



Seminar Series Computer Science



Cyber-Physical Systems: From Computing to Tangible Physical Effects

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Sep 27th Tuesday, 12:30 to 1:30pm

216 Comp. Sci. Bldg.

Abstract - Modern critical infrastructure networks are cyber-physical systems that utilize intelligent embedded devices, communication capability, and often distributed computing to streamline and fortify their operation. Smart grids and intelligent water distribution networks serve as practical examples. The benefits of using cyber infrastructure include greater autonomy and a potential increase in the efficacy of physical operations. The downsides include increased complexity; and more importantly, imperfection of the control and decision support offered.

This talk presents techniques for characterizing the effects of introducing “intelligence” to physical infrastructure systems. Two case studies will be presented. The first illustrates qualitative analysis of an intelligent water distribution network, with focus on automated identification and mitigation of failure. The second case study centers on a quantitative reliability model that captures the gains and risks involved in replacing a physical system with its cyber-physical counterpart.

Brief Bio - Dr. Sahra Sedigh is an Associate Professor of Electrical and Computer Engineering and a Research Investigator with the Intelligent Systems Center at the Missouri University of Science and Technology. Her current research centers on development and modeling of dependable networks and systems, with focus on critical infrastructure. She received the B.S. degree from Sharif University of Technology and the M.S. and Ph.D. degrees from Purdue University, all in electrical engineering. In Nov. 2009, she was selected as one of 49 participants in the National Academy of Engineering's First Frontiers of Engineering Education Symposium. She held a Purdue Research Foundation Fellowship from 1996 to 2000; and is a member of HKN, IEEE, ACM, and ISIS.