

Seminar

Two problems in physical biology

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I will describe two problems in physical biology: the modelling of intracellular transport in neurons and a simple description of nuclear fluctuations in stem cells. Our work on intracellular transport describes how cells deal with the inevitability of macromolecular crowding in unusual ways, showing that such crowding triggers changes in the nature of motion of transport vesicles in order to maintain vesicle flux and prevent the build-up of permanent traffic jams. These ideas provide a very different way of thinking about molecular-motor-based transport, suggesting that the in vivo biological context is likely very different from the one conventional models usually assume. For the stem cell problem, I will show how the observation of “auxeticity” (a negative Poisson's ratio) of stem cells provides clues to the interaction between DNA in the form of chromatin and the nuclear envelope. This approach suggests that novel force spectroscopies can be conceptualized that could potentially be used to map out the epigenetic landscape of stem cells.

Thursday, Apr 28th 2016

11:30 AM (Tea/Coffee at 11:15 AM)

Seminar Hall, TCIS