ICTS Seminar

Title : Theoretical models of cell swimming and crawling

Speaker : Mohd Suhail Rizvi, Centre national de la recherche scientifique (CNRS) and Laboratoire Interdisciplinaire de Physique

Date : Wednesday, January 29, 2020

Time : 2:15 PM

Venue : Emmy Noether Seminar Room, ICTS Campus, Bangalore

Abstract : Swimming and crawling are the two most prominent mechanisms of cell migration. We have devel- oped theoretical models of these two mechanisms of cell migration to understand their similarities and differences. Towards this, we have followed two modeling approaches – bead and spring based models which represent a very simple setup to capture the basic features of motility, and, detailed models by taking cellular ingredients into account.

In this talk, I will describe the mechanisms of the symmetry breaking for the swimmer and crawler for their persistent motion. I will also show the necessary conditions for mechanosensitive adhesion based crawling (similar to “scallop theorem” for microswimmers), and the relationship between cell velocity and the magnitude of cellular forces

(v~f 2 for swimming and v~f 3 for crawling). I will also demonstrate non-Newtonian rheology of swimmer suspensions and non-monotonic dependence of crawling speed on the adhesion strength.