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The Department of Automatic Control & Systems Engineering is pleased to announce the following seminar:

Specification, Design and Verification of Networked Control Systems

Speaker: **Professor Richard M. Murray**

*Control and Dynamical Systems
California Institute of Technology*

Thursday, 29th August 2013 at 11:00

Location: John Carr Library, Mappin Building

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 allow 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.

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. He is a Fellow of the IEEE and a member of the National Academy of Engineering, USA.