

Title **Design, Control and Integration of Next Generation Power and Energy Systems**

Speaker Dr. Jack Brouwer

Associate Professor, Mechanical, Aerospace and Environmental Engineering, U.C. Irvine;
 Associate Director, National Fuel Cell Research Center & Advanced Power and Energy Program
 USA

Date & Time Tuesday, December 17, 2013 4:00p.m.

Place I²CNER Hall, Ito campus, Kyushu University



Abstract

Renewable and ultra-low emissions and high efficiency energy conversion systems will be required to introduce energy resource and environmental sustainability. Next generation power systems must be designed for dynamic dispatch to complement the intermittencies of renewable power, which must be increasingly utilized. The complex interactions of the heat transfer, chemistry, electrochemistry, and fluid dynamics must be considered in the design and control of dispatchable power systems such as gas turbine, fuel cell and hybrid fuel cell gas turbine systems. The National Fuel Cell Research Center (NFCRC) of the University of California, Irvine (UCI) has developed a dynamic simulation approach and detailed physical modeling platform that is used to garner insights into the design and control of next generation power systems. It is shown that fueled power plants can be dynamically dispatched over a wide range of operation while maintaining physical operations that are safe and non-degrading.

The same dynamic simulation tools are being used to evaluate smart grid technologies in the Irvine Smart Grid Demonstration (ISGD) project led by Southern California Edison with funding from the U.S. Department of Energy. ISGD is considering the integration of greater amounts of renewable power, electricity use in vehicles, energy storage, direct consumer participation in the energy supply chain to ensure the continued reliability and vitality of the electric grid.

About the Speaker

Research interests include advanced and alternative energy systems development; electrochemical conversion devices and systems such as fuel cells, electrolyzers and batteries; dynamic simulation and control systems development; energy system thermodynamics, design, and integration; turbulent reacting flows; chemical kinetics; and electrochemical reactions with concurrent heat, mass and momentum transfer.

Host: Professor Petros Sofronis

For registration, please visit our website:

<http://i2cner.kyushu-u.ac.jp/>

CONTACT: Research Support and International Affairs Division
 International Institute for Carbon-Neutral Energy Research
 TEL:092-802-6934 email:wpikenkyu@jimu.kyushu-u.ac.jp

