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The University of Alabama in Huntsville
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PROFESSIONAL PREPARATION

Xi'an Jiaotong University	Thermal Energy & Power Engineering	B.S.	2003
Xi'an Jiaotong University	English	B.A.	2003
Xi'an Jiaotong University	Power Eng. & Eng. Thermophysics	Ph.D.	2010
Rochester Institute of Technology	Mechanical Engineering	Postdoc	2010-2011
Pennsylvania State University	Mechanical & Nuclear Engineering	Postdoc	2011-2013

APPOINTMENTS

- 08/2017 - present Assistant Professor, Department of Mechanical & Aerospace Engineering, University of Alabama in Huntsville, AL
- 08/2013 - 07/2017 Research Associate, Department of Mechanical & Nuclear Engineering, Pennsylvania State University, University Park, PA

TEACHING

Fall 2017, MAE 341 Thermodynamics I, University of Alabama in Huntsville, AL

RESEARCH PUBLICATIONS

Google Scholar Profile:

<https://scholar.google.com/citations?user=p3eW1xgAAAAJ&hl=en>

Manuscripts under Review

- [27] **G. Zhang**, H. Tian, S. Ge, D. Marple, C.Y. Wang. Visualization of self-heating of an all climate battery by infrared thermography, *Journal of Power Sources*, under review
- [26] **G. Zhang**, S. Ge, X.G. Yang, Y. Leng, D. Marple, C.Y. Wang. Rapid restoration of electric vehicle battery performance while driving at low temperatures, *Journal of Power Sources*, under review

Published Journal Papers

- [25] X.G. Yang, Y. Leng, **G. Zhang**, S. Ge, C.Y. Wang. Modeling of lithium plating induced aging of lithium-ion batteries. Part I. Transition from linear to nonlinear aging, *Journal of Power Sources*, 2017, 360: 28-40
- [24] C.Y. Wang, **G. Zhang**, S. Ge, T. Xu, Y. Ji, X.G. Yang, Y.J. Leng. Lithium-ion battery structure that self-heats at low temperatures, *Nature*, 2016, 529: 515-518 (Highlighted in over 20 news articles by *Nature*, *R&D Magazine*, *ScienceDaily*, *Phys.org*, *IEEE Spectrum*, *Green Car Reports*, *Penn State News*, etc.)
- [23] **G. Zhang**, S. Ge, T. Xu, X. G. Yang, H. Tian, C. Y. Wang. Rapid self-heating and internal temperature sensing of lithium-ion batteries at low temperatures. *Electrochimica*

- Acta*, 2016, 218: 149-155
- [22] X. G. Yang, **G. Zhang**, C. Y. Wang. Computational design and refinement of self-heating lithium-ion batteries. *Journal of Power Sources*, 2016, 328: 203-211
- [21] C. Y. Wang, T. Xu, S. Ge, **G. Zhang**, X. G. Yang, Y. Ji. A Fast Rechargeable Lithium-Ion Battery at Subfreezing Temperatures. *Journal of The Electrochemical Society*, 2016, 163(9): A1944-A1950
- [20] G.Y. Chen, **G. Zhang**, L.J. Guo, H.T. Liu. Systematic study on the functions and mechanisms of micro porous layer on water transport in proton exchange membrane fuel cells. *International Journal of Hydrogen Energy*, 2016, 41(9): 5063–5073
- [19] **G. Zhang**, L. Cao, S. Ge, C. Y. Wang, C. E. Shaffer, C. D. Rahn. Reaction temperature sensing (RTS)-based control for Li-ion battery safety, *Scientific Reports*, 2015, 5: 18237 (Highlighted by *R&D Magazine*, *Phys.org*, *Penn State News*, etc.)
- [18] **G. Zhang**, L. Cao, S. Ge, C.Y. Wang, C. E. Shaffer, C. D. Rahn. In situ measurement of radial temperature distributions in cylindrical Li-ion cells, *Journal of The Electrochemical Society*, 2014, 161: A1499-A1507
- [17] **G. Zhang**, C. E. Shaffer, C.Y. Wang, C. D. Rahn. Effects of non-uniform current distribution on energy density of Li-ion cells, *Journal of The Electrochemical Society*, 2013, 160: A2299-A2305
- [16] **G. Zhang**, C. E. Shaffer, C.Y. Wang, C. D. Rahn. In-situ measurement of current distribution in a Li-ion cell, *Journal of The Electrochemical Society*, 2013, 160: A610-A615
- [15] **G. Zhang**, S. G. Kandlikar. A critical review of cooling techniques in proton exchange membrane fuel cell stacks. *International Journal of Hydrogen Energy*, 2012, 37(3): 2412-2429
- [14] **G. Zhang**, S.L. Shen, L.J. Guo, H.T. Liu. Dynamic characteristics of local current densities and temperatures in proton exchange membrane fuel cell during reactant starvations. *International Journal of Hydrogen Energy*, 2012, 37(2): 1884-1892
- [13] Z.J. Lu, C. Rath, **G. Zhang**, S. G. Kandlikar. Water management studies in PEM fuel cells, Part IV: Effects of channel surface wettability, geometry and orientation on the two-phase flow in parallel gas channels. *International Journal of Hydrogen Energy*, 2011, 36(16): 9864-9875
- [12] **G. Zhang**, L.J. Guo, L.Z. Ma, H.T. Liu. Simultaneous measurement of current and temperature distributions in a proton exchange membrane fuel cell. *Journal of Power Sources*, 2010, 195(11): 3597-3604
- [11] C.J. Xu, **G. Zhang**, L.J. Guo, H.T. Liu. Modeling of water transport in PEM fuel cells. *Journal of Engineering Thermophysics*, 2010, 31(9): 1505-1508
- [10] **G. Zhang**, L.J. Guo, B. Ma, H.T. Liu. Comparison of current distributions in proton exchange membrane fuel cells with interdigitated and serpentine flow fields. *Journal of Power Sources*, 2009, 188(1): 213-219
- [9] H. Sun, **G. Zhang**, L.J. Guo, H.T. Liu. A study of dynamic characteristics of PEM fuel cells by measuring local currents. *International Journal of Hydrogen Energy*, 2009, 34(13): 5529-5536
- [8] D.H. Shang, B. Ma, **G. Zhang**, L.J. Guo, H.T. Liu. Analysis of impedance with different discharge current in proton exchange membrane fuel cell, *Journal of Xi'an Jiaotong University*, 2008, 42(5): 622-625
- [7] H. Sun, **G. Zhang**, L.J. Guo, D.H. Shang, H.T. Liu. Effects of humidification

- temperatures on local current characteristics in a PEM fuel cell, *Journal of Power Sources*, 2007, 168: 400-407
- [6] H. Sun, **G. Zhang**, L.J. Guo, H.T. Liu. A novel method of measuring current distribution in PEM fuel cells, *Journal of Power Sources*, 2006, 158(1): 326-332
- [5] D.H. Shang, **G. Zhang**, L.J. Guo. Effects of reactant gas flow rates on the current distribution in a PEM fuel cell, *Journal of Wuhan University of Technology*, 2006, 28 (s2): 601-604
- [4] H. Sun, L.J. Guo, H.T. Liu, **G. Zhang**. Two-phase mass transport in PEM fuel cell and its effects, *Journal of Engineering Thermophysics*, 2006, 27(2): 262-264
- [3] H. Sun, L.J. Guo, H.T. Liu, **G. Zhang**. Effects of operating parameters on mass transport of water in PEM fuel cell, *Journal of Engineering Thermophysics*, 2005, 26(2): 257-260
- [2] H. Sun, L.J. Guo, H.T. Liu, **G. Zhang**. Transport characteristics of water and proton in the membrane of PEM fuel cells, *Journal of Chemical Industry and Engineering*, 2005, 56(6): 1081-1085
- [1] H. Sun, L.J. Guo, H.T. Liu, **G. Zhang**. Two-phase transport of water in porous medium of proton exchange membrane fuel cells, *Journal of Xi'an Jiaotong University*, 2005, 39(11): 1177-1181

Conference Papers/Abstracts

- [22] **G. Zhang**, S. Ge, Y. Leng, X. G. Yang, D. Marple, C. Y. Wang. Wang. Robust internal temperature sensing of large-format Li-ion cells, *231st ECS Meeting*, New Orleans, LA, USA, May 28-June 1, 2017
- [21] **G. Zhang**, S. Ge, T. Xu, C. Y. Wang. In situ diagnosis and control of Li-ion batteries for enhanced safety, *228th ECS Meeting*, Phoenix, AZ, USA, Oct. 11 - 15, 2015
- [20] C. Y. Wang, **G. Zhang**, S. Ge, T. Xu, Y. Ji, and X. G. Yang. Fast charging of Li-ion batteries in extreme cold, *228th ECS Meeting*, Phoenix, AZ, USA, Oct. 11 - 15, 2015
- [19] **G. Zhang**, L. Cao, S. Ge, C. Y. Wang, C. E. Shaffer, C. D. Rahn. Enhancing safety of Li-ion battery for electric vehicles through in situ diagnosis, *14th International Conference on Clean Energy (ICCE 2015)*, Saskatoon, SK, Canada, Sep. 27- Oct. 1, 2015
- [18] **G. Zhang**, L. Cao, S. Ge, C. Y. Wang, C. E. Shaffer, C. D. Rahn. In situ measurement of temperature distribution in cylindrical Li-ion cells, *2014 ECS and SMEQ Joint International Meeting*, Cancun, Mexico, Oct. 5-10, 2014
- [17] C. Y. Wang, **G. Zhang**, C. E. Shaffer and Puneet K. Sinha. Delivering 10x improvement in Li-ion battery power and energy at -30 °C through active control, *MRS Spring Meeting & Exhibit*, San Francisco, USA, Apr. 21-25, 2014
- [16] **G. Zhang**, L. Cao, S. Ge, C. Y. Wang, C. E. Shaffer, C. D. Rahn, In situ measurement of li-ion battery internal temperature, *224th ECS Meeting*, Abstract #538, San Francisco, USA, Oct. 27 - Nov. 01, 2013
- [15] J. P. Owejan, W. Gu, J. Gagliardo, P. Nicotera, A. Kongkanand, R. Reid, M. Mench, J. LaManna, S. Chakraborty, F. Zhang, M. Hickner, S. Petrina, S. G. Kandlikar, T. Trabold, **G. Zhang**, J. Sergi, M. Daino. Validation and characterization database supporting two-phase 1+1D PEMFC model development, *220th ECS Meeting*, Boston, USA, Oct. 9-14, 2011
- [14] **G. Zhang**, S.L. Shen, H.T. Liu, L.J. Guo. Study of reactants starvation in PEM fuel cell via dynamic measurement of local currents and temperatures, *10th Int. Conf. on Clean Energy (ICCE-2010)*, Gazimagusa, N. Cyprus, Sep. 15-17, 2010
- [13] H. Sun, **G. Zhang**, L.J. Guo. Transient Characteristics of PEMFC based on Fuel Cell

- Temperature, *Power and Energy Engineering Conference (APPEEC), 2010 Asia-Pacific, Chengdu, China, Mar. 28-31, 2010*
- [12] **G. Zhang**, L.J. Guo, L.Z. Ma, S.L. Shen, H.T. Liu. Simultaneous measurement of current and temperature distributions in PEM fuel cell. *China-North America Workshop on Fuel Cell*, Shanghai, China, Aug. 13-15, 2009
- [11] L.J. Guo, **G. Zhang**, C.J. Xu, L.Z. Ma, S.L. Shen, H.T. Liu, Y. Yang and H. Sun, Study of thermal management in PEM fuel cells with numerical modeling and *in-situ* diagnosis approaches, *Int. Symp. on Convective Heat and Mass Transfer in Sustainable Energy (CONV-09)*, Hammamet, Tunisia, Apr. 26 - May 1, 2009
- [10] H. Sun, **G. Zhang**, H.T. Liu, L.J. Guo. Dynamic local current characteristics of PEM fuel cells to humidification temperature. *6th Int. Symp. on Multiphase Flow, Heat Mass Transfer & Energy Conversion*, Xi'an, China, Jul. 11-15, 2009
- [9] B. Ma, **G. Zhang**, H.T. Liu, L.J. Guo. Characterization of a H₂/air PEMFC with different flow fields by electrochemical impedance spectroscopy. *International Hydrogen Forum (HyForum)*, Changsha, China, Aug. 3-6, 2008
- [8] **G. Zhang**, B. Ma, D.H. Shang, L.J. Guo, H. Sun, H.T. Liu. Measurement of current distributions in a PEM fuel cell with interdigitated flow fields. *ECS Transactions*, 2007, 11(1): 1545-1552
- [7] **G. Zhang**, B. Ma, C.J. Xu, H.T. Liu, L.J. Guo, D.H. Shang, C.M. Zhang, H.T. Liu. Current distributions in a PEM fuel cell with interdigitated flow fields. *8th Chinese Hydrogen Energy Conference*, Xi'an, China, Oct. 12-14, 2007
- [6] **G. Zhang**, H. Sun, L.J. Guo, D.H. Shang, H.T. Liu. Study of a PEMFC performance based on a novel current distribution measurement method, *16th World Hydrogen Energy Conference*, Lyon, France, Jun. 13-16, 2006
- [5] H. Sun, **G. Zhang**, L.J. Guo, H.T. Liu, D.H. Shang. A novel method to measuring current distribution in PEM fuel cells, *2005 Fuel Cell Seminar*, Palm Springs, CA, USA, Nov. 14-18, 2005
- [4] H. Sun, H.T. Liu, J. Ji, **G. Zhang**, L.J. Guo. Water transport in porous media of PEM fuel cells, *5th Int. Symp. on Multiphase Flow, Heat Mass Transfer and Energy Conversion*, Xi'an, China, Jul. 3-6, 2005
- [3] H. Sun, **G. Zhang**, D.H. Shang, L.J. Guo, H.T. Liu. Experimental study on the effects of humidification temperature on current distribution in PEM fuel cells. *6th Chinese Hydrogen Energy Conference*, Shanghai, China, Nov. 18-21, 2005
- [2] L.J. Guo, H. Sun, **G. Zhang**, H.T. Liu. Research on the measurement method for current distribution in single fuel cell and stack. *6th Chinese Hydrogen Energy Conference*, Shanghai, China, Nov. 18-21, 2005
- [1] **G. Zhang**, L.J. Guo, H. Sun, D.H. Shang, C.M. Zhang, H.T. Liu. Effects of operating parameters on the performance of PEM fuel cells. *5th Chinese Hydrogen Energy Conference*, Beijing, China, Oct. 20-22, 2004

PRESENTATIONS & INVITED TALKS

- [12] Methods to improve Li-ion battery performance, *2017 IEEE International Conference on Prognostics and Health Management*, Dallas, TX, USA, June 19-21, 2017 (**Invited Panel Discussion**)
- [11] Robust internal temperature sensing of large-format Li-ion cells, *Battery Safety Symposium, 231st ECS Meeting*, New Orleans, LA, USA, May 28-June 1, 2017 (**Invited**)

- [10] Fast charging of Li-ion batteries in extreme cold, *228th ECS Meeting*, Phoenix, AZ, USA, Oct. 11-15, 2015
- [9] In situ diagnosis and control of Li-ion batteries for enhanced safety, *228th ECS Meeting*, Phoenix, AZ, USA, Oct. 11-15, 2015
- [8] Enhancing safety of Li-ion battery for electric vehicles through in situ diagnosis, *14th International Conference on Clean Energy*, Saskatoon, Canada, Sep. 27- Oct. 1, 2015
- [7] In situ measurement of temperature distribution in cylindrical Li-ion cells, *2014 ECS and SMEQ Joint International Meeting*, Cancun, Mexico, Oct. 5-9, 2014
- [6] In situ measurement of Li-ion battery internal temperature, *Battery Safety Symposium at 224th ECS Meeting*, San Francisco, CA, USA, Oct. 27 - Nov. 01, 2013
- [5] Study of thermal management in PEM fuel cells with numerical modeling and in-situ diagnosis approaches, *Int. Symp. on Convective Heat and Mass Transfer in Sustainable Energy (CONV-09)*, Hammamet, Tunisia, Apr. 26 - May 1, 2009 (**Invited Plenary Talk**, on behalf of Prof. Liejin Guo)
- [4] Simultaneous measurement of current and temperature distributions in PEM fuel cell. *2009 China-North America Workshop on Fuel Cell*, Shanghai, China, Aug. 13-15, 2009
- [3] Modeling of water transport in PEM fuel cells. *Annual Meeting of Chinese Society of Engineering Thermophysics*, Jilin, China, Aug. 30-31, 2009
- [2] Current distributions in a PEM fuel cell with interdigitated flow fields. *8th National Conference on Hydrogen Energy*, Xi'an, China, Oct. 12-14, 2007
- [1] Study of a PEMFC performance based on a novel current distribution measurement method, *16th World Hydrogen Energy Conference*, Lyon, France, Jun. 13-16, 2006

PROFESSIONAL SERVICE

Conference Organization

- Co-Organizer, *Battery Safety and Failure Modes Symposium, 235th ECS Meeting*, May 26-31, 2019, Dallas, TX
- Co-Editor, *ECS Transactions (Battery Safety Symposium, 231st ECS Meeting)*
- Co-Organizer & Session Chair, *Battery Safety Symposium, 231st ECS Meeting*, New Orleans, LA, May 28-June 2, 2017
- Session Chair, *The 14th International Conference on Clean Energy*, Saskatoon, SK, Canada, Sep. 27 - Oct. 1, 2015
- Member of Organizing Committee, *The 6th International Symposium on Multiphase Flow, Heat Mass Transfer and Energy Conversion*, Xi'an, China, Jul. 10-16, 2009
- Member of Organizing Committee, *The 5th International Symposium on Multiphase Flow, Heat Mass Transfer and Energy Conversion*, Xi'an, China, Jul. 3-6, 2005

Reviewer for Journals

- *Energy & Environmental Science*
- *Energy Conversion and Management*
- *International Journal of Heat and Mass Transfer*
- *International Journal of Hydrogen Energy*
- *Journal of Power Sources*
- *Journal of The Electrochemical Society*
- *Renewable & Sustainable Energy Reviews*

Community Outreach:

- Reviewer, College of Engineering Research Symposium (CERS), The Pennsylvania State University, University Park, PA 2016
- Proposal Reviewer, College of Engineering Research Experience for Undergraduates (COEREU) program, The Pennsylvania State University, University Park, PA 2014, 2015
- Judge for Graduate Exhibition. The 29th Annual Graduate Exhibition, The Pennsylvania State University, University Park, PA 2014

PROFESSIONAL SOCIETY MEMBERSHIP

- American Society of Mechanical Engineers (ASME)
- International Society of Electrochemistry (ISE)
- The Electrochemical Society (ECS)

HONOR

2016 Institution of Chemical Engineers (IChemE) Global Award in Energy, Finalist
(Team for self-heating lithium-ion battery)