

Department of Applied Mathematics and Statistics
The Johns Hopkins University

SEMINAR

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October 19, 2006
304 Whitehead Hall
Refreshments: 3:30 p.m.
Seminar: 4:00 p.m.

**TOPOLOGY OPTIMIZATION AS A STRUCTURAL DESIGN TOOL:
APPLICATIONS AND CHALLENGES**

ABSTRACT

Topology optimization is a tool for finding the optimal distribution of material, or layout of structure, to engineering design problems. Unlike sizing and shape optimization, continuum topology optimization allows material to be added, moved, or removed from any location within the design domain. While generally offering improved designs, finding solutions via topology optimization is a particularly challenging task. The design space is extremely large and engineering design problems are usually discrete and nonconvex, and often ill-posed. This seminar will discuss schemes for handling these challenges and examine the application of topology optimization to multi-scale structures ranging from structural systems to the microstructure of materials. Design objectives considered will include maximizing stiffness in linear elastic structures, minimizing power dissipation/drag in creeping fluid flows, and achieving extreme properties and prescribed symmetries in periodic material structures.