## Overview of Seminar by Prof. Marilyn Wolf

# "Cyber-Physical Systems at Small and Large Scales"

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### Abstract

Although we have used computers to control physical systems for more than a half century, we still have surprisingly little understanding of the fundamentals governing cyber-physical systems. An important goal of the field is to develop a unified theory of control and computation. This talk will start with a brief overview of the state of CPS and some important challenges. We will then discuss recent results at both small and large scales. At a small scale, we developed with Fumin Zhang at al. an analysis of the relationship between controllability and schedulability. We analyze a controller than uses multiple processes to control a set of stick balancers and determine the conditions under which the control tasks can be scheduled such that all the sticks remain stable. At a large scale, we will discuss work with Santiago Grivalga et al. smart energy grids and service-oriented architecture for control. Traditional service-oriented architectures allow scaling of distributed services but are not designed to support deadlines and quality of service requirements. We propose enhanced service-oriented architectures that support the demands of distributed real-time control.

### Biography



Marilyn Wolf is Farmer Distinguished Chair and Georgia Research Alliance Eminent Scholar at the Georgia Institute of Technology. She received her BS, MS, and PhD in electrical engineering from Stanford University in 1980, 1981, and 1984, respectively. She was with AT&T Bell Laboratories from 1984 to 1989. She was on the faculty of Princeton University from 1989 to 2007. Her research interests include cyber-physical systems, embedded computing, embedded video and computer vision, and VLSI systems. She has received the ASEE Terman Award and IEEE Circuits and Systems Society Education Award. She is a Fellow of the IEEE and ACM and an IEEE Computer Society Golden Core member.

**Friday, September 28, 2012**
2:00-3:00PM
4011 Donald Bren Hall
CECS Host: Professor Nikil Dutt at dutt@uci.edu

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