Distinguished Lecture in Applied Mathematics

Department of Mathematics & Statistics

University of Massachusetts Amherst

Beyond Mean-field Approximations: Limits of Interacting Stochastic Processes on Sparse Networks

Kavita Ramanan

Roland George Dwight Richardson
University Professor
Division of Applied Mathematics
Brown University

Abstract: Many applications can be modeled as a large system of homogeneous stochastically interacting particles on a graph in which the infinitesimal evolution of each particle depends on its own state and the empirical measure of the states of neighboring particles. When the graph is complete, it is well known that the dynamics of a typical particle converges, as the size of the graph goes to infinity, to a stochastic process called the mean-field limit, whose evolution is described by a certain nonlinear partial differential equation. In this talk, we focus on the complementary case of dynamics on sparse networks. We obtain a novel characterization of the evolution of a typical particle on certain deterministic and random tree-like graphs, and describe its ramifications. This is based on various joint works with Ankan Ganguly, Dan Lacker, Mitchell Wortsman and Ruoyu Wu.

Thursday, October 11th 2018 4PM
1634 Lederle Graduate Research Tower

This annual lecture is supported by a generous contribution from Peter and Anne Costa in memory of Professor Melvyn S. Berger