

ICTS Seminar

Title : An information-theoretic analysis of the interplay between gene expression and cell growth

Speaker : David Lacoste, ESPCI , Paris

Date : Thursday, February 9, 2017

Time : 11:30 AM

Venue : Emmy Noether Seminar Room, ICTS Campus, Bangalore

Abstract : Fluctuations in gene expression and growth rate of single cells can have important consequences for cellular function and fitness. In ref [1], fluctuations in the instantaneous growth rate of single cells of *Escherichia coli* and in the expression of metabolic enzymes have been measured using time-lapse microscopy.

In order to characterize the information processing involved by the feedback between growth and gene expression, we study their transfer entropy and information flow, which can be inferred directly from the fluctuations present in the time series. We first test this idea on some feedback models based on linear Langevin equations, for which many analytical results can be derived. We then apply our method to the data of ref [1]. We suggest ways to construct an improved model which captures better the information flow.

[1] Stochasticity of metabolism and growth at the single-cell level, D. J. Kiviet et al., *Nature*, 514, 376 (2014).