

ICTS Seminar

Title : Active mechanochemical patterns: nonlinear oscillations and pattern selection by domain shape

Speaker : Jemseena V, ICTS-TIFR, Bangalore

Date : Thursday, July 18, 2019

Time : 2:00 PM

Venue : Emmy Noether Seminar Room, ICTS Campus, Bangalore

Abstract : Pattern formation in the active cellular cytoskeleton involves mechanical stresses in an integral manner. As such, mechanochemical patterns are very sensitive to the underlying geometry of the domain. We will discuss three problems that exemplify this aspect. (1) We study active patterns on curved two-dimensional manifolds embedded in \mathbb{R}^3 . We show that the emergent patterns sense the underlying curvature of the domains and uncover transitions in pattern localization as a function of the activity strength. (2) Next, we consider a flat two-dimensional domain with a curved boundary and demonstrate that the emergent patterns localize to preferred regions of the boundary depending on parameters. (3) Finally, we will discuss a surprising case where oscillatory patterns emerge in a model with a single regulator of active stress when the coefficient of a linear turnover term is tuned. We show that this is a genuinely nonlinear effect and is independent of the boundary conditions.