

STATISTICS COLLOQUIUM

MONDAY, SEPTEMBER 17, 2012

TALK: 4:00 PM — SCIENCE CENTER RM. 309

RECEPTION: 5:15 PM — SCIENCE CENTER, 7TH FLOOR

“Monte Carlo Methods for Diffusion Processes Avoiding Random Obstacles”

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ABSTRACT

A target travels around a region according to a diffusion process with an instantaneous drift which locally maximizes an objective function and with a noise correction. At the beginning obstacles are placed according to a non-homogeneous Poisson spatial process (all the obstacles are placed at once and independently of the diffusion process). Motivated by applications related to tracking and location of rogue objects, we are interested in efficiently sampling the conditional distribution of the target given that it has evaded the obstacles for long time.

The talk discusses an algorithm that addresses this problem. Our algorithm can be shown to be asymptotically optimal (in the sense of variance minimization and running time) in a large deviations regime as the time horizon increases and the number of obstacles per unit area is suitably large. The procedure touches upon topics related to so-called quasi-stationary distributions (i.e. the distribution of Markov chains constrained to live in a given area for long time), and stochastic approximation algorithms.

The talk is based on joint work with Paul Dupuis, Peter Glynn, Aya Wallwater, and John Zheng.