

DO&IT Seminar Series

Speaker: Robert L Smith
Program Director for Operations Research
National Science Foundation

Date: Friday, September 11, 2009

Time: 10:30 am – 11:30 am

Location: VMH 1505

A Fictitious Play Approach to Complex Systems Optimization

Complex systems consisting of a large number of interacting components are in practice increasingly modeled through computer simulations rather than via traditional equation based approaches. The resulting model typically allows for little or no structural assumptions on the form of the objective function or constraints, thus posing a challenging optimization problem. We explore in this talk a novel optimization paradigm inherited from game theory that animates the components of the system within a non-cooperative game of identical interest. The optimizations take place though individual best replies of the players, thus vastly reducing the dimensionality of the optimization problems solved (the components' joint interactions are reflected indirectly through their shared objective function). We will illustrate the approach by discussing an application to intelligent transportation systems. Opportunities for NSF funding in Operations Research will be discussed at the end of the talk.

Bio

Robert L. Smith is Director of the Operations Research Program at NSF. Dr. Smith received his Ph.D. in Engineering Science from the University of California at Berkeley where he held an NSF Fellowship. He holds a bachelors degree in Physics from Harvey Mudd College and an MBA from Berkeley. He is on leave from the University of Michigan in Ann Arbor where he is the Altarum/ERIM Russell D. O'Neal Professor of Engineering.

He is the recipient of the first Altarum/ERIM Russell D. O'Neal Professorship of Engineering at the University of Michigan. He has also been honored with the Distinguished Faculty Achievement Award from the University of Michigan, the College of Engineering Research Excellence Award, the Industrial and Operations Engineering Award for Outstanding Accomplishment, an Outstanding

Teacher Award from the Michigan Student Assembly, and a National Science Foundation Fellowship. He is a Fellow of the Institute for Operations Research and the Management Sciences.

Professor Smith teaches courses in dynamic programming and stochastic processes. He has supervised the doctoral research of twenty-eight students since 1984.

At the University of Michigan, he serves as Director of the Dynamic Systems Optimization Laboratory. The Laboratory research is directed toward the modeling and analysis of dynamical systems over time. Dr. Smith worked earlier at Bell Laboratories in the Network Planning Department where he developed models and algorithms for optimal routing of communications traffic. He is an Associate Editor of Operations Research and past Associate Editor of Management Science, and is the author of nearly one hundred peer reviewed publications.