

ICTS Seminar

- Title** : A continuum theory for cytoplasmic streaming in the *Drosophila* oocyte
- Speaker** : Brato Chakrabarti (Flatiron Institute, Simons Foundation)
- Date** : Wednesday, 14th December 2022
- Time** : 03:00 pm (IST)
- Abstract** : In several large cells, of which egg cells are an important example, diffusion is inadequate for intracellular transport. Fruit fly eggs solve this problem by giving rise to a coherent circulatory flow called ‘cytoplasmic streaming’ that spans the cell’s entire $\sim 200 \mu\text{m}$ scale. Cytoplasmic streaming is a striking example of fluid-structure interactions within living cells that is driven by the motion of nanometric motors transporting subcellular cargo along stiff biopolymers (microtubules) anchored at the cell boundary. Despite its ubiquity, the underlying fluid-structure interactions remain unclear. In this talk, I will outline a coarse-grained continuum theory that explains the emergence of such large-scale flows and elucidates how the emergent flow topology is influenced by microtubule density and cell geometry. The theory, which has the structure of an active boundary layer coupled to a bulk fluid, provides quantitative and experimentally testable predictions and is readily extended to other biological flows.
- Venue** : **Hybrid talk**
- Offline:** Emmy Noether Seminar Room
- Online:** Please click on the below link to join the seminar
- <https://icts-res-in.zoom.us/j/84890206852?pwd=Z0tiZlJkZUFkZXREZpak9sMEVsR0lwQT09>
- Meeting ID: 848 9020 6852
- Passcode: 121312