Science at the Edge

2018 Seminar Series

Quantitative Biology Graduate Program | Gene Expression in Development and Disease

Sudin Bhattacharya

Biomedical Engineering, Pharmacology & Toxicology
Michigan State University

"Predicting critical cellular transitions in health and disease"

"Critical transitions", where cells undergo an abrupt shift from one state to another, are common both in normal physiological processes like cell differentiation, and in transitions from healthy to diseased states. A well-developed theory of critical transitions suggests that dynamic systems like cells exhibit characteristic "early warning signals" before the onset of such transitions: (i) increased recovery time from small perturbations to the system; and (ii) increased variance and (iii) increased autocorrelation in state variables of the system. I propose that reconstructed dynamic cell fate trajectories from single-cell transcriptomic data sets can reveal early warning signals of critical transitions in biological systems in health and disease. I will present evidence for this hypothesis from simulated and real single-cell gene expression data.

Friday, October 26, 2018
11:30 / Room 1400 BPS

Refreshments at 11:15

MICHIGAN STATE UNIVERSITY