Distinguished Speaker Series  
Friday, April 6 at 11:30am, NTDP F285

Cyber-Physical Data Analytics and Security  
in Energy and Environment Systems  
Dr. WenZhan Song

Abstract  
This talk will present several research opportunities and case studies of Cyber-physical Data Analytics and Security in energy and environment systems. We will present an innovative Real-time In-situ Seismic Imaging (RISI) system design that has vast application in oil/gas extraction and environment safety. It is a smart sensor network that senses and computes the 3D subsurface imaging in real-time and continuously. Instead of data collection then post processing, the mesh network performs the distributed data processing and tomographic inversion computing under the severe bandwidth and resource constraints, and generates an evolving 3D subsurface image as more data arrives. A RISI system is essentially a “Subsurface Camera” that is a groundbreaking technology and has never been attempted before. We will also briefly discuss several smart grid analytics and security problems. With the integration of advanced computing and communication technologies, Smart Grid holds the promise as the next-generation energy critical infrastructure - efficient, resilient and sustainable. To achieve that end, significant research challenges and opportunities need to be addressed, such as security attacks and countermeasures, fault identification and restoration, demand response and microgrid cooperative controls.

Bio  
Dr. WenZhan Song is a Chair Professor of Computer Engineering and Director of Center for Cyber-Physical Systems in the University of Georgia. His research focus on big data and security in cyber-physical systems and their applications in energy, environment and health, and has been leading large multidisciplinary research projects on those issues with multi-million grant support from NSF, NASA, USGS, and industry. Dr. Song is a pioneer of fog computing in energy and environment IoT systems and the inventor of “Subsurface Camera” technology which has been recognized by oil&gas industry as top 10 groundbreaking technology. His research was featured in MIT Technology Review, Network World, Scientific America, New Scientist, National Geographic, etc. Dr. Song is a recipient of NSF CAREER Award (2010), Outstanding Research Contribution Award (2012), Chancellor Research Excellence Award (2010). Dr. Song serves many premium conferences and journals as editor, chair or TPC member. He is also an inaugural member of OpenFog consortium involving industry and academic leaders. Dr. Song received Ph.D. in Computer Science from Illinois Institute of Technology (2005), B.S. and M.S. degree from Nanjing University of Science and Technology (1997 and 1999).