

## ICTS Seminar

- Title : The Hidden World of Sand
- Speaker : Bulbul Chakraborty, Brandeis University, USA
- Date : Wednesday, May 24, 2017
- Time : 11:00 AM
- Venue : Emmy Noether Seminar Room, ICTS Campus, Bangalore
- Abstract : The origin of collectively organized structures at atomic and molecular scales is the competition between energy and entropy, with thermal motion providing the mechanism for organization by allowing particles to explore the space of configurations. This well-established paradigm of temperature-assisted emergent behavior breaks down for aggregates of macroscopic objects ranging from grains of sand to asteroids. Sand dunes are patterned by the shearing forces of winds. Sand piles and even asteroid belts self-assemble under gravity. In this talk, I will discuss a statistical mechanics framework for describing the collective behavior of such granular aggregates. I will argue that we need to go beneath what is visible to the eye and look for patterns in gauge potentials that enforce the constraints of force and torque balance. As a specific example, I will present our work on dense suspensions displaying the phenomenon of discontinuous shear thickening.