



# International Conference on Micro Nano Fluidics (ICOM 2025)



October 31 – November 2, 2025, IIT Guwahati

---

**Speaker/affiliation:** Prof. Shubhadeep Mandal, IISc, Bengaluru

**Tentative topic of the invited talk**

*Microscale swimming in nematic liquid crystals*

**Abstract of the invited talk**

Microswimmers exhibit fascinating behaviour due to the interplay of activity and hydrodynamics. By means of nematic multi-particle collision dynamics simulations and analytical modelling, we investigate the motion of swimmers immersed in a nematic liquid crystal and confined by solid walls. For isolated squirmers, we find a rich phase diagram including oscillatory dynamics for weak pushers, depending on the strength of their propulsion and degree of confinement. Increasing the number of squirmers shows the emergence of cooperativity in pusher-type squirmers, while pullers' flow fields hinder each other's motion. The interplay of nematodynamic torque, wall-induced elastic repulsion, and active flows thus offers the opportunity for both control and transport in active nematic systems