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PROFESSIONAL PREPARATION

Postdoctoral Fellow, Mechanical Engineering, The Pennsylvania State University, 2011-2013
Postdoctoral Fellow, Mechanical Engineering, Rochester Institute of Technology, 2010-2011
Ph.D., Power Engineering and Engineering Thermophysics, Xi'an Jiaotong University, China, 2010
B.S., Thermal Energy and Power Engineering, Xi'an Jiaotong University, China, 2003
B.A., English (Minor Diploma Program), Xi'an Jiaotong University, China, 2003

APPOINTMENTS

Associate Professor, Department of Mechanical & Aerospace Engineering, The University of Alabama in Huntsville, 08/2024 – Present

Assistant Professor, Department of Mechanical & Aerospace Engineering, The University of Alabama in Huntsville, 08/2017 – 07/2024

Research Associate, Department of Mechanical & Nuclear Engineering, The Pennsylvania State University, University Park, PA, 08/2013 - 07/2017

AWARDS

[3] UAH COE Outstanding Faculty Award, 2024
[2] UAH COE Outstanding Junior Faculty Award, 2023
[1] NSF Faculty Early Career Development Program (CAREER) Award, 2023

TEACHING

[4] MAE 695-03, ST: Battery Fundamentals and Challenges (Graduate level), The University of Alabama in Huntsville, Spring 2026
[3] MAE 643, Advanced Heat & Mass Transfer (Graduate level), The University of Alabama in Huntsville, Spring 2022 - 2026
[2] MAE 450, Intro to Heat & Mass Transfer (Undergraduate level), The University of Alabama in Huntsville, Spring 2019 - Fall 2025
[1] MAE 341, Thermodynamics I (Undergraduate level), The University of Alabama in Huntsville: Fall 2017, Spring/Fall 2018, Fall 2021, Spring/Fall 2024, Fall 2025

RESEARCH PUBLICATIONS

Google Scholar Profile

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

Book Chapter

[BC2] B. Liaw, **G. Zhang**, Battery types – Lithium batteries – Lithium battery safety | Cell level - Safety related material and design engineering, ***Encyclopedia of Electrochemical***

Power Sources (2nd Edition). Editor: Jürgen Garche, Elsevier, 2025, vol.4, 688-700, https://doi.org/10.1016/B978-0-323-96022-9.00114-6.

[BC1] **G. Zhang**, C. E. Shaffer, X.G. Yang, C.Y. Wang, C. D. Rahn, *In Situ Measurement of Current Distribution in Large-format Li-ion Cells,* Chapter 2 in ***Computer Aided Engineering of Batteries*** (Modern Aspects of Electrochemistry book series). Edited by Shriram Santhanagopalan. Springer Nature Switzerland AG, 2023

Journal Papers (*supervised students)

[J41] S. Liu*, M. Liu*, M. K. Long*, N. Brugler*, M. Carter*, **G. Zhang**, and C.Y. Wang, Suppressing Internal Short Circuit Caused Thermal Runaway of Lithium-ion Batteries through Current Modulation, ***Journal of Power Sources***, 2025, 660, 238544

[J40] M. Carter*, P. Poudel*, T. Iriyama, B. Liaw, and **G. Zhang**. Effects of low-temperature pre-cycling on high-temperature cycle life of lithium-ion cells, ***Energy Mater. Devices***, 2025, 3(3), 9370078.

[J39] S. Liu*, S. Huang*, Q. Zhou, K. Snyder, M. K. Long*, and **G. Zhang**, Understanding the Evolution of Internal Short Circuit in Large-Format Li-Ion Cells through Simultaneous Measurement of Local Current, Resistance and Temperature, ***Journal of Power Sources,*** 2025, 647, 237344.

[J38] T. Iriyama*, M. Carter*, G.M. Cavalheiro*, P. Poudel*, G.J. Nelson, and **G. Zhang**, Effects of Non-Uniform Temperature Distribution on the Degradation of Liquid-Cooled Parallel-Connected Lithium-Ion Cells, ***Batteries,*** 2024, 10 (8), 274.

[J37] M. K. Long*, S. Liu*, and **G. Zhang**, A Novel Method for Simultaneous Triggering and In Situ Sensing of Internal Short Circuit in Lithium-ion Cells, ***Energy Advances***, 2023, 2: 2018-2028

[J36] S. Liu*, S. Huang*, Q. Zhou, K. Snyder, M. K. Long*, and **G. Zhang**, In Situ Measurement of Dynamic Internal Short Circuit Resistance during Nail Penetration of Lithium-Ion Cells and its Implications on Cell Robustness and Abuse Tolerance, ***Journal of The Electrochemical Society***, 2023, 170 (6): 060515.

[J35] S. Liu*, **G. Zhang,** and C.Y. Wang. Challenges and Innovations of Lithium-ion Battery Thermal Management under Extreme Conditions: A Review, ***ASME Journal of Heat and Mass Transfer***, 2023, **145** (8): 080801

[J34] P. Patel, **G. Zhang,** and G. J. Nelson. Assessing the Impact of Electrode Structure on the Fast Charge Performance of Lithium-ion Batteries, ***Journal of The Electrochemical Society***, 2023, ***170***, 010501

[J33] H. J. Gonzalez Malabet, G. M. Cavalheiro*, T. Iriyama*, A. Gabhart, G. J. Nelson, and **G. Zhang**. Electrochemical and Post-Mortem Degradation Analysis of Parallel-Connected Lithium-Ion Cells with Non-Uniform Temperature Distribution, ***Journal of The Electrochemical Society***, 2021, ***168***, 100507

[J32] S. Huang*, Z. Du, Q. Zhou, K. Snyder, S. Liu*, and **G. Zhang**. In Situ Measurement of Temperature Distributions in a Li-ion Cell during Internal Short Circuit and Thermal Runaway, ***Journal of The Electrochemical Society***, 2021, ***168***, 090510

[J31] S. Huang*, X. Du*, M. Richter*, J. Ford*, G. M. Cavalheiro*, Z. Du, R. T. White, and **G. Zhang**. Understanding Li-ion Cell Internal Short Circuit and Thermal Runaway through Small, Slow and In Situ Sensing Nail Penetration, ***Journal of The Electrochemical Society***, 2020, ***167***, 090526

[J30] G. M. Cavalheiro*, T. Iriyama*, G. J. Nelson, S. Huang*, and **G. Zhang**. Effects of Nonuniform Temperature Distribution on Degradation of Lithium-Ion Batteries. ***Journal of Electrochemical Energy Conversion and Storage***, 2020, 17(2), 021001

[J29] S. Huang*, X. Wu, G. M. Cavalheiro*, X. Du*, B. Liu, Z. Du, and **G. Zhang**. In situ measurement of lithium-ion cell internal temperatures during extreme fast charging,

Journal of The Electrochemical Society, 2019, 166: A3254-A3259

[J28] X.G. Yang, **G. Zhang,** S. Ge, C.Y. Wang. Fast charging of lithium-ion batteries at all temperatures, ***Proceedings of the National Academy of Sciences***, 2018, 115 (28): 7266–7271

[J27] **G. Zhang,** H. Tian, S. Ge, D. Marple, F. Sun, C.Y. Wang. Visualization of self-heating of an all climate battery by infrared thermography, ***Journal of Power Sources***, 2018, 376: 111-116

[J26] **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***, 2017, 371: 35-40

[J25] X.G. Yang, Y. Leng, **G. Zhang**, S. Ge, C.Y. Wang. Modeling of lithium plating induced aging of lithium-ion batteries: Transition from linear to nonlinear aging, ***Journal of Power Sources***, 2017, 360: 28-40

[J24] 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

[J23] **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

[J22] 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

[J21] 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

[J20] 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

[J19] **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

[J18] **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

[J17] **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

[J16] **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

[J15] **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

[J14] **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

[J13] 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

[J12] **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

[J11] 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

[J10] **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

[J9] 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

[J8] 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

[J7] 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

[J6] 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

[J5] 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

[J4] 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

[J3] 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

[J2] 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

[J1] 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 Abstracts/Presentations

[C51] **G. Zhang**. Challenges and Opportunities in Battery Safety for the Aerospace Sector, *AIAA SciTech Forum 2026*, January 12-16, Orlando, FL. **(Invited Panelist)**

[C50] S. Liu, M. Liu, and **G. Zhang**, *In Situ* Diagnosis and Mitigation of Internal Short Circuit Caused Battery Thermal Runaway, ***The 247th ECS Meeting***, May 18-22, 2025, Montréal, Canada. **(Invited)**

[C49] M. Carter and **G. Zhang**, Understanding the Mechanisms behind Enhanced Durability of Lithium-Ion Cells at Elevated Temperatures Due to Low-Temperature Pre-Cycling, ***The 247th ECS Meeting***, May 18-22, 2025, Montréal, Canada.

[C48] M. Liu, S. Liu, and **G. Zhang**, Effects of Internal Short Circuit Type in Li-Ion Battery Cells on the Risk of Thermal Runaway, ***The 247th ECS Meeting***, May 18-22, 2025, Montréal, Canada.

[C47] **G. Zhang**, S. Liu, M. Liu, M. Long, S. Huang, N. Brugler. Understanding Internal Short Circuit Caused Thermal Runaway of Li-Ion Cells Through *In Situ* Diagnosis, ***IMECE2024***, November 17–21, 2024, Portland, Oregon, USA. **(Invited)**

[C46] **G. Zhang**, S. Liu, N. Brugler, M. Liu, Understanding internal short circuit caused thermal runaway of Li-ion battery cells through in situ diagnosis, ACS Fall 2024, Denver, CO, August 18-22, 2024 **(Invited)**

[C45] S. Liu and **G. Zhang**, Understanding Internal Short Circuit and Thermal Runaway in Li-Ion Battery Cells through *In Situ* Diagnosis and Modeling, ***Cell Symposia***, May 20–22, 2024, Ann Arbor, MI, USA.

[C44] **G. Zhang**, Understanding Internal Short Circuit Caused Thermal Runaway of Li-ion Battery Cells through In Situ Diagnosis, ***ASTFE TFEC2024 Conference***, April 21-24, 2024, Corvallis, OR, USA.

[C43] S. Liu and **G. Zhang**, Modeling Analysis of Thermal Runaway Confinement during Nail Penetration of Segmented Li-Ion Cells, ***ASTFE TFEC2024 Conference***, April 21-24, 2024, Corvallis, OR, USA.

[C42] M. Carter, P. Poudel, Z. Du, T. Iriyama, B. Liaw, G. Zhang, Effects of Lithium Plating on High Temperature Degradation of Lithium-ion Cells, 2023 NASA Aerospace Battery Workshop, Huntsville, AL, November 14-16, 2023

[C41] **G. Zhang**, Understanding the Interplay between Thermal and Electrochemical Phenomena in Li-Ion Cells through in-Situ Diagnosis, 244th ECS Meeting, Gothenburg, Sweden, October 8-12, 2023 **(Invited)**

[C40] M. K. Long, S. Liu and **G. Zhang**, Understanding Internal Short Circuit Caused Thermal Runaway of Li-Ion Cells through in-Situ Diagnosis, Gothenburg, Sweden, October 8-12, 2023

[C39] S. Liu, and **G. Zhang**, Understanding Internal Short Circuit Caused Thermal Runaway of Li-ion Cells through In Situ Diagnosis, Clean Energy Forum, La Jolla, CA, 9/25-9/26, 2023

[C38] M. Carter, P. Poudel, M. Gober, B. Liaw, G. J. Nelson, and **G. Zhang**, Effects of Low-Temperature Pre-Cycling on High-Temperature Degradation of Lithium-Ion Cells, 243rd ECS Meeting, Boston, MA, 5/28-6/2, 2023

[C37] S. Liu, S. Huang, Q. Zhou, K. Snyder, M. K. Long and **G. Zhang**, Understanding Li-Ion Cell Internal Short Circuit during Nail Penetration By Simultaneous in Situ Measurement of Local Current, Resistance and Temperature, 242nd ECS Meeting, Atlanta, GA, 10/9-10/13, 2022

[C36] M. K. Long, S. Liu and **G. Zhang**, A New Method for Triggering Lithium-Ion Cell Internal Short Circuit (ISC) While Monitoring the ISC Current, 242nd ECS meeting, Atlanta, GA, October 9-13, 2022

[C35] S. Liu, S. Huang, M. K. Long, Q. Zhou, K. Snyder and **G. Zhang**, In Situ Measurement of Internal Short Circuit Resistance during Nail Penetration of Lithium-Ion Cells, ECS Meeting Abstracts 2022 Vol. MA2022-01 Issue 2 Page 173

[C34] T. Iriyama, G. M. Cavalheiro, S. Liu, P. Poudel and **G. Zhang**, Effects of Non-Uniform Temperature Distribution on the Degradation of Liquid-Cooled Lithium-Ion Cells, ECS Meeting Abstracts 2022 Vol. MA2022-01 Issue 2 Pages 442

[C33] P. Poudel, Z. Du, B. Liaw, T. Iriyama and **G. Zhang**, Protective Effects of Lithium Plating on High Temperature Degradation of Lithium-Ion Cells, ECS Meeting Abstracts 2022 Vol. MA2022-01 Issue 2 Page 443

[C32] S. Huang, Z. Du, Q. Zhou, K. Snyder, S. Liu, and **G. Zhang**. Understanding Li-Ion Cell Thermal Runaway through in Situ Measurement of Temperature Distribution, 239th ECS Meeting with the 18th International Meeting on Chemical Sensors (IMCS), Online May 30-June 3, 2021

[C31] S. Huang, and **G. Zhang**. Understanding Li-Ion Battery Thermal Runaway through Small, Slow and in Situ Sensing Nail Penetration, *ECS Meeting Abstracts*, Volume MA2020-01, A02: Lithium Ion Batteries and Beyond, 430

[C30] S. Huang, X. Wu, G. M. Cavalheiro, X. Du, B. Liu, Z. Du, and **G. Zhang**. Characterizing Li-Ion Battery Extreme Fast Charging through in Situ Measurement of Temperature Distributions, 236th ECS Meeting, October 13 - 17, 2019, Atlanta, GA **(Invited)**

[C29] S. Huang, and G. Zhang. In-situ Diagnosis of Li-Ion Battery Internal Short Circuit, ASME

InterPACK 2019 Conference, Anaheim, CA, Oct. 7-9, 2019

[C28] G. M. Cavalheiro, T. Iriyama, G. J. Nelson, S. Huang, and **G. Zhang**. Effects of Non-Uniform Temperature Distributions on Lithium- Ion Battery Degradation, ASME InterPACK 2019 Conference, Anaheim, CA, Oct. 7-9, 2019

[C27] S. Huang, X. Du, G. M. Cavalheiro, M. Richter, T. Iriyama, **G. Zhang**. Single-Layer Nail Penetration for Lithium-Ion Battery Safety Characterization, 235th ECS Meeting, May 26 - 30, 2019, Dallas, TX

[C26] S. Huang, X. Du, G. M. Cavalheiro, M. Richter, T. Iriyama, **G. Zhang**. Characterizing Lithium-ion Battery Internal Short Circuit with Slow-penetrating Micro Sensing Nails, *2018 NASA Aerospace Battery Workshop*, Huntsville, AL, November 27- 29, 2018

[C25] S. Huang, X. Du, G. M. Cavalheiro, M. Richter, T. Iriyama, **G. Zhang**. In Situ Measurement of Temperatures in Li-ion Cells under Extreme Conditions, *Americas International Meeting on Electrochemistry and Solid State Science (AiMES 2018)*, September 30 - October 4, 2018, Cancun, Mexico (**Invited**)

[C24] **G. Zhang,** Effects of Non-Uniform Temperature Distribution on Degradation of Lithium-Ion Cells, *233rd ECS Meeting*, Seattle, WA, May 13-17, 2018

[C23] **G. Zhang,** Internal temperature sensing and thermal management of large-format Li-ion cells, *2017 NASA Aerospace Battery Workshop*, Huntsville, AL, November 14-16, 2017

[C22] **G. Zhang,** S. Ge, Y. Leng, X. G. Yang, D. Marple, C. Y. Wang. Robust internal temperature sensing of large-format Li-ion cells, *231st ECS Meeting,* New Orleans, LA, USA, May 28-June 1, 2017 (**Invited**)

[C21] **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

[C20] 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

[C19] **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

[C18] **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

[C17] C. Y. Wang, **G. Zhang,** C. E. Shaffer and Puneet K. Sinha. Delivering 10x improvement in Li-ion battery power and energy at -30 ^{o}C through active control, *MRS Spring Meeting & Exhibit*, San Francisco, USA, Apr. 21-25, 2014

[C16] **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

[C15] 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

[C14] **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

[C13] 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

[C12] **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

[C11] 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 (**Plenary**)

[C10] 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

[C9] 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

[C8] **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

[C7] **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

[C6] **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

[C5] 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

[C4] 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

[C3] 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

[C2] 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

[C1] **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

OTHER INVITED PRESENTATIONS

[P12] Understanding Internal Short Circuit and Thermal Runaway of Lithium-ion Cells through *In Situ* Diagnosis, 2024 BATTERY SAFETY WORKSHOP, University of South Carolina, August 5-6, 2024

[P11] Understanding Internal Short Circuit and Thermal Runaway of Lithium-ion Cells through *In Situ* Diagnosis, 2023 BATTERY SAFETY WORKSHOP, UNC CHARLOTTE, June 8-9, 2023

[P10] (Panel discussion) Understanding Li-Ion Cell Internal Short Circuit during Nail Penetration By Simultaneous in Situ Measurement of Local Current, Resistance and Temperature, Consortium for Battery Innovation webinar, 'The Big Short Challenge 2022', Automotive Lead Battery Advancements (ALBA) Workshop Special, 1/24, 2023

[P09] Understanding Lithium-ion Battery Thermal Runaway through Field-Failure-Relevant In Situ Diagnosis, *NSF CBET Energy Storage Workshop: Frontiers of Materials, Architectures and Techniques*, Austin, TX, August 13-14, 2020

[P08] (Panel discussion) Future of Energy - Preparing for Distributed Energy Resources, *APA-*

AL/MS Annual Conference, Huntsville, AL, October 18, 2019

[P07] Kindling fires in batteries and minds, *TEDxHuntsville*, Huntsville, AL, September 22, 2019

[P06] In Situ Temperature Sensing and Thermal Management of Lithium-ion Battery Cells, *UAH Department of Physics*, Huntsville, AL, October 23, 2018

[P05] Internal Temperature Sensing and Thermal Management of Large-format Li-ion Battery Cells, *CFD Research Corporation*, Huntsville, AL, June 1, 2018

[P04] Internal temperature sensing and thermal management of large-format Li-ion cells, *Engineering Advisory Board Meeting*, University of Alabama in Huntsville, March 2, 2018

[P03] (Panel discussion) Methods to improve Li-ion battery performance, *2017 IEEE International Conference on Prognostics and Health Management*, Dallas, TX, USA, June 19-21, 2017

[P02] Internal temperature sensing and thermal management of large-format Li-ion battery cells, *Oak Ridge National Laboratory*, Oak Ridge, TN, October 23, 2017

[P01] Lithium-ion batteries for aerospace applications, University of Alabama in Huntsville, *UAH Student Section of the American Institute of Aeronautics and Astronautics (AIAA)*, October 11, 2017

PATENTS

[PT2] Inventor: **G. Zhang**. Systems and Methods for Storing and Transporting Batteries. 11888131, filed on March 3, 2021, Granted on January 30, 2024

[PT1] Inventors： L.J. Guo, H. Sun, H.T. Liu, **G. Zhang.** A gasket for in situ measurement of current density distribution in fuel cells, CN100365424C, Granted on 1/30/2008

THESIS/DISSERTATION ADVISING

[8] **Madelin Liu**. *In Situ Diagnosis of Internal Short Circuit Caused Thermal Runaway,* MS, Department of Mechanical and Aerospace Engineering, University of Alabama in Huntsville, June, 2025

[7] **Siyi Liu**. *Understanding the Behaviors of Internal Short Circuit and Thermal Runaway of Li-Ion Batteries through In Situ Diagnosis and Modeling,* PhD, Department of Mechanical and Aerospace Engineering, University of Alabama in Huntsville, March, 2025

[6] **Muriel Carter**. *The Effects of Low-Temperature Pre-Cycling on High-Temperature Degradation of Lithium-Ion Cells,* MS, Department of Mechanical and Aerospace Engineering, University of Alabama in Huntsville, June, 2024.

[5] **Mary K. Long**. *A Novel Method for Triggering and In Situ Sensing of Internal Short Circuit in Lithium-ion Cells,* BS (Honors Thesis), Department of Mechanical and Aerospace Engineering, University of Alabama in Huntsville, May, 2023.

[4] **Takuto Iriyama**. *Effects of Non-Uniform Internal Temperature Distribution on The Degradation of Liquid-Cooled Parallel-Connected Lithium-ion Cells,* MS, Department of Mechanical and Aerospace Engineering, University of Alabama in Huntsville, 2021.

[3] **Pragati Poudel**. *Enhancing the Durability of Lithium-Ion Cells at High Temperatures by Inducing Lithium Plating*, MS, Department of Mechanical and Aerospace Engineering, University of Alabama in Huntsville, 2021.

[2] **Shan Huang**. *Understanding Failure Mechanisms of Li-Ion Battery During Internal Short Circuit and Thermal Runaway Through In Situ Diagnosis*, MS, Department of Mechanical and Aerospace Engineering, University of Alabama in Huntsville, 2021.

[1] **Gabriel M. Cavalheiro**. Effects of Non-Uniform Temperature Distribution on Degradation of Lithium-Ion Batteries, MS, Department of Mechanical and Aerospace Engineering, University of Alabama in Huntsville, 2019.

RESERACH FUNDING

External:

[4] CAREER: Understanding Spontaneous Internal Short Circuit Caused Thermal Runaway of Lithium-ion Batteries through In Situ Diagnosis, National Science Foundation; **PI: G. Zhang**; Duration: 05/2023 – 04/2028; Amount: $598,181.

[3] Lithium-Ion Battery Recycling Prize, Phase I: Battery Self Cooling for Safe Recycling, Department of Energy; **PI: G. Zhang**; Duration: 10/2019 – 12/2020; Amount: $67,000.

[2] University Research Program (URP): In Situ Safety Characterization of Li-ion Batteries for Electric Vehicles, Ford Motors; **University PI: G. Zhang**, Ford PI: Z. Zhou, Ford Co-PI: K. Snyder; Duration: 07/2019 - 06/2022; Amount: $150,000.

[1] Marsbee - Swarm of Flapping Wing Flyers for Enhanced Mars Exploration, National Aeronautics and Space Administration; PI: Dr. Chang-kwon Kang, **co-I**: F. Fahimi, R. Griffin, D. Landrum, B. Mesmer, **G. Zhang**; T. Lee; Dr. H. Aono; Duration: 05/2018 - 02/2019; Amount: $124,999.

Internal:

[8] UAH College of Engineering Undergraduate Research Program: On-demand Triggering and In Situ Diagnosis of Internal Short Circuit in Large-format Li-ion Cells, **PI: G. Zhang**, Student: Mary Long. Duration: 2022 Fall – 2023 Spring; Amount: $2,500.

[7] UAH Honors College Honors Capstone Research Summer Program: Characterization of Li-ion battery internal short circuit caused failures using smart nails, **PI: G. Zhang**, Student: Mary Long. Duration: Summer 2022; Amount: $3,750.

[6] UAH College of Engineering Undergraduate Research Program: A Smart Nail for in situ Diagnosis of Local Voltage and Local Temperature during Internal Short Circuit of Li-Ion Battery Cells, **PI: G. Zhang**, Student: Mary Long. Duration: 2021 Fall – 2022 Spring; Amount: $2,000.

[5] UAH Research and Creative Experience for Undergraduates Program (RCEU) Summer 2021: Smart Nails for Lithium-ion Battery Internal Short Circuit and Thermal Runaway Characterization, **PI: G. Zhang**, Student: Mary Long. Duration: Summer 2021; Amount: $3,750.

[4] UAH College of Engineering Undergraduate Research Program: A Slow Nail Penetration Apparatus for Battery Safety Characterization, **PI: G. Zhang**, Student: Noah Clanton. Duration: 2020; Amount: $2,000.

[3] UAH Honors College Honors Capstone Research Summer Program: Quantitative Characterization of Lithium-ion Batteries under Abuse Conditions, **PI: G. Zhang**; Student: Xiaoniu Du. Duration: Summer 2018; Amount: $3,000.

[2] UAH College of Engineering Undergraduate Research Program: Smart Batteries with Embedded Wireless Sensors, **PI: G. Zhang**, Student: Xiaoniu Du. Duration: 2018; Amount: $1,000.

[1] UAH New Faculty Research Program Award, Effects of Temperature Distribution on Degradation of Large-format Li-ion Battery Cell, **PI: G. Zhang**, Duration: 11/2017 – 5/2019; Amount: $10,000.

PROFESSIONAL SERVICE

Conference Organization

- Session Chair, *Symposium on Battery Characterization and Diagnosis, 247th ECS Meeting*, May 18-22, 2025, Montréal, Canada.
- Session Chair, *Symposium on Interplay between Temperature and Battery Phenomenon 2, 247th ECS Meeting*, May 18-22, 2025, Montréal, Canada.

- Lead Track Organizer, *Energy Conversion and Storage Track*, *ASME InterPACK 2019 Conference*, Anaheim, CA, Oct. 7-9, 2019
- Co-Organizer and Session Chair, *Battery Safety and Failure Modes Symposium, 235th ECS Meeting*, Dallas, TX, May 26-31, 2019
- Session Chair, *ASME InterPACK 2018 Conference*, San Francisco, CA, Aug. 27-30, 2018
- Session Chair, *AiMES 2018 (ECS and SMEQ Joint International Meeting)*, Cancun, Mexico, Sep 30 - Oct 4, 2018
- Co-Organizer and Session Chair, *Battery Safety Symposium, 231st ECS Meeting*, New Orleans, LA, May 28-June 2, 2017

Guest Editor

- ASME Journal of Electronic Packaging (Special Issue InterPACK 2019)
- ECS Transactions (*235th ECS Meeting* A06 symposium, "Battery Safety and Failure Modes", Dallas, TX, May 26-31, 2019)

Proposal Reviewer

- Canada Foundation for Innovation (CFI)
- DOE
- Natural Sciences and Engineering Research Council of Canada
- NSF

Journal Reviewer (representative)

- ASME Journal of Electrochemical Energy Conversion and Storage
- Chemical Engineering Journal
- Energy & Environmental Science
- International Journal of Heat and Mass Transfer
- Joule
- Journal of Power Sources
- Journal of The Electrochemical Society
- Journal of Energy Storage
- Nature Communications
- Progress in Energy and Combustion Science
- Renewable & Sustainable Energy Reviews

PROFESSIONAL SOCIETY MEMBERSHIP

- American Society of Mechanical Engineers (ASME), 2011 - Present
- International Society of Electrochemistry (ISE), 2014 - Present
- The Electrochemical Society (ECS), 2006 - Present