# SEMINAR NOTICE

### Preston M. Green Department of Electrical and Systems Engineering

## LECTURE 1

### Specification, Design and Verification of Networked Control Systems

*Richard Murray*
*Thomas E. and Doris Everhart Professor*
*Control & Dynamical Systems and Bioengineering at Caltech*

**Abstract:**   In this talk I will describe our work over the last several years in specification, design and verification of distributed systems that combine communications, computation and control in dynamic, uncertain and adversarial environments.  Our long-term goal is to develop methods and tools for designing control policies, specifying the properties of the resulting distributed embedded system and the physical environment, and proving that the specifications are met.  We have recently developed a promising set of results in receding horizon temporal logic planning that allows automatic synthesis of control protocols for hybrid dynamical systems that are guaranteed, by construction, to satisfy the desired properties even in the presence of an unknown environment. The desired properties are expressed in the language of temporal logic and the resulting system consists of a discrete planner that generates -- in an appropriately abstracted, discrete domain -- a set of transitions of the system to ensure the correct behaviors along with a continuous controller that implements the plan.  Extensions of this work allow the incorporation of uncertainty, optimality and timing, with applications ranging from autonomy to vehicle management systems to distributed surveillance.

Monday April 9, 2012

10:00 - 11:30 a.m.

Green Hall, room 0120                           Host:  Hiro Mukai

**Short Bio:**  Richard M. Murray received the B.S. degree in Electrical Engineering from California Institute of Technology in 1985 and the M.S. and Ph.D. degrees in Electrical Engineering and Computer Sciences from the University of California, Berkeley, in 1988 and 1991, respectively.  He is currently the Thomas E. and Doris Everhart Professor of Control & Dynamical Systems and Bioengineering at Caltech.  Murray's research is in the application of feedback and control to networked systems, with applications in biology and autonomy. Current projects include specification, design and verification of networked control systems, novel control architectures using "slow computing", and biological circuit design.

**The Annual Zaborszky Lecture Series was created in 1990 to honor the founder and first chairman of the Department of Systems Science and Mathematics, Professor John Zaborszky.  Each year a distinguished scholar is invited to present a series of three lectures in his/her field of expertise.**

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