

## **Colloquium**

**The edge of a cell: a living fabric where Physics meets Biology**

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Our attempt at understanding the structure and organisation of the membrane of living cells has a long history, almost as long as the discovery of the cell. From the identification of lipids as constituents of the membrane of living cells to its organisation as a bilayer, a number of hypothesis were proposed to explain this interface of a cell with its outside world. Famously captured in the 'fluid mosaic' model of Singer and Nicolson, in 1972, the membrane was posited as a lipid bilayer wherein proteins were dissolved in a sea of lipids, in other words, an inert matrix. Today, 50 years hence, our picture of the membrane has undergone a tectonic shift driven by our understanding of the functional organisation of this 2D fluid membrane bilayer, in terms of its lateral heterogeneity of composition at different length scales, as well as its transverse asymmetry. In addition to cell biologists, this has attracted the attention of evolutionary biologists, physical chemists and active matter physicists. Using insights from these disciplines, coupled with *in vitro* biochemical reconstitutions, I will lay out a new picture of the membrane as an *active actin membrane composite*, that is fundamentally an energy consuming, out-of equilibrium fabric, which also serves as a mechanoresponsive sensorium for the cell.

**Monday, Oct 30<sup>th</sup> 2023**

**4:00 PM (Tea / Coffee 3.45 PM)**

**Auditorium, TIFR-H**