Arizona State University
Fulton School of Engineering
Department of Industrial Engineering
FALL 05-SPRING 06 SEMINAR SERIES

George Shanthikumar

Department of Industrial Engineering and Operations Research,
University of California at Berkeley

Title: **Integrated Learning and Optimization in Operations Management with Operational Statistics**

Date: **April 28, 2006 (Friday)**

Time: **1:30 pm**

Place: **Goldwater Center GWC 510**

Abstract:

It is a common practice in operations management (OM) to assume that the parameters of an optimization problem are either deterministic and known or that they are stochastic and their distributions are known. For example in inventory control (or revenue management), it is not uncommon to assume that the demand (or the demand as a function of price) is known in advance. In many situations, however, only an estimate of these may be known, but the actual values will be unknown. One of the recent emphasis in OM has been to formulate stochastic models for these problems. Almost all such models assume that the full probabilistic characterization of these models will be known at the time of implementing the solution. That is, one assumes that the distribution function of the demand (or the stochastic function for demand as a function of price) will be known. However, in reality, only an estimate, not the true probabilistic characterization will be known. In this talk we will demonstrate that such an assumption (that is separating estimation and optimization) may lead to inefficient solution to real problem.

We will discuss an approach, called operational statistics that integrates estimation and optimization. We will apply this integrated learning and optimization approach to two examples: (1) inventory control with unknown parameters for the demand distribution and (2) revenue management with unknown parameters for the demand function. We will compare and contrast this approach to (a) statistical learning, (b) reinforcement learning and (c) subjective and objective Bayesian learning.

Bio: J. George Shanthikumar is Professor of Industrial Engineering and Operations Research at the University of California, Berkeley. He received the B. Sc. degree in mechanical engineering from the University of Sri Lanka, Peradeniya, and the M. A. Sc. and Ph. D. degrees in industrial engineering from the University of Toronto, Canada. His research interests are in integrated inter-disciplinary decision making, model uncertainty & learning, production systems modeling and analysis, queueing theory, reliability, scheduling, semiconductor yield management, simulation, stochastic processes, and supply chain management. He has written or written jointly over 250 papers on these topics. He is a coauthor (with John A. Buzacott) of the book Stochastic Models of Manufacturing Systems and a coauthor (with Moshe Shaked) of the book Stochastic Orders and Their Applications.

For further information about the seminar series, or to be added to the seminar announcement e-mail list, please contact Dr. Esma Gel <esma.gel@asu.edu>.