

SIRIVATCH SHIMPALEE

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Chemical Engineering Department
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EDUCATION:

- 1998 - 2001 Ph.D., Mechanical Engineering "*Numerical Prediction of Gas-Humidification effects on Energy Transfer in PEM Fuel Cells*".
University of South Carolina, Columbia, SC.
Advisors: S. Dutta and J.W. Van Zee
- 1996 - 1997 M.S., Mechanical Engineering "*Finite Element Analysis of Heating a Non-mixed Liquid with a Non-uniform Solar Flux through Semi-transparent Medium*".
Bradley University, Peoria, IL.
Advisor: Y.B. Safdari
- 1988 - 1992 B.S., Mechanical Engineering
Chiang Mai University, Chiang Mai, Thailand.

PROFESSIONAL EXPERIENCE:

- 08/15 – Present Research Professor
*Department of Chemical Engineering,
University of South Carolina, Columbia, SC.*
- 01/09 – 08/15 Research Associate Professor
*Department of Chemical Engineering,
University of South Carolina, Columbia, SC.*
- 10/05 – 12/14 *Co-founder, Palmetto Fuel Cell Analysis & Design, LLC*
- 05/02 – 12/08 Research Assistant Professor
*Department of Chemical Engineering,
University of South Carolina, Columbia, SC.*
- 01/01 – 05/02 Postdoctoral Research Associate
*Department of Chemical Engineering,
University of South Carolina, Columbia, SC.*
- 3/92 - 3/95 Technical Service Engineer, Service Department.
*Siam-Hitachi Construction Machinery Co., Ltd.,
Bangkok, Thailand.*

PROFESSIONAL MEMBERS :

1. Executive member and Energy team leader of Association of Thai Professional in America and Canada (ATPAC)
2. The Electrochemical Society

AWARDS :

3. Outstanding Alumni Award, Chiang Mai University Engineering Alumni Association, November 18, 2017.
2. Outstanding Service Award, Association of Thai Professionals in America and Canada, August 10, 2015.
1. Crystal Flame Innovation Award in Entrepreneurship, The FuelCellSouth 2004, March 16, 2004, Columbia, SC. USA.

PUBLICATIONS IN REFEREED JOURNALS :

50. D-W Choi, M. Ohashi, C. A. Lozano, J. W. Van Zee . P. Aungkavattana. **S. Shimpalee**, "Sulfur Diffusion of Hydrogen Sulfide Contaminants to Cathode in a Micro-tubular Solid Oxide Fuel Cell," *in press Electrochimica Acta*, 2019. (*Corresponding author*)
49. **S. Shimpalee**, P. Satjaritanun, S. Hirano, N. Tippayawong, J.W. Weidner, "Multiscale Modeling of PEMFC Using Co-Simulation Approach," *J. of Electrochem. Soc.*, 166(8), F534-F543, 2019. (*Corresponding author*)
48. P. Satjaritanun, S. Hirano, A. D. Shum, I. V. Zenyuk, A. Z. Weber, J. W. Weidner, and **S. Shimpalee**, "Fundamental Understanding of Water Movement in Gas Diffusion Layer under Different Arrangements using Combination of Direct Modeling and Experimental Visualization," *J. of Electrochem. Soc.*, 165(13), F1115-F1126, 2018. (*Corresponding author*)
47. A. L. Martin, P. Satjaritanun, **S. Shimpalee**, B. A. Devivo, J. W. Weidner, S. Greenway, M. Henson; C. Turick, "*In-situ* Electrochemical Analysis of Microbial Activity," *AMB Express*, 8, 162, 1-10, 2018.
46. **S. Shimpalee**, V. Lilavivat, H. Xu, J. R. Rowlett, C. Mittelsteadt, and J. W. Van Zee, "The Effect of Membrane Properties on Performance and Transports inside Polymer Electrolyte Membrane Fuel Cells," *J. of Electrochem. Soc.* 165 (11), F1019-F1026, 2018. (*Corresponding author*)
45. P. Satjaritanun, E. Bringley, J.R. Regalbuto, J.A. Regalbuto, J. Register, J.W. Weidner, Y. Khunatorn, and **S. Shimpalee**, "Experimental and Computational Investigation of Mixing with Contra-Rotating, Baffle-Free Impellers," *J. of Chemical Engineering Research and Design*, 130, 63-77, 2018. (*Corresponding author*)
44. C. Corgnale, **S. Shimpalee**, M.B. Gorenssek, P. Satjaritanun, J. W. Weidner, W. A. Summers, "Numerical Modeling of a Bayonet Heat Exchanger-based Reactor for Sulfuric Acid Decomposition in Thermo-Electrochemical Hydrogen Production Processes," *Intl. J. of Hydrogen Energy*, 42 (32), 20463-20472, 2017.
43. J.R. Rowlett, V. Lilavivat, A.S. Shaver, Y. Chen, A. Daryaei, H. Xu, C. Mittelsteadt, **S. Shimpalee**, J.S. Riffle, J. E. McGrath, "Multiblock Poly(arylene ether nitrile) Disulfonated Poly(arylene ether sulfone) Copolymers for Proton Exchange Membranes: Part 2 Electrochemical and H₂/Air Fuel Cell Analysis," *Polymer*, 122, 296-302, 2017.
42. K. Wuttikid, **S. Shimpalee**, J.W. Weidner, K. Punyawudho, "Evaluation of Nafion with various Pt-C concentrations in membrane electrode assemblies for PEMFCs," *Fuel Cells from Fundamentals to Systems*, 17(5), 643-651, 2017.
41. P. Satjaritanun, J. W. Weidner, S. Hirano, Z. Lu, Y. Khunatorn, S. Ogawa, S. Litster, A. D. Shum, I. V. Zenyuk, **S. Shimpalee**, "Micro-scale Analysis of Liquid Water Breakthrough inside Gas Diffusion Layer for PEMFC using X-ray Computed Tomography and Lattice Boltzmann Method," *J. of Electrochem. Soc.*, 164(11), E3359-E3371, 2017. (*Corresponding author*)

40. **S. Shimpalee**, S. Hirano, M. DeBolt, V. Lilavivat, J.W.Weidner, Y. Khunatorn, "Macro-scale Analysis of Large Scale PEM Fuel Cell Flow-Fields for Automotive Applications," J. of Electrochem. Soc., 164(11), E3073-E3080, 2017. *(Corresponding author)*
39. B. Tavakoli, J. W. Weidner, B. Garcia-Diaz, M. Martinez-Rodriguez, L. Olson, **S. Shimpalee**, "Modeling the Effect of Cathodic Protection on Superalloys inside High Temperature Molten Salt Systems," J. of Electrochem. Soc., 164 (7), C171-C179, 2017. *(Corresponding author)*
38. **S. Shimpalee**, V. Lilavivat, H. Xu, C. K. Mittlesteadt, Y. Khunatorn, "Experimental Investigation and Numerical Determination of Custom Gas Diffusion Layers on PEMFC Performance," Electrochimica Acta, 222,1210-1219, 2016. *(Corresponding author)*
37. B. Tavakoli, J. W. Weidner, B. Garcia-Diaz, M. Martinez-Rodriguez, L. Olson, **S. Shimpalee**, "Multidimensional Modeling of Nickel Alloy Corrosion inside High Temperature Molten Salt Systems," J. of Electrochem. Soc., 163(4), C830-C838, 2016. *(Corresponding author)*
36. H. Garich, **S. Shimpalee**, V. Lilavivat, S. Snyder, EJ. Taylor, "Non-Traditional Cell Geometry for Improved Copper Plating Uniformity," J. of Electrochem. Soc., 163(8), E216-E222, 2016.
35. **S. Shimpalee**, V. Lilavivat, H. McCrabb, J.W. Weidner, Y. Khunatorn, H-K. Lee, and W-K. Lee, "Investigation of Bipolar Plate Materials for Proton Exchange Membrane Fuel Cells," Intl. Journal of Hydrogen Energy, 41, 13688-13696, 2016. *(Corresponding author)*
34. **S. Shimpalee** and V. Lilavivat," Study of Water Droplet Removal on Etched-Metal Surfaces for Proton Exchange Membrane Fuel Cell Flow Channel," ASME-Journal of Electrochemical Energy Conversion and Storage, 13, 011003-1 – 011003-7, 2016. *(Corresponding author)*
33. P. Satjaritanun, **S. Shimpalee**, Y. Khunatorn, E. Bringley, N. Vorayos, "Numerical Analysis of the Mixing Characteristic for Napier Grass in the Continuous Stirring Tank Reactor for Biogas Production," Biomass and Bioenergy, 86, 53-64, 2016. *(Corresponding author)*
32. H-S. Cho, J.W. Van Zee, **S. Shimpalee**, B. Tavakoli, J.W. Weidner, B. Garcia-Diaz, M. Martinez-Rodriguez, L. Olson, J. Gray, "Dimensionless Analysis for Predicting Fe-Ni-Cr Alloy Corrosion in Molten Salt System for Concentrated Solar Power Systems," CORROSION, 72(6), 742-760, 2016.
31. J. Shim, K.J. Lopez, H-J. Sun, G. Park, J-C. An, S. Eom, **S. Shimpalee**, J.W. Weidner, "Preparation and Characterization of Electrospun LaCoO₃ Fibers for Oxygen Reduction and Evolution in Rechargeable Zn-air Batteries," J. Appl Electrochem, 45, 1005-1012, 2015.
30. V. Lilavivat, **S. Shimpalee**, J.W. Van Zee, H. Xu, and C.K. Mittlesteadt, "Current Distribution Mapping for PEMFC," Electrochimica Acta,174,1253–1260, 2015. *(Corresponding author)*
29. K. Punyawudho, N. Vorayos, Y. Zhang, **S. Shimpalee**, and J. R. Monnier, "Identification and quantification of performance losses for PEM fuel cells as determined by selective chemisorption and ESA measurements," Int. J. of Hydrogen Energy, 2014, 39 (21),11110–11119, 2014.
28. **S. Shimpalee**, "Dynamic Simulation of Large Scale PEM Fuel Cell under Driving Cycle," J. of Electrochem. Soc, 161(8), E3138-E3148, 2014.
27. M. Martinez, **S. Shimpalee**, T. Cui, B. Duong, S. Seraphin, J.W. Van Zee, "Effect of microporous layer on MacMullin number of carbon paper gas diffusion layer," J. of Power Sources, 207, 91-100, 2012. *(Corresponding author)*
26. C. Andres Lozano, M. Ohashi, **S. Shimpalee**, P. Aungkavattana, J.W. Van Zee, "Comparison of hydrogen and methane as fuel in micro-tubular SOFC using electrochemical analysis," J. of Electrochem. Soc., 158 (10), B1235-1245, 2011. *(Corresponding author)*
25. J. Farmer, M. Martinez, **S. Shimpalee**, B. Duong, S. Seraphin, J.W. Van Zee, "Assessing porosity of PEM fuel cell gas diffusion layers by SEM image analysis," J. of Power Sources, 197C, 1-11, 2011.
24. **S. Shimpalee**, V. Lilavivat, H. McCrabb, A. Lozano-Morales, J.W. Van Zee, "Understanding the effect of channel tolerances on performance of PEMFCs," Intl. J. of Hydrogen Energy, 36/19, 12512-12523, 2011. *(First and Corresponding author)*
23. T. Gu, **S. Shimpalee**, C-Y. Chen, C-W. Lin, J. W. Van Zee, "A study of water adsorption and desorption by a PBI-H₃PO₄ membrane electrode assembly," J. of Power Sources, 195/24, 8194-8197, 2010. *(Corresponding author)*
22. M. Venkatraman, **S. Shimpalee**, C. Extrand, S. Moon, J. W. Van Zee, "Estimates of pressure gradients in PEMFC gas channels due to blockage by static liquid drops," Intl J. of Hydrogen Energy, 34, 5522-5528, 2009. *(Corresponding author)*

21. **S. Shimpalee**, M. Ohashi, C. Ziegler, C. Sadeler, C. Stoeckmann, C. Hebling and J. W. Van Zee, "Experimental and numerical studies of portable PEMFC stack," *Electrochimica Acta*, 54, 2899-2911, 2009. (*First and Corresponding author*)
20. M. Martinez, **S. Shimpalee**, and J. W. Van Zee, "Assessing methods and data for pore size distribution of PEM fuel cell gas diffusion media," *J. of Electrochem. Soc.*, 156/5, B558-B564, 2009.
19. M. Martinez, **S. Shimpalee**, and J. W. Van Zee, "Measurement of MacMullin numbers for PEMFC gas diffusion media," *J. of Electrochem. Soc.*, 156/1, B80-B85, 2009.
18. M. Venkatraman, **S. Shimpalee**, and J. W. Van Zee, "Effect of Net Geometry on the Nusselt Number Distribution for Channel Flow," *Numerical Heat transfer Part A: Applications*, 55, 309-336, 2009.
17. M. Martinez, **S. Shimpalee**, and J. W. Van Zee, "Comparison predictions of PEM fuel Cell behavior using Maxwell-Stefan and CFD approximation equations" *Computer and Chemical Engineering*, 32, 2958-2965, 2008.
16. D-h. Jeon, S. Greenway, **S. Shimpalee**, and J. W. Van Zee, "The effect of serpentine flow-field designs on PEM fuel cells performance," *Intl. J. of Hydrogen Energy*, 33, 1052-1066, 2008. (*Corresponding author*)
15. **S. Shimpalee**, U. Beuscher, J. W. Van Zee, "Analysis of GDL flooding effects on PEMFC performance," *Electrochimica Acta*, 52/24, 6748-6754, 2007. (*First and Corresponding author*)
14. **S. Shimpalee**, D. Spuckler, J. W. Van Zee, "Prediction of transient response for a 25-cm² PEM fuel cell," *J. of Power Sources*, 167/1, 130-138, 2007. (*First and Corresponding author*)
13. **S. Shimpalee** and J. W. Van Zee, "Numerical study on rib/channel dimension of flow-field on PEMFC performance," *Int. J. of Hydrogen Energy*, 32/7, 842-856, 2007. (*First and Corresponding author*)
12. **S. Shimpalee**, U. Beuscher, and J. W. Van Zee, "Investigation of Gas Diffusion Media inside PEMFC Using CFD Modeling," *J. of Power Sources*, 163, 480-489, 2006. (*First and Corresponding author*)
11. **S. Shimpalee**, S. Greenway, and J. W. Van Zee, "The Impact of Channel Path Length on PEMFC Flow-field Design", *J. of Power Sources*, 160, 398-406, 2006. (*First and Corresponding author*)
10. **S. Shimpalee**, W-k. Lee, J. W. Van Zee, and H. Naseri-Neshat, "Predicting the Transient Response of a Serpentine Flow-field PEMFC. II: Normal to Minimal Fuel and Air", *J. of Power Sources*, 156, 369-374, 2006. (*First and Corresponding author*)
9. **S. Shimpalee**, W-k. Lee, J. W. Van Zee, and H. Naseri-Neshat, "Predicting the Transient Response of a Serpentine Flow-field PEMFC. I: Excess to Normal Fuel and Air", *J. of Power Sources*, 156, 355-368, 2006. (*First and Corresponding author*)
8. S-h. Kim, **S. Shimpalee**, and J. W. Van Zee, "Effect of Channel Length and Voltage Change Rate and Range on Second Order Dynamic Behavior." *J. of Electrochem. Soc.* 152(6), A1265-A1271, 2005.
7. S-h. Kim, **S. Shimpalee**, and J. W. Van Zee, "Effect of Reservoirs and Fuel Dilution on 7. Dynamic Behavior of Proton Exchange Membrane Fuel Cells (PEMFC)." *J. of Power Source*, 137, 43 - 52, 2004.
6. S-h. Kim, **S. Shimpalee**, and J. W. Van Zee, "Effect of Stoichiometry on Dynamic Behavior of Proton Exchange Membrane Fuel Cells (PEMFC) During Load Change." *J. of Power Source*, 135, 110 – 121, 2004.
5. **S. Shimpalee**, S. Greenway, D. Spuckler, and J. W. Van Zee, "Predicting Water and Current Distributions of a Commercial Size PEMFC." *J. of Power Source*, 135, 79 – 87, 2004. (*First and Corresponding author*)
4. W-k. Lee, **S. Shimpalee**, and J. W. Van Zee. "Verifying Prediction of Water and Current Distribution in a Serpentine Flow Field PEMFC," *J. of Electrochemical Society*, 150(3), pp. A341-A348 (2003).
3. S. Dutta, **S. Shimpalee**, and J. W. Van Zee. "Numerical Prediction of Mass-exchange between Cathode and Anode Channels in a PEM Fuel Cell," *International Journal of Heat and Mass Transfer*, 44. 2029 - 2042, 2001.
2. **S. Shimpalee** and S. Dutta. "Numerical Prediction of Temperature Distribution in PEM Fuel Cells," *Numerical Heat Transfer, Part A*, 38: 111-128, 2000. (*First author*)

1. S. Dutta, **S. Shimpalee**, and J. W. Van Zee. "Three-dimensional Numerical Simulation of Straight Channel PEM Fuel Cells," Journal of Applied Electrochemistry, 30, 135-146, 2000.

PUBLICATIONS IN CONFERENCE PROCEEDINGS:

35. P. Satjaritanun, **S. Shimpalee**, J.W. Weidner, S. Hirano, Z. Lu, A. Shum, I.V. Zenyuk, S. Ogawa, S. Litster, "Numerical Prediction of Liquid Water Transport inside Gas Diffusion Layer for PEMFC Using Lattice Boltzmann Method," ECS Transactions, 80 (8) 187-195 (2017).
34. P. Satjaritanun, E. Bringley, **S. Shimpalee**, J. W. Weidner, J. A. Regalbuto, J. R. Regalbuto, "Lower Torque and Higher Efficiency Mixing with Contra-Rotating, Baffle-Free Impellers," AIChE Transcation, 2017 Spring Meeting & 12th Global Congress on Process Safety (2017).
33. C. Corgnale, **S. Shimpalee**, M. Gorenssek, J.W. Weidner, W. Summers, "Modeling of a Bayonet Reactor for Sulfuric Acid Decomposition in Thermo-Electrochemical Sulfur Based Hydrogen Production Processes," ECS Transactions, 75(43), 7-15 (2017). (*refereed*)
32. B. Tavakoli, **S. Shimpalee**, J. W. Weidner, B. Garcia-Diaz, M. Martinez-Rodriguez, L. Olson, "The Effect of Nickel Alloy Corrosion Under Cathodic Protection Inside High Temperature Molten Salt Systems," ECS Transactions, 72 (17) 151-162 (2016). (*refereed*)
31. **S. Shimpalee**, V. Lilavivat, S. Hirano, B. Pence, D. Wilkosz, and M. DeBolt, "Multi-scale Analysis for Automotive Fuel Cell System: Macro-scale analysis," ECS Trans 64/3, 639-654, 2014. (*refereed*)
30. C. Mittelsteadt, P. Cortes, V. Lilavivat, **S. Shimpalee**, and J. W. Van Zee, "Novel Current Distribution Board for PEM Devices," ECS Trans.41/1, 549-559, 2011. (*refereed*)
29. C. Lozano, M. Ohashi, **S. Shimpalee**, P. Aungkavattana, and J. W. Van Zee, "Electrochemical Analysis of Microtubular SOFC under Fuel Contaminants," ECS Trans.33/40, 149-160, 2011. (*refereed*)
28. J. Ippolito and **S. Shimpalee**, "Electron Transport Modeling for a Portable PEMFC Stack Using Star-CD Analysis and Modeling," ECS Trans.30/1, 195-205, 2011. (*refereed*)
27. H. Garich, L. Gebhart, S. Snyder, E. J. Taylor, **S. Shimpalee**, and J. W. Van Zee. "Alternating Flow Patterns for Copper Plating Uniformity," ECS Trans.28/16, 11-16, 2010. (*refereed*)
26. Md. Opu, D-w. Choi, M. Ohashi, **S. Shimpalee**, and J. W. Van Zee, "Understanding Differences in the Performance of Laboratory Scale PEMFCs: I. The Effect of Active-Area," ECS Trans.33/1, 1017-1025, 2010. (*refereed*)
25. V. Lilavivat, S. Shimpalee, H. McCrabb, A. Lozano-Morales, and J. W. Van Zee, "Fundamental Analyses, Observations, and Predictions of Liquid Droplet Movement on Etched-Metal Surfaces for PEMFC Flow Fields," ECS Trans.33/1, 973-978, 2010. (*refereed*)
24. M. Martinez, **S. Shimpalee**, T. Cui, and J. W. Van Zee, "Characterization of Microporous Layer in Carbon Paper GDL for PEM Fuel Cell," ECS Trans.33/1, 1133-1141, 2010. (*refereed*)
23. H. McCrabb, E. Jennings Taylor, A. Lozano-Morales, **S. Shimpalee**, M. Inman, and J. W. Van Zee, "Through-Mask Electroetching for Fabrication of Metal Bipolar Plate Gas Flow Field Channels," ECS Trans.33/1, 991-1006, 2010. (*refereed*)
22. M. Martinez, **S. Shimpalee**, T. Cui, M. Ohashi, and J. W. Van Zee, "Characterization of GDL for Water Transport in PEMFC Cathode Water and Thermal Management," ECS Trans.25/1, 357-367, 2009. (*refereed*)
21. **S. Shimpalee**, T. Gu, and J. W. Van Zee, "The Study of Water Adsorption and Desorption by a PBI Membrane and its Impact on H3PO4 Transport," ECS Transactions, 16/2, 2171-2179, 2008. (*refereed*)
20. **S. Shimpalee**, M. Martinez, and J. W. Van Zee, " Investigation of GDL's Pore Size Distribution Effects on PEMFC Performance under Different Operating Conditions," Abstract # FCS-TS1-2, The 2nd Annual Korea-USA Joint Symposium on Hydrogen & Fuel Cell Technologies, May 3 – 4, 2007, Columbia, SC., USA.

19. **S. Shimpalee**, M. Martinez, and J. W. Van Zee, "Water Phase Distribution in the Gas Diffusion Layer along a Serpentine Flow Field of a PEMFC," Abstract # 460, 210 Meeting of The Electrochemical Society, October 29 – November 03, 2006, Cancun, Mexico. (*refereed*)
18. M. Martinez, **S. Shimpalee**, and J. W. Van Zee, "Simple Model for the Water Phase Distribution in the Gas Diffusion Layer of a PEMFC Cathode," Abstract # 475, 210 Meeting of The Electrochemical Society, October 29 – November 03, 2006, Cancun, Mexico. (*refereed*)
17. M. Venkatraman, **S. Shimpalee**, and J. W. Van Zee, "Effect of Net Geometry on Limiting Current Density Distribution in a Parallel Plate Channel," Abstract # 379, 210 Meeting of The Electrochemical Society, October 29 – November 03, 2006, Cancun, Mexico. (*refereed*)
16. **S. Shimpalee**, "Using CFD to Understand the Effect of GDL Characteristics on PEMFC Performance," Abstract # 3-2, The 1st Annual Korea-USA Joint Symposium on Hydrogen & Fuel Cell Technologies, May 24 – 26, 2006, Daejeon, KOREA.
15. **S. Shimpalee** and J. W. Van Zee, "Studies on Rib and Channel Characteristic of Flow Field on PEMFC Performance," Proceeding Volume, 208 Meeting of the Electrochemical Society, October 16 – 21, 2005, Los Angeles, CA. (*refereed*)
14. S. Greenway, **S. Shimpalee**, W-k. Lee, Y. Goo, S. Jeoung, S. Yoo, and J. W. Van Zee, "The Effect of Dissimilar Anode/Cathode Flow Field Designs in PEM Fuel Cells," Proceeding Volume, 208 Meeting of the Electrochemical Society, October 16 – 21, 2005, Los Angeles, CA. (*refereed*)
13. M. Martinez, **S. Shimpalee**, and J. W. Van Zee, "Comparing Prediction of PEMFC Behavior Using Maxwell-Stefan and CFD Approximation Equations," Proceeding Volume, 208 Meeting of the Electrochemical Society, October 16 – 21, 2005, Los Angeles, CA. (*refereed*)
12. S. Greenway, **S. Shimpalee**, D. Johnson, L. Scribner, and J. W. Van Zee, "Interpretation of Impedance Diagrams: The correlation of First Principles Models and Zview Analysis." Proceeding in 2004 Fuel Cell Seminar, November 1 – 5, 2004, San Antonio, Texas
11. **S. Shimpalee**, U. Beuscher, and J. W. Van Zee, "Investigation of GDL Flooding Effects on PEMFC Performance." Fourth International Symposium on PEM Fuel Cells: Proceeding Volume, 206 Meeting of the Electrochemical Society, October 3 – 8, 2004, Honolulu, Hawaii. (*refereed*)
10. W-k. Lee, **S. Shimpalee**, Y. Gu, S. K. Jeoung, S. E. Yoo, and J. W. Van Zee, "Study of Flow Field Design for Improving PEMFC Stack Performance." In press in Fourth International Symposium on PEM Fuel Cells: Proceeding Volume, 206 Meeting of The Electrochemical Society, October 3 – 8, 2004, Honolulu, Hawaii. (*refereed*)
9. U. Beuscher, G. Rusch, **S. Shimpalee**, and J. W. Van Zee, "Investigate of Gas Diffusion Media Using CFD Modeling," In press in Third International Symposium on PEM Fuel Cells: Proceeding Volume, 202 Meeting of The Electrochemical Society, Oct 20-24, 2002, Salt Lake City, Utah. (*refereed*)
8. Glandt, **S. Shimpalee**, and J. W. Van Zee, "Effect of Flow Field Configuration on PEMFC Performance," Abstract # 80a, AIChE's 2002 spring national meeting, New Orleans, LA., 2002.
7. **S. Shimpalee**, W.K. Lee, J. W. Van Zee, and H. Naseri-Neshat. "Advance in Computational Fluid Dynamics Modeling for PEM Fuel Cells," Proceeding in IECEC 2001, 2001-ET-10, Savannah, GA.
6. W.K. Lee, **S. Shimpalee**, J.W. Van Zee, and H. Naseri-Neshat. "Experimental Techniques for PEM Fuel Cell," Proceeding in IECEC 2001, 2001-ET-11, Savannah, GA.
5. **S. Shimpalee**, S. Dutta, and J. W. Van Zee. "Numerical Prediction of Local Temperature and Current Density in a PEM Fuel Cell." Proceeding in ASME IMECE, Orlando, FL. November 5-10, 2000, HTD 366-1, pp. 1-12. (*refereed*)
4. H. Naseri, **S. Shimpalee**, S. Dutta, W. K. Lee, and J. W. Van Zee. "Predicting the Effect of Gas-flow Spacing on Current Density in PEM Fuel Cells," Proceeding in ASME IMECE, Nashville, TN. November 14-19, 1999, AES 39, pp. 337-350. (*refereed*)
3. **S. Shimpalee**, S. Dutta, W. K. Lee, and J. W. Van Zee. "Effect of Humidity on PEM Fuel Cell Performance Part II: Numerical Simulation," Proceeding in ASME IMECE, Nashville, TN. November 14-19, 1999, HTD 364-1, pp. 367-374. (*refereed*)

2. W. K. Lee, J. W. Van Zee, **S. Shimpalee**, and S. Dutta. "Effect of Humidity on PEM Fuel Cell Performance Part I: Experiment," Proceeding in ASME IMECE, Nashville, TN. November 14-19 1999, HTD 364-1, pp. 359-366. (*refereed*)
1. **S. Shimpalee** and Y. B. Safdari. "Finite Element Analysis of Heating a Non-mixed Liquid with non-uniform Solar Flux through Semi-transparent Medium," Proceeding in International Solar Energy Conference, Malaysia 1999. (*refereed*)

PROFESSIONAL PRESENTATIONS :

72. P. Satjaritanun, **S. Shimpalee**, J. W. Weidner, B. A. Devivo, C. E. Turick, H. Colon-Mercado, S. Greenway, A. L. Martin, and J. M. Henson, "Electrochemical Techniques for Real Time, in-Situ Monitoring of Biogeochemistry," Abstract# M01-1995, AiMES 2018, Sept. 30 – Oct. 4, 2018, Cancun, Mexico.
71. C. Corgnale, **S. Shimpalee**, P. Satjaritanun, and Z. Ma, "Numerical Modeling of a Novel Solar Driven Sulfuric Acid Decomposition Reactor," Abstract# L04-1910, AiMES 2018, Sept. 30 – Oct. 4, 2018, Cancun, Mexico.
70. C. Corgnale, J. R. Monnier, J. R. Regalbuto, **S. Shimpalee**, J. W. Weidner, J. Tengco, W. Diao, D. Ginosar, M. Gorenssek, Z. Ma, and W. Summers, "Solar Driven Thermo-Electrochemical Hybrid Sulfur Process for Hydrogen Production," Abstract# L04-1898, AiMES 2018, Sept. 30 – Oct. 4, 2018, Cancun, Mexico.
69. P. Satjaritanun, **S. Shimpalee**, J. W. Weidner, A. Shum, I. V. Zenyuk, A. Z., and S. Hirano, "Fundamental Understanding of Water Movement in Gas Diffusion Layer Under Different Arrangements Using Combination of Direct Modeling and Experimental Visualization," Abstract# I01A-1375, AiMES 2018, Sept. 30 – Oct. 4, 2018, Cancun, Mexico.
68. **S. Shimpalee**, P. Satjaritanun, J. W. Weidner and S. Hirano, "Numerical Study of Liquid Water Saturation inside Gas Diffusion Layer and Micro Porous Layer during PEMFC Operations Using Multiscale and Multiphase Modeling Approach," Abstract# I01A-1369, AiMES 2018, Sept. 30 – Oct. 4, 2018, Cancun, Mexico.
67. S. Hirano, **S. Shimpalee**, P. Satjaritanun, and J. W. Weidner, "Model-Based Engineering for Water Management in the Gas Diffusion Layer of PEMFC," Abstract# I01A-1354, AiMES 2018, Sept. 30 – Oct. 4, 2018, Cancun, Mexico.
66. D. J. Pereira, C. H. Wilkins, **S. Shimpalee**, and J. W. Weidner, "Pt-Ru/C Catalyst Performance during Direct Methanol Fuel Cell Operation," Abstract# 1613, 232nd Electrochemical Society Meeting, October 1-5, 2017, National Harbor, Maryland.
65. S. Hirano, **S. Shimpalee**, Z. Lu, P. Satjaritanun, J. W. Weidner, "Investigation of PEMFC Performance and Property of the Gas Diffusion Layers Utilizing the Numerical Model," Abstract# 1419, 232nd Electrochemical Society Meeting, October 1-5, 2017, National Harbor, Maryland.
64. **S. Shimpalee**, P. Satjaritanun, J. W. Weidner, S. Hirano, Z. Lu, A. Shum, I. V. Zenyuk, S. Ogawa, and S. Litster, "Using Multi-Scale Modeling to Understand Transports inside PEMFC Under Different Configurations," Abstract# 1418, 232nd Electrochemical Society Meeting, October 1-5, 2017, National Harbor, Maryland.
63. P. Satjaritanun, **S. Shimpalee**, J. W. Weidner, S. Hirano, Z. Lu, A. Shum, I. V. Zenyuk, S. Ogawa, and S. Litster, "Numerical Prediction of Liquid Water Transport inside Gas Diffusion Layer for PEMFC Using Lattice Boltzmann Method," Abstract# 1373, 232nd Electrochemical Society Meeting, October 1-5, 2017, National Harbor, Maryland.
62. P. Satjaritanun, E. Bringley, **S. Shimpalee**, J. W. Weidner, J. A. Regalbuto, J. R. Regalbuto, "Lower Torque and Higher Efficiency Mixing with Contra-Rotating, Baffle-Free Impellers," Abstract# 479869, 2017 Spring Meeting & 12th Global Congress on Process Safety, March 26-30, 2017, San Antonio, Texas.
61. **S. Shimpalee**, "Understanding of Transports inside PEM Fuel Cells for Fuel Cell Electric Vehicle," Reverse Brain Drain Seminar, National Science and Technology Development Agency, November 24, 2016, Pathum Thani, Thailand. (Invited)

60. **S. Shimpalee**, "Evaluation of Research Readiness Prior to Commercialization and Technology Trends," seminar and workshop "Strengthening the Business from Researches", November 15, 2016, Chiang Mai, Thailand. (Invited)
59. C. Corngale, **S. Shimpalee**, M. Gorenssek, J.W. Weidner, W. Summers, "Modeling of a Bayonet Reactor for Sulfuric Acid Decomposition in Thermo-Electrochemical Hydrogen Production Processes," Abstract # 3033, Pacific Rim Meeting on Electrochemical and Solid-State Science, October 4, 2016, Honolulu, Hawaii.
58. S. Hirano, J. Chen, **S. Shimpalee**, C. Wang, G. Saloka, "Diagnostic Analysis of the Oxygen Fraction at the Boundary Between Cathode Flowfield and Gas Diffusion Layer in the PEMFC," Abstract # 2749, Pacific Rim Meeting on Electrochemical and Solid-State Science, October 6, 2016, Honolulu, Hawaii.
57. **S. Shimpalee**, P. Satjaritanun, S. Hirano, S. Ogawa, Z. Lu, S. Litster, Y. Khunatorn, J. W. Weidner, "Multi-Scale Modeling of Transports inside PEMFC By Combining Multi-Phase CFD Fuel Cell Model with Lattice Boltzmann Method," Abstract # 2387, Pacific Rim Meeting on Electrochemical and Solid-State Science, October 2, 2016, Honolulu, Hawaii.
56. B. Tavakoli, **S. Shimpalee**, J.W. Weidner, B.L. Garcia-Diaz, M.J. Martinez-Rodriguez, L.C. Olson, "Modeling the Effect of High-Temperature Alloys on Corrosion inside Molten Salt Systems," Abstract # 1239, Pacific Rim Meeting on Electrochemical and Solid-State Science, October 4, 2016, Honolulu, Hawaii.
55. B. Tavakoli, **S. Shimpalee**, J.W. Weidner, B.L. Garcia-Diaz, M.J. Martinez-Rodriguez, L.C. Olson, "The Effect of Nickel Alloy Corrosion under Cathodic Protection inside High Temperature Molten Salt Systems," Abstract # 971, 229th Meeting of The Electrochemical Society, June 2, 2016, San Diego, CA.
54. B. Tavakoli, **S. Shimpalee**, J.W. Weidner, H-S. Cho, J.W. Van Zee, B.L. Garcia-Diaz, M.J. Martinez-Rodriguez, L.C. Olson, J.R. Gray, "Multidimensional Modeling of Nickel Alloy Corrosion inside High Temperature Molten Salt Systems," Abstract # 711, 228th Meeting of The Electrochemical Society, October 15, 2015, Phoenix, AZ.
53. H-S. Cho, **S. Shimpalee**, J.W. Van Zee, B. Tavakoli, J.W. Weidner, B.L. Garcia-Diaz, M. Martinez-Rodriguez, R. Fuentes, L. Olson, J. Grey, "Dimensionless Analysis for Predicting High Temperature Alloys Corrosion in Molten Salt Systems for Concentrated Solar Power Systems," Abstract # 1113, 227th Meeting of The Electrochemical Society, May 25, 2015, Chicago, IL.
52. V. Lilavivat, **S. Shimpalee**, H. Xu, and C. Mittelsteadt, "Experimental Investigation and Numerical Determination of Custom Gas Diffusion Layers to Understand Water Transports in PEMFC," Abstract # 1222, 226th Meeting of The Electrochemical Society, October 5, 2014, Cancun, Mexico.
51. **S. Shimpalee**, V. Lilavivat, S. Hirano, B. Pence, D. Wilkosz, M. DeBolt, G. Saloka, "Multi-scale Analysis for Automotive Fuel Cell System: Macro-scale analysis," Abstract # 1031, 226th Meeting of The Electrochemical Society, October 5, 2014, Cancun, Mexico.
50. V. Lilavivat, **S. Shimpalee**, H. Xu, C. Mittelsteadt, and J.W. Van Zee, "The Effect of Membrane Properties on Water Transport in PEMFCs" Abstract #1345, 224 Meeting of The Electrochemical Society, October 29, 2013, San Francisco, CA.
49. V. Lilavivat, **S. Shimpalee**, H. Xu, C. Mittelsteadt, and J.W. Van Zee, "Using a Novel Current Distribution Board to Understand Local Water Transport in PEMFCs," Abstract #1545, 222 Meeting of The Electrochemical Society, October 7-12, 2012, Honolulu, Hawaii.
48. C. Mittelsteadt, P. Cortes, V. Lilavivat, **S. Shimpalee**, and J.W. Van Zee, "Novel Current Distribution Board for PEM Devices," Abstract #1078, 220 Meeting of The Electrochemical Society, October 9-14, 2011, Boston, MA.
47. **S. Shimpalee**, V. Lilavivat, H. McCrabb, E.J. Taylor, and J.W. Van Zee, "Development of Metal Bipolar Plate for PEMFCs Using Through-Mask Electro-Etching Process," Abstract #793, 220 Meeting of The Electrochemical Society, October 9-14, 2011, Boston, MA.
46. D-w. Choi, M. Ohashi, **S. Shimpalee**, P. Aungkavattana, and J.W. Van Zee, "A Study of Hydrogen Sulfide Contaminants on the Anode of Micro-Tubular SOFC," Abstract #1536, 220 Meeting of The Electrochemical Society, October 9-14, 2011, Boston, MA.

45. C. Andres-Lozano, M. Ohashi, **S. Shimpalee**, P. Aungkavattana, and J.W. Van Zee, "Electrochemical Analysis of Microtubular SOFC under Fuel Contaminants," Abstract #1185, 218 Meeting of The Electrochemical Society, October 10-15, 2010, Las Vegas, NV.
44. V. Lilavivat, **S. Shimpalee**, H. McCrabb, A. Lozano-Morales, and J.W. Van Zee, "Fundamental Analyses, Observations, and Predictions of Liquid Droplet Movement on Etched-Metal Surfaces for PEMFC," Abstract #726, 218 Meeting of The Electrochemical Society, October 10-15, 2010, Las Vegas, NV.
43. H. McCrabb, E.J. Taylor, A. Lozano-Morales, **S. Shimpalee**, M. Inman, and J.W. Van Zee, "Through-Mask Electroetching for Fabrication of Metal Bipolar Plate Gas Flow Field Channels," Abstract #728, 218 Meeting of The Electrochemical Society, October 10-15, 2010, Las Vegas, NV.
42. M. Martinez, **S. Shimpalee**, T. Cui, and J.W. Van Zee, "Characterization of Microporous Layer in Carbon Paper GDL for PEM Fuel Cell," Abstract #927, 218 Meeting of The Electrochemical Society, October 10-15, 2010, Las Vegas, NV.
41. **S. Shimpalee**, V. Lilavivat, H. McCrabb, A. Lozano-Morales, and J.W. Van Zee, "Understanding the Effect of Channel Tolerances on Performance of PEMFCs," Abstract #718, 218 Meeting of The Electrochemical Society, October 10-15, 2010, Las Vegas, NV.
40. Md. Opu, D-w. Choi, M. Ohashi, **S. Shimpalee**, and J.W. Van Zee, "Understanding Differences in the Performance of Laboratory Scale," Abstract #823, 218 Meeting of The Electrochemical Society, October 10-15, 2010, Las Vegas, NV.
39. H. Garich, L. Gebhart, S. Snyder, E.J. Taylor, **S. Shimpalee** and J.W. Van Zee, "Alternating Flow Patterns for Copper Plating Uniformity," Abstract #1296, 217 Meeting of The Electrochemical Society, April 25-30, 2010, Vancouver, Canada.
38. M. Martinez, **S. Shimpalee**, T. Cui, M. Ohashi, and J. W. Van Zee, "Characterization of GDL for Water Transport in PEMFC Cathode," Abstract #821, 216 Meeting of The Electrochemical Society, October 4-9, 2009, Vienna, Austria.
37. J. W. Van Zee and **S. Shimpalee**, "Non-uniform Current Distributions in PEM Fuel Cells Energy Technology," Abstract #1080, 215 Meeting of The Electrochemical Society, May 24-29, 2009, San Francisco, CA.
36. J. W. Van Zee, **S. Shimpalee**, M. Martinez, M. Venkatraman, and D. Jeon, "Applications of Computational Fluid Dynamics to Electrochemical Systems," Abstract #2681, 214 Meeting of The Electrochemical Society, October 12– 17, 2008, Honolulu, Hawaii.
35. **S. Shimpalee**, T. Gu, and J. W. Van Zee, "The Study of Water Adsorption and Desorption by a PBI Membrane and its Impact on H3PO4 Transport," Abstract #1131, 214 Meeting of The Electrochemical Society, October 12– 17, 2008, Honolulu, Hawaii.
34. **S. Shimpalee**, "How a Fuel Cell works", Citizens' School on Fuel Cell and Hydrogen Technology, March 31, 2008, Columbia, SC. (*Invited*)
33. M. J. Martinez, **S. Shimpalee** and J. Van Zee, "Effect of Gas Diffusion Layer Properties in the Water Transport of a PEMFC Cathode," Abstract # 539, 212 Meeting of The Electrochemical Society, October 7– 12, 2007, Washington, DC.
32. D. Jeon, **S. Shimpalee** and J. Van Zee, "A Geometrical Approach to Minimize Contaminant effect on Straight Parallel PEM Fuel Cells," Abstract # 537, 212 Meeting of The Electrochemical Society, October 7– 12, 2007, Washington, DC.
31. K. Punyawudho, **S. Shimpalee** and J. Van Zee, "Sulfur Dioxide Contamination in PEMFCs: Material Balance Approach," Abstract # 445, 212 Meeting of The Electrochemical Society, October 7– 12, 2007, Washington, DC.
30. M. Venkatraman, **S. Shimpalee**, and J. W. Van Zee, "Effect of Net Geometry on Limiting Current Density Distribution in a Parallel Plate Channel," Abstract # 379, 210 Meeting of The Electrochemical Society, October 29 – November 03, 2006, Cancun, Mexico.
29. M. Martinez, **S. Shimpalee**, and J. W. Van Zee, "Simple Model for the Water Phase Distribution in the Gas Diffusion Layer of a PEMFC Cathode," Abstract # 475, 210 Meeting of The Electrochemical Society, October 29 – November 03, 2006, Cancun, Mexico.
28. **S. Shimpalee**, M. Martinez, and J. W. Van Zee, "Water Phase Distribution in the Gas Diffusion Layer along a Serpentine Flow Field of a PEMFC," Abstract # 460, 210 Meeting of The Electrochemical Society, October 29 – November 03, 2006, Cancun, Mexico.

27. M. Martinez, **S. Shimpalee**, and J. W. Van Zee, "Modeling the Effects of Pore Size and Surface Wettability on Water Phase Distribution Inside the Gas Diffusion Layer of the Cathode in a PEMFC," Workshop on Numerical, Mathematical and Modeling Analysis related to Fluid Dynamics in Hydrogen Fuel Cells, University of Ottawa, May 10-12, 2006, Ottawa, Canada.
26. **S. Shimpalee**, "Using CFD for System Design of Solid Oxide Fuel Cells," Annual Meeting of Association of Thai Professionals in America and Canada, March 25 – 26, 2006, Washington DC. **(Invited)**
25. **S. Shimpalee**, "Using CFD to Understand the Effect of GDL Characteristics on PEMFC Performance," Abstract # 3-2, The 1st Annual Korea-USA Joint Symposium on Hydrogen & Fuel Cell Technologies, May 24 – 26, 2006, Daejeon, KOREA. **(Invited)**
24. **S. Shimpalee** and J. W. Van Zee, "Studies on Rib and Channel Characteristic of Flow Field on PEMFC Performance," Abstract # 1006, 208 Meeting of The Electrochemical Society, October 16 – 21, 2005, Los Angeles, CA.
23. S. Greenway, **S. Shimpalee**, W-k. Lee, Y. Goo, S. Jeoung, S. Yoo, and J. W. Van Zee, "The Effect of Dissimilar Anode/Cathode Flow Field Designs in PEM Fuel Cells, " Abstract # 1009, 208 Meeting of The Electrochemical Society, October 16 – 21, 2005, Los Angeles, CA.
22. M. Martinez, **S. Shimpalee**, and J. W. Van Zee, "Comparing Prediction of PEMFC Behavior Using Maxwell-Stefan and CFD Approximation Equations," Abstract # 943, 208 Meeting of The Electrochemical Society, October 16 – 21, 2005, Los Angeles, CA.
21. **S. Shimpalee**, "Using CFD to Understand PEMFC's Behavior," International Fuel Cell Symposium "New Trend in Fuel Cell Technology," Yonsei University, April 15, 2005, Seoul, Korea. **(Invited)**
20. **S. Shimpalee**, "The Effect of GDL's Electrical Conductivity on PEMFC Performance," Computational Fuel Cells Dynamics (CFCD)-III workshop, March 19-24, 2005, Banff, Alberta, Canada. **(Invited)**
19. S. Greenway, **S. Shimpalee**, D. Johnson, L. Scribner, and J. W. Van Zee, "Interpretation of Impedance Diagrams: The correlation of First Principles Models and Zview Analysis." 2004 Fuel Cell Seminar, November 1 – 5, 2004, San Antonio, Texas.
18. **S. Shimpalee**, U. Beuscher, and J. W. Van Zee, "Investigation of GDL Flooding Effects on PEMFC Performance." Abstract # 1931, 206 Meeting of the Electrochemical Society, October 3 – 8, 2004, Honolulu, Hawaii.
17. W-k. Lee, **S. Shimpalee**, Y. Gu, S. K. Jeoung, S. E. Yoo, and J. W. Van Zee, "Study of Flow Field Design for Improving PEMFC Stack Performance." Abstract # 1874, 206th meeting of the Electrochemical Society, October 3-8, 2004, Honolulu, Hawaii.
16. S. Greenway, **S. Shimpalee**, and J. W. Van Zee, "The Effect of Proton Conductivity and Gas Diffusion Layer Properties on Impedance in PEMFCs." 6th International Symposium on Electrochemical Impedance Spectroscopy, May 16 – 21, 2004, Cocoa Beach, Florida.
15. **S. Shimpalee**, "Overview of PEM Fuel Cell and R&D activity at U. of South Carolina." The next generation Association of Thai Professional in America and Canada (ATPAC), ATPAC annual meeting, April 9 – 11, 2004, San Francisco, CA. **(Invited)**
14. **S. Shimpalee** and J. W. Van Zee, "Using CFD to Understand PEM Fuel Cell Behavior: Interaction of CFD and Experimental Research," The 2003 STAR-CD Korean user conference, September 29, 2003, Seoul, Korea. **(Invited)**
13. **S. Shimpalee** and J. W. Van Zee, "Using CFD to understand the Effect of CO Poisoning in a PEMFC." Abstract # 1203, 203 Meeting of the Electrochemical Society, April 27 – May 2, 2003, Paris, France.
12. S. Greenway, **S. Shimpalee**, F. Buechi, and J. W. Van Zee, "Local Current Density Prediction in a 200-cm² PEMFC Semi-segmented Electrode System," Abstract # 1195, 203 Meeting of The Electrochemical Society, April 27 – May 2, 2003, Paris, France.
11. **S. Shimpalee**, S. Greenway, and J. W. Van Zee, "Using CFD to Understand PEM Fuel Cell Behavior: Transient Operation," The 2002 STAR-CD French user conference, September 16, 2002, Paris, France.
10. U. Beuscher, G. Rusch, **S. Shimpalee**, and J. W. Van Zee, "Investigate of Gas Diffusion Media Using CFD Modeling." Abstract # 861, 202 Meeting of the Electrochemical Society, Oct 20-24, 2002, Salt Lake City, Utah.

9. S. Greenway, **S. Shimpalee**, and J. W. Van Zee, "The Interaction of Permeability and Flow-field Geometry on PEMFC Performance." Abstract # 860, 202 Meeting of the Electrochemical Society, Oct 20-24, 2002, Salt Lake City, Utah.
8. **S. Shimpalee**, W-k. Lee, H. Nasei-Neshat, and J. W. Van Zee, "Prediction of Transient Response for a 25-cm² PEM Fuel Cell," Abstract # 1136, 201 Meeting of The Electrochemical Society, May 12-17, 2002, Philadelphia, PA.
7. **S. Shimpalee**, J. Glandt, and J. W. Van Zee," Effect of Flow Field Configuration on PEMFC Performance." Abstract # 80a, AIChE's 2002 spring national meeting, New Orleans, LA., 2002.
6. W.K. Lee, **S. Shimpalee**, J.W. Van Zee, and H. Naseri-Neshat, "Experimental Techniques for PEM Fuel Cell." Presented in IECEC 2001, Savannah, GA.
5. **S. Shimpalee**, W.K. Lee, J. W. Van Zee, and H. Naseri-Neshat, "Advance in Computational Fluid Dynamics Modeling for PEM Fuel Cells." Presented in IECEC 2001, Savannah, GA.
4. **S. Shimpalee**, S. Dutta, and J. W. Van Zee. "Numerical Prediction of Local Temperature and Current Density in a PEM Fuel Cell." Presented in ASME IMECE, Orlando, FL. November 5-10, 2000.
3. H. Naseri-Neshat, **S. Shimpalee**, S. Dutta, W. K. Lee, and J. W. Van Zee, "Predicting the Effect of Gas-flow Spacing on Current Density in PEM Fuel Cells," Presented in ASME IMECE, Nashville, TN. November 14-19, 1999.
2. **S. Shimpalee**, S. Dutta, W. K. Lee, and J. W. Van Zee, "Effect of Humidity on PEM Fuel Cell Performance Part II: *Numerical Simulation*." Presented in ASME IMECE, Nashville, TN. November 14-19, 1999.
1. W. K. Lee, J. W. Van Zee, **S. Shimpalee**, and S. Dutta. "Effect of Humidity on PEM Fuel 2Cell Performance Part I: Experiment," Proceeding in ASME IMECE, Nashville, TN. November 14-19 1999.

COURSE TAUGHT :

1. **ECHE 589: Computational Fluid Dynamics for Engineering Applications**
An introduction to the use of commercial CFD codes to analyze flow, heat, and mass transfer problems of practical engineering interest. At the end of the course students will understand the process of developing a geometrical model for the flow, applying appropriate boundary conditions, specifying solution parameters, and visualizing the results.
2. **Transport Phenomena**
Applications of chemical/mechanical/civil engineering analysis to momentum, heat/mass, and multiphase transport problems for advanced undergraduate and graduate students.
3. **ENCP 460: Sustainable Development in Thailand**
An examination of political, social, technical, and economic issues that Thailand faces as they overcome these problems in a more sustainable and sufficiency way by the initiative of His Majesty the Late King Rama IX and members of his Family.

GRANTS :

52. "Modeling of Electrolytic Dissolution", funded by Savannah River Nuclear Solution 07/19 – 06/21 (\$250,000)
51. "Core technology development for alkaline water electrolysis", funded by Korean Institute of Energy Research 07/19 – 06/23 (\$178,000)
50. "Flow Loop and Getter Bed Simulation", funded by SRNL under DoE SunShot 08/18 – 03/20 (\$117,200)
49. "Innovative Bilayer Microporous Layer for PEM Fuel Cells", funded by Giner Inc. under DOE SBIR 05/18 – 12/18 (\$30,000)
48. "Numerical simulation of multiphase behavior in state of the art alkaline water electrolyzer", funded by Korean Institute of Energy Research 01/18 – 12/20 (\$162,000)
47. "Mass-transport Modeling of Catalyst Layer in PEMFC using Lattice Boltzmann Method", funded by Ford Motor Company– University Research Program 01/18 – 12/20 (\$150,000)

46. "High temperature reactor catalyst material development for low cost and efficient solar driven sulfur-based processes", funded by Greenway Energy under DoE EERE HydroGEN 10/17 – 09/20 (\$461,250)
45. "Multi-phase CFD Fuel Cell Models with Lattice Boltzmann Method Implementation for High Current Density Operation in PEMFCs-Year 2017", funded by Ford Motor – University Research Program 01/17 – 12/17 (\$20,000)
44. "Bioprocess Intensification", funded by Savannah River National Laboratories under DoE-Bioenergy Technologies Program – 01/17 – 12/19 (\$240,000)
43. "Design of Bayonet Reactor and Sand-to-Particles Heat Exchanger in Solar Hydrogen Production by the Hybrid Sulfur Process", funded by Savannah River National Laboratories under SunShot Program – 05/16 – 05/17 (\$37,500)
42. "Multi-phase CFD Fuel Cell Models with Lattice Boltzmann Method Implementation for High Current Density Operation in PEMFCs-Year 2016", funded by Ford Motor – University Research Program 01/16 – 12/16 (\$40,000)
41. "Using CFD to Understand the Transport and Corrosion Phenomenon inside High Temperature Molten Salt Systems for Next Generation Concentrated Solar Power Systems", funded by Savannah River National Laboratories under DoE SunShot Program – 01/16 – 12/16 (\$40,000)
40. "Electrochemical Systems and Materials Durability", funded by Clean Energy Research for Savannah River Nuclear Solutions – 01/15 – 12/17 (\$120,000)
39. "Using CFD to Understand the Transport and Corrosion Phenomenon inside High Temperature Molten Salt Systems for Next Generation Concentrated Solar Power Systems", funded by Savannah River National Laboratories under DoE SunShot Program – 01/15 – 12/15 (\$40,000)
38. "Multi-phase CFD Fuel Cell Models with Lattice Boltzmann Method Implementation for High Current Density Operation in PEMFCs-Year 2015", funded by Ford Motor – University Research Program 12/14 – 12/15 (\$40,000)
37. "Fundamental Corrosion Studies in High-Temperature Molten Salt Systems for Next Generation Concentrated Solar Power Systems", funded by Savannah River National Laboratory – 10/14 – 12/15 (\$25,000)
36. "Allergens and Induced Asthma: Eradicating Indoor Allergens from Dust Mites", funded by CarboNix under NIH-SBIR Phase II's subcontractor – 07/14 – 06/15 (\$89,869)
35. "Using CFD to Understand the Transport and Corrosion Phenomenon inside High Temperature Molten Salt Systems for Next Generation Concentrated Solar Power Systems", funded by Savannah River National Laboratories under DoE SunShot Program – 01/14 – 12/14 (\$40,000)
34. "Multi-phase CFD Fuel Cell Models with Lattice Boltzmann Method Implementation for High Current Density Operation in PEMFCs", funded by Ford Motor – University Research Program 12/13 – 12/14 (\$20,000)
33. "Using CFD to understand heat and mass flows inside electrolyzer system enclosures and gas/liquid separators", funded by the NSF I/UCRC for Fuel Cells as Project # 48. 01/12 – 12/13 (\$96,000)
32. "Characterization of Gas Diffusion Layer and Their Effects on PEMFC Performance", funded by the NSF I/UCRC for Fuel Cells as Project # 19H. 01/11 – 12/11 (\$48,000)
31. "Computational Fluid Dynamics Analysis of Electro Etched Stainless Steel micro-channel of bipolar plate", funded by the NSF I/UCRC for Fuel Cells as Project # 45B. 01/11 – 12/11 (\$48,000)
30. "Characterization of Gas Diffusion Layer and Their Effects on PEMFC Performance", funded by the NSF I/UCRC for Fuel Cells as Project # 19G. 01/10 – 12/10 (\$48,000)
29. "Transport Studies and Modeling in PEM Fuel Cells," DOE award number DE-EE0000471 – USC subcontract. 02/10 – 08/13 (\$800,000)
28. "Understanding the effects of coal based gas contaminants and degradation mechanisms on SOFCs," funded by National Metal and Material Technology Center (MTEC), Thailand. 01/01/10 – 12/31/11 (\$29,488)

27. "Computational Fluid Dynamics Analysis of Electro Etched Stainless Steel micro-channel of bipolar plate", funded by the NSF I/UCRC for Fuel Cells as Project # 45. 01/10 – 12/10 (\$48,000)
26. "Pressure Drop in Flow Channels due to Blockage by Water Drops", funded by the NSF I/UCRC for Fuel Cells as Project # 40B. 01/09 – 12/09 (\$48,000)
25. "Characterization of Gas Diffusion Layer and Their Effects on PEMFC Performance", funded by the NSF I/UCRC for Fuel Cells as Project # 19F. 01/09 – 12/09 (\$48,000)
24. "Using Internal Pressure-assisted Embossing and Mechanical Bonding for Robust and Low-cost Fabrication of Metal PEMFC Bipolar Plates," A TIE Project for cooperative research funded by the NSF I/UCRC program as Project # 37D. 06/08 – 05/10 (\$100,000)
23. "Seminar & Workshop: Proton Exchange Membrane (PEM) Fuel Cells", travel grant funded by Office of Science and Technology, Ministry of Science and Technology, Thailand. 06/17/08 – 06/19/08 (\$15,000)
22. "Pressure Drop in Flow Channels due to Blockage by Water Drops", funded by the NSF I/UCRC for Fuel Cells as Project # 40. 01/08 – 12/08 (\$48,000)
21. "Characterization of Gas Diffusion Layer and Their Effects on PEMFC Performance", funded by the NSF I/UCRC for Fuel Cells as Project # 19E. 01/08 – 12/08 (\$48,000)
20. "FY06 DOE EARMARK Award NO. DE-FC36-06GO86041 Project # 5: Model of High Temperature Membrane with Plug Power", 10/06 – 04/08 (\$367,987)
19. "Using CFD for Optimum Design PEMFC", funded by the NSF I/UCRC for Fuel Cells as Project # 13E. 01/07 – 12/07 (\$48,000)
18. "Characterization of Gas Diffusion Layer and Their Effects on PEMFC Performance", funded by the NSF I/UCRC for Fuel Cells as Project # 19D. 01/07 – 12/07 (\$48,000)
17. "Characterization of Gas Diffusion Layer and Their Effects on PEMFC Performance", funded by the NSF I/UCRC for Fuel Cells as Project # 19C. 01/06 – 12/06 (\$48,000)
16. "Understanding of PEMFCs Using Impedance Analysis", funded by the NSF I/UCRC for Fuel Cells as Project # 28B. 01/06 – 12/06 (\$48,000)
15. "Using CFD for Optimum Design PEMFC", funded by the NSF I/UCRC for Fuel Cells as Project # 13D. 01/06 – 12/06 (\$48,000)
14. "DOE Award Number DE-FC36-03GO13097 USC Subcontract", funded by Plug Power, Inc. 01/05 – 03/06 (\$68,100)
13. "1-3 kW Tubular SOFC Stack for Household Distributed Generator Task # 7: Using CFD for System Design of Solid Oxide Fuel Cells", funded by MTEC. 12/05 – 09/06 (\$82,736)
12. "Characterization of Gas Diffusion Layers and Their Effects on PEMFC Performance" funded by I/UCRC for Fuel Cells as Project # 19C. 01/05 – 12/05 (\$30,000, with Dr. Woo-kum Lee)
11. "Understanding of PEMFCs Using Impedance Analysis" funded by I/UCRC for Fuel Cells as Project # 28B. 01/05 – 12/05 (\$30,000)
10. "Using CFD for Optimum Design PEMFC" funded by I/UCRC for Fuel Cells as Project # 13C. 01/05 – 12/05 (\$30,000)
9. "Understanding of PEMFCs Using Impedance Analysis" funded by I/UCRC for Fuel Cells as Project # 28A. 01/04 – 12/04 (\$30,000)
8. "Using CFD for Optimum Design PEMFC" funded by I/UCRC for Fuel Cells as Project # 13B. 01/04 – 12/04 (\$30,000)
7. "Testing of Gas Diffusion Media Performance Using Mathematical Models: Phase III" funded by W.L. Gore & Associates, Inc. 01/04 – 08/04 (\$50,000)
6. "Computer Simulation of New Flow-field(s) for PEMFCs" funded by Plug Power, Inc./GE Global Research. 03/03 – 10/03 (\$12,500)
5. "Using CFD for Optimum Design PEMFC" funded by I/UCRC for Fuel Cells as Project # 13A. 01/03 – 12/03 (\$30,000)
4. "Design Fuel Cells for Improved Transportation Safety and Security" funded by SCSU/UTC. 04/02 – 03/03 (assigned as senior researcher, \$45,000, PI: J. W. Van Zee)
3. "Testing of Gas Diffusion Media Performance Using Mathematical Models: Phase I & II" funded by W.L. Gore & Associates, Inc. 06/01 – 02/02 (assigned as senior researcher, \$40,000, PI: J. W. Van Zee)

2. "The Effect of Scale-up and Water Phase Change on PEM Fuel Cell Performance for a Moving Vehicle on Urban Roads" funded by SCSU/UTC. 04/01 – 03/02 (*assigned as senior researcher, \$ 35,000, PI: J. W. Van Zee*)
1. "Fundamental Studies for Mapping the Current, Temperature, and Water Distributions in an Electrochemical Membrane Reactor" funded by Honda R&D company, Ltd. 06/00 – 06/01 (*assigned as senior researcher, \$150,000, PI: J. W. Van Zee*)

STUDENTS UNDER SUPERVISION:

17. Daniel Tedeschi – High school student (SC Governor's School For Science & Mathematics)
16. Kris Likit-Anurak – Ph.D. student
15. Mitchell Sepe – Undergraduate student
14. Mike Brize – Undergraduate student
13. John Weiss – Undergraduate student
12. Joseph Lopata – Ph.D. student
11. Drew Pereira – Ph.D. student
10. Pongsarun Satjaritanun – Ph.D. student (Refereed Journals # 33, 41, 44-45, 47-49)
9. Cody Wilkins – Master student (Class 2017)
8. Taylor Garrick - Ph.D. (Class 2017)
7. Bahareh Alsa Tavakoli Mehrabadi, Ph.D. (Class 2016): (Refereed Journals # 32, 37, 39)
6. Visarn Lilavivat, Ph.D. (Class 2013). (Refereed Journals # 24, 30, 34-36, 38, 40, 43, 46): MTEC, Thailand
5. Dong-woong Choi, Master of Engineer (Class 2011): United Kingdom
4. Carlos Andres Lozano, Master of Engineer (Class 2010): Spain. (Refereed Journal # 26)
3. Michael Martinez, Ph.D. (Class 2009): Savannah National Laboratory, Aiken, SC. USA. (Refereed Journals # 17, 19, 20)
2. Scott Greenway, Ph.D. (Class 2007): Greenway Energy LLC. Aiken, SC. USA. (Refereed Journals # 5, 11, 16)
1. Sun-hoe Kim, Ph.D. (Class 2004): Sangji University, South Korea. (Refereed Journals # 6, 7, 8)

DISCLOSURES:

5. USC Disclosure: "PEM Fuel Cell Sub-stack Module Design and Features", USCRF#00508.
4. USC Disclosure: "Fluent Subroutines for PEM Fuel Cells Simulation, Multi Phase-thermal Analysis Edition", USCRF#00313.
3. USC Disclosure: "Fluent Subroutines for PEM Fuel Cells Simulation, Single Phase-isothermal Analysis Edition", USCRF#00312.
2. USC Disclosure: "Star-CD Subroutines for PEM Fuel Cells Simulation, Single Phase-isothermal Analysis Edition", USCRF#00322. (*licensed by Adapco Group, NY.*)
1. USC Disclosure: "Star-CD Subroutines for PEM Fuel Cells Simulation, Multi Phase-thermal Analysis Edition", USCRF#00323. (*licensed by Adapco Group, NY.*)

EDITORS:

1. Fourth International Symposium on PEM Fuel Cells, 206 Electrochemical Society Meeting, Honolulu, Hawaii, 2004.

SESSION CHAIR IN CONFERENCE:

4. Americas International Meeting on Electrochemistry and Solid State Science 2018, September 30 – October 4, 2018, Cancun, Mexico.
3. 232nd Electrochemical Society Meeting, October 1-5, 2017, National Harbor, Maryland.

2. Pacific Rim Meeting on Electrochemical and Solid-State Science, October 2-7, 2016, Honolulu, Hawaii.
1. Intersociety Energy Conversion Engineering Conference, Electrochemical Technology Update Session, July 29 – August 2, 2001, Savannah, GA.

REFEREE :

1. Numerical Heat Transfer
2. International Journal of Heat and Mass Transfer
3. Journal of Power Sources
4. Journal of Fuel Cells – From Fundamentals to Systems
5. Journal of Zhejiang University SCIENCE (JZUS)
6. Journal of Electrochemical Society
7. Electrochimica Acta
8. International Journal of Hydrogen Energy
9. International Journal of Thermal Sciences
10. Journal of Renewable Energy

RECENT COLLABORATIONS :

Dr. Bruce Pint (ORNL), Dr. Zhiwen Ma (NREL), Prof. Shawn Litster (CMU), Prof. Iryna Zenyuk (UCI, Tufts U.), Profs. John Weidner, Michael Matthews, John Monnier, John Regalbuto, Christ William, Bronko Popov, Jason Hattrick-Samper, Ed Gatzky, Phil Moore (USC), Adam Weber (LBNL), Dr. Shinichi Hirano (Ford Motor Company); Drs. Brenda Garcia-Diaz, Michael Martinez, Claudio Corgnale, Chuck Turick and Luke Olson (SRNL); Profs. Ramada Reddy and John Van Zee (University of Alabama); Prof. Supapan Seraphin (University of Arizona); Profs. Yottana Khunatorn and Konlayutt Punyawudho (Chiang Mai University, Thailand)

CONSULTING AND PROFESSIONAL SERVICES :

- Kalaya Technology Limited Partnership (2018 - present)
Consulting Services
- CertainTech Inc (2017-2018)
Consulting Services
- National Science Foundation (March, 2013)
Small Business Innovation Research (SBIR) Phase I Panel Review, National Science Foundation
- National Science Foundation (March, 2011)
Small Business Innovation Research (SBIR) Phase I Panel Review, National Science Foundation
- National Science Foundation (March, 2010)
Small Business Innovation Research (SBIR) Phase II Panel Review, National Science Foundation
- National Science Foundation (March, 2009)
Small Business Innovation Research (SBIR) Phase II Panel Review, National Science Foundation
- National Science Foundation (October 4, 2007)
Small Business Innovation Research (SBIR) Phase II Panel Review, National Science Foundation
- National Science Foundation (March 1, 2006)
Small Business Innovation Research (SBIR) Phase I Panel Review, National Science Foundation
- National Science Foundation (April 14 – 15, 2004)
Small Business Innovation Research (SBIR) Phase I Panel Review, National Science Foundation

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Analysis and Reporting for Fuel Cell Simulations

Palmetto Fuel Cell Technology, LLC, Columbia SC.

Consulting Services

Palmetto Fuel Cell Analysis & Design, LLC, Columbia, SC.

Consulting Services

Faraday Technology, Inc.

Consulting Services