

**PRESENTING:**

Dr. Nanpeng (Eric) Yu
Southern California Edison

A Talk on “Enabling Smart Grid Technology and Renewable Generation with Agent-based Simulation and Big Data Approach”

Abstract:

This presentation first gives a brief overview of the physical characteristics and performance of the U.S. electric power grid and electric power industry. Various technical challenges and research opportunities in the next five to ten years in the field of power engineering are discussed in detail. The challenges include the integration of grid-scale renewable generation, distribution generation, changes in electricity demand and a changing workforce. Two research directions are proposed to address the above mentioned technical challenges. Historical, the inability to effectively model and evaluate renewable resources and smart grid technologies has been a barrier to adoption. The flexible multi-agent based system is well suited to model the vast physical and human network that connects thousands of electric generators to millions of consumers. Examples are given to demonstrate how the proposed agent-based simulation platform could address problems such as electricity market design and integration of renewable generation and smart grid technologies. Approximately 50 million smart meters have already been installed in several regions in the U.S. For example, Southern California Edison has deployed 5 million smart meters. They collect electricity usage data every 15 minutes which will produce nearly 16 terabytes of information a year, a 3,000 fold increase in the amount of data the same utility would process today. So far, most smart meter data are mostly employed to ensure accurate billing. The availability of smart meter data, two-way communication system enable us to conduct next generation load research, develop innovative energy efficiency services and design self-healing distribution system. Together these researches will transform the planning and operation of the entire power distribution system.

Biography:

Nanpeng (Eric) Yu received his M.S. degree and Ph.D. in electrical engineering from Iowa State University in 2007 and 2010. He also received his M.S. degree in Economics from Iowa State University. He is currently a senior power planner in power supply department at Southern California Edison. His principal research area includes smart grid technology, big data applications in power distribution system, restructured electricity market and renewable energy integration.

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