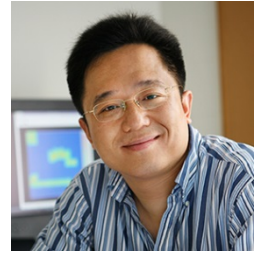




# Distinguished Seminar Computer Science



## Wireless Clinical Monitoring at Scale

**Dr. Chenyang Lu, Washington Univ., St. Louis**

**Mar 11th Tuesday, 12:30 to 1:20pm**

**CS 209**

**Abstract** – Early detection and intervention are essential for preventing clinical deterioration in patients. We are developing a two-tiered clinical warning system designed to identify the signs of clinical deterioration and provide early warning of serious clinical events at general hospital units. The first tier of the system automatically identifies patients at risk of clinical deterioration from existing electronic medical record databases. The second tier performs real-time clinical event detection based on vital sign data collected from on-body wireless sensors attached to those high-risk patients. Wireless sensor networks play an important role in clinical warning by collecting real-time vital signs for clinical decision support. This talk presents the architecture of, and our experiences with, a large-scale wireless clinical monitoring system. Our system encompasses portable wireless pulse oximeters, a wireless relay network spanning multiple hospital floors, and integration with electronic medical record databases. We report our experience and lessons learned from a 14-month clinical trial of the system in six hospital wards of Barnes-Jewish Hospital in St. Louis, Missouri. Our experiences show the feasibility of achieving reliable vital sign collection using a wireless sensor network integrated with hospital IT infrastructure and procedures. We highlight technical and non-technical elements that pose challenges in a real-world hospital environment and provide guidelines for successful and efficient deployment of similar systems. The convergence of wireless sensors, mobile computing, data mining and electronic medical record in clinical warning systems will lead to enhanced quality of care for patients in hospitals as well as outpatients in their everyday lives.

**Brief Bio** - 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, Area Editor of IEEE Internet of Things Journal, 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 48. 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.