

SMU Department of Mechanical Engineering
SEMINAR

Dr. James E. Bobrow

**Professor of Mechanical & Aerospace
Engineering at University of California,
Irvine**

**"DYNAMICS, CONTROL, AND PLANNING OF MOTION FOR
ROBOTS AND HUMANS"**

Friday, November 13, 2009

3:00 p.m. – 4:00 p.m.

Junkins 110

ABSTRACT: Current robots are not nearly as agile, graceful, or coordinated as animals, and this limits their usefulness in accomplishing complex tasks. If the movement capabilities of robots were extended, they could perform a wider range of tasks in hostile environments that are too dangerous for humans. This talk presents results that we have obtained to improve the movement capabilities for some robot systems. We use a numerically efficient representation of the multibody dynamic equations and their derivatives with an efficient nonlinear optimal control solver to produce the motions. These motions are remarkably coordinated looking and human-like. We will show some recent work on the application of these ideas to human gait rehabilitation and to arm movement therapy.

BIO: James E. Bobrow is a Professor of Mechanical and Aerospace Engineering at the University of California, Irvine. He received his Ph.D. in 1983 from the University of California, Los Angeles. After graduate school, Prof. Bobrow was a senior programmer analyst at McDonnell Douglas Automation Company, where he developed CAM software for the Unigraphics system. Dr. Bobrow joined UCI as an Assistant Professor in 1984. While at UCI, his research interests have included optimal control and motion planning for robots, design of pneumatic actuators and sensors for automation systems, robots for rehabilitation, and machine learning systems. Dr. Bobrow has also been a Visiting Professor in Computer Science at Stanford University and in Mechanical Engineering at MIT, and he has created robots and automation devices for several start-up companies, including Robomedica, Inc. and Cobra Technologies. He has served on the program committees or organizing committees of the leading conferences in control systems and robotics. He is currently on the Engineering steering committee for Robomedica, Inc., and he is an Associate Editor of the IEEE Transactions on Systems, Man, and Cybernetics, Part B: Cybernetics.