

## **Stochastic optimization with particles and Markov chains**

**Keynote speaker: John Birge**

Many decision problems can be modeled as stochastic dynamic systems, which typically have state spaces that suffer from the curse of dimensionality and grow exponentially in both time and dimension. Even building simulations of these systems can be problematic in the presence of complex dynamics that depends on both previous actions and realizations of uncertain outcomes. This talk will describe computational approaches that maintain a fixed number of samples or particles in each period to counter the curse of dimensionality. The methods' convergence depends on the stationary distribution of a Markov chain defined over states and actions. These properties and comparisons with other approaches such as approximate dynamic programming will also be discussed.