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STRUCK BY LIGHTNING

THE CURIOUS WORLD OF PROBABILITIES

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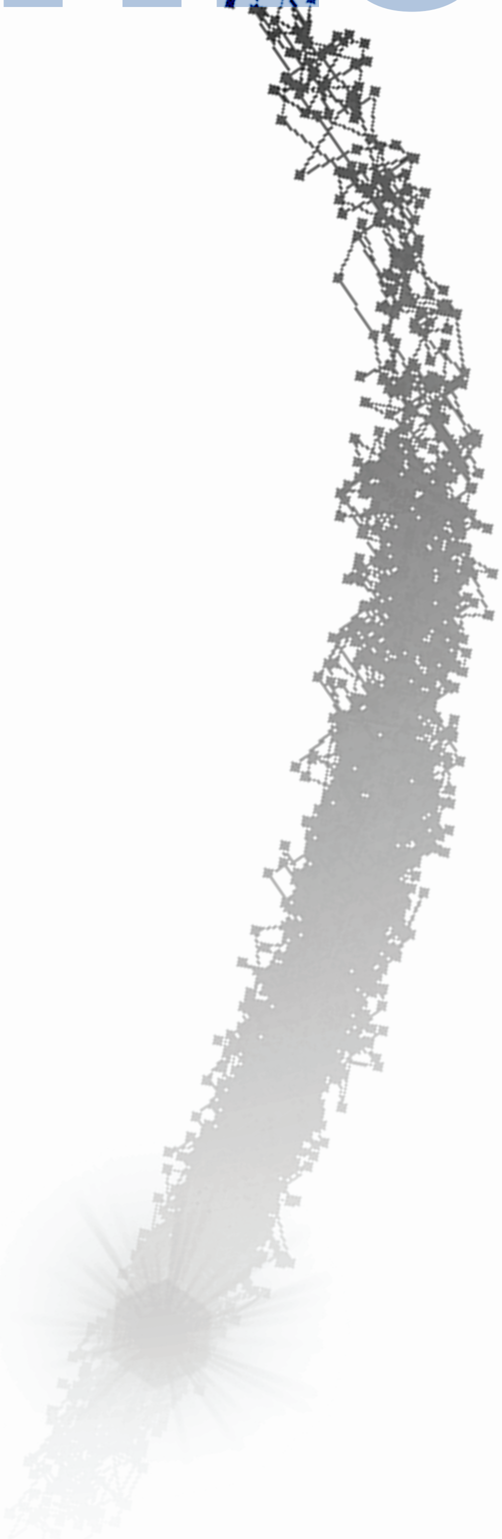

The Curious World of Probabilities
7:30 - 9:30 PM June 4, 2009, *Fairmont Social Lounge, St. John's College, UBC*
A background in math and science is not necessary to enjoy this talk!
Probabilities and randomness arise whenever we're not sure what will happen next. They apply to everything from lottery jackpots to airplane crashes; casino gambling to homicide rates; medical studies to election polls to surprising coincidences. This talk will explain how a Probability Perspective can shed new light on many familiar situations. It will also discuss "Monte Carlo" computer algorithms which use randomness to solve problems in many branches of science.

Adaptive MCMC: Challenges and Opportunities
1:30 - 3:00 PM June 5, 2009, *IRMACS Theatre, ASB 10900, SFU*
To sample from a given target probability distribution, a wide variety of Markov Chain Monte Carlo (MCMC) schemes and tunings are available, and it can be difficult to choose among them. One possibility is to have the computer automatically 'adapt' the algorithm while it runs, to try to improve and tune on the fly. However, natural-seeming adaptive schemes can destroy the ergodic properties and explain how it can fail using a very simple graphical example (http://probability.ca/jeff/java/adapt.html). We then present a theorem (joint with G. O. Roberts) which gives simple conditions that ensure ergodicity. We apply Metropolis-within-Gibbs examples. Finally, we briefly discuss a preliminary general-purpose adaptive MCMC software package (http://probability.ca/amcmc).

Theoretical Rates of Convergence for MCMC Algorithms
1:30 - 3:00 PM June 10, 2009, *AQ3005, SFU*
A fundamental question about Markov Chain Monte Carlo (MCMC) algorithms concerns the rate of convergence; how long should the algorithm be run before it gives satisfactory answers? While various convergence diagnostics have been proposed, none are completely satisfactory. An alternative approach involves proving theoretical, a priori bounds on the time required for convergence. We shall describe a method for computing explicit, rigorous bounds on the distance to stationarity of MCMC, using coupling constructions based on minorisation and drift conditions. The method is in principle quite general, and does not require special properties such as reversibility. We apply our method to some specific examples of MCMC, including the Gibbs sampler for variance components models and for hierarchical Poisson models.

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