

2008-2009 Graduate Seminar Series

The Department of Mechanical Engineering – Engineering Mechanics

Proudly Presents

Dr. Abel (Po-Ya) Chuang

General Motors



Abel Chuang got his undergraduate and master degrees in Aerospace Engineering from Taiwan. In his master work, he designed, fabricated, and tested a 10-lbf altitude control monopropellant thruster used on a satellite. He also served in Taiwan Air-force for two years as an F-16 tactical fighter avionic technician. After that he came to Penn State University to work on his Doctoral degree, where he worked on a passive two-phase heat transfer device called loop heat pipe. He applied Neutron Radiography as a visualization tool to help his experimental and modeling work. After that, he did his postdoctoral work using Neutron Radiography to study fuel cell water management issues. He was hired by General Motors Fuel Cell Activities in early 2005 and has been working on fuel cell research since then. Currently, he is leading a small group working on a fuel cell component called diffusion media.

In his spare time he likes to do sports, including volleyball, basketball, table tennis and tennis. Besides work and sports, he enjoys spending time to play with his three daughters.

Thursday, Dec. 11, 2008 3:00 – 4:00 p.m. Room 112, ME-EM Bldg.

PEM Fuel Cell Diffusion Media for Automotive Application

The presentation will start with a brief introduction of fuel cell components, stack, and system. The majority of the presentation will focus on the role and functions of diffusion media. At the end, the presenter will list couple areas of challenge for future research directions.

Polymer Electrolyte Membrane (PEM) Fuel Cell is an electrochemical device, which uses hydrogen and oxygen to generate water and electricity. Major fuel cell components include current collector plate with flow field design, diffusion media, electrode with catalyst, and polymer electrolyte membrane. Each component has its own functions and all components are critical for an optimal fuel cell design.

The major functions of diffusion media are conducting electron, transporting heat and reactant gases, managing water in liquid and vapor forms, and providing mechanical support to Membrane Electrode Assembly (MEA). These functions are important for a fuel cell to function appropriately. They also have strong impact on fuel cell cost, performance, and durability.

After this talk, you should have a good understanding of a PEM fuel cell. It is also the presenter's intention to share his opinions of how a mechanical engineer can contribute to this electrochemical device and what are the areas that require further understanding.

Funding for the ME-EM Graduate Seminar Series is provided by Professional Plating, Inc. of Anoka, MN www.proplate.com
and the Department of Mechanical Engineering – Engineering Mechanics www.me.mtu.edu/seminar