The Department of Applied Mathematics and Statistics

presents

The 2020 Acheson J. Duncan Lecture Series

featuring

Kavita Ramanan

Brown University

Beyond Mean-field Limits for Large-scale Stochastic Systems

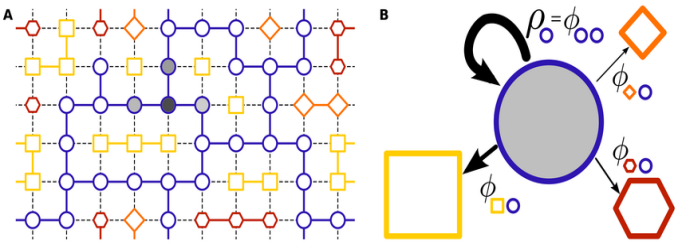
Thursday, December 3rd, 2020

via Zoom: 1:30 -- 2:30pm

Here is the Zoom link and meeting info:

https://wse.zoom.us/j/98200438645?pwd=d3M3WEljc0sxd3BRQldUU3dudzhvdz09

Meeting ID: 982 0043 8645 Passcode**: 374212**



Many large-scale stochastic systems that arise as models in a variety of fields including neuroscience, epidemiology, physics, engineering and computer science, can be described in terms of a large collection of "locally" interacting Markov chains, where each particle's transition rates depend only on the states of neighboring particles with respect to an underlying (possibly random) graph. Since these dynamics are typically not amenable to exact analysis, a common paradigm is to instead study a more tractable approximation that is asymptotically exact as the number of particles goes to infinity in order to gain qualitative insight into the system. A frequently used approximation is the mean-field approximation, which works provably well when the interaction graph is sufficiently dense. However, it performs quite poorly when the interaction graph is sparse, which is the case in many applications. We describe new asymptotically accurate approximations that can be developed in the latter setting, and show how they perform in various applications. This is joint work with A. Ganguly.

Bio: Kavita Ramanan is the Roland George Dwight Richardson University Professor and Associate Chair at the Division of Applied Mathematics, Brown University. Her field of research is probability theory, stochastic processes and their applications. She has received several honors in recognition of her research, including a Guggenheim Fellowship, a Distinguished Alumni Award from IIT-Bombay, and the Newton Award from the Department of Defense (DoD), all in 2020, a Simons Fellowship in 2018, an IMS Medallion in 2015 and the Erlang Prize from the INFORMS Applied Probability Society in 2006 for "outstanding contributions to applied probability." She serves on multiple editorial boards and is an elected fellow of several societies, including AAAS, AMS, INFORMS, IMS and SIAM.