

Department of Computer Science  
University of Houston

**FACULTY CANDIDATE SEMINAR  
SPRING 2011**

**WHEN:** FRIDAY, APRIL 8, 2011

**WHERE:** PGH 232

**TIME:** 11:00 AM

**SPEAKER:** Dr. Ahmad Rahmati, Rice University

Host: Dr. Edgar Gabriel

**Title:** From Understanding Human Users to Building Efficient Mobile Systems

**Abstract:**

Modern mobile systems are increasingly capable of assessing their physical context, including their human user. They are aware of time, location, and mobility. They can hear, see, and feel. Such capabilities have already inspired novel applications such as participatory sensing and sensor-based interaction. Complementary to such application research, my research investigates how an understanding of human users can be used in the foundations of computing and communication. In this talk, I will present a user-centered approach for combining multiple wireless networks, e.g. Wi-Fi and cellular, to improve energy consumption, coverage, performance, and network load.

The key to efficiently selecting the best network interface is estimating network conditions without actively probing the network. Based on real-life traces from 14 mobile users, I show that context information enables us to accurately estimate current and future network conditions. Our results show that it is possible to predict Wi-Fi availability even for 10 hours into the future with 90% accuracy. The estimation can subsequently be used to schedule data transfers, with a 30 to 40% battery lifetime improvement for a smartphone-based health monitoring application. We further studied how combining networks can be realized without any network support. Utilizing network flow and application usage information from a field study of 27 iPhone users, I devise and prototype two novel system mechanisms that allow switching between multiple networks without network support.

**Bio:**

Ahmad Rahmati is a Ph.D. candidate at Rice University, Houston, TX. He received his M.S. degree in Electrical and Computer Engineering from Rice University in 2008, and his B.S. degree in Computer Engineering from Sharif University of Technology, Tehran, Iran in 2004. He has been a research intern at AT&T Labs Research, Motorola Labs, and Deutsche Telekom R&D Lab. USA, in 2006, 2008, and 2010, respectively. His publications have received the ACM SIGCHI/SIGMOBILE MobileHCI Best Paper Award in 2007, and have been featured as the spotlight paper of the IEEE Transactions on Mobile Computing twice, in 2010 and 2011. His research interests include the design and applications of efficient, context-aware mobile and wireless systems, their human factors, and medical applications.