

ICTS Seminar

- Title : Marangoni Instabilities and Pattern Selection
- Speaker : Jason R. Picardo, University of Florida, Gainesville, United States
- Date : Tuesday, October 4, 2016
- Time : 1:30 pm
- Venue : Emmy Noether Seminar Room, ICTS Campus, Bangalore
- Abstract : This talk will begin with a discussion of the stability of immiscible layered flow with transverse diffusion of a soluble surfactant – a situation encountered in micro-scale solvent extraction. A linear stability analysis reveals the presence of three distinct types of Marangoni instabilities, of interfacial and convective origins. This multiplicity of modes raises the question of which pattern would be observed in an experiment. This issue, relevant to many pattern forming systems, is the focus of the second half of the talk. We study a model problem (involving two superposed thin films on a hot surface) in which two distinct instability modes are present with identical growth rates. Using numerical simulations and reduced models, we attempt to understand the subtle nonlinear interactions between the two peak. Our results indicate that the traditional paradigm of pattern selection, based on the fastest growing linear mode, breaks down in systems with competing modes.