ICTS Synopsis Seminar

Title : Active patterns, geometry, and growth during morphogenesis

Speaker : Jigyasa Watwani (ICTS-TIFR, Bengaluru)

Date : Friday, 30 January 2026

Time : 10:30 AM (IST)

Abstract :

Living matter is maintained out of thermodynamic equilibrium by a continuous throughput of energy. Self-organisation of living systems involves pattern formation, growth, and change of form. In this thesis, we develop a theoretical framework to explore the interplay between these features. First, we study how mechanochemical patterns of an active stress regulator in a confined domain are influenced by the boundary geometry. Next, we consider deformable domains and show the emergence of bounded and unbounded growth resulting from the competition between the material properties of the tissue and active stresses driven by cell proliferation. Finally, we demonstrate that including an orientational order parameter into our framework leads to the emergence of anisotropic tissue shapes in response to imposed signalling profiles. We compare the predictions of our model with the semi-autonomous growth patterns of explanted tissues from zebrafish embryos.

Venue : Feynman Lecture Hall
Zoom link: https://icts-res-in.zoom.us/j/92878917206?pwd=2BzaLIyN5TZry20fgte9VQMaXSfbbH.1
Meeting ID: 928 7891 7206
Passcode: 013026