March 8th, 2019
KAP 414
3:30 P.M. – 4:30 P.M.

Daniel Lacker

(Columbia University)

"Beyond mean field limits: Local dynamics for large sparse networks of interacting processes"

Abstract: We study large systems of stochastic processes (particles), in discrete or continuous time, in which each particle is associated with a vertex in a graph and interacts only with its neighbors. It is known that when the graph is complete and the numbers of particles grows to infinity, the system is well-described by a nonlinear (McKean-Vlasov) process, which describes the behavior of one typical particle. For general (sparse) graphs, however, the system is no longer exchangeable, and the mean field approximation fails. Nevertheless, if the underlying graph is locally tree-like, we show that a single particle and its nearest neighbors are characterized by an autonomous evolution we call the "local dynamics." These local dynamics are peculiar in that they are inevitably non-Markovian even if the original system is Markovian; the dynamics depend on the conditional law of the solution given the histories of certain particles. Joint work with Kavita Ramanan and Ruoyu Wu.

PLEASE NOTE THIS IS A **FRIDAY EVENT AT 3:30PM!