S N BOSE NATIONAL CENTRE
FOR BASIC SCIENCES
Block JD, Sector III, Salt Lake, Kolkata 700 106

DEPARTMENTAL SEMINAR

Physics of Complex Systems

07th July,2023 **4.00 PM** **ONLINE / FERMION**

SPEAKER

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TITLE OF THE TALK

Cellular spreading and migration on curved surfaces

ABSTRACT

Cells often spread and migrate on curved surfaces inside the body, such as curved tissues, blood vessels, fibers of the extracellular matrix or cylindrical protrusions of other cells. Recent in-vitro experiments provide clear evidence that the dynamics and spreading of cells are affected by the curvature of the substrate on which they spread or migrate. Cellular protrusions at the leading edge are found to wrap (coil) around the extra-cellular fibers, rather than extending axially.

The migrating cells are found to prefer certain curvatures to others, such as, when migrating on sinusoidal substrate, the cells move along the grooves (minima), while avoiding motion along the ridges. Our aim is to develop a qualitative understanding of the above-mentioned phenomena using a simple physics-based model. We employ a "minimal cell" model which is composed of a vesicle that contains curved membrane protein complexes, that exert protrusive forces on the membrane (representing the pressure due to actin polymerization). This minimal-cell model gives rise to spontaneous emergence of a motile phenotype, driven by a lamellipodia-like leading edge. Our model could capture the qualitative features observed in real cells, and allows us to make further new predictions that are verified using different cell types.

HOST FACULTY

Dr. Sakuntala Chatterjee, Associate Professor
DEPT. OF PHYSICS OF COMPLEX SYSTEMS

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