

**Program in Industrial & Systems Engineering**  
**IE 8773-8774**

**Title: Four Modeling Paradigms in Mathematical Programming**

by

**Dr. Jong-Shi Pang**  
**University of Illinois at Urbana-Champaign**  
**Wednesday, October 28, 2009**  
**3:15 PM – Refreshments before the seminar**  
**3:30 PM – Graduate Seminar**

**Room 4125 A & B Mechanical Engineering**

**Abstract:** We discuss four modeling paradigms in mathematical programming that extends beyond the classical notion of optimization. These paradigms are competition, dynamics, hierarchy, and inverse. We discuss how mathematical programming can contribute to each of these topics, drawing applications from contemporary systems engineering applications such as in communication, electricity markets, transportation, and data-driven modeling.

**Short Bio:** With a Ph.D. degree in Operations Research from Stanford University, Jong-Shi Pang is presently the Department Head and Caterpillar Professor of Industrial and Enterprise Systems Engineering at the University of Urbana-Champaign. Prior to this position, Dr. Pang was the Margaret A. Darrin Distinguished Professor in Applied Mathematics at Rensselaer Polytechnic Institute in Troy, New York; he has taught at The Johns Hopkins University, The University of Texas at Dallas, and Carnegie-Mellon University. Dr. Pang has received several awards and honors, most notably the George B. Dantzig Prize in 2003 jointly awarded by the Mathematical Programming Society and the Society for Industrial and Applied Mathematics and the 1994 Lanchester Prize by the Institute for Operations Research and Management Science. He is a member of the inaugural class of Fellows of the Society of Industrial and Applied Mathematics in 2009 and an ISI highly cited author in the mathematics category. Dr. Pang's research interests are in continuous optimization and equilibrium programming and their applications in engineering, economics, and finance. Among the current projects, Dr. Pang is studying various extensions of the basic Nash equilibrium problem, including the Stackelberg game and its multi-leader generalization, and the dynamic version of the Nash problem. The mathematical tool for the latter problem is a new class of dynamical systems known as differential variational inequalities, which provides a powerful framework for dealing with applications that involve dynamics, unilateral constraints, and disjunction.