

**MECHANICAL ENGINEERING DEPARTMENT
ME/IE 8773-8774**

**INDUSTRIAL ENGINEERING SERIES
Topic: INDUSTRIAL ENGINEERING
Host: William L. Cooper**

Large-Scale Membership Services

by

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Wednesday, September 21, 2005

3:30-5:00 p.m.

Room 1130 ME

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

ABSTRACT — In the public policy arena, California and other states have established requisite and hospital ward-specific nurse staffing levels as functions of the number of patients in residence. The staffing levels are given as minimum nurse-patient ratios.

Motivated by such issues in health care as well as staffing decisions in professional, warranty and repair services, we promote modeling service centers that are exclusively dedicated to fixed client constituencies as closed multi-server queueing systems, a framework we refer to as Membership Services. We provide diffusion approximations for the number of users within the membership who are requesting service. The approximations are obtained via many-server heavy-traffic limit theorems, where the limiting regime assumptions of each theorem correspond with a particular staffing strategy a manager might employ.

Our heavy traffic limit theorems facilitate understanding the effects of the nurse-patient ratio policy and suggests an alternative policy structure. Also a slight expansion of the models enables us to investigate the well-known repairman problem with spares.

BIO — Otis Jennings is an assistant professor of Operations Management in the Fuqua School of Business at Duke University. He received his Bachelor Degree in Civil Engineering & Operations Research at Princeton University and his Ph.D. Degree in Industrial Engineering from the Georgia Institute of Technology. His research interests are limit theorems of stochastic processes and management of manufacturing and services.

Informal Faculty Luncheon: Wednesday, September 21, 2005, 12:00 noon. Meet in 1100 ME and walk to lunch with other faculty. Prof. Otis Jennings will be able to attend.