

Plenary Lectures

Title: Integration of Control, Communications, and Computing in Networked Systems

Abstract: Modern systems are dominantly characterized by interconnected network systems. They are exemplified by autonomous vehicles, smart grids, smart cities, gene networks, social networks, energy and material flow networks, to name just a few. Management of such network systems encounters fundamental issues of information, uncertainty, and complexity, and demands integration of control, communications, and computing.

In this presentation, we will highlight some key motivations and critical complexity issues in networked systems, discuss historical pursuit of integrated control, communications, and computing, and explain how communication uncertainties introduce new issues in control design and stimulate new control frameworks and methodologies. We will summarize some recent efforts and advances in developing new control frameworks to accommodate data complexity, time complexity, group complexity, and spatial complexity in managing network systems, as well as highlight some methods to handle communication-induced asynchronous operation, switching network topology, and random delays.



Biography: Le Yi Wang received the Ph.D. degree in electrical engineering from McGill University, Montreal, Canada, in 1990. Since 1990, he has been with Wayne State University, Detroit, Michigan, where he is currently a professor in the Department of Electrical and Computer Engineering. His research interests are in the areas of complexity and information, system identification, robust control, H-infinity optimization, time-varying systems, adaptive systems, hybrid and nonlinear systems, information processing and learning, as well as medical, automotive, communications, power systems, and computer applications of control methodologies. He was a keynote speaker in several international conferences. He serves on the IFAC Technical Committee on Modeling, Identification and Signal Processing. He was an Associate Editor of the IEEE Transactions on Automatic Control and several other journals. He was a Visiting Faculty at University of Michigan in 1996, Visiting Faculty Fellow at University of Western Sydney, Australia, in 2009 and 2013, and Visiting Faculty at Vienna University of Technology, Austria, in 2016. He is an Eminent Engineer in Tau Beta Pi, a member of Academy of Scholars at Wayne State University, and a Fellow of IEEE.