

Industrial & Systems Engineering Seminar

Wednesday, September 29, 2010

3:15 PM – Refreshments before the seminar

3:30 PM – Graduate Seminar

Room 4125 A & B Mechanical Engineering

Computational Geometry Approaches to Some Algorithmic Problems in Air Traffic Management

by

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The next generation of air transportation system will have to use technology to be able to cope with the ever increasing demand for flights. Several challenging optimization problems arise in trying to maximize efficiency while maintaining safe operation in air traffic management (ATM). Constraints and issues unique to air transportation arise in the ATM domain, including weather hazards, turbulence, no-fly zones, and three-dimensional routing. The challenge is substantially compounded when the constraints vary in time and are not known with certainty, as is the case with weather hazards. Human oversight is provided by air traffic controllers, who are responsible for safe operation within a portion of airspace known as a sector.

In this talk we discuss algorithmic methods that can be used in modeling and solving air traffic management problems, including routing of traffic flows, airspace configuration into load-balanced sectors, and capacity estimation in the face of dynamic and uncertain constraints and demands. We highlight several open problems.

BIO: Joseph S. B. Mitchell received a BS (1981, Physics and Applied Mathematics), and an MS (1981, Mathematics) from Carnegie-Mellon University, and Ph.D. (1986, Operations Research) from Stanford University (under advisorship of Christos Papadimitriou). Mitchell was with Hughes Research Labs (1981-86) and then on the faculty of Cornell University (1986-1991). He now serves as Professor of Applied Mathematics and Statistics and Research Professor of Computer Science at the University at Stony Brook. Mitchell has received various research awards (Goedel Prize, NSF Presidential Young Investigator, Fulbright Scholar, President's Award for Excellence in Scholarship and Creative Activities) and numerous teaching awards. His primary research area is computational geometry, applied to problems in computer graphics, visualization, air traffic management, manufacturing, and geographic information systems.

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