

Partha P. Mukherjee

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Research Interests

Electrochemical energy storage and conversion; Mesoscale physics and stochastics of physicochemical transport, chemistry and mechanics interactions; Processing – microstructure – property relationships in energy materials and manufacturing

Education

Ph.D., Mechanical Engineering, Pennsylvania State University, 2007
Dissertation: *Pore-Scale Modeling and Analysis of the Polymer Electrolyte Fuel Cell Catalyst Layer*
Advisor: Professor Chao-Yang Wang

M.S., Mechanical Engineering, Indian Institute of Technology, Kanpur, India, 1999
Dissertation: *Modeling and Simulation of Enhanced Oil Recovery from Porous Formations*
Advisor: Professor Gautam Biswas

B.S., Mechanical Engineering, Jalpaiguri Government Engineering College, University of North Bengal, 1997
Dissertation: *Conceptual Design of Central Tower Receiver for a Solar Power Plant*
Advisor: Professor P. S. Banerjee

Experience

Assistant Professor

Department of Mechanical Engineering, Texas A&M University (TAMU), 01/2012 – present

Affiliate Faculty, Institute for Scientific Computation, Texas A&M University, 2102 - present

Staff Scientist

Computational Engineering and Energy Sciences Group, Computer Science and Mathematics Division, Oak Ridge National Laboratory (ORNL), 2009 – 2011

Affiliate Faculty, Department of Mechanical Engineering, Virginia Tech, 2010 – 2011

Affiliate Faculty, Department of Civil and Environmental Engineering, University of Tennessee, Knoxville, 2010 – 2011

Director's Research Fellow

Joint affiliation with *Sensors and Electrochemical Devices Group* (Materials Physics & Applications Division), and *Computational Earth Sciences Group* (Earth & Environmental Sciences Division), Los Alamos National Laboratory (LANL), 2008 – 2009

Research Assistant

Electrochemical Engine Center (ECEC), Department of Mechanical and Nuclear Engineering Pennsylvania State University, 2004 – 2007

Teaching Assistant

Department of Mechanical and Nuclear Engineering, Pennsylvania State University, 08/2003 – 12/2003

Consulting Engineer

Fluent India Pvt. Ltd. (fully owned subsidiary of Fluent Inc, currently Ansys Inc.), India, 1999 – 2003

[As a consulting engineer, was responsible for proposals development, leading projects, on-site project reviews for computational fluid dynamics (CFD) projects involving rotating machinery, reacting systems, two-phase flow and HVAC with major engineering R&D centers in the USA.]

Research and Teaching Assistant

Department of Mechanical Engineering, Indian Institute of Technology, Kanpur, India, 1997 – 1999

Publications

(Citations: **1092**; H-index: **13**; i10-index: 19; Source: Google Scholar Citations; Retrieved on August 31, 2014; Total publications #: **71**; Journal articles – 28; Conference proceedings papers – 31; Book chapters – 12)

(Author names with an underline indicate the work of a graduate student advisee. Undergraduate student researchers are indicated in *italics*.)

Journal Articles

1. Z. Liu and **P. P. Mukherjee**, "Microstructure Evolution in Lithium-Ion Battery Electrode Processing," *Journal of the Electrochemical Society*, **161**, E3248 (2014).
2. K. An, P. Barai, K. Smith, and **P. P. Mukherjee**, "Probing the Thermal Implications in Mechanical Degradation of Lithium-ion Battery Electrodes," *Journal of the Electrochemical Society*, **161**, A1058 (2014).
3. P. Barai and **P. P. Mukherjee**, "Stochastic Analysis of Diffusion Induced Damage in Lithium-ion Battery Electrodes," *Journal of the Electrochemical Society*, **160**, A955 (2013).
4. N. A. Siddique, A. M. Allen, **P. P. Mukherjee**, and F. Liu, "Simulation of the Effect of Interfacial Lithium Flux on Miscibility Gap in Non-equilibrium Phase Transformation of LiFePO₄ Particles," *Journal of Power Sources*, **245**, 83 (2014).
5. K. C. Smith, **P. P. Mukherjee**, and T. S. Fisher, "Columnar Order in Jammed LiFePO₄ Cathodes: Ion Transport Catastrophe and its Mitigation." *Physical Chemistry Chemical Physics*, **14**, 7040 (2012).
6. F. Liu, N. A. Siddique, and **P. P. Mukherjee**, "Non-equilibrium Phase Transformation and Particle Shape Effect in LiFePO₄ Materials for Li-Ion Batteries," *Electrochemical and Solid State Letters*, **14**, 1 (2011).
7. G. T. Teixidor, B. Y. Park, **P. P. Mukherjee**, Q. Kang, and M. J. Madou, "Modeling of Fractal Electrodes in Li-Ion Batteries," *Electrochimica Acta*, **54**, 5928 (2009).
8. **P. P. Mukherjee**, Q. Kang, and C. Y. Wang, "Pore-Scale Modeling of Two-Phase Transport in Polymer Electrolyte Fuel Cells – Progress and Perspective," *Energy & Environmental Science*, **4**, 346 (2011).
9. Y. Wang, J. Mishler, **P. P. Mukherjee**, R. Mukundan, and R. L. Borup, "Subfreezing Operation of Polymer Electrolyte Fuel Cells: Ice Formation and Cell Performance Loss," *Electrochimica Acta*, **65**, 127 (2012).
10. Y. Wang, **P. P. Mukherjee**, J. Mishler, R. Mukundan, and R. L. Borup, "Cold Start of Polymer Electrolyte Fuel Cells: Three-Stage Startup Characterization," *Electrochimica Acta*, **55**, 2636 (2010).
11. Q. Kang, M. Wang, **P. P. Mukherjee**, and P. C. Lichtner, "Mesoscopic Modeling of Multi-physicochemical Transport Phenomena in Porous Media," *Advances in Mechanical Engineering*, Article ID 142879, doi:10.1155/2010/142879 (2010).
12. **P. P. Mukherjee**, C. Y. Wang, and Q. Kang, "Mesoscopic Modeling of Two-phase Behavior and Flooding Phenomena in Polymer Electrolyte Fuel Cells," *Electrochimica Acta*, **54**, 6861 (2009). [**Top 25 Most Cited Articles**]
13. **P. P. Mukherjee** and C. Y. Wang, "Direct Numerical Simulation Modeling of Bi-layer Cathode Catalyst Layers for Polymer Electrolyte Fuel Cells," *Journal of the Electrochemical Society*, **154**, B1121 (2007).

14. P. K. Sinha, **P. P. Mukherjee**, and C. Y. Wang, "Impact of Gas Diffusion Layer Structure and Wettability on Water Management in Polymer Electrolyte Fuel Cells," *Journal of Materials Chemistry*, **17**, 3089 (2007). [**Journal Issue Cover Feature**]
15. G. Wang, **P. P. Mukherjee**, and C. Y. Wang, "Optimization of Polymer Electrolyte Fuel Cell Cathode Catalyst Layers via Direct Numerical Simulation Modeling," *Electrochimica Acta*, **52**, 6367 (2007).
16. U. Pasaogullari, **P. P. Mukherjee**, C. Y. Wang, and K. S. Chen, "Anisotropic Heat and Water Transport in a PEFC Cathode Gas Diffusion Layer", *Journal of the Electrochemical Society*, **154**, B823 (2007).
17. V. P. Schulz, J. Becker, A. Wiegmann, **P. P. Mukherjee**, and C. Y. Wang, "Modeling of Two-phase Behavior in the Gas Diffusion Medium of Polymer Electrolyte Fuel Cells via Full Morphology Approach," *Journal of the Electrochemical Society*, **154**, B419 (2007). [**5th Most Cited Article**]
18. **P. P. Mukherjee** and C. Y. Wang, "Stochastic Microstructure Reconstruction and Direct Numerical Simulation of the PEFC Catalyst Layer," *Journal of the Electrochemical Society*, **153**, A840 (2006).
19. G. Wang, **P. P. Mukherjee**, and C. Y. Wang, "Direct Numerical Simulation (DNS) Modeling of PEFC Electrodes: Part I. Regular Microstructure," *Electrochimica Acta*, **51**, 3139 (2006).
20. G. Wang, **P. P. Mukherjee**, and C. Y. Wang, "Direct Numerical Simulation (DNS) Modeling of PEFC Electrodes: Part II. Random Microstructure," *Electrochimica Acta*, **51**, 3151 (2006).
21. P. Randive, A. Dalal, and **P. P. Mukherjee**, "Lattice Boltzmann Modeling of Two-phase Behavior under Acoustic Excitation: Capillarity-Wettability Interaction," *International Journal of Heat and Mass Transfer*, **74**, 460 (2014).
22. P. Randive, A. Dalal, and **P. P. Mukherjee**, "Probing the Influence of Superhydrophobicity and Mixed Wettability on Droplet Displacement Behavior," *Microfluidics and Nanofluidics*, DOI 10.1007/s10404-014-1350-x (2014).
23. P. Randive, A. Dalal, and **P. P. Mukherjee**, "Mesoscopic Simulation of Blob Resonance in a Model Porous Pathway," *Microfluidics and Nanofluidics*, in press (2014).
24. M. Hassanpourfard, X. Sun, A. Valiei, **P. P. Mukherjee**, T. Thundat, Y. Liu, and A. Kumar, "Biofilm Streamer Formation in a Microfluidic Device with Micro-pillars," *Journal of Visualized Experiments*, in press (2014).
25. A. Valiei, A. Kumar, **P. P. Mukherjee**, Y. Liu, and T. Thundat, "A Web of Streamers: Biofilm Formation in a Porous Microfluidic Device," *Lab on a Chip*, **12**, 5133 (2012).
26. A. Kumar, D. Karig, R. Acharya, S. Neethirajan, **P. P. Mukherjee**, S. Retterer, and M. J. Doktycz, "Microscale Confinement Features Can Affect Biofilm Formation," *Microfluidics and Nanofluidics*, **14**, 895 (2013).
27. A. Kumar, N. P. Mortensen, **P. P. Mukherjee**, S. Retterer, and M. J. Doktycz, "Electric Field Induced Bacterial Flocculation of Enterococcal *Escherichia Coli* 042," *Applied Physics Letters*, **98**, 253701 (2011) [**Journal Issue Cover Feature; also featured in Virtual Journal of Biological Physics Research, July 2011 Issue**]
28. T. Sheorey, K. Muralidhar, and **P. P. Mukherjee**, "Numerical Experiments in the Simulation of Enhanced Oil Recovery from a Porous Formation," *International Journal of Thermal Sciences*, **40**, 981 (2001).

Journal Articles (under review and forthcoming submission)

1. P. Barai and **P. P. Mukherjee**, "Mechano-Electrochemical Model for Acoustic Emission Characterization in Intercalation Electrodes," *Journal of the Electrochemical Society*, under review (2014).
2. C.-F. Chen, P. Barai, and **P. P. Mukherjee**, "Diffusion Induced Damage and Impedance Response in Lithium-Ion Battery Electrodes," *Journal of the Electrochemical Society*, under review (2014).
3. Z. Liu and **P. P. Mukherjee**, "Mesoscale Elucidation of the Influence of Mixing Sequence in Electrode Processing," *Langmuir* (target submission: September 2014).
4. S. Cho and **P. P. Mukherjee**, "Probing the Influence of Microstructures on Impedance Response in Lithium-ion Battery Electrodes," *Analytical Chemistry* (target submission: September 2014).

5. M. Stein IV, C.-F. Chen, A. Wiegmann, and **P. P. Mukherjee**, "Microstructural Influence on Long Range Interactions in Lithium-ion Battery Electrodes," *Electrochimica Acta* (target submission: October 2014).
6. C.-F. Chen and **P. P. Mukherjee**, "Solid Electrolyte Interphase and Impedance Response in Lithium-ion Battery Electrodes: a Mesoscale Approach," *Journal of the Electrochemical Society* (target submission: October 2014).
7. P. Barai and **P. P. Mukherjee**, "Stochastics of Diffusion Induced Damage in Disordered Media," *Physical Review E* (target submission: November 2014).
8. M. A. Martin, **P. P. Mukherjee et al.**, "Electrochemical and Transport Characteristics of Lithium-ion Battery 3-D Electrode Architectures," *Electrochimica Acta* (target submission: November 2014).
9. M. Hasan, C.-F. Chen and **P. P. Mukherjee**, "Analysis of Chemo-Mechanical Interaction in Intercalation Electrodes," *Journal of the Electrochemical Society* (target submission: December 2014).
10. D. Bhatia and **P. P. Mukherjee**, "Analysis of the Influence of Manufacturing Variability on Lithium-ion Battery Electrode Performance," *Journal of Power Sources* (target submission: December 2014).

Conference Proceedings

1. **P. P. Mukherjee** and C.-F. Chen, "Electrodics: Mesoscale Physicochemical Interactions in Lithium-ion Batteries" SPIE Proceedings (2014).
2. P. Barai, K. An, and **P. P. Mukherjee**, "Temperature Dependent Performance of a Lithium-ion Battery Electrode," Proceedings of the 11th International and 22nd National ISHMT-ASME Heat and Mass Transfer Conference, IIT Kharagpur, India (2013).
3. C. Lopez, P. Barai, and **P. P. Mukherjee**, "Lithium-ion Battery Safety – a Computational Perspective," Proceedings of the Process Safety International Symposium (2013).
4. T. Kotaka, K. Aotani, Y. Tabuchi, and **P. P. Mukherjee**, "Analysis of Mass Transport Phenomena in Microporous Layer for High Current Density Operation on PEFC for Automobile Applications," Proceedings of the 11th ASME International Fuel Cell Science, Engineering, and Technology Conference (2013).
5. P. Randive, A. Dalal, and **P. P. Mukherjee**, "Simulation of Blob Dynamics inside a Channel under Acoustic Excitation," Proceedings of the ASME Summer Heat Transfer Conference (2013).
6. P. Barai, S. Simunovic, and **P. P. Mukherjee**, "Damage and Crack Analysis in a Li-ion Battery Electrode using Random Spring Model," Proceedings of the ASME International Mechanical Engineering Congress and Exposition (IMECE) (2012).
7. A. Kumar, D. Karig, S. Neethirajan, A. K. Suresh, B. R. Srijanto, **P. P. Mukherjee**, S. T. Retterer, M. J. Doktycz "Adhesion and formation of microbial biofilms in complex microfluidic devices," Proceedings of ASME 3rd Micro/Nanoscale Heat and Mass Transfer International Conference (2012).
8. V. P. Schulz, **P. P. Mukherjee**, and H. Andrä, "Compression Modeling and Transport Characterization of the PEM Fuel Cell Diffusion Medium," Proceedings of ASME FuelCell2011, 9th ASME International Fuel Cell Science, Engineering, and Technology Conference (2011).
9. **P. P. Mukherjee**, E. Shim, R. Mukundan, and R. L. Borup, "Digital Volume Imaging of the PEFC Gas Diffusion Layer," ECS Transactions, **33**, 1483 (2010).
10. D. Spornjak, **P. P. Mukherjee**, R. Mukundan, J. R. Davey, D. S. Hussey, D. L. Jacobson, and R. L. Borup, "Measurement of Water Content in Polymer Electrolyte Membranes Using High Resolution Neutron Imaging," ECS Transactions, **33**, 1451 (2010).
11. Y. Wang and **P. P. Mukherjee**, "Multi-physics, Multi-scale Modeling in Polymer Electrolyte Fuel Cells," **Invited Paper** in ASME International Mechanical Engineering Congress and Exposition (IMECE), (2010).
12. **P. P. Mukherjee**, D. Ranjan, R. Mukundan, and R. L. Borup, "Heat and Water Transport in a Polymer Electrolyte Fuel Cell Electrode," Proceedings of the ASME International Heat Transfer Conference (IHTC-14) (2010).

13. Y. Wang, **P. P. Mukherjee**, J. Mishler, R. Mukundan, and R. L. Borup “Cold Start Characteristics of Polymer Electrolyte Fuel Cells,” Proceedings of the ASME International Heat Transfer Conference (IHTC-14) (2010).
14. **P. P. Mukherjee**, R. Mukundan, and R. L. Borup, “Modeling of Durability Effect on the Flooding Behavior in the PEFC Gas Diffusion Layer,” Proceedings of ASME FuelCell2010, 8th ASME International Fuel Cell Science, Engineering, and Technology Conference (2010).
15. J. Mishler, Y. Wang, **P. P. Mukherjee**, R. Mukundan, and R. L. Borup, “Numerical and Experimental Analysis of Subfreezing Operation in PEM Fuel Cells,” Proceedings of ASME FuelCell2010, 8th ASME International Fuel Cell Science, Engineering, and Technology Conference (2010).
16. **P. P. Mukherjee**, Q. Kang, R. Mukundan, and R. L. Borup, “Numerical Modeling of Two-Phase Behavior in the PEFC Gas Diffusion Layer,” ECS Transactions, **26**, 97 (2010).
17. V. Ho, M. Shimada, D. Szeto, **P. P. Mukherjee**, Q. Kang, L. Kulinsky, and M. Madou, “ Novel Fabrication Technology for Three-dimensional High Surface Area Pyrolyzed Structures,” SPIE Proceedings, **7647** (2010).
18. **P. P. Mukherjee**, C. Y. Wang, V. P. Schulz, Q. Kang, J. Becker, and A. Wiegmann, “Two-Phase Behavior and Effect of Compression in a PEFC Gas Diffusion Medium,” ECS Transactions, **25**, 1485 (2009).
19. **P. P. Mukherjee**, R. Mukundan, J. Spendelow, J. R. Davey, R. L. Borup, D. S. Hussey, D. L. Jacobson, and M. Arif, “High Resolution Neutron Imaging of Water in the Polymer Electrolyte Membrane,” ECS Transactions, **25**, 505 (2009).
20. Y. Wang, J. Mishler, **P. P. Mukherjee**, R. Mukundan, and R. L. Borup, “Pseudo One-Dimensional Analysis of Polymer Electrolyte Fuel Cell Cold-Start,” ECS Transactions, **25**, 285 (2009).
21. J. R. Davey, R. Mukundan, J. S. Spendelow, **P. P. Mukherjee**, D. S. Hussey, D. L. Jacobson, and M. Arif, and R. L. Borup, “Wetting and Drying Responses of Gas Diffusion Layers and Proton Exchange Membrane to Current Transients,” ECS Transactions, **25**, 971 (2009).
22. **P. P. Mukherjee**, “Capillarity, Wettability and Interfacial Dynamics in Polymer Electrolyte Fuel Cells,” **Invited Keynote Paper** in Proceedings of the ASME 7th International Conference on Nanochannels, Microchannels and Minichannels, Pohang, South Korea, June 22-24 (2009).
23. **P. P. Mukherjee** and C. Y. Wang, “Mesoscopic Modeling of Liquid Water Transport in Polymer Electrolyte Fuel Cells,” ECS Transactions, **16** (2), 2125 (2008).
24. **P. P. Mukherjee**, T. E. Springer, R. Mukundan, D. S. Hussey, D. L. Jacobson, M. Arif, and R. L. Borup, “Probing Liquid Water Profile in the Polymer Electrolyte Fuel Cell Membrane,” ECS Transactions, **16** (2), 1027 (2008).
25. J. Chen, Y. Wang, and **P. P. Mukherjee**, “One Dimensional Analysis of Subzero Start-Up for Polymer Electrolyte Fuel Cells,” ECS Transactions, **16** (2), 273 (2008).
26. **P. P. Mukherjee** and C. Y. Wang, “A Catalyst Layer Flooding Model for Polymer Electrolyte Fuel Cells,” Proceedings of ASME FuelCell2008, 6th ASME International Fuel Cell Science, Engineering, and Technology Conference, Denver, CO, USA, June 16 – 18 (2008).
27. **P. P. Mukherjee** and C. Y. Wang, “Modeling of Catalyst Layer Surface Coverage and Volume Blockage Owing to Liquid Water in a PEFC,” ECS Transactions, **3**, 1085 (2006).
28. V. P. Schulz, **P. P. Mukherjee**, J. Becker, A. Wiegmann, and C. Y. Wang, “Numerical Evaluation of Effective Gas Diffusivity – Saturation Dependence of Uncompressed and Compressed Gas Diffusion Media in PEFCs,” ECS Transactions, **3**, 1069 (2006).
29. U. Pasaogullari, **P. P. Mukherjee**, C. Y. Wang, and K. S. Chen, “Effect of Anisotropy of Gas Diffusion Layers on Two-Phase Heat and Mass Transport in Polymer Electrolyte Fuel Cells,” ECS Transactions, **3**, 1239 (2006).
30. **P. P. Mukherjee**, S. Sarkar, and G. Biswas, “Numerical Investigation of Heat Transfer Enhancement in Fin-tube Heat Exchangers with Winglet Type Vortex Generators,” *Proceedings of the International Conference on Scientific and Engineering Computation (IC-SEC)*, Singapore, December 3 – 5 (2002).

31. **P. P. Mukherjee**, K. Muralidhar, and G. Biswas, "Numerical Simulation of Enhanced Oil Recovery from Porous Formations and Fractured Rocks," *Proceedings of the 4th ISHMT-ASME Heat and Mass Transfer Conference*, 857, Pune, India, January 12 – 14 (2000).

Book Chapters

1. **P. P. Mukherjee**, S. Pannala, and J. A. Turner "Modeling and Simulation of Battery Systems," Invited Chapter in *Handbook of Battery Materials*, 2nd Edition, Ed: C. Daniel, and J. O. Besenhard, Ch. 25, Wiley-VCH, Weinheim, Germany (2011).
2. **P. P. Mukherjee** and F. Liu, "Lithium-ion Battery Cathode: Materials and Physicochemical Transport," Invited Chapter in *Rechargeable Lithium Batteries: from Fundamentals to Applications*, Ed: A. Franco, Woodhead Publishing Ltd. (2014).
3. **P. P. Mukherjee**, V. P. Schulz, J. Becker, E. Glatt, and A. Wiegmann, "Microstructure Reconstruction and Transport Simulation in PEM Fuel Cells," Invited Chapter in *Polymer Electrolyte Membrane and Direct Methanol Fuel Cell Technology (PEMFCs and DMFCs)*, Ed: C. Hartnig and C. Roth, Ch. 9, Woodhead Publishing Ltd., (2012).
4. J. Hinebaugh, A. Bazylak, and **P. P. Mukherjee**, "Multi-scale Modeling of Two-Phase Transport Phenomena in PEM Fuel Cells," Invited Chapter in *Polymer Electrolyte Membrane and Direct Methanol Fuel Cell Technology (PEMFCs and DMFCs)*, Ed: C. Hartnig and C. Roth, Ch. 10, Woodhead Publishing Ltd., (2012).
5. R. Ghosh, A. Kumar, and **P. P. Mukherjee**, "Micro/nano Transport in Microbial Energy Harvesting", in *Encyclopedia of Nanotechnology*, Ed: B. Bhushan, Article 00421, Springer (2012).
6. S. Neethirajan, D. Karig, A. Kumar, **P. P. Mukherjee**, S. T. Retterer, and M. J. Doktycz, "Biofilms in Microfluidic Devices", in *Encyclopedia of Nanotechnology*, Ed: B. Bhushan, Article 00427, Springer (2012).
7. **P. P. Mukherjee** and Q. Kang, "Electrodics in Electrochemical Energy Conversion Systems," Invited Chapter in *Mechanics over Micro and Nano Scales*, Springer, Ed: S. Chakraborty, Ch. 7, Springer (2011).
8. P. K. Sinha and **P. P. Mukherjee**, "Modeling of Two-phase Transport Phenomena in Porous Media – Pore-scale Approach," Invited Chapter in *Mechanics over Micro and Nano Scales*, Springer, Ed: S. Chakraborty, Ch. 3, Springer (2011).
9. **P. P. Mukherjee** and C. Y. Wang, "Polymer Electrolyte Fuel Cell Modeling – a Pore-Scale Perspective," Invited Chapter in *Progress in Green Energy*, Ed: X. Li, Vol. 1, Ch. 5, Springer (2011).
10. **P. P. Mukherjee** and C. Y. Wang, "Mesoscopic Modeling of Two-Phase Transport in Polymer Electrolyte Fuel Cells," Invited Chapter in *Modeling and Diagnostics of Polymer Electrolyte Fuel Cells*, special issue of *Modern Aspects of Electrochemistry* series, Ed: U. Pasaogullari and C. Y. Wang, **49**, Ch. 8, Springer (2010).
11. R. Martinez-Duarte, G. T. Teixidor, **P. P. Mukherjee**, Q. Kang, and M. J. Madou, "Perspectives of Micro and Nanofabrication of Carbon for Electrochemical and Microfluidic Applications," Invited Chapter in *Microfluidics and Microfabrication*, Ed: S. Chakraborty, 181-263, Springer (2010).
12. **P. P. Mukherjee**, G. Wang, and C. Y. Wang, "Direct Numerical Simulation of Polymer Electrolyte Fuel Cell Catalyst Layers," Invited Chapter in *Modern Aspects of Electrochemistry*, Ed: R. White *et al.*, **40**, Ch. 6, Springer, New York (2007).

Books

1. "*Electrochemical Energy Conversion and Storage*," Edited Volume (with W. Chiu, G. Nelson, M. Ellis, and I. Avdeev), Wiley Publications, *in preparation* (2014).

Honors and Awards

1. Guest Co-Editor, Focus Issue of Journal of the Electrochemical Society, on “*Mechano-Electrochemical Coupling in Energy Related Materials and Devices*” Vol. 161, No. 9 (2014).
2. Symposium Co-Organizer, “*Mechanical-Electrochemical Coupling in Energy Related Materials and Devices*,” Sponsored by the Electrochemical Society, 225th ECS Meeting, Orlando, FL, May 11 – 16 (2014).
3. Co-Editor, ECS Transaction (proceeding) from “*Mechanical-Electrochemical Coupling in Energy Related Materials and Devices*,” symposium, 225th ECS Meeting (2014).
4. Symposium Co-Organizer, “*Mechano-Thermo-Electrochemical Interactions in Energy Storage: Perspective toward Safety and Life*,” 17th US National Congress on Theoretical & Applied Mechanics, Michigan State University, June 15 – 20 (2014).
5. Featured Article on ASME portal: “Lengthening the Life of Lithium-Ion Batteries” (2014).
6. Featured Video on Energy Storage in the ASME Nanoengineering for Energy and Sustainability series (2014).
7. Featured in an article on batteries in Fortune magazine (2014).
8. Nominee and Invited Participant, “*Future Leaders Program*,” Leadership Summit, American Ceramic Society (ACerS); (*Recognition at the Summit; featured in the ACerS Bulletin and inFocus newsletter*) (2014).
9. Quoted in the article “Cars without Combustion” in the September issue of the ASME Magazine for the research work on PEM fuel cell electrodes (2013).
10. Pi Tau Sigma Honor Society Faculty Member (2013).
11. “**Top 25 most cited articles**” as published in *Electrochimica Acta* (2008-2009) [reported in 2012]; **Featured** in the 63rd Annual Meeting of the International Society of Electrochemistry, Prague, Czech Republic, 19 – 24 August (2012).
12. Front Cover Illustration, *Applied Physics Letters* (2011)
13. “**5th most cited article**” as published in *Journal of the Electrochemical Society* (2007) [reported in 2010]
14. LAAP (Los Alamos Awards Program) Award, Los Alamos National Laboratory (2009)
15. Director’s Research Fellowship, Los Alamos National Laboratory (LANL), NM, USA (2008)
16. **Front Cover Illustration**, *New Energy Materials* theme issue, August, 2007, in *Journal of Materials Chemistry – Royal Society of Chemistry* (RSC). Honorable mention and citation of the liquid water dynamics study from the lattice Boltzmann simulations by Professor S. Islam, Editor, in the editorial of *New Energy Materials* theme issue, one of the most accessed RSC web-links since its publication
17. Research Invitation and Travel Grant Award, Fraunhofer Institute of Industrial Mathematics (ITWM), Kaiserslautern, Germany, July 9 – 16 (2007)
18. Travel Grant Award, International Conference for Mesoscopic Methods in Engineering and Science (ICMMES-2007), Munich, Germany, July 17 – 20 (2007)
19. Honorable Mention and Citation by Dr. Shimshon Gottesfeld of the paper, “Stochastic Microstructure Reconstruction and Direct Numerical Simulation of the PEFC Catalyst Layer,” *Journal of the Electrochemical Society*, 153, A840 (2006), in his *Grove Medal acceptance speech* titled “Fuel Cell Techno-Personal Milestones 1984–2006” [*Journal of Power Sources*, 171, 37 (2007)]
20. Travel Grant Award, Electrochemical Society Meeting, Cancun, Mexico, October 29 – November 3 (2006)
21. Travel Grant Award, International Conference for Mesoscopic Methods in Engineering and Science (ICMMES-2006), Hampton, VA, USA, July 24 – 28 (2006)
22. Tau Beta Pi Engineering Honor Society Invitational Membership for academic excellence (2007)
23. The Chancellor’s List for academic achievements in graduate studies (2005, 2006)
24. Topped (1st Rank) the Thermal Science and Fluid Mechanics Program, Master of Technology, Department of Mechanical Engineering, Indian Institute of Technology, Kanpur, India (1997-1999)

25. 99.09 Percentile in Graduate Aptitude Test in Engineering (GATE), India (All India entrance examination for Masters Program in Engineering) (1997)
26. Silver Medal for 2nd rank in B.S. in the Department of Mechanical Engineering, University of North Bengal (1997)
27. Scholarship from Bankura Chamber of Commerce & Industry for exemplary result in Higher Secondary (10+2) Examination in Bankura district, West Bengal, India (1993)
28. National Scholarships for Higher Secondary (10+2) (1993) and Secondary (1991) Examinations

Invited Presentations

1. "Advances in Energy Storage Systems: Lithium Batteries, Supercapacitors and Beyond," International Conference on Materials for Advanced Technologies (ICMAT) (2015).
2. "Nanostructured Materials for Rechargeable Batteries and for Supercapacitors" Symposium, 144th TMS Annual Meeting (2015).
3. "Synthesis and Processing of Nanostructured Materials for Energy Applications" Symposium, 39th International Conference on Advanced Ceramics & Composites, American Ceramic Society (2015).
4. "Advanced Materials and Technologies for Energy Generation, Conversion and Rechargeable Energy Storage" Symposium, 39th Intl. Conference on Advanced Ceramics & Composites, American Ceramic Society (2015).
5. "Materials Challenges in Alternative and Renewable Energy," American Ceramic Society (2014).
6. "Energy Harvesting and Storage: Materials, Devices and Applications," SPIE Defense, Security, and Sensing (DSS) Conference (2014).
7. "Nanostructured Materials for Rechargeable Batteries and for Supercapacitors" Symposium, 143rd TMS Annual Meeting (2014).
8. Graduate Seminar, Department of Mechanical Engineering, Michigan Tech, April 19 (2014).
9. "Advances in Batteries" Symposium, 245th ACS Meeting (2013).
10. "Nanoengineering for Energy Storage" Panel, ASME International Mechanical Engineering Congress and Exposition (2013).
11. Energy Storage Webinar, ASME Nanotechnology Institute – Renewable Energy Webinar Series, May 7 (2013).
12. 9th ASME International Fuel Cell Science, Engineering, and Technology Conference (2011).
13. 7th Annual International Lithium Battery Power Conference (2011).
14. Graduate Seminar, School of Mechanical Engineering, Purdue University, September 23 (2010).
15. Department of Aeronautics and Astronautics, MIT, August 16 (2010).
16. Department of Civil & Environmental Engineering, University of Tennessee, Knoxville, May 11 (2010).
17. Computational Multiscale Nanosystems Seminar, Beckman Institute, University of Illinois at Urbana-Champaign, May 5 (2010).
18. Graduate Seminar, Department of Mechanical Engineering, Virginia Tech, April 19 (2010).
19. Departmental Seminar, Mechanical Engineering, California Institute of Technology, March 5 (2010).
20. *Keynote*, ASME 7th International Conference on Nanochannels, Microchannels and Minichannels, Pohang, South Korea, June 22-24 (2009).
21. PReSS (Post-Doc and Recent Staff Seminar), Sandia National Laboratories, Albuquerque, April 30 (2009).
22. Graduate Seminar, Department of Mechanical Engineering, Texas A&M University, March 11 (2009).
23. Departmental Seminar, Department of Mechanical Engineering, University of California, Berkeley, March 2 (2009).
24. Nanogeosciences Group, Lawrence Berkeley National Laboratory and University of California, Berkeley, November 11 (2008).

25. Departmental Seminar, Department of Mechanical Engineering, Carnegie Mellon University, October 10 (2008).
26. Graduate Seminar, Department of Metallurgical and Materials Science, Colorado School of Mines, September 18 (2008).
27. Departmental Seminar, Department of Mechanical Engineering, Indian Institute of Technology, Kanpur, India, August 11 (2008).
28. Departmental Seminar, Department of Mechanical Engineering, Indian Institute of Technology, Kharagpur, India, August 1 (2008).
29. Microfluidics Laboratory, Department of Mechanical Engineering, Stanford University, July 9 (2008).
30. Clean Energy Supercluster (CES), Colorado State University, June 20 (2008).
31. Colorado Fuel Cell Center (CFCC), Colorado School of Mines, June 19 (2008).
32. National Renewable Energy Laboratory (NREL), June 18 (2008).
33. Departmental Seminar, Department of Mechanical and Aerospace Engineering, University of California – Irvine, April 4 (2008).
34. Graduate Seminar, Department of Mechanical Engineering, City College of New York, November 1 (2007).
35. PSU-Nissan Workshop on Automotive Fuel Cells, Pennsylvania State University, October 15 (2007).
36. Fraunhofer Institute of Industrial Mathematics (ITWM), Kaiserslautern, Germany, July 11 (2007).
37. Departmental Seminar, Department of Mechanical Engineering, Indian School of Mines, India, July 13 (2006).

Research Funding

At TAMU: ~\$1.14M (PI share)

1. NSF, “Collaborative Research: Mesoscale Investigation of Microstructure-Transport Interaction of High-Capacity Electrodes for Energy Storage,” \$214,740 (my share); 09/2014 – 08/2017; Mukherjee is Lead PI.
2. U.S. DOE, “Addressing Internal “Shuttle” Effect: Electrolyte Design and Cathode Morphology Evolution in Li-S Batteries,” \$990,000; 09/2014 – 08/2017; Mukherjee is Co-PI; \$330,000 (my share).
3. NASA, “Lithium-Ion Battery Safety and Thermal Management,” \$120,000; 09/2013 – 08/2016; Mukherjee is PI.
4. Texas Instruments, “Lithium Materials Based Battery Deterioration Diagnosis,” \$201,000; 09/2014 – 08/2017; Mukherjee is PI.
5. National Renewable Energy Laboratory, “Improved Fidelity Battery Life Prognostic Models,” \$55,000; 06/2014 – 03/2015; Mukherjee is PI.
6. CONACYT (Mexico) – TAMU Research Collaboration, “High-performance Electrode Architecture for Lithium-Air Batteries,” \$24,000 (seed grant); 09/2014 – 08/2015; Mukherjee is PI.
7. U.S. DOE SBIR Phase II, “A Cost-Effective Oxygen Separation System Based on Open Gradient Magnetic Field by Polymer Beads,” \$103,000 (my share); 07/2014 – 06/2016; Mukherjee is University PI.
8. U.S. DOE SBIR Phase I, “A Cost-Effective Oxygen Separation System Based on Open Gradient Magnetic Field by Polymer Beads,” \$35,000 (my share); 07/2013 – 03/2014; Mukherjee is University PI.
9. Oak Ridge National Laboratory, “Analysis of Biofilm in Microfluidic Platform,” \$6,700; 10/2012 – 12/2012; Mukherjee is PI.
10. TAMU Engineering Challenge Program, “Designing Transparent Energy Storage Devices,” \$50,000; 09/2012 – 05/2014; Mukherjee is PI.

Before TAMU:

1. Strategic Hire in Energy Storage, Oak Ridge National Laboratory (ORNL) (2009-2011).

2. "Fractal Electrodes for Lithium-Ion Batteries," Collaborative Research Program: University of California System, Los Alamos National Laboratory and Lawrence Livermore National Laboratory; \$740,000 (2009-2011).
3. "Pore-scale Modeling of Multiphase Flow and Reaction in Charged Porous Media," Director's Research Fellowship, LANL LDRD Program; \$288,000 (2008-2009).

Research Mentoring

Ph.D. Student

1. P. Barai, Mechanical Engineering, TAMU (2012 – present) (Thesis chair)
2. Z. Liu, Mechanical Engineering, TAMU (2012 – present) (Thesis chair)
3. C.-F. Chen, Mechanical Engineering, TAMU (2013 – present) (Thesis chair)
4. B. Takabi, Mechanical Engineering, TAMU (2014 – present) (Thesis chair)
5. G. Li, Mathematics, TAMU (2012 – present) (Thesis co-chair)

M.S. Student

1. C. Lopez, Mechanical Engineering, TAMU (2013 – present) (Thesis chair)
2. M. Stein IV, Mechanical Engineering, TAMU (2013 – present) (Thesis chair)
3. J. Saichua, Mechanical Engineering, TAMU (2014 – present) (Thesis chair)
4. D. Bhatia, Mechanical Engineering, TAMU (2014 – present) (Thesis chair)
5. N. Kotak, Mechanical Engineering, TAMU (2014 – present) (Thesis chair)
6. S. Palakurthy, Mechanical Engineering, TAMU (2014 – present) (Thesis chair)
7. B. Vajipeyajula, Mechanical Engineering, TAMU (2014 – present) (Thesis chair)
8. M. Hasan, Mechanical Engineering, TAMU (2013 – 2014) (Thesis chair)
9. S. Cho, Mechanical Engineering, TAMU (2012 – 2013) (Thesis chair)
10. K. An, Mechanical Engineering, TAMU (2012 – 2013) (Thesis chair)
11. M. Martin, Mechanical Engineering, TAMU (2010 – 2012) (Thesis co-chair)

Undergraduate Student

1. B. Powell, Mechanical Engineering, TAMU (2012 – 2014)
2. D. Hubble, Chemical Engineering, TAMU (2012 – 2014)
3. D. Bhatia, Electrical and Computer Engineering, TAMU (2013 – 2014)
4. C. Lopez, Mechanical Engineering, TAMU (2012 – 2013)
5. M. Stein IV, Mechanical Engineering, TAMU (2012 – 2013)
6. A. Vaclavik, Mechanical Engineering, TAMU (2012 – 2013)
7. J. Ellington, Mechanical Engineering, TAMU (2013)
8. S. Widger, Mechanical Engineering, TAMU (2012 – 2013)

Visiting Scientist

1. Dr. B. Mondal, IUSSTF (Indo-US Science and Technology Forum) Fellow, (2014-2015)
2. Dr. B. Bej, Researcher (2014-2015)
3. Dr. A. Dalal, Visiting Faculty, IIT Guwahati, India (2013)

Visiting Graduate Student

1. W. Wiebe, M.S. Student, Mechanical Engineering, DHBW Cooperative State University – Mannheim, Germany (September, 2014)
2. F. Nitz, M.S. Student, Mechanical Engineering, DHBW Cooperative State University – Mannheim, Germany (June, 2014)
3. B. Priggemeier, Mechanical Engineering, Ruhr-Universität Bochum, Germany (January – May, 2014)
4. T. Schmitt, M.S. Student, Applied Mathematics and Statistics, Institute of Stochastics, Ulm University, Germany (October 2011 – March 2012)
5. T. Mabuchi, M.S. Student, Department of Mechanical and Aerospace Engineering, Tohoku University, Japan (February – March, 2012)

Summer Student

1. W. Reed, Angelo State University, Physics, (2014, NSF REU Program)
2. D. Hubble, TAMU, Chemical (2013, TAMU Undergraduate Summer Research Fellowship)
3. D. Bhatia, TAMU, Electrical (2013, TAMU Undergraduate Summer Research Fellowship)
4. J. Thomas III, TAMU Kingsville, Mechanical (2013, NSF REU Program)
5. A. Rana, IIT Kanpur, India, Mechanical (2013, IIT Kanpur – TAMU Summer Program)
6. B. Powell, TAMU, Mechanical (2012, TAMU Undergraduate Summer Research Fellowship)
7. M. Stein IV, TAMU, Mechanical (2012, TAMU Undergraduate Summer Research Fellowship)
8. M. Martin, TAMU, Mechanical (2011, Internship at Oak Ridge National Laboratory)

Student Awards and Honors

1. P. Barai, Texas A&M Energy Institute ConocoPhillips (Graduate) Fellowship (2013)
2. P. Barai, NSF Student Travel Grant Award to ASME IMECE (2012, 2013)
3. C. Lopez, NASA Harriett G. Jenkins Graduate Fellowship (2013-2016).
4. J. Saichua, TAMU Graduate Diversity Fellowship for graduate studies (2014-2017).
5. C. Lopez, graduate student spotlight and recognition in the Mechanical Engineering Magazine (2014).
6. M. Stein IV, 1st place in MEGSO (Mechanical Engineering Graduate Students Association) at the Pi Tau Sigma National Convention (2014).
7. C. Lopez, 1st place in graduate poster presentation in Engineering at the Student Research Week Competition on "Thermal Management of Lithium-Ion Batteries for Space Application"; and 2nd place in the Sigma Xi Theme Award (2014).
8. C. Lopez, 2nd place in undergraduate poster presentation in Engineering at the Student Research Week Competition on "The Effect of Vortex Generators on Active Battery Thermal Management" from his Undergraduate Thesis (2013)
9. C. Lopez, Thompson Outstanding Senior Award, Mechanical Engineering (2013).
10. M. Martin, Electrochemical Society (ECS) Student Travel Grant Award to the Spring ECS Meeting (2012).
11. 1st Place Award, Undergraduate Research (AggiE Challenge) Team for their work on lithium-ion batteries, TAMU Engineering Project Showcase (2014)
12. 2nd Place Award, Undergraduate Research (AggiE Challenge) Team for their work on lithium-ion batteries, TAMU Engineering Project Showcase (2013)
13. D. Hubble (Chemical), B. Powell (Mechanical), D. Bhatia (Electrical): Research Opportunities for Engineers (ROE) scholarship for pursuing undergraduate research in fall 2013 and spring 2014 semesters.
14. M. Stein IV, Research Opportunities for Engineers (ROE) scholarship for pursuing undergraduate research in fall 2012 and spring 2013 semesters.
15. B. Powell, M. Stein IV (summer 2012); D. Hubble, D. Bhatia (summer 2013): Undergraduate Summer Research Grant (USRG) Fellowship.

Teaching

1. Graduate Heat Transfer, Mechanical Engineering, TAMU (Fall 2013, Spring 2014)
2. Undergraduate Heat Transfer, Mechanical Engineering, TAMU (Spring 2012, Fall 2012, Fall 2014)
3. Undergraduate Thermo-Fluid Analysis and Design, Mechanical Engineering, TAMU (Spring 2013)
4. Numerical Simulation: Energy Conversion & Storage, International School (1-week short course), Mechanical Engineering, TAMU and DHBW Mannheim – Germany (Fall 2014)
5. Physicochemical Fundamentals in Energy Storage, New Course Development (Target: Spring 2015)
6. Lecturer, LANL Fuel Cell Short Course, Los Alamos, NM, USA (2008, 2009).
7. Guest Student Lecturer, "Microfluidics Fundamentals and Applications" in ME 497J – Micro/Nano Science and Engineering, Department of Mechanical & Nuclear Engineering, Pennsylvania State Univ., December 08 (2004).

8. Teaching Assistant, Thermodynamics II, Undergraduate Course, Department of Mechanical & Nuclear Engineering, Pennsylvania State Univ., August – December (2003).
9. Lecturer, Client Training on CFD, Fluent India Pvt. Ltd, Subsidiary of Ansys - Fluent, Pune, India, (2000 - 2003).
10. Teaching Assistant, Undergraduate Heat Transfer Laboratory, Department of Mechanical Engineering, Indian Institute of Technology (IIT), Kanpur, India, August 1997- May 1998.
11. Laboratory Assistant, Undergraduate Fluid Mechanics Laboratory, Department of Mechanical Engineering, Indian Institute of Technology, Kanpur, India, August 1998 – March 1999.
12. Grader, Undergraduate Heat Transfer, Department of Mechanical Engineering, Indian Institute of Technology, Kanpur, India, January 1998 – May 1998.

Synergistic Activities

1. Guest Editor, Focus Issue of Journal of the Electrochemical Society, on “*Mechano-Electrochemical Coupling in Energy Related Materials and Devices*” Vol. 161, No. 9 (2014).
2. Symposium Organizer, “*Mechano-Electrochemical Coupling in Energy Related Materials and Devices*,” Sponsored by the Electrochemical Society, 225th ECS Meeting, Orlando, FL, May 11 – 16 (2014).
3. Symposium Organizer, “*Mechano-Thermo-Electrochemical Interactions in Energy Storage: Perspective toward Safety and Life*,” 17th US National Congress on Theoretical & Applied Mechanics, Michigan State University, June 15 – 20 (2014).
4. Vice-Chair, Technical Committee, ASME Electrochemical Energy Conversion and Storage (2014 – present).
5. Technical Committee, ASME Nano-Engineering for Energy and Sustainability (NEES) (2013 – present).
6. Seminar Committee, Mechanical Engineering, TAMU (2013 – present)
7. Search Committee, College of Engineering, TAMU (2013 – 2014)
8. **Track/Session/Panel Organizer:**
 ECS Meeting (session: 2009 – 2014; symposium: 2014)
 ASME International Fuel Cell Conference (track and session: 2008 – 2014)
 ASME IMECE (topic, track, session, panel: 2010, 2012 – 2014)
 ASME International Heat Transfer Conference (panel: 2010).
9. **Reviewer**
Proposals:
 National Science Foundation, Department of Energy, ACS Petroleum Research Fund, California Energy Commission, University of Wisconsin Milwaukee Research Foundation, ORNL Laboratory Directed Research and Development, NRC Canada, Qatar National Research Foundation, NSF China, NSF South Africa, Zurich Research Commission.
Journals (>30):
 Journal of the Electrochemical Society, Electrochimica Acta, Energy and Environmental Science, Analytical Chemistry, Analytica Chimica Acta, Langmuir, Journal of Power Sources, Electrochemistry Communications, Progress in Energy and Combustion Science, International Journal of Hydrogen Energy, Fuel Cells
Conference Proceedings:
 ASME International Fuel Cell Conference, ASME International Conference on Energy Sustainability, ASME International Heat Transfer Conference, ASME International Micro/Nanoscale Heat and Mass Transfer Conference, ASME International Mechanical Engineering Congress and Exposition, ASME International Conference on Nanochannels, Microchannels and Minichannels
10. **Professional Affiliation & Membership:** Electrochemical Society (ECS); Materials Research Society (MRS); American Chemical Society (ACS); The Metals, Minerals and Materials Society (TMS); American Society of Mechanical Engineers (ASME); American Society for Engineering Education (ASEE)