

『Tsinghua Information Forum #104 —Samsung #6』



- **Title:** Real-Time Wireless Control Networks for Cyber-Physical Systems
- **Speaker :** Chenyang Lu
Professor of Computer Science and Engineering at
Washington University in St. Louis, USA
- **Time:** 2:00-4:00pm, May 28, 2013
- **Venue:** Room 10-316, East Main Building, Tsinghua University

Abstract :

Wireless control systems represent a new frontier of cyber-physical systems. Rapid adoption of wireless sensing and actuation networking standards has demonstrated the feasibility of reliable wireless communication for industrial automation. However, wireless control networks face significant challenges in meeting real-time communication requirements of control systems. Furthermore, close coupling between control and communication requires a cyber-physical co-design approach to optimize control performance under stringent resources constraints. This talk will present recent advances in real-time wireless control networks. (1) I will describe a new real-time wireless scheduling theory that supports real-time performance analysis for wireless control networks. (2) I will address the scheduling-control co-design problem of determining the optimal sampling rates of feedback control loops sharing a wireless network. (3) I will present Wireless Cyber-Physical Simulator (WCPS), a holistic environment for realistic simulations of large-scale wireless control systems, as well as two case studies of wireless structural control for civil infrastructure. I will conclude my talk by highlighting future challenges and opportunities on wireless cyber-physical systems.

Biography :

Chenyang Lu is a Professor of Computer Science and Engineering at Washington University in St. Louis. Professor Lu is Editor-in-Chief of ACM Transactions on Sensor Networks and Associate Editor of Real-Time Systems. He also serves as Program Chair of premier conferences such as IEEE Real-Time Systems Symposium (RTSS 2012), ACM/IEEE International Conference on Cyber-Physical Systems (ICCPS 2012) and ACM Conference on Embedded Networked Sensor Systems (SenSys 2014). Professor Lu is the author and co-author of over 100 research papers with over 10000 citations and an h-index of 45. He received the Ph.D. degree from University of Virginia in 2001, the M.S. degree from Chinese Academy of Sciences in 1997, and the B.S. degree from University of Science and Technology of China in 1995, all in computer science. His research interests include real-time systems, wireless sensor networks and cyber-physical systems.