Colorado State University's
Information Science and Technology Center (ISTeC)
presents <u>two</u> lectures by

Dr. Jie Wu

Chair and Laura H. Carnell Professor
Department of Computer Information Sciences
Temple University

ISTeC Distinguished Lecture
In conjunction with the
Electrical and Computer Engineering Department and
Computer Science Department Seminar Series

"Algorithmic Crowdsourcing and Applications in Social Networking"

Monday, March 3, 2014
Reception with refreshments: 10:30 am
Lecture: 11:00 am – 12:00 noon
Location: Morgan Library, Event Hall

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Electrical and Computer Engineering Department Special Seminar *Sponsored by ISTeC*

"Collaborative Mobile Charging and Coverage in Wireless Sensor Networks"

Monday, March 3, 2014
Lecture: 2:00 – 3:00 pm
Location: Engineering B103

ISTeC (Information Science and Technology Center) is a university-wide organization for promoting, facilitating, and enhancing CSU's research, education, and outreach activities pertaining to the design and innovative application of computer, communication, and information systems. For more information please see ISTeC.ColoState.EDU.

Abstracts:

Algorithmic Crowdsourcing (and Applications in Social Networking)

This talk gives a survey of crowdsourcing applications, with a focus on algorithmic solutions. Fundamental issues in crowdsourcing, in particular, incentive mechanisms for paid crowdsourcing, and algorithms and theory for crowdsourced problem-solving are reviewed. Several applications of algorithmic crowdsourcing applications are discussed in detail. The talk also discusses several on-going projects on crowdsourcing at Temple University. Finally, some thoughts on future directions are given.

Collaborative Mobile Charging and Coverage in Wireless Sensor Networks

The limited battery capacity of sensor nodes has become the biggest impediment to wireless sensor networks (WSNs) applications over the years. Recent breakthroughs in wireless energy transfer based on rechargeable lithium batteries provide a promising application of mobile vehicles. These mobile vehicles act as mobile chargers to transfer energy wirelessly to static sensors in an efficient way. In this talk, we discuss some of our recent results on several charging and coverage problems involving multiple mobile chargers. In collaborative mobile charging, a fixed charging location, called base station (BS), provides source of energy to mobile chargers, which in turn are allowed to recharge each other while collaboratively charge static sensors. The objective is to ensure sensor coverage while maximizing the ratio of the amount of payload energy (used to charge sensors) to overhead energy (used to move mobile chargers from one location to another), such that none of the sensors will run out of battery. Here, sensor coverage spans both dimensions of time and space. We first consider the uniform case, where all sensors consume energy at the same rate, and propose an optimal scheduling scheme that can cover a one-dimensional (1-D) WSN with infinite length. Then, we present several greedy scheduling solutions to 1-D WSNs with non-uniform sensors and 2-D WSNs, both of which are NP-hard. Finally, we study another variation, in which all mobile chargers have batteries of unlimited capacity without resorting to a BS for recharging. The objective is then to deploy and schedule a minimum number of mobile chargers that can cover all sensors. Again, we provide an optimal solution to this problem in a 1-D WSN with uniform sensors and several greedy solutions with competitive approximation ratios to the problem setting of 1-D WSNs with non-uniform sensors and 2-D WSNs, respectively.

Speaker Biography:

Jie Wu is the chair and a Laura H. Carnell Professor in the Department of Computer and Information Sciences at Temple University. Prior to joining Temple University, he was a program director at the National Science Foundation and Distinguished Professor at Florida Atlantic University. His current research interests include mobile computing and wireless networks, routing protocols, cloud and green computing, network trust and security, and social network applications. Dr. Wu regularly publishes in scholarly journals, conference proceedings, and books. He serves on several editorial boards, including IEEE Transactions on Computers, IEEE Transactions on Service Computing, and Journal of Parallel and Distributed Computing. Dr. Wu was general co-chair/chair for IEEE MASS 2006 and IEEE IPDPS 2008 and program co-chair for IEEE INFOCOM 2011. He served as general chair for IEEE ICDCS 2013 and ACM MobiHoc 2014, and program chair for CCF CNCC 2013. He was an IEEE Computer Society Distinguished Visitor, ACM Distinguished Speaker, and chair for the IEEE Technical Committee on Distributed Processing (TCDP). Dr. Wu is a CCF Distinguished Speaker and a Fellow of the IEEE. He is the recipient of the 2011 China Computer Federation (CCF) Overseas Outstanding Achievement Award.

To arrange a meeting with the speaker, please contact Liuqing Yang, lqyang@Engr.ColoState.EDU 970-491-6215