Interdisciplinary Stochastic Processes Colloquium

Organizer: David Aldous

Tuesday, 4:10–5:00pm, 60 Evans

Feb 20   **Tom Griffiths**, U.C. Berkeley, Psychology and Cognitive Science

Markov chain Monte Carlo with people

Research exploring connections between statistics and human cognition typically aims to test whether people act rationally. In this talk, I will take a different perspective, making the assumption that people's decisions can be approximately described by the principles of Bayesian statistics, and then seeing how far that assumption can get us in solving some fundamental problems in cognitive science. Specifically, I will show that we can use this assumption to design experiments that let us measure people's inductive biases (as expressed in a prior distribution over hypotheses) and their mental representations of the structure of categories (as expressed in distributions over objects associated with those categories). The basic idea behind these experiments is simple: if we can construct tasks that lead people to make choices in accordance with the subjective probabilities of different alternatives, we can get those people to act as elements of a Markov chain Monte Carlo (MCMC) algorithm, yielding samples from the corresponding subjective probability distributions. I will describe experiments in which human participants act as elements of a Gibbs sampler and the Metropolis algorithm, and mention some connections between MCMC algorithms and processes of cultural evolution. This is joint work with Mike Kalish, Steve Lewandowsky, and Adam Sanborn.