ICTS Seminar

Title : Inferring cellular dynamics from correlations

Speaker : Shaon Chakrabarti, Harvard University and Dana Farber Cancer Institute, USA

Date : Thursday, October 4, 2018

Time : 10:00 AM

Venue : Emmy Noether Seminar Room, ICTS Campus, Bangalore

Abstract : Theoretical modeling of correlations in biological datasets provides insights that cannot be gleaned from measurements of bulk quantities alone. I will discuss two of my ongoing research directions based on this idea: (1) Developing a theoretical framework for modeling circadian coupling to cell division and apoptosis, allowing for an exploration of the origin of lineage correlations observed in single cells – an understanding of the source of these correlations provides insight into mechanisms of cell fate control. (2) A statistical physics approach using the Ising Model to identify stretches of the genome that exhibit cooperative DNA methylation, a covalent modification of specific sites on the DNA that regulates cell fate outcomes. I will show how the Ising model can exploit correlations in methylation patterns in neural progenitor cells to distinguish between different genomic regions exhibiting potentially divergent methylation behavior, providing important insight into how methylation states are maintained during cellular development.