ICTS | INTERNATIONAL CENTRE for THEORETICAL SCIENCES

TATA INSTITUTE OF FUNDAMENTAL RESEARCH

# ICTS Biophysics Seminar

**Title** : Control of Tissue Flows and Embryo Geometry in Avian Gastrulation

**Speaker** : Mattia Serra (University of California, San Diego)

**Date** : Thursday, 11 September 2025

**Time** : 11:30 AM (IST)

**Abstract** : Embryonic tissues undergo coordinated flows during avian gastrulation to establish the body plan. Here, we elucidate how tens of thousands of cells coordinate their behaviors to sculpt the chick embryo's dynamic geometry (size and shape). These two distinct geometric changes are each associated with dynamic curves across which trajectories separate (kinematic repellers). Through physical modeling and experimental manipulations, we selectively eliminate either or both repellers in model and experiments, revealing their mechanistic origins. We find that embryo size is affected by the competition between extraembryonic epiboly and embryonic myosin-driven contraction---which persists when mesoderm induction is blocked. Instead, the characteristic shape change from circular to pear-shaped arises from myosin-driven cell intercalations in the mesendoderm, irrespective of epiboly. These findings elucidate modular mechanisms for the independent control of embryo size and shape during development.
https://www.nature.com/articles/s41467-025-60249-8

**Venue** : Feynman Lecture Hall
Zoom Link: https://icts-res-in.zoom.us/j/95013741971?pwd=q5mQZfmiWWaxb3BpZxTaG0nGSEqlA0.1
Meeting ID: 950 1374 1971
Passcode: 202040