

COMPUTER SCIENCE  
SEMINAR

*Sensor Web: Research Challenges and Opportunities*

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**Abstract:** In this talk, we will discuss several research challenges and opportunities of sensor web in environment monitoring, smart grid and smart environment. Several years ago, we designed and deployed the first space in-situ sensor web in Mount St. Helens collaborating with USGS and JPL in a NASA ESTO project. We are currently advancing this research agenda to create a new paradigm, VolcanoSRI (Volcano Seismic Realtime Imaging), for imaging the 4D volcano tomography in a large-scale sensor network, joint with UNC and MSU in a NSF CDI project. A future effort aims to integrate seismic tomography, InSAR and deformation model to make the fictional holographic projector known as Virgil in the film "Supervolcano" a reality. We are also collaborating with Cornell and UC Berkeley to investigate several key aspects of a computation and information foundation of the smart grids in a NSF CPS project. We are studying distributed demand and response algorithms and designing an open and scalable experimental platform for smart grid, known as SmartGridLab, that integrates a hardware testbed with a software emulator, allowing software virtual nodes to interact with physical nodes in the testbed. We also discuss several research opportunities on smart environments, with the goal of enabling smart healthcare and ambient intelligence.

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