

Mechanical Engineering

Seminar

Friday October 1, 2004

11:00 a.m.

3004 – 3006 H. M. Black Engineering Bldg.

Professor Nicholas Zabaras
Materials Process Design and Control Laboratory
Sibley School of Mechanical and Aerospace Engineering
Cornell University

“Computational techniques for the development of materials-by-design”

Abstract:

This presentation will set forward a number of methodologies that can be used to obtain polycrystalline materials with desired microstructure-sensitive properties. We will discuss computational mathematics and statistical techniques for microstructure representation and classification, microstructure-model reduction and for exploring the synergy between classification of microstructures and materials process sequence selection. We will conclude with a discussion of materials-by-design techniques for obtaining microstructure-sensitive properties through deformation and thermal process sequence selection and design.

After completing doctoral work in Theoretical and Applied Mechanics, Professor Zabaras joined the faculty of the Mechanical Engineering Department at the University of Minnesota, Minneapolis, MN. He became a Cornell faculty member in 1991. Professor Zabaras is a member of the American Society of Mechanical Engineers, the American Academy of Mechanics and of the Society for Industrial and Applied Mathematics. He received a Presidential Young Investigator Award from the National Science Foundation in 1991.

His main research focus is on the computational design and control of materials processes including deformation and solidification/crystal growth processes. Specific current projects include the development of robust design simulators for deformation and solidification processes, spectral stochastic methods for modeling of uncertainty propagation in analysis, optimization and design of continuum systems, and development of multi-length scale algorithms for the analysis and design of microstructures in engineering materials. He is also very active in interfacing robust control of continuum systems with information technologies including machine learning techniques in order to develop real time feedback mechanisms for the control of complex materials processes in the presence of uncertainty.

Professor N. Zabaras is the director of the Materials Process Design and Control Laboratory.

For questions, contact Patti Boone (4-0368, boone@iastate.edu)