active matter represents an emergent system spanning different scales: individual, population and community; and complexity arising from sub-cellular and cellular to collective and ecosystem scale dynamics. This cross-scale active matter system responds to a range of abiotic (temperature, fluid flow and light conditions) and biotic factors (nutrients, pH, secondary metabolites) characteristic to the relevant ecosystems they are part of. Active modulation of cell phenotypes, including morphology, motility, and intracellular organization enable planktonic microbes to dynamically interact with other individuals and species; and adapt - often rapidly - to the changes in their environment. In this talk, I discuss our recent results, focusing from a mechanistic standpoint, with specific references to plankton's ability to actively tune the behaviour and physiology which enable emergent structures and functions under both natural constraints as well as those imposed due to the shifting climatic trends.

ABOUT THE SPEAKER

Anupam Sengupta is an ATTRACT Fellow and Associate Professor of Biological Physics at the University of Luxembourg. Anupam directs the Physics of Living Matter Group, a cross-disciplinary team of scientists working on emergent functionalities in biological systems within the Department of Physics and Materials Science. Anupam holds a Dual Degree in Mechanical Engineering from IIT Bombay, India, and a Ph.D. in Soft Matter Physics carried out at the Max Planck Institute for Dynamics and Self-Organization in G ttingen, Germany. Before starting his lab, Anupam was a Human Frontiers Cross-Disciplinary Fellow at MIT (Cambridge, USA) and ETH Zurich (Switzerland), working on the physical ecology of microorganisms. Anupam is a member of the Institute of Advanced Studies at the University of Luxembourg, and among other roles, serves as the Director of the Undergraduate Physics Studies of U. of Luxembourg.

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4:00 PM, A. R. Auditorium