CURRICULUM VITAE

Po-Ya Abel Chuang, Ph.D.
Assistant Professor, School of Engineering, University of California, Merced
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RESEARCH INTERESTS:

High temperature and low temperature PEM fuel cell, heat exchanger, thermal management, two-phase heat transfer and fluid flow, loop heat pipe, porous material, and carbon fiber.

EDUCATION:

Executive MBA, Rochester Institute of Technology	**08/2008─11/2009**
Doctor of Philosophy, Mechanical Engineering, Penn State University	**08/1999─12/2003**
Master of Science, Aerospace Engineering, NCKU, Tainan, Taiwan	**09/1995─06/1997**
Bachelor of Science, Aerospace Engineering, NCKU, Tainan, Taiwan	**09/1991─06/1995**

CURRENT ACADEMIC POSITION:

Assistant Professor, School of Engineering, University of California Merced, CA	**07/2014─Present**

PREVIOUS POSITIONS HELD:

Research Fellow, Discovery Park, Purdue University, IN	**07/2012─06/2013**
Assistant Professor, Mechanical Engineering Technology, Purdue University, IN	**08/2012─06/2014**
Consultant, Industrial Technology Research Institute, Tainan, Taiwan	**01/2012─07/2012**
Assistant Professor, Institute of Energy Engineering, National Central University, Taiwan	**08/2011─07/2012**
Sr. Research Engineer/Team Lead, General Motors Corp., Honeoye Falls, NY	**04/2006─07/2011**
Sr. Research Engineer, General Motors Corp., Honeoye Falls, NY	**02/2005─04/2006**
Postdoctoral Scholar, Penn State University, University Park, PA	**01/2004─01/2005**
Consultant, Omega Piezo Technologies, Inc., State College, PA	**02/2004─05/2004**
Research Engineer, TTH Research, Inc., Laurel, MD	**05/2001─12/2003**
Research Assistant, Penn State University, University Park, PA	**08/2000─12/2003**
F16 Avionics Technician, Taiwan Air Force, Chiayi, Taiwan	**07/1997─06/1999**

TEACHING ACTIVITIES:

Thermodynamics, School of Engineering, University of California, Merced	**Spring 2015**
Professional Seminar, School of Engineering, University of California, Merced	**2014-2015**
Fuel Cell Fundamentals, Modeling, and Diagnostic, Purdue University	**Spring 2014**
Applied Fluid Mechanics, Mechanical Engineering Technology, Purdue University	**2012-2013**
Electric Vehicle, Mechanical Engineering Technology, Purdue University	**Fall 2012**
Advanced Heat Transfer, Mechanical Engineering, National Central University, Taiwan	**Spring 2012**
Vehicle Electrification, Mechanical Engineering, National Central University, Taiwan	**Spring 2012**
Heat Exchanger Design, Energy Engineering, National Central University, Taiwan	**Fall 2011**
Experimental Method, Energy Engineering, National Central University, Taiwan	**Fall 2011**

RESEARCH GRANTS AWARDED:

Principle Investigator: Industrial Technology Research Institute (ITRI), Taiwan, "High Efficiency Combined Heat and Power System," March1, 2013 – February 28, 2016, US$800,000

Discover Park Research Fellow, Purdue University, "Material, Integration, and System Study of Proton Exchange Membrane Fuel Cells," July 1, 2013 – June 30, 2014, US$35,000

Principle Investigator: ALDI Far-IR Products, Inc. "Study of the Impact of Infrared on Water Electrolysis," July 15, 2013 – December 15, 2013, US$10,000

Principle Investigator: National Science Council, Taiwan: "Development of a Novel Diagnostic Tool and a 1-D Dry Model to Study In-Situ Oxygen Diffusion Resistance in A PEM Fuel Cell," January 1, 2012 – July 31, 2013, NT$1,147,000 (US$38,233), NSC 101-2218-E-008-007-MY2 – This project was terminated on September 4, 2012 due to PI's position change.

Principle Investigator: Industrial Technology Research Institute (ITRI), Taiwan, "Study of PEM Fuel Cell Thermal Properties and Temperature Distribution," February 17, 2012 – November 30, 2013, NT$500,000 (US$16,667)

Co-Principle Investigator: Department of Energy, Nuclear Engineering Research Grant Programs (NEER), USA, "Neutron Computed Tomography of Freeze/Thaw Phenomena in Polymer Electrolyte Fuel Cells," July 2005 – June 2008, $300,000, DE-PS07-04ID14632

PUBLICATIONS:

Chuang, P. A., Cimbala, J. M., Brenizer, J. S., "Experimental and Analytical Study of a Loop Heat Pipe at Positive Elevation using Neutron Radiography," International Journal of Thermal Science 77 (2014) 84-95

Chen, P. C., Chang, S. M., and **Chuang, P. A**., "Optimal Oxygen Stoichiometry for Maximum Net Power Output of Proton Exchange Membrane Fuel Cell Systems," International Journal on Energy Conversion (I.R.E.Con.), Vol. 1, N. 1, January 2013, pp. 4-13

Nicotera, P., Evans, R., Weaver, C., and **Chuang, P. A.**, (2012) "Gas Diffusion Media for Proton Exchange Membrane Fuel Cells Made from Carbon Fibers with Controlled Conductivity," *MRS Proceedings,* 1384, mrsf11-1384-b16-04 doi:10.1557/opl.2012.353

Fultz, D. and **Chuang, P. A.**, "The Property and Performance Differences between Catalyst Coated Membrane and Catalyst Coated Diffusion Media," *Journal of Fuel Cell Science and Technology,* Volume 8, Issue 4, August 2011

Chuang, P. A., Turhan, A., Heller, K., et al., "The nature of flooding and drying in polymer electrolyte fuel cells," 3rd *International Conference on Fuel Cell Science, Engineering and Technology*, May 23-25, 2005, Ypsilanti, MI, USA

Pekula, N., Heller, K., **Chuang, P. A.**, et al., "Study of water distribution and transport in a polymer electrolyte fuel cell using neutron imaging," *Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors, and Associated Equipment*, Volume 542, Issues 1-3, 21 April 2005, pp. 134-141

Chuang, P. A., Cimbala, J. M., and Brenizer, J. S., "Theoretical and experimental study of a loop heat pipe at positive elevation," *International Mechanical Engineering Congress and RD&D Expo*, November 13-19, 2004, Anaheim, CA USA

Chuang, P. A., Cimbala, J. M., and Brenizer, J. S., "Analytical modeling of a loop heat pipe at positive elevation," *International Mechanical Engineering Congress and RD&D Expo*, November 13-19, 2004, Anaheim, CA USA

Chuang, P. A., Cimbala, J. M., Brenizer, J. S., et al., "Comparison of experiments and 1-D steady-state model of a loop heat pipe," *International Mechanical Engineering Congress and Exposition*, November 17-22, 2002, New Orleans, LA USA

Cimbala, J. M., Brenizer, J. S., **Chuang, P. A.**, et al., "Study of a loop heat pipe using neutron radiography," *Applied Radiation and Isotopes*, 61 (2004) 701-705

CONFERENCE PRESENTATIONS:

46th Power Sources Conference, Orlando, FL **6/10/2014**
- An Electrochemical Model and Experimental Analysis of Alkaline Water Electrolysis

10th Int'l Hydrogen & Fuel Cell Expo, Tokyo, Japan **2/27/2014**
- Bulk and Interfacial Transport Study in PEM Fuel Cell Research

2010 Materials Research Society Fall Meeting, Boston, MA **11/29/2010**
- Low Cost Gas Diffusion Media Based on Alternative Carbon Fiber Precursors: Properties and Proton Exchange Membrane Fuel Cell Performance

2010 Fuel Cell Seminar & Exposition, San Antonio, TX **10/19/2010**
- Fuel Cell Vehicle Commercial Applications and Challenges in Stack Research and Development

218th Meeting of the Electrochemical Society, Las Vegas, NV **10/14/2010**
- Limiting Current as a Screening Tool for Diffusion Media and Micro-Porous Layers

ASME 8th International Conference on Fuel Cell Science, New York, NY **6/14/2010**
- Characterization of Microporous Layer Materials for Low Temperature PEM Fuel Cell Modeling

2009 IMECE, ASME, Lake Buena Vista, FL **11/19/2009**
- The Effect of Catalyst Coated Diffusion Media on PEM Fuel Cell Performance

Materials Science & Technology 2009 Conference & Exhibition, Pittsburgh, PA **10/29/2009**
- Correlation of Heat Treatment Temperature and the Carbonization of Textile-Grade PAN Precursors to Diffusion Media Properties and PEM Fuel Cell Performance

ASME 7th International Conference on Fuel Cell Science, Newport Beach, CA **6/10/2009**
- Effect of Temperature Gradient on Water Balance and Performance in a PEM Fuel Cell

ASME 5th International Conference on Fuel Cell Science, New York, NY **6/20/2007**
- Effect of Land/Channel Width on Cell Performance and Water Distribution in a PEMFC

ASME 3rd International Conference on Fuel Cell Science, Ypsilanti, MI **5/24/2005**
- The Nature of Flooding and Drying in Polymer Electrolyte Fuel Cells

208th Meeting of the Electrochemical Society, Los Angeles, CA, USA **10/16/2005**
- Liquid Water Distribution and Flooding as a Function of Flow Field Design in a PEFC

Spring 2005 Meeting of the Electrochemical Society, Quebec, CANADA **5/16/2005**
- Water Distribution at Onset of Flooding and Dry-out in PEFCs

2004 IMECE, ASME, Anaheim, CA **11/14/2004**
- Theoretical and Experimental Study of a Loop Heat Pipe at Positive Elevation

2004 IMECE, ASME, Anaheim, CA **11/14/2004**
- Analytical Modeling of a Loop Heat Pipe at Positive Elevation

2002 IMECE, ASME, New Orleans, LA **11/19/2002**
- Comparison of Experiments and 1-D Steady-State Model of a Loop Heat Pipe

ISSUED and PENDING PATENTS:

Optimized GDM to improve fuel cell performance, US Pat. 8178259

Gas diffusion media made from electrically conductive coatings on non-conductive fibers, US20110143262

Fuel cell with anode and cathode plate temperature difference, US20110076583

Fuel cell stack with improved end cell performance through a diffusion media having lower compressibility, Application number: 20140051005

Fuel cell stack with improved end cell performance provided by higher modulus of elasticity, Application number: 20140051004

Method for Optimizing Diffusion Media with Spatially Varying Mass Transport Resistance, US7829230

Fuel Cell Stack with Improved End Cell Performance, US20080299418

Method of Making a Membrane Electrode Assembly Comprising a Vapor Barrier Layer, a Gas Diffusion Layer, or Both, US2007141405 AA, 2007

INVITED TALKS & KEYNOTE SPEECHES:

"Study of Interactive Transport Phenomena in Fuel Cells," *Graduate Seminar,* State Key Laboratory of Advanced Technology for Materials Synthesis and Processing, Wuhan University of Technology, November 7, 2014, Wuhan, China

"Study of Interactive Transport Phenomena in Fuel Cells," *Graduate Seminar,* Clean Energy Automotive Engineering Center, TongJi University, November 6, 2014, Shanghai, China

"The Impact of Diffusion Media and Water Management on Fuel Cell Stack Performance and Durability," *2014 International Symposium on Electrochemical Energy,* Jiao Tong University, July 14, 2014, Shanghai, CHINA

"Limiting Current as a Screening Tool for Diffusion Media and Micro-Porous Layers," *2010 International Fuel Cell Workshop,* Fuel Cell Center, Yuan Ze University, December 6, 2010, Taoyuan, TAIWAN

"Fuel Cell Vehicle Commercial Applications," *Low Emission Light Vehicle Technical Standards and Validation International Forum,* Taiwan Institute of Economic Research, December 1, 2010, Taipei, TAIWAN

"Current Challenges in Fuel Cell Stack Research and Commercialization," *AIST FC-Cubic Mass Transfer Workshop,* Polymer Electrolyte Fuel Cell Cutting-Edge Research Center, Advanced Industrial Science and Technology, January 8, 2010, Tokyo, JAPAN

"Challenges and Opportunities of PEM Fuel Cell Research," *Tianda International Fuel Cell Workshop*, State Key Laboratory of Engines, Tianjin University, December 23-23, 2009, Tianjin, CHINA

"Challenges of Current Fuel Cell Stack Technology," Canada-US Fuel Cell Modeling and *Characterization Workshop*, Institute of Fuel Cell Innovation, National Research Council, November 12-13, 2009, Vancouver, CANADA

"Challenges and Opportunities of PEM Fuel Cell for Automotive Application," *Graduate Seminar,* Chemistry Department, Chung-Yuan Christian University, December 29, 2008, Chung-Li, TAIWAN

"PEM Fuel Cell for Automotive Application," *Graduate Seminar,* Mechanical Engineering, Michigan Tech University, December 11, 2008, Houghton, Michigan, USA

"Impact of Diffusion Media on Fuel Cell Operation," *2008 Gordon Research Conference on Fuel Cells,* July 20-25, 2008, Smithfield, Rhode Island, USA

"Study of Water Management in a Polymer Electrolyte Fuel Cell," Energy and Environment Research Laboratories, Industrial Technology Research Institute, September 29, 2004, Hsin-Chu, TAIWAN

"Study of a Loop Heat Pipe using Neutron Radiography," *Graduate Seminar,* Nuclear Engineering, The Pennsylvania State University, December 11, 2003, University Park, Pennsylvania, USA

"Fundamental Studies of Loop Heat Pipes," Thermal Division, U.S. Naval Research Laboratory, July 23, 2003, Washington D.C., USA

"Introduction of General Operating Characteristics of Loop Heat Pipes," Thermacore International, Inc., January 30, 2003, Lancaster, Pennsylvania, USA

ENGAGEMENT ACTIVITIES:

Journal Publication Reviewer **2005─Present**

ASME Journal of Fuel Cell Science and Technology, Fuel Cells, International Journal of Hydrogen Energy, International Journal of Thermal Sciences, Journal of Power Sources, etc.

Conference Paper Reviewer **2004─Present**

2004 ASME International Mechanical Engineering Congress and RD&D Expo; 2008 International Conference on Nanochannels, Microchannels, and Minichannels; ASME Fuel Cell Science, Engineering, and Technology Conference

Textbook Reviewer (Accuracy Check) **2004─Present**

Engineering Fluid Mechanics, Clayton T. Crowe, et. al., Wiley, 2012
Fluid Mechanics: Fundamentals and Application, Cengel, Y. and Cimbala, J. M., McGraw-Hill, Boston, 2005

AWARDS:

Discovery Park Research Fellow, Purdue University **07/2013─06/2014**
Elected by Discovery Park Research Centers, Purdue University.

Honorary Member of Beta Gamma Sigma Honor Society **04/2010**
Elected by The E. Philip Saunders College of Business, Rochester Institute of Technology.

Honorary Member of The Phi-Tau-Phi Scholastic Honor Society **01/1997**
Elected by The National Cheng-Kung University for excellent academic achievement.

Outstanding Fellowship of IAA, NCKU, Tainan, Taiwan **07/1996**
Awarded by IAA, NCKU for Excellent Academic Performance.