



अंतर्राष्ट्रीय सैद्धांतिक विज्ञान केंद्र
International Centre for Theoretical Sciences

टाटा मूलभूत अनुसंधान संस्थान
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भारत सरकार के परमाणु ऊर्जा विभाग की एक स्वायत्त संस्थान एवं समविश्वविद्यालय

An Autonomous Institution of the Department of Atomic Energy of Government of India and a Deemed to be University

ICTS Thesis Defense Seminar

Title : Active patterns, geometry, and growth during morphogenesis

Speaker : Jigyasa Watwani (ICTS-TIFR, Bengaluru)

Date : Friday, 24 July 2026

Time : 10:00 AM – 11:30 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/96228418601?pwd=AHkRBT1wrQeLU3bJbqltkVbIMpZaKW.1>

Meeting ID: 962 2841 8601

Passcode: 242526