

# Electric Power and Power Electronics Institute

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## INVITED SEMINAR

Wednesday, March 4<sup>th</sup>, 2015, 3:00pm – 3:50pm, WERC 236C

(Location Changed)

## TITLE

### REAL-TIME IN-SITU SEISMIC IMAGING WITH SENSOR NETWORKS

Dr. WenZhan Song

Professor

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## Abstract

The seismic imaging process today involves massive seismic data collection from hundreds and thousands of seismic sensors to a central place for post computing. The whole process is expensive and often takes days even months to complete. There is great demand for real-time as it would reduce the costs and risks of E&P and mitigate the environment concerns. This talk presents an innovative Real-time In-situ Seismic Imaging (RISI) system that can compute the 3D subsurface imaging in seconds. The RISI system is a mesh network of seismometers that sense and process seismic signals, and compute 3D tomography in-situ in real-time. 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 events arrive. Several innovative distributed tomographic computing algorithms based on travel-time tomography principles have been successfully developed and validated using both synthetic and real-world seismic data set. The hardware prototype system has also been implemented and can be extended as a general field instrumentation platform, to incorporate new geophysical data processing and computing algorithms, beyond seismic.

## Speakers Bio

Dr. WenZhan Song is a Professor of Computer Science at Georgia State University. His research mainly focuses on cyber-physical systems and computing for geophysical imaging, smart grid and smart health, where decentralized sensing, computing, communication and security play a critical role and need a transformative study. Dr. Song has led several major interdisciplinary research projects on those issues with \$7 million+ grant support (with funding ratio near 90%) from NSF, NASA, USGS, and industry since 2005, and his work on volcano monitoring sensor network 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) by GSU Computer Science, Chancellor Research Excellence Award (2010) by WSU Vancouver. Dr. Song is currently a visiting professor at the ICES of UT Austin for Spring 2015.