

SEMINAR SERIES
Department of Quantitative Analysis and Operations Management
College of Business Administration
University of Cincinnati

**"Flexible Service Capacity:
Optimal Investment and the Impact of Demand Correlation"**

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**Joint work with Serguei Netessine and Gregory Dobson,
also of the Simon School, University of Rochester**

Friday, November 17, 2000
12:30 p.m.
214 Lindner Hall

We consider a firm that provides multiple services using both specialized and flexible capacity. The problem is formulated as a two-stage single-period stochastic program. The firm invests in capacity before the actual demand is known and optimally assigns capacity to customers when demand is realized. We obtain an analytical solution for a particular case, when services may be upgraded by one class. The simple form of the solution allows us to compare the optimal capacities explicitly with a solution that does not anticipate flexibility. Given that demand follows a multivariate Normal distribution, we characterize the effects of increasing demand correlation on the optimal solution. For the case with two customer classes, the effects of demand correlation are intuitive: increasing correlation induces a shift from flexible to dedicated capacity. When there are three or more classes, there are also adjustments to the resources not directly affected by the correlation change. As correlation rises, these changes follow an alternating pattern (for example, if the optimal capacity of one resource rises, then the optimal capacity of the adjacent resource falls). These results make precise conjectures based on numerical experiments that have existed in the literature for some time.

Robert Shumsky is an assistant professor of Operations Management at the Simon School, University of Rochester. He received a Ph.D. from the Operations Research Center at MIT in 1995. Professor Shumsky has research and teaching interests in the modeling and control of service systems. Current research focuses on the interactions among quality, flexibility and efficiency in service processes. He has studied transportation operations for the Massachusetts Port Authority and the Federal Aviation Administration and served as a consultant for a number of service and manufacturing firms, including Eastman Kodak and Frontier Communications. His research has been published in *Management Science*, *Operations Research*, *Manufacturing and Service Operations Management*, and *Air Traffic Control Quarterly*, and he is an Associate Editor for *Operations Research* and *Management Science*. At the Simon School he has won teaching awards from the Executive MBA Class of 2000 and from the first-year students in the full-time MBA class of 2001.