

MECHANICAL ENGINEERING DEPARTMENT
Industrial and Systems Engineering Seminar

Provably Near-Optimal Sampling-Based Policies for Stochastic Inventory Control Models*

by

Dr. Robin Roundy

**Professor, School of Operations Research and Industrial Engineering
Cornell University
Ithaca, NY 14853**

Friday, February 2, 2007

3:30-4:30 p.m.

Room 1130 Mechanical Engineering

Coffee and cookies will be available at 3:15 p.m. in Room 1130 ME before the seminar

ABSTRACT —Two fundamental stochastic-demand inventory models, the single-period and the multi-period newsvendor problem will be considered in this presentation. We will assume that the demand distribution is not known. The only information available is a set of historical demands, drawn from the true distribution. When demand distributions are known, these models are well studied. However, in most real-life scenarios, demand distributions are not available. This makes a data-driven algorithmic framework very attractive, both in practice and in theory.

How to make inventory control decisions using only observed samples of the random demand will be described. We will prove that if enough samples are available, the expected cost of the sampling-based policies has an arbitrarily small relative error, relative to the optimal policy. (The optimal policy has full access to the demand distribution.) The bounds that we develop are general, easy to compute and surprisingly do not depend at all on the specific demand distributions.

*Co-authored by Retsef Levi, Martin Pál, Robin Roundy and David B. Shmoys

BIO — **Professor Roundy** holds bachelors and masters degrees in mathematics from Brigham Young University, and a doctoral degree in operations research from Stanford University. He joined the faculty of the School of Operations Research and Industrial Engineering at Cornell University in 1983. Professor Roundy won the Nicholson Student Paper Competition, and has received a Presidential Young Investigator Award from the National Science Foundation and the Fredrick W. Lanchester Prize from the Operations Research Society of America. He is a two-time recipient of the S. Yau '72 Excellence in Teaching Award, and has received other teaching and research awards. He is a member of the Institute for Operations Research and Management Sciences (INFORMS), the Institute of Industrial Engineers (IIE), and the International Council on Systems Engineering (INCOSE).

Informal Faculty Luncheon: Friday, February 2, 2007, 12:00 noon. Meet in 1100 ME and walk to lunch with other faculty. Prof. David Roundy will be able to attend.