

STATISTICS COLLOQUIUM

WEDNESDAY, JANUARY 26, 2011

TALK: 2:00 PM — SCIENCE CENTER RM. 705

RECEPTION: 3:15 p.m. – SCIENCE CENTER, 7th floor

“Large Deviations Computation for Large Loss Systems: A Point Process Approach”

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ABSTRACT

This talk concerns large deviations asymptotics and efficient Monte Carlo estimation of quantities related to "loss" in large-scale stochastic systems. Generally speaking, "loss" refers to a scenario in which the system "destabilizes" in a suitable sense. For instance, in high-quality communication networks, we are interested in studying the event that a call is lost due to capacity overflow. In large insurance portfolios, a loss refers to huge monetary outflow. A common feature is that these systems are highly dimensional, while the loss events typically have tiny occurrence probabilities but are important as system performance measures. In this talk we focus on the approximation of these loss probabilities, as well as the conditional sample path leading to such loss events. In addition to large deviations asymptotics, we propose an asymptotically optimal importance sampling scheme that draws upon the common point process structure of this type of systems. The algorithm involves a function-valued process descriptor due to the large system size and requires tracking the whole history of the sample path.