

Internal Seminar

Synthetic Developmental Biology: Synthetic Tools to study Developmental Biology

Shirshadri Chakraborty

TIFR, Hyderabad

The field of Synthetic Developmental Biology lies at the intersection of Synthetic Biology and Developmental Biology, and aims to uncover complex developmental mechanisms by building tissues in a bottom-up approach, contrary to traditional top-down approaches. In this talk, I will be discussing two synthetic tools we are trying to develop in the lab to address questions pertaining to tissue morphogenesis and morpho-dynamics. One of them is a short peptide designed to bind and label endogenous E-Cadherin molecules in a user-friendly, non-perturbative way, allowing real-time visualisation of tissue dynamics. The other tool is an organoid model derived from mouse stem cell aggregates that can recapitulate characteristics of early embryonic development. These ‘Gastruloids’, as they have been named, exhibit robust gene expression and general morphogenetic patterns, thereby enabling high-throughput studies of gastrulation while circumventing the technical and ethical challenges associated with their in vivo counterparts. I will discuss the design principles underpinning both the tools and research directions we hope to explore using them.

Tuesday, Jul 28th 2026

16:00 Hrs

Seminar Hall, TIFRH