



THE CHINESE UNIVERSITY OF HONG KONG
Department of Information Engineering

Seminar

**Real-Time Wireless Communications Infrastructures
for Cyber-Physical Systems**

by

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Date : 13 June, 2016 (Monday)
Time : 11:00am – 12:00noon
Venue : Room 833 Ho Sin Hang Engineering Building
The Chinese University of Hong Kong

Abstract

Many Cyber-Physical Systems (CPS) involve real-time sensing and actuating, and are mission/life critical. To support such systems, the communications infrastructure should put dependability before throughput, and value guaranteed service over best-effort. Such drastically different design philosophy reveals a different perspective for design and analysis.

For the wireless real-time communications infrastructure, we study how to meet the dependability and service guarantee demands with physical, MAC, and application layer designs. Our comparison study shows by fully exploiting the low data rate feature of real-time communication links, DSSS-CDMA cellular architecture can dramatically improve the robustness of wireless communications links. Alternatively, for multi-radio multi-cell infrastructure capable of TDMA and FDMA scheduling between cells, we find an optimal scheduling algorithm together with a linear time closed-form schedulability test formula, for a class of typical topologies for real-time CPS applications. Finally, we propose an application layer design pattern, which can guarantee Proper-Temporal-Embedding safety rule in case of arbitrary wireless packet losses.

The talk takes 45 minutes and an additional 15 minutes for Q&A.

Biography

Dr. Qixin Wang is an associate professor in the Department of Computing, The Hong Kong Polytechnic University since 2009. He received the BE and ME degrees from the Department of Computer Science and Technology, Tsinghua University, Beijing, China, in 1999 and 2001, respectively, and the PhD degree from the Department of Computer Science, University of Illinois at Urbana-Champaign in 2008.

Dr. Wang's research interests include Cyber-Physical Systems, Real-Time Systems, and Wireless Sensor Networks. He has published 12 first/lead author refereed papers in top journals and conferences, and over 40 papers/articles in various venues, such as TPDS, TMC, TII, RTSS, INFOCOM, DSN, ICCPS etc. He has won an IEEE Transactions on Industrial Informatics Best Paper Award in 2008, and has one paper chosen as the featured article by IEEE Transactions on Mobile Computing 2008 May issue. He has served several top conference organization committees, such as INFOCOM, RTCSA, as well as many top conference TPCs, such as RTSS, INFOCOM, ICCPS, etc. He is currently serving the editorial board of Taylor & Francis's journal of Cyber-Physical Systems. He is a member of the IEEE and the ACM.

**** ALL ARE WELCOME ****