

## **ICTS PhD Synopsis Seminar**

- Title : Lagrangian Statistics in High and Low Re Number Flows: From Filaments in Fully Developed Turbulence to Tracers in Bacterial Suspensions
- Speaker : Rahul Kumar Singh (ICTS-TIFR, Bangalore)
- Date : Friday, 21<sup>st</sup> January 2022
- Time : 04:00 pm (IST)
- Abstract : In this talk we discuss different aspects of Lagrangian statistics to investigate the dynamics of objects in high and low Reynolds number flows.

In the first half, we discuss the dynamics of model filaments whose lengths extend well beyond the dissipation range in high Reynolds number fluid turbulence. In particular, we show the distinctive nature of preferential sampling of vortical structures by these filaments in two and three dimensions. We end this talk by focussing on the gravitational settling of such filaments and the complex tumbling dynamics they exhibit as they descend.

In the second half, we show how emergent features in low Reynolds number active turbulent flows, for e.g. dense bacterial suspensions, result in distinct particle trajectories. These result in anomalous diffusion, via Lévy walks, which shows up in measurements of the mean-squared-displacement and first-passage statistics. Furthermore, we uncover other aspects of Lagrangian statistics, such as dynamical heterogeneity, in such two-dimensional bacterial suspensions, thus underlining the key differences between active and inertial turbulence.

- Online Seminar : Zoom link:  
<https://us06web.zoom.us/j/87043792110?pwd=bEhiS2JlMDdaNFp0V0NzRzlZbkZYdz09>  
Meeting ID: 870 4379 2110  
Passcode: 484148