

Information Science and Technology Seminar Speaker Series



Andrew M. Fraser

Los Alamos National Laboratory

“Maxentropic Markov Chains”

Wednesday, August 8, 2012

3:00 - 4:00 PM

TA-3, Bldg. 1690, Room 102 (CNLS Conference Room)

Abstract: I describe an algorithm that calculates, for any strongly connected directed graph, the set of branching probabilities for the edges that yields a Markov process with the maximum possible entropy rate. I developed the algorithm as a tool for quantifying uncertainty about an equation of state. I will introduce the entropy maximization problem in terms of Information Theory as I first encountered it in the homework problems for chapter 4 of Cover and Thomas' text (problems 4.7 and 4.16 in the second edition). Although I will present the set of polynomial equations from Graph Theory that the solution must satisfy, the operationally useful algorithm relies on the power method for calculating eigenvalues.

Biography: Andy Fraser is a Scientist in the Space and Remote Sensing Sciences division of Los Alamos National Laboratory, where he uses stochastic models in his work on signal analysis. Before coming to the Lab, he was on the faculty of Portland State University in both the Systems Science Program and the Electrical and Computer Engineering department. He earned a Ph.D. in Physics from the University of Texas at Austin for work on the application of ideas from Information Theory to measurements of chaotic dynamics. A new flyer listing SIAM's best selling titles includes Andy's recent book: "Hidden Markov Models and Dynamical Systems."