ICTS Synopsis Seminar

Title : Physics of Cytokinesis

Speaker : Aditya Singh Rajput (ICTS-TIFR, Bengaluru)

Date : Friday, 04 July 2025

Time : 11:30 AM (IST)

Abstract : Cell division is a fundamental biological process that ensures the segregation of genetic material and also involves dramatic changes in the cellular geometry, leading to cytokinesis: the cleavage of a cell giving rise to two daughter cells. In metazoans, cytokinesis is orchestrated by flows resulting from active stress gradients in the actomyosin cortex -- a thin film comprising myosin motors, actin filaments, and other associated macromolecules. In this thesis, we develop a theory for the geometrodynamics of the cortex treated as an active surface. At high activity, we observe self-organised dynamics of the cytokinetic furrow and concomitant myosin patterns, which agree well with experimental measurements during the first division in the *C. elegans* embryo. Through RNAi perturbations, we further test our prediction that higher contractility generically leads to asymmetric ingression. This work suggests that active, self-organised dynamics could underlie the widely observed kinematic features and asymmetries in cytokinesis.

Venue : Chern Lecture Hall
Zoom link: https://icts-res-in.zoom.us/j/93109744656?pwd=u4lHyb0sNqY2s0Dgm04RuHCO7OfTr7.1
Meeting ID: 931 0974 4656
Passcode: 468896