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Professional Preparation

Virginia Tech	Chemical Engineering Dissertation Advisor: J. E. McGrath, Chemistry (deceased)	Ph.D. 2003
Virginia Tech	Chemical Engineering	M.Eng. 2002
Michigan Technological University	Chemical Engineering	B.S. 1999

Appointments

2023-present	Craig A. Rogerson Endowed Professor Department of Chemical Engineering and Materials Science Michigan State University, East Lansing, MI
2023-present	Adjunct Professor, Department of Materials Science and Engineering Pennsylvania State University, University Park, PA
August 2018-present	Associate Editor, ACS Applied Energy Materials, American Chemical Society
July 2018-Dec 2022	Professor, Materials Science and Engineering Professor by courtesy, Department of Chemistry and Department of Chemical Engineering The Pennsylvania State University, University Park PA
Sept. 2017-Dec 2022	Co-Director, Center for Innovative Materials Processing through Direct Digital Deposition (CIMP-3D) The Pennsylvania State University, University Park PA
Nov. 2016-Dec 2022	Associate Director, Materials Research Institute The Pennsylvania State University, University Park PA
Oct. 2016-July 2018	Associate Professor by courtesy, Department of Chemistry The Pennsylvania State University, University Park PA
Feb. 2014-July 2018	Associate Professor by courtesy, Department of Chemical Engineering The Pennsylvania State University, University Park PA
July 2013-July 2018	Associate Professor, Department of Materials Science and Engineering The Pennsylvania State University, University Park PA Corning Faculty Fellow (2016-2019)
July 2007-June 2013	Assistant Professor, Department of Materials Science and Engineering The Pennsylvania State University, University Park, PA Virginia S. and Philip L. Walker, Jr. Faculty Fellow (2010-2013)
2005-June 2007	Senior Member of the Technical Staff

	Sandia National Laboratories, Albuquerque, NM
2003-2005	Postdoctoral Appointee Sandia National Laboratories, Albuquerque, NM
2002, 2000	Graduate Research Assistant Los Alamos National Laboratory, Los Alamos, NM

Research Interests and Expertise

My research interests focus on the coupling of polymer composition and nanophase structure, water diffusion in membranes, and ion transport. My research group strives to understand the self-assembly of polymers with attached ions, the binding of water to the polymer matrix through hydration and nanoscale confinement, and how this water-polymer framework sets the stage for the transport of ions and small molecules through the material. To achieve basic understanding of the properties of ionic polymer systems, we undertake the synthesis of new polymers and perform measurements of their solution and solid-state structure. We elucidate water-polymer interactions using spectroscopic methods and study the effects of chemical composition, phase-separated domain structure, grain boundaries, and surface interactions on polymer membrane properties. Through this fundamental work, we strive to develop new materials for membrane and electrochemical processes including applications in batteries, fuel cells, and water purification. A recent facet of my work has been on measuring and controlling the surface properties of new polymers to combat fouling in marine environments and microbial fuel cells. We have also broken new ground in additive manufacturing of unique materials, assemblies, composites, and polymer-derived ceramics. My group also draws on its core expertise in polymer synthesis and polymer function to devise new polymers for basic studies of polymer thin films and control of interfaces and transport processes in organic electronics.

Professional Service

- Presiding Session Organizer, "Cooperative Research Award: Symposium in Honor of Enrique Gomez, Manish Kumar, Abhishek Roy, Mou Paul, Jeffrey Wilbur, and Tyler Culp" American Chemical Society Spring National Meeting, March 26-30, 2023.
- Co-organizer (with Brian Benicewicz, U. South Carolina) American Chemical Society Polymer Chemistry Division Workshop, "Polymers for Fuel Cells, Energy Storage, and Conversion" Napa CA, February 15-18, 2022.
- Co-organizer (with Rob Hickey, Penn State) Penn State EMS 125th Polymer Symposium, University Park, PA April 10, 2021.
- Co-organizer (with Peter Pintauro and Michael Guiver) North American Membrane Society 2019 National Meeting, Session on Fuel Cells and Batteries, Pittsbuergh, PA, May 11-15, 2019.
- Co-organizer (with Brian Benicewicz, U. South Carolina) American Chemical Society Polymer Chemistry Division Workshop, "Polymers for Fuel Cells, Energy Storage, and Conversion" Asilomar CA, February 15-18, 2019.
- Co-organizer (with Stephen Paddison UTK, Mark Tuckerman NYU, and Chulsung Bae RPI) 19th International Conference on Solid State Protonic Conductors (SSPC-19), Stowe, VT, Sept. 16-21, 2018.
- Co-organizer (with Rigoberto Andvincula CWRU) for session on Membranes and Blends, 4th US-Mexico Symposium on Advances in Polymer Science – MACROMEX 2017, Cabo San Lucas, Mexico, December 9, 2017.
- Co-organizer (with Corky Mittlesteadt) for session on Ionic Membranes, International Conference on Membranes – ICOM, San Francisco, California July 30, 2017.
- Co-organizer (with Andrew Herring, Patrik Jannasch, and Peter Pintauro) for session on Anion and Cation Exchange Membranes, 21st Conference on Solid State Ionics, June 19, 2017.
- MRS Bulletin Volume Editor – 2017-2018.
- Electrochemical Society Journals Editorial Advisory Committee, 2016-present.
- Guest Editor (with Geoff Geise, U Virgnia, and Abhishek Roy, Dow) *Polymer* Special Issue on Using the Tools of Polymer Science to Impact Water Treatment Membranes.
- International Advisory Board – International Symposium on Polymer Electrolytes, 2013-present.
- International Advisory Board – Solid State Ionics, 2016-present.
- Membrane Session Chairperson – Department of Energy Workshop on Alkaline Membranes, Phoenix, AZ, April 1, 2016.
- Co-organizer (with Benny Freeman, UT Austin) for session on Energy - Membranes, Batteries, and Fuel Cells at Pacific Polymer Conference, Kauai, Hawaii, December 2015.
- Co-organizer (with Kenji Miyatake and Bryan Pivovar) – Pacifichem 2015 session on "Current Status and Future Prospect of Polymer Electrolyte Fuel Cells", Honolulu, Hawaii, December 2015.
- Co-organizer (with Jeff McCutcheon, UConn and Lauren Greenlee, NIST) for American Chemical Society Polymer Chemistry Division Workshop Advances in Materials and Processes for Polymeric Membrane Mediated Water Purification, Asilomar CA, February 15-18, 2015.

- Co-organizer (with Benny Freeman, UT Austin) for session on Symposium on Advanced Polymer Materials: Membranes at 3rd US-Mexico Symposium on Advances in Polymer Science – MACROMEX 2014, Nuevo Vallarta, Mexico, December 6, 2014.
- Lead investigator on American Chemical Society Technical Division Innovative Project Grant on "Strengthening Division Activities by Outreach to Meeting Attendees and Engaging Students". A $5,000 society grant for innovative ideas in division activities.
- 2012-2015 – Elected by the division members to the POLY Executive Council as "Alternate Councilor" for the Polymer Division of the American Chemical Society.
- 2013-2016 – Selected by the Editor-in-Chief Tim Lodge to serve on Macromolecules and ACS Macro Letters Editorial Advisory Boards.
- 2011-2013 - Elected to the Center for Nanophase Materials Sciences User Executive Committee by vote of the user group at Oak Ridge National Laboratory.
- Co-organizer 6th international fuel cell workshop (IFCW) August 2nd and 3rd, 2012 Kofu Japan.
- Co-Organizer (with Michael Eikerling and Stephen Paddison) Pacifichem 2010 session on "The Chemistry, Structure, and Properties of Fuel Cell Membranes" Honolulu, Hawaii, December 2010.
- Session co-chair for numerous technical sessions at Electrochemical Society, American Chemical Society, and other technical meetings.
- Manuscript reviewer for Journal of Physical Chemistry, Angewande Chemie, Journal of the American Chemical Society, Macromolecules, Industrial & Engineering Chemistry Research, Journal of Polymer Science and Engineering, Electrochimica Acta, Science, Fuel Cells, Applied Physics Letters, Nature Publishing Group, Journal of Membrane Science, Electrochemical and Solid- State Letters, Journal of the Electrochemical Society, International Journal of Hydrogen Energy, Journal of Power Sources, Polymer, Polymer International, ASME Journal of Fuel Cell Science and Technology.
- Proposal reviewer for NRC Canada, DOE Basic Energy Sciences, DOE Energy Efficiency and Renewable Energy, American Chemical Society Petroleum Research Fund, NSF Engineering Directorate and Division of Materials Research, American Association for the Advancement of Science, Danish Innovation Fund, National Center for Science and Technology – Kazakhstan, CRDF Global – a US non-profit.

University and Department Service

- MSU CHEMS/ECE Semiconductor Search Committee 2023-2024.
- MSU College of Engineering College Review Committee 2023-2024.
- MSU CHEMS Faculty Advisory Committee 2023-2024.
- MSU College of Engineering, Engineering Research Counsel 2023-2024.
- PSU EMS Faculty Performance Evaluation Committee 2019-2022.
- PSU MATSE Department Diversity Committee 2020-2022.
- PSU MATSE Department Graduate Recruiting Committee 2019-present.
- PSU Department of Chemical Engineering/PSIEE faculty search committee – 2019.
- PSU MATSE Faculty Search Committee – 2019.
- PSU MATSE Department Mentoring Committee 2017-2022.
- PSU MATSE Department Facilities Committee 2017-present.
- PSU MATSE Department Awards Committee 2016-present.
- PSU EMS faculty senator, sabbatical replacement appointment – 2016-2017.

- PSU Department of Chemistry faculty search committee – 2016-2018.
- PSU Undergraduate class adviser for MATSE – 2013-2018.
- PSU Materials Research Institute and MATSE Department strategic planning committees – 2015.
- PSU MATSE Department Steidle Building renovation committee – 2013-2015.
- PSU MATSE Department safety committee faculty chair – 2009-2015.
- PSU MATSE Department faculty search committee – Fall 2012 and Fall 2015.
- PSU Earth and Mineral Sciences College Faculty Advisory Committee member – 2011-2013.
- PSU MATSE Department undergraduate curriculum committee member - Core I, recommendations submitted to department chair – 2011.
- PSU Chemical Engineering Department faculty search committee – Fall 2008.
- PSU Nuclear and Mechanical Engineering Department faculty search committee – Spring 2008.
- PSU MATSE Department recruiting committee – 2007-2010.
- PSU MATSE Department Energy strategic planning subgroup, report submitted to department chair – 2008.

Awards

2019	PMSE Cooperative Research Award from the Polymeric Materials Science and Engineering Division of the American Chemical Society – with NIST and DOW team members.
2017	CRDF Global Visiting Scholar Sabbatical Fellowship at KAUST.
2017	Faculty mentoring award, Penn State College of Earth and Mineral Sciences.
2016-2019	Corning Faculty Fellow, Department of Materials Science and Engineering, The Pennsylvania State University.
2013	Rustum and Della Roy Innovation in Materials Research Award, The Pennsylvania State University.
2010-2013	Virginia S. and Philip L. Walker, Jr. Faculty Fellow, College of Earth and Mineral Sciences, The Pennsylvania State University.
2009	Presidential Early Career Award for Scientists and Engineers (PECASE) from DoD/ONR
2009	3M Non-tenured Faculty Grant.
2008	Students' Choice Faculty of the Year Award in Materials Science and Engineering Department, The Pennsylvania State University.
2008	U.S. Office of Naval Research Young Investigator Award.
2008	U.S. Army Research Office Young Investigator Award.
2008	Ralph E. Powe Junior Faculty Enhancement Award from Oak Ridge Associated Universities.
2004	R&D 100 Award for Proton Exchange Membrane Development with VT/Battelle Group.
Fall 2001	Richard A. Glenn Award for Best Paper in the Division of Fuel Chemistry at the National ACS Meeting, Chicago, IL.
2001	Omnova Solutions Graduate Student Signature Award.
1999–2002	Cunningham Doctoral Fellowship, Virginia Tech.
1999	Bredekamp Award for Outstanding Unit Operations Team, Michigan Tech.
1999	Department Scholar – Chemical Engineering, Michigan Tech.
1998	AIChE Donald A. Othmer and Mildred Topp Othmer National Scholarship.

Professional Affiliations

- American Chemical Society
- Materials Research Society
- The Electrochemical Society

Peer-Reviewed Journal Publications

More than 29,000 citations as of February 2024 (Google Scholar)
Hirsch index = 84
https://scholar.google.com/citations?user=RJHRgYQAAAAJ&hl=en
Web of Science – more than 21,900 citations, Hirsch index = 75, Average citations per item = 69.35

223. Cassady, H. J., M. F. Rochow, M. A. Hickner, "Describing the permeability of permanganate co-ions in a CEM with varying supporting electrolyte concentrations," *J. Membrane Science* **2024**, 694, 122381.

222. Shi, L., X. Zhou, R. F. Taylor, C. Xie, B. Bian, D. M. Hall, R. Rossi, M. A. Hickner, C. A. Gorski, B. E. Logan, "Thin-Film Composite Membranes for Hydrogen Evolution with a Saline Catholyte Water Feed," *Environmental Science & Technology* **2024**.

221. Peeke, L. M., W. Liu, M. Periyasamy, R. R. Campbell, E. Sassano, W. J. Hajduczek, M. A. Hickner, "Material extrusion additive manufacturing of dual material composite thermoset silicone components," *Polymer Engineering & Science* **2024**, 64 (1), 218-230.

220. Capparelli, C., C. Rafalko, H. J. Cassady, M. E. Matta, B. J. Stovall, M. A. Hickner, "Nonporous Cation Exchange Membranes with pH-Responsive Properties as Chemical Valves," *ACS Applied Polymer Materials* **2023**.

219. Afolayan, E. O., I. Dursun, A. Pizano, C. Lang, D. Lungwitz, M. Kondakova, M. Boroson, A. Kahn, M. Hickner, N. C. Giebink, "Improved Light Extraction in Organic Light-Emitting Diodes via Semiconductor Dilution, "*Advanced Optical Materials* **2023**, 2302588

218. Guo, Z., A. Plant, J. Del Mundo, J. H. Litofsky, B. Liu, R. J. L. Hallman, E. W. Gomez, M. A. Hickner, Y. Lee, E. D. Gomez, "Fully conjugated block copolymers enhance thermal stability of polymer blend solar cells," *Polymer* **2023**, 288, 126465.

217. Rafalko, C., B. J. Stovall, T. Zimudzi, M. A. Hickner, "Tunable Stereolithography Photopolymerization Resin for Molding Water-Soluble Cavities," *ACS Applied Polymer Materials* **2023**, 5 (12), 10097-10104.

216. Cross, N. R., H. Vazquez-Sanchez, M. J. Rau, S. N. Lvov, M. A. Hickner, C. A. Gorski, S. S. Nagaraja, S. M. Sarathy, B. E. Logan, Derek M Hall "Hydrocarbon-based membranes cost-effectively manage species transport and increase performance in thermally regenerative batteries," *Electrochimica Acta* **2023**, 467, 143090.

215. Liu, W. L. M. Peeke, M. Periyasamy, R. R. Campbell, M. A. Hickner, "Additive manufacturing of silicone composite structures with continuous carbon fiber reinforcement," *Polymer Engineering & Science* **2023**, 63(6), 1716-1724.

214. Liu, W., R. R. Campbell, M. Periyasamy, M. A. Hickner, "Additive manufacturing of silicone-thermoplastic elastomeric composite architectures," *Journal of Composite Materials* **2022**, 5, 29, ASAP.

213. Yeh, S.-L., N. Narasimhalu, L. G. Vom Steeg, J. Muthami, S. LeConey, Z. He, M. Pitcher, H. Cassady, V. J. Morley, S. H. Cho, C. Bator, R. Koshani, R. J. Woods, M. Hickner, A. F. Read, A.

Sheikhi "Ion exchange biomaterials to capture daptomycin and prevent resistance evolution in off-target bacterial populations,"*ACS Applied Materials & Interfaces* **2022**,14 (38), 42864-42875.

212. Afolayan, E. O., I. Dursun, C. Lang, E. Pakhomenko, M. Kondakova, M. Boroson, M. Hickner, R. J. Holmes, N. C. Giebink, "Reducing Spontaneous Orientational Polarization via Semiconductor Dilution Improves OLED Efficiency and Lifetime," *Physical Review Applied* **2022**,17 (5), L051002.

211. T. Zelovich, L. Vogt-Maranto, C. Simari, I. Nicotera, M. A. Hickner, S. J. Paddison, C. Bae, D. R. Dekel, M. E. Tuckerman, "Non-Monotonic Temperature Dependence of Hydroxide Ion Diffusion in Anion Exchange Membranes," *Chemistry of Materials* **2022**, 34, 5, 2133–2145.

210. Zimudzi, T. J., S. E. Sheffield, K. E. Feldman, P. A. Beaucage, D. M. DeLongchamp, D. I. Kushner, C. M. Stafford, M. A Hickner, "Orientation of Thin Polyamide Layer-by-Layer Films on Non-Porous Substrates," *Macromolecules* **2021**, 54, 24, 11296–11303.

209. Xu, F., K. Qiu, B. Lin, Y. Ren, J. Li, J. Ding, M. A. Hickner, "Enhanced performance of poly (olefin)-based anion exchange membranes cross-linked by triallylmethyl ammonium iodine and divinylbenzene," *Journal of Membrane Science* **2021**, 637, 119629.

208. Salvatore, D. A., C. M. Gabardo, A. Reyes, C. P. O'Brien, S. Holdcroft, P. Pintauro, B. Bahar, M. Hickner, C. Bae, D. Sinton, E. H. Sargent, C. P. Berlinguette, "Designing anion exchange membranes for CO2 electrolysers," *Nature Energy* **2021**, 6 (4), 339-348.

207. Rossi, R., D. M. Hall, L. Shi, N. R. Cross, C. A. Gorski, M. A. Hickner, B. E. Logan, "Using a vapor-fed anode and saline catholyte to manage ion transport in a proton exchange membrane electrolyzer," *Energy & Environmental Science* **2021**, 14 (11), 6041-6049.

206. López, A. G., R. G. Najjar, M. A. M. Friedrichs, M. A. Hickner, D. H. Wardrop, "Estuaries as Filters for Riverine Microplastics: Simulations in a Large, Coastal-Plain Estuary," *Frontiers in Marine Science* **2021**, 26 (715924).

205. Yan, Z., J. L. Hitt, Z. Zeng, M. A. Hickner, T. E. Mallouk, "Improving the efficiency of CO 2 electrolysis by using a bipolar membrane with a weak-acid cation exchange layer," *Nature Chemistry* **2021**, 1-8.

204. Kuray, P., W. Mei, S. E. Sheffield, J. Sengeh, C. R. F. Pulido, C. Capparelli, R. J. Hickey, M. A Hickner, "Ion Transport in Solvated Sodium-Ion Conducting Gel Polymer Electrolytes," *Frontiers in Energy Research* **2020**, 8, 250.

203. Luo, X., H. Liu, C. Bae, M. E. Tuckerman, M. A. Hickner, S. J. Paddison, "Mesoscale Simulations of Quaternary Ammonium-Tethered Triblock Copolymers: Effects of the Degree of Functionalization and Styrene Content," *The Journal of Physical Chemistry C* **2020**, 124 (30), 16315-16323.

202. Shi, L., R. Rossi, M. Son, D. M. Hall, M. A. Hickner, C. A. Gorski, B. E. Logan, "Using reverse osmosis membranes to control ion transport during water electrolysis," *Energy & Environmental Science* **2020**, 13 (9), 3138-3148,

201. Eneh, C. I., M. J. Bolen, P. C. Suarez-Martinez, A. L. Bachmann, T. J. Zimudzi, M. A. Hickner, P. Batys, M. Sammalkorpi, J. L Lutkenhaus, "Fourier transform infrared spectroscopy investigation

of water microenvironments in polyelectrolyte multilayers at varying temperatures," *Soft Matter* **2020**, 16 (9), 2291-2300.

200. Zhu, L., X. Yu, X. Peng, T. J. Zimudzi, N. Saikia, M. T. Kwasny, Shaofei Song, Douglas I Kushner, Zhisheng Fu, Gregory N Tew, William E Mustain, Michael A Yandrasits, Michael A Hickner Poly (olefin)-Based Anion Exchange Membranes Prepared Using Ziegler–Natta Polymerization," *Macromolecules* **2019**, 52, 11, 4030-4041.

199. Wang, X., R. Rossi, Z. Yan, W. Yang, M. A. Hickner, T. E. Mallouk, B. E. Logan, "Balancing water dissociation and current densities to enable sustainable hydrogen production with bipolar membranes in microbial electrolysis cells," *Environmental Science & Technology* **2019**, 53, 24, 14761-14768.

198. Kushner, D. I., A. Kusoglu, N. J. Podraza, M. A. Hickner, "Substrate-Dependent Molecular and Nanostructural Orientation of Nafion Thin Films," *Advanced Functional Materials* **2019**, 29, 37, 1902699.

197. Zelovich, T., L. Vogt-Maranto, M. A. Hickner, S. J. Paddison, C. Bae, D. R. Dekel, M. E. Tuckerman, "Hydroxide Ion Diffusion in Anion-Exchange Membranes at Low Hydration: Insights from Ab Initio Molecular Dynamics," *Chemistry of Materials* **2019**, 31 (15), 5778-5787.

196. Zhu, L., X. Peng, S. L. Shang, M. T. Kwasny, T. J. Zimudzi, X. Yu, N. Saikia, J. Pan, Z.-K. Liu, G. N. Tew, W. E. Mustain, M. Yandrasits, M.A. Hickner, "High Performance Anion Exchange Membrane Fuel Cells Enabled by Fluoropoly (olefin) Membranes," *Advanced Functional Materials* **2019**, 29 (26), 1902059.

195. Lang, C., J. A. LaNasa, N. Utomo, Y. Xu, M. J. Nelson, W. Song, M. A. Hickner, R. H. Colby, M. Kumar, R. J. Hickey, "Solvent-non-solvent rapid-injection for preparing nanostructured materials from micelles to hydrogels," *Nature Communications* **2019**, 10 (1), 1-10.

194. Kuray, P., T. Noda, A. Matsumoto, C. Iacob, T. Inoue, M. A. Hickner, J. Runt, "Ion Transport in Pendant and Backbone Polymerized Ionic Liquids," *Macromolecules* **2019**, 52 (17), 6438-6448.

193. Saha, P., C. Nam, M. A. Hickner, I. V. Zenyuk, "Electrokinetic Streaming-Current Methods to Probe the Electrode–Electrolyte Interface under Applied Potentials," *The Journal of Physical Chemistry C* **2019**, 123 (32), 19493-19505.

192. Capparelli, C., C. R. Fernandez Pulido, R. Lopez-Hallman, G. M. Geise, M. A. Hickner, "Anion Exchange Membranes with Dynamic Redox-Responsive Properties," *ACS Applied Materials & Interfaces* **2019**, 11 (32), 29187-29194.

191. Capparelli, C., C. R. Fernandez Pulido, R. A. Wiencek, M. A. Hickner, "Resistance and Permselectivity of 3D Printed Micropatterned Anion Exchange Membranes," *ACS Applied Materials & Interfaces* **2019**, 11 (29), 26298-26306.

190. Lang, C. D. Ye, W. Song, C. Yao, Y. Tu, C. Capparelli, J. A. LaNasa, M. A. Hickner, E. W. Gomez, E. D. Gomez, R. J. Hickey, M. Kumar, "Biomimetic separation of transport and matrix functions in lamellar block copolymer channel-based membranes," *ACS Nano* **2019**, 13 (7), 8292-8302

189. Zelovich, T., Z. Long, M. A. Hickner, S. J. Paddison, C. Bae, M. E. Tuckerman, "Ab initio Molecular Dynamics Study of Hydroxide Diffusion Mechanisms in Nano-Confined Structural mimics of Anion Exchange Membranes," *The Journal of Physical Chemistry C* **2019**, 123 (8), 4638-4653.

188. Jeon, J. Y., S. Park, J. Han, S. Maurya, A. D. Mohanty, D. Tian, N. Saikia, M. A. Hickner, C. Y. Ryu, M. E. Tuckerman, S. J. Paddison, Y. S. Kim, C. Bae, "Synthesis of Aromatic Anion Exchange Membranes by Friedel–Crafts Bromoalkylation and Cross-Linking of Polystyrene Block Copolymers," *Macromolecules* **2019**, 52 (5), 2139-2147.

187. Harrelson, T. F., V. Dantanarayana, X. Xie, C. Koshnick, D. Nai, R. Fair, S. A. Nuñez, A. K. Thomas, T. L Murrey, M. A. Hickner, J. K. Grey, J. E. Anthony, E. D. Gomez, A. Troisi, R. Faller, A. J. Moulé, "Direct probe of the nuclear modes limiting charge mobility in molecular semiconductors," *Materials Horizons* **2019**, 6 (1), 182-191.

186. Thieu, L. M., L. Zhu, A. G. Korovich, M. A. Hickner, L. A. Madsen, "Multiscale Tortuous Diffusion in Anion and Cation Exchange Membranes," *Macromolecules* **2018**, 52 (1), 24-35.

185. Buelke, C., A. Alshami, J. Casler, J. Lewis, M. Al-Sayaghi, M. A. Hickner, "Graphene oxide membranes for enhancing water purification in terrestrial and space-born applications: State of the art," *Desalination* **2018**, 448, 113-132.

184. Zimudzi, T. J., K. E. Feldman, J. F. Sturnfield, A. Roy, M. A. Hickner, C. M. Stafford, "Quantifying Carboxylic Acid Concentration in Model Polyamide Desalination Membranes via Fourier Transform Infrared Spectroscopy," *Macromolecules* **2018**, 51 (17), 6623-6629.

183. Kwasny, M. T., L. Zhu, M. A. Hickner, G. N. Tew, "Thermodynamics of counterion release is critical for anion exchange membrane conductivity," *Journal of the American Chemical Society* **2018**, 140 (25), 7961-7969.

182. Miao, Z., J. Seo, M. A. Hickner, "Solvent-Cast 3D Printing of Polysulfone and Polyaniline Composites," *Polymer* **2018** 152, 18-24.

181. Yan, Z., L. Zhu, Y. C. Li, R. Wycisk, P. N. Pintauro, M. A. Hickner, T. E. Mallouk, "The Balance of Electric Field and Interfacial Catalysis in Promoting Water Dissociation in Bipolar Membranes," *Energy and Environmental Science* **2018**, 11 (8), 2235-2245

180. McCrum, I. T., M. A. Hickner, M. J. Janik, "Quaternary Ammonium Cation Specific Adsorption on Platinum Electrodes: A Combined Experimental and Density Functional Theory Study," *J. Electrochem. Soc.* **2018**, 165(2), F114-F121.

179. Moazezi, N., M. Baghdadi, M. A. Hickner, M. A. Moosavian, "Modeling and Experimental Evaluation of Ni(II) and Pb(II) Sorption from Aqueous Solutions Using a Polyaniline/CoFeC6N6 Nanocomposite," *Journal of Chemical & Engineering Data* **2018**, 63(3), 741-750.

178. Lang, C., Y.-X. Shen, J. A. LaNasa, D. Ye, W. Song, T. J. Zimudzi, M. A. Hickner, E. D. Gomez, E. W. Gomez, M. Kumar, R. Hickey, "Creating Cross-Linked Lamellar Block Copolymer Supporting Layers for Biomimetic Membranes," *Faraday Discussions* **2018**, 209, 179-191.

177. Kushner, D., M. A. Hickner, "Substrate-dependent Physical Aging of Confined Nafion Thin Films," *ACS Macro Letters* **2018**, 7(2), 223-227.

176. Seo, J., A. K. Singh, Y. Zhang, J. Ma, C. E. Bakis, C. D. Rahn, M. A. Hickner, "Electrolyte-resistant epoxy for bonding batteries based on sandwich structures," *Journal of Applied Polymer Science* **2018**, 135 (15), 46059-1,9.

175. Dishari, S., C. Rumble, M. Maroncelli, J. Dura, M. A. Hickner, "Unraveling the Complex Hydration Behavior of Ionomers Under Thin Film Confinement," *J Phys. Chem. C* **2018**, 122(6), 3471-3481.

174. Liu, L., X. Chu, J. Liao, Y. Huang, Y. Li, Z. Ge, M. A. Hickner, N. Li, "Tuning the Properties of Poly (2, 6-dimethyl-1, 4-phenylene oxide) Anion Exchange Membranes and Their Performance in H2/O2 Fuel Cells," *Energ. & Environ. Sci.* **2018**, 11(2), 435-446.

173. Pena-Francesch, A., H. Jung, M. A. Hickner, M. Tyagi, B. D. Allen, M. C. Demirel, "Programmable Proton Conduction in Stretchable and Self-Healing Proteins," *Chem. Mater.* **2018** 30(3), 898-905.

172. Zhu, L., X. Yu, M. Hickner, "Exploring backbone-cation alkyl spacers for multi-cation side chain anion exchange membranes," *Journal of Power Sources* **2018**, 375, 433-441.

171. Intan, N. N., K. Klyukin, T. Zimudzi, M. Hickner, V. Alexandrov, "A Combined Theoretical-Experimental Study of Interactions between Vanadium Ions and Na on Membrane in All-Vanadium Redox Flow Batteries," *J. Power Sources* **2018**, 373, 150-160.

170. Kwasny, M.T., L. Zhu, M. A. Hickner, G. N. Tew, "Utilizing Thiol-ene Chemistry for Crosslinked Nickel-Cation-Based Anion Exchange Membranes," *J. Polym. Sci. A: Polym. Chem.* **2018**, 56(3), 328-339.

169. Gatley-Montross, C., J. Finlay, N. Aldred, H. Cassady, J. Destino, B. Orihuela-Diaz, M. Hickner, A. S. Clare, D.Rittschof, E. Holm, M. Detty, "Multivariate Analysis of Attachment of Biofouling Organisms in Response to Material Surface Characteristics," *Biointerphases* **2017**, 12(5), 051003-1,12.

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4. Pawar, M. S., Y. Zha, M. L. Disabb-Miller, Z. D. Johnson, M. A. Hickner, G. Tew, "Metal-ligand based anion exchange membranes," in Polymer Composites for Energy Harvesting, Conversion, and Storage, ACS Symposium Series Volume 1161, 127-146, eds L. Li, W. Wong-Ng and J. Sharp, American Chemical Society: Washington, DC, DOI: 10.1021/bk-2014-1161.ch006, Published July 7, 2014.

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Patents

12. Periyasamy, M. R. R. Campbell, E. Sassano, W. J. Hajduczek, M. A. Hickner, L. Peeke, "Method For Forming Layered Thermoset Silicone and Thermoplastic Articles Using Additive Manufacturing, Articles Formed Therefrom and Apparatus for Use Therein," U.S. Patent App. 20210299949 filed September **2021**.

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1. McGrath, J. E., M. Hickner, "Sulfonated polymer composition for forming fuel cell electrodes," U.S. 7,544,764 and 7,790,314, Canadian patent 2,481,343.

Lectures and Conference Activities *denotes invited talks

205. * "The Effects of Water Binding and Morphology on Proton Transport in Polymer Membranes," Invited lecture at General Motors, Pontiac MI, April 27, 2023.

204. *"Advanced Batteries and Graduate School: Where to Chemical Engineers Fit?," Invited talk at 2023 MSU AIChE chapter meeting, East Lansing, MI, March 12, 2023.

203. *"Synthesis of Ion Exchange Membranes for Large-Scale Energy Conversion and Storage," Invited talk at 2022 AIChE Annual Meeting, Polymer Synthesis and Reaction Engineering session, Phoenix, AZ November 14, 2022.

205. *"3D Printed Membranes for Next-Generation Energy and Water Applications," Invited talk at The ASTM International Conference on Additive Manufacturing (ICAM 2022), Orlando, FL November 1, 2022.

204. *"Polymer Membranes for Large-Scale Energy Conversion and Storage," Invited lecture at University of Illinois Chicago, Department of Chemical Engineering, Chicago, IL October 27, 2022.

203. *"Asymmetric Transport in Bipolar Membranes," Invited talk at Polymers for Fuel Cells, Energy Storage, and Conversion, an ACS Polymer Chemistry Division workshop, Napa, CA, May 16th, 2022.

202. *"Novel Membranes and Ionomers," Invited talk at DOE H2-AMP Workshop, Online, March 20, 2022.

201. *"Transport in Polymer Membranes for Large-Scale Energy Conversion and Storage," Invited talk at American Physical Society March Meeting, Transport in Polymers, DPOLY Division, Chicago, IL March 14, 2022.

200. *"3D Printed Polymer Membranes," Invited lecture at Penn State University, EMS 125th Anniversary Symposium, University Park, PA April 10, 2021.

199. *"Polymer Membranes for Large-Scale Energy Conversion and Storage," Invited lecture at Bucknell University, Department of Chemical Engineering, Lewisburg, PA February 12, 2021.

198. *"Polymer Membranes for Large-Scale Energy Conversion and Storage," Invited lecture for Penn State Electrochemistry Club, University Park, PA December 14, 2020.

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197. *"Polyolefin Anion Exchange Membranes," Invited talk at American Chemical Society Spring 2020 National Meeting & Expo, Designing Polymers for Electrochemical Energy Conversion & Storage, PMSE Division, Philadelphia, PA April 30, 2020.

196. *"Polymer Membranes for Large-Scale Energy Conversion and Storage," Invited lecture at Virginia Tech, Department of Chemistry, Blacksburg, VA February 27, 2020.

195. *"Polymer Membranes for Large-Scale Energy Conversion and Storage," Invited lecture at Michigan State University, Department of Chemical Engineering and Materials Science, East Lansing, MI February 21, 2020.

194. *"Polymers Containing Acidic or Basic Groups," Invited talk at Toyota Research Center, Ann Arbor, MI December 20, 2019.

193. *"Polymers Containing Acidic or Basic Groups," Invited talk at The University of Pennsylvania, Advanced Membrane Workshop, Philadelphia, PA December 17, 2019.

192. *" Ion-Conducting Membranes for Large-Scale Energy Storage," Invited talk at Materials Research Society Fall 2019 National Meeting, Session on Advanced Membranes for Energy-Efficient Molecular Separation and Ion Conduction, Boston, MA December 2, 2019.

191. *"Polymer Membranes for Large-Scale Energy Conversion and Storage," Invited lecture at University of Wyoming, Department of Mechanical Engineering, Laramie, WY October 31, 2019.

190. *"Polymer Membranes for Large-Scale Energy Conversion and Storage," Keynote lecture at 5th International Symposium on Energy Chemistry & Materials, Fudan University, Shanghai, China October 20th, 2019.

189. * "Polyolefin Anion Exchange Membranes: Fundamentals, Membranes, and Devices," Invited lecture at Cornell University, Center for Alkaline-Based Electrochemical Systems, Ithaca, NY October 11, 2019.

188. *"Polymer Membranes for Large-Scale Energy Conversion and Storage," Invited lecture at Louisiana State University, Department of Chemical Engineering, Baton Rouge, LA September 13, 2019.

187. *"Using quantitative IR spectroscopy to probe thin polymer films," Invited talk at American Chemical Society Spring 2019 National Meeting & Expo, Young Industrial Polymer Scientist Award Symposium, POLY Division, San Diego, CA August 27, 2019.

186. *"Toughening Anion Exchange Membranes," Invited talk at American Chemical Society Spring 2019 National Meeting & Expo, Toughening of Networks & Gels through Molecular Design, PMSE Division, San Diego, CA August 27, 2019.

185. *"New Polymer Structures for Anion Exchange Membranes," Invited talk presented at the 235th Meeting of the Electrochemical Society, An Invited Symposium on Advances and Perspectives on Modern Polymer Electrolyte Fuel Cells, Dallas, TX, May 29th, 2019.

184. *"Membrane Design Principles and Characterization Methods," Roundtable on Ion Selective Membranes in CO2 Electrolysis, CIFAR Symposium, Pittsburg PA May 15, 2019.

183. "Using quantitative IR spectroscopy to probe thin polymer films," Invited talk at American Chemical Society Spring 2019 National Meeting & Expo, Cooperative Research Award Symposium, PMSE Division, Orlando, FL April 3, 2019.

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182. *"New ion transport membranes for large-scale energy storage," Invited talk at American Chemical Society Spring 2019 National Meeting & Expo, Transport in Polymer Membranes, POLY Division, Orlando, FL April 2, 2019.

181. *"Ionic Materials - Applications and Future Prospects," Invited talk at American Chemical Society Spring 2019 National Meeting & Expo, ACS Award in Applied Polymer Science Symposium, PMSE Division, Orlando, FL April 1, 2019.

180. *"Polyolefin-based Anion Exchange Membranes," Invited talk at Polymers for Fuel Cells, Energy Storage, and Conversion, an ACS Polymer Chemistry Division workshop, Asilomar, CA, Feb. 25th, 2019.

179. *"Polymer Membranes for Large-Scale Energy Conversion and Storage," Invited lecture at New York University, Department of Chemical Engineering, New York, NY October 12th, 2018.

178. *"The Effects of Water Binding and Morphology on Proton Transport in Polymer Membranes," Invited talk presented at the AiMES 2018 Joint International meeting of ECS and SMEQ, Cancun, Mexico, October 3rd, 2018.

177. *"Designing Hydroxide-Conducting Polymer Membranes," Invited presentation at 19th Solid State Proton Conductors, Stowe, VT Sept 19, 2018.

176. *"Polymers Containing Acidic and Basic Groups," Invited lecture at Case Western Reserve University, Department of Macromolecular Science and Engineering, Cleveland, OH September 7, 2018.

175. * "Polymer Membranes for Large-Scale Energy Conversion and Storage," Invited lecture at Case Western Reserve University, Department of Chemical Engineering, Cleveland, OH September 6, 2018.

174. *"Polyolefin-Based Anion Exchange Membranes," Invited presentation at 16th International Symposium on Polymer Electrolytes, Yokohama, Japan June 26, 2018.

173. *" Polymer Membranes for Large-Scale Energy Conversion and Storage," Invited lecture at Tokyo Institute of Technology, Department of Chemical Engineering, Yokohama, Japan June 22, 2018.

172. * "Polymers Containing Acidic and Basic Groups," Invited lecture at UT Austin, Department of Chemical Engineering, Austin, Texas December 13, 2017.

171. * "Toughening Anion Exchange Membranes," Invited talk at 4th US-Mexico Symposium on Advances in Polymer Science – MACROMEX 2017, Los Cabos, Mexico, December 5, 2017.

170. * "Polymer Membranes for Large-Scale Energy Conversion and Storage," Invited lecture at Texas A&M University, Department of Chemical Engineering, College Station, Texas November 3, 2017.

169. * "Membranes With Tethered Basic Groups," Invited lecture at King Abdullah University of Science and Technology (KAUST), Advanced Membranes and Porous Materials (AMPM) Center, Thuwal, Saudi Arabia, October 10, 2017.

168. * "Micropatterned Membranes for Energy, Water, and Separation Applications," Invited lecture at SABIC Advanced Manufacturing Seminar, Plastic Applications Development Center (SPADC), Riyadh, Saudi Arabia, Oct 2, 2017.

167. * "Polymer Membranes for Large-Scale Energy Conversion and Storage," Invited presentation at Arkema, King of Prussia, PA August 31, 2017.

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166. * "Polymer Membranes for Large-Scale Energy Conversion and Storage," Invited presentation at 21st International Conference on Solid State Ionics, Padova, Italy June 15, 2017.

165. * "Polymer Membranes for Large-Scale Energy Conversion and Storage," Invited lecture at 3M Company, St. Paul, Minnesota June 12, 2017.

164. * "3D Printing of Micro-patterned Anion Exchange Membranes for Green Energy and Clean Water Applications," Invited lecture at Polytechnic University of Milan, Department of Energy, Milan, Italy May 22, 2017.

163. * "Additive Manufacturing Technologies for Polymer Membranes," Invited lecture at European Polymer Forum 8th Summer School on Transport Phenomena in Polymers and Hybrid Materials, Gragnano, Italy May 19, 2017.

162. * "3D Printing of Functional Micro-Patterned Membranes for Water and Energy Applications," Introductory Speaker for the Taylor Lecture, Department of Materials Science and Engineering, University Park, PA, April 27, 2017.

161. * "Structured Anion Exchange Membranes," Invited talk at CARISMA 2017 – European Coordination Fuel Cell Network Conference, Newcastle, UK, April 10th, 2017.

160. * "New Membranes for Aqueous Batteries," Invited talk at International Battery Seminar, Flow Batteries – Deliver the Right Charge at the Right Time, Ft. Lauderdale, FL, March 23rd, 2017.

159. * "New Polymer Structures for Anion Exchange Membranes," Invited talk at APS March Meeting, Ion Containing Polymers - The Role of Structure and Dynamics I, New Orleans, LA, March 13th, 2017.

158. * "3D Printing of Micro-patterned Anion Exchange Membranes for Green Energy and Clean Water Applications," Invited lecture at Michigan State University, Department of Chemical Engineering, East Lansing, Michigan March 2, 2017.

157. * "Polymer Membranes for Large-Scale Energy Conversion and Storage," Invited talk at Advances in Polymers for Fuel Cells, Energy Storage, and Conversion, an ACS Polymer Chemistry Division workshop, Asilomar, CA, Feb. 26th, 2017.

156. * "Polymer Membranes for Large-Scale Energy Conversion and Storage," Invited lecture at Dalian University of Technology, Department of Chemical Engineering, Dalian, China December 12, 2016.

155. * "Designing Ion Exchange Membranes for New Energy and Clean Water Processes," Invited lecture at Tsinghua University, Department of Environmental Science, Beijing, China December 9, 2016.

154. * "Crosslinked Anion Exchange Membranes," Invited talk at Beijing Forum 2016 on Electrochemical Frontier, Wuhan University, Wuhan, China December 7, 2016.

153. * "New Designs for Anion Conducting Membranes," Keynote talk 2016 AIChE Annual Meeting, Session on Membrane and Direct Methanol Fuel Cells, San Francisco, CA November 14, 2016.

152. * "Polymer Membranes for Large-Scale Green Energy and Clean Water Technologies," DeNora N.A. Research Symposium, Cleveland, OH November 10, 2016.

151. * "Polymer Membranes for Large-Scale Energy Conversion and Storage," Invited lecture at Drexel University, Department of Materials Science and Engineering, Philadelphia, PA October 26, 2016.

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150. * "Membranes and Water," Invited lecture at The Millennium Cafe, Materials Research Institute, University Park, PA October 11, 2016.

149. * "3D Printing of Micro-patterned Anion Exchange Membranes," Invited lecture at The Pennsylvania State University, Department of Engineering Science and Mechanics, University Park, PA September 14, 2016.

148. * "Ion-Conducting Polymers for Green Energy and Clean Water Applications," Invited lecture at The Pennsylvania State University, Department of Materials Science and Engineering, University Park, PA September 15, 2016.

147. * "Composition and Alignment in Layer-by-layer Polyamide Thin Films," Invited talk at 252nd American Chemical Society Fall 2016 National Meeting & Exposition, Polymer Science at the Interface of Industry, Government & Academics Session, Philadelphia, PA August 24, 2016.

146. "3D Printing of Micro-patterned Anion Exchange Membranes," Invited talk at 252nd American Chemical Society Fall 2016 National Meeting & Exposition, Polymers Designed for 3D Printing Applications: Evaluation of the Fundamental & Applied Aspects of the Field Session, Philadelphia, PA August 22, 2016.

145. "Crosslinked Anion Exchange Membranes with Complex Structures," International Symposium on Polymer Electrolytes, ISPE-15, Uppsala, Sweden August 15-19, 2016.

144. * "Nanostructured Anion Exchange Membranes," Invited talk at MRS 2016 Spring Meeting & Exhibit, Phoenix, AZ March 28-April 1, 2016.

143. * "Polymer Membranes for Large-Scale Energy Conversion and Storage," Invited lecture at Arizona State University, School for Engineering of Matter, Transport and Energy, October 15th, 2015.

142. * "New Polymer Structures for Anion Exchange Membranes," Invited talk presented at the 228th Meeting of the Electrochemical Society, Phoenix, AZ, October 14th, 2015.

141. * "Synthesis of Cationic Polymers for Membrane Applications," Invited talk at Center for Nanophase Materials Sciences User Meeting, Oak Ridge, TN, Sept. 2nd, 2015.

140. * "Polymer Membranes for Large-Scale Energy Conversion and Storage," Invited lecture at Ohio University, Department of Chemical and Biomolecular Engineering, Athens, OH, Aug. 31st, 2015.

139. * "Ion Transport in Functionalized Polymers," Invited talk at Center for Nanophase Materials Sciences, Oak Ridge, TN, May 14th, 2015.

138. * "Polymers in Additive Manufacturing - Materials and Processes," Invited seminar at Center for Innovative Materials Processing by Direct Deposition (CIMP-3D), The Pennsylvania State University, Mar. 3rd, 2015.

137. * "Anion Exchange Membranes for Energy Applications," Invited talk at Advances in Polymers for Fuel Cells and Energy Devices, an ACS Polymer Chemistry Division workshop, Asilomar, CA, Feb. 9th, 2015.

136. * "Anion Exchange Membranes for Energy Applications," Invited talk at 3rd US-Mexico Symposium on Advances in Polymer Science – MACROMEX 2014, Nuevo Vallarta, Mexico, December 6, 2014.

135. * “Anion Exchange Membranes for Energy Applications,” Invited lecture at Yamanashi University, Fuel Cell Nanomaterials Center, Kofu, Japan, November 10, 2014.

134. * “Polymer Membranes for Large-Scale Energy Conversion and Storage,” Invited lecture at Boston University, Department of Materials Science and Engineering, Boston, MA, November 7, 2014.

133. * “Acidity and Morphology in Proton-Conducting Membranes,” Invited lecture at Carnegie Mellon University, Department of Chemical Engineering, Pittsburgh, PA, October 28, 2014.

132. * “Anion Exchange Membranes for Ammonium Bicarbonate-based Reverse Electrodialysis,” Invited lecture at Clemson University, Department of Chemical Engineering, Clemson, SC, October 9, 2014.

131. * “Anion Exchange Membranes for Ammonium Bicarbonate-based Reverse Electrodialysis,” Invited lecture at Hanyang University, Department of Energy Engineering, Seoul, South Korea, September 17, 2014.

130. * “Headgroup Acidity Effects in Proton Exchange Membrane Performance,” Keynote speech Solid State Protonic Conductors – 17 (SSPC-17), Korea Institute of Science and Technology (KIST), Seoul, South Korea, September 16, 2014.

129. “Acidic Polymers and Basic Polymers: Materials Synthesis and Mechanistic Analysis,” MATSE 590 seminar at Penn State University, Department of Materials Science and Engineering, University Park, PA, September 11, 2014.

128. * “Water Hydrogen Bonding in Functionalized Membranes,” Invited talk at 248th American Chemical Society Fall 2014 National Meeting & Exposition, Transport in Polymer Membranes Session, San Francisco, CA August 13, 2014.

127. * “Hydration, Conductivity, and Stability of Anion Exchange Membranes,” Invited lecture at the Gordon Research Conference on Fuel Cells, Smithfield, RI, August 6, 2014.

126. * “Membranes for Ammonium Bicarbonate-based Reverse Electrodialysis,” Keynote lecture at the International Conference on Membranes (ICOM) 2014, Suzhou, China, July 24, 2014.

125. * “Polycondensation for High Performance Fuel Cells,” Invited lecture at the American Chemical Society Polymer Chemistry Division Workshop - From Anionic Polymerization to Aerospace Materials to Membranes, Cetraro, Italy, June 30, 2014.

124. * “Designing Ion Exchange (Polymers and) Membranes for New Energy Processes,” Invited lecture at the North American regional meeting of the International Society for Electrochemistry and Microbiology (ISMET), The Pennsylvania State University, University Park, PA, May 15, 2014.

123. * “Ion-Containing Polymers for New Energy and Clean Water,” Keynote lecture at The 16th Israel Materials Engineering Conference (IMEC16), Technion – Israel Institute of Technology, Haifa, Israel, February 24-25, 2014.

122. * “Anion Exchange Membranes – Fundamental Polymer Properties and Performance in Pure Water Systems,” Invited lecture at Daihatsu Motor Company, Ryuo, Shiga Prefecture, Japan, December 18th, 2013.

121. * “Superacid Aromatic Membranes and Thin Ionomer Films,” Invited lecture at Nissan Motor Company Automotive Research Center, Yokosuka, Japan, December 16th, 2013.

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120. * "Underlying Factors Governing Membrane Resistance and Permselectivity," Invited lecture at Francqui Symposium: Recent Advances in Microbial and Enzymatic Electrocatalysis, Ghent University, Ghent, Belgium, Nov. 22, 2013.

119. * "Stability of Anion Exchange Membranes," Invited lecture at 7th Santa Fe Workshop on Materials for Energy Conversion, Alkaline Membrane Fuel Cells, Bishop's Lodge, NM, November 4-5, 2013.

118. * "Cationic Polymers for Anion Exchange Membranes," Invited lecture at Rensselaer Polytechnic Institute, Department of Chemistry, Troy, NY, October 22nd, 2013.

117. * "Ion Exchange Membranes for New Energy and Clean Water," Plenary Lecture, The Pennsylvania State University, Materials Day 2013 – Converging on Materials, October 16, 2013.

116. * "Water Binding Interactions in Superacid Proton Exchange Membranes," Invited lecture at Norwegian University of Science and Technology (NTNU), PEM 2013 International Workshop, Trondheim, Norway, October 3-4, 2013.

115. * "Ion Mobility in Anion Exchange Membranes," Invited lecture at University of Surrey, Anion-Exchange Membranes for Energy Generation Technologies Workshop, Guildford, England, July 25, 2013.

114. * "Ion-Containing Polymers in Energy and Water Applications," Invited lecture at University of Massachusetts Amherst, Polymer Science and Engineering Department, Amherst, MA, May 23, 2013.

113. "Effects of Membrane Thickness on the Performance of Vanadium Redox Flow Batteries," Contributed talk presented at the 223rd Meeting of the Electrochemical Society, Toronto, CA, May 14th, 2013.

112. "Anion Exchange Membranes for Vanadium Redox Flow Batteries," Contributed talk presented at the 223rd Meeting of the Electrochemical Society, Toronto, CA, May 14th, 2013.

111. * "Designing New Ionic Polymers for Electrochemical Applications," Invited lecture at Wuhan University, Department of Chemistry, Wuhan, China, May 23, 2013.

110. * "Anion Exchange Membranes for Energy Applications," Invited lecture at Sun Yat-sen University, Department of Chemical Engineering, Guangzhou, China, March 19, 2013.

109. * "Using Infrared Spectroscopy to Learn about Water Treatment Membranes," Invited talk at Advances in Materials and Processes for Polymeric Membrane Mediated Water Purification, an ACS POLY Division workshop, Pacific Grove, CA, Feb. 25, 2013.

108. * "Anion Exchange Membranes," Advances in Materials for Proton Exchange Membrane Fuel Cell Systems, an ACS POLY Division workshop, Pacific Grove, CA, Feb. 20, 2013.

107. * "Cationic Polymers for Platinum-Free Fuel Cells," Invited lecture at IPC 2012, The 9th SPSJ International Polymer Conference, Kobe, Japan, December 13, 2012.

106. * "Thin Ion-Containing Polymer Films," Invited lecture at Texas A&M University, Materials Science and Engineering Program, College Station, TX, October 26, 2012.

105. * "Side Chain Functionalized Aromatic Polymers," Invited talk at 244th American Chemical Society Fall 2012 National Meeting & Exposition, Journal of Polymer Science Award: Symposium in Honor of Christopher Bielawski, Philadelphia, PA August 20, 2012.

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104. * "Tuning Polymer Nanophase Morphology for Higher Performance in Vanadium Redox Flow Batteries," Invited talk at 244th American Chemical Society Fall 2012 National Meeting & Exposition, WCU International Symposium on Energy Storage and Conversion, Philadelphia, PA August 20, 2012.

103. * "Polymer membranes for new batteries and fuel cells," Invited talk at 244th American Chemical Society Fall 2012 National Meeting & Exposition, Polymer Science of Everyday Things, Philadelphia, PA August 19, 2012.

102. * "New Polymers for Electrochemical Energy Conversion and Storage," Invited lecture at Penn State-University of Freiburg Symposium on Energy Conversion, Freiburg University, Freiburg, Germany, July 13, 2012.

101. * "Using Lessons of Fuel Cell Membranes to Design Polymers for Energy Storage Applications," Green Energy Conversion Science and Technology, University of Yamanashi, Kofu Japan, August 1, 2012.

100. * "Water-polymer interactions in cation and anion conducting membranes," Invited lecture at Macro 2012 - IUPAC World Polymer Congress, Blacksburg, VA, June 25th, 2012.

99. * "Water Dynamics in Thin Polymer Films," Invited lecture at Dow Water Solutions, Edina, MN, June 19, 2012.

98. * "Designing New Ionic Polymers for Electrochemical Applications," Invited lecture at Technion – Israel Institute of Technology, Department of Materials Science and Engineering, Haifa, Israel, June 7, 2012.

97. * "New Polymer Membranes for Redox Flow Batteries and Fuel Cells," Invited lecture at University of Rochester, Rochester Advanced Materials Program Nanomaterials 2012, Rochester, NY, May 21, 2012.

96. * "Ion and Water Motion in Self-Assembled Polymers," Invited lecture at Carnegie Mellon University, Department of Chemistry, Pittsburgh, PA, April 20, 2012.

95. * "Electrostatically Assembled Mixed Charge Multilayers for Antifouling Applications," Invited lecture at Dow Chemical Company for the Dow Discussion Group on Interfacial Science, Midland, MI, April 11, 2012.

94. * "Ion and Water Motion in Self-Assembled Polymers," Introductory Speaker for the Taylor Lecture, Department of Materials Science and Engineering, University Park, PA, April 5, 2012.

93. * "Synthesis and Degradation of Anion Exchange Membranes," Invited talk at 243rd American Chemical Society Spring 2012 National Meeting & Exposition, Materials and Catalysis in Fuel Cells, San Diego, CA March 27th, 2012.

92. * "Aromatic Ion-Conducting Membranes," Invited lecture at WL Gore & Associates, Newark, DE, March 6, 2012.

91. * "Thin Ion-Containing Polymer Films," Invited lecture at National Institute of Standards and Technology, Boulder, CO, Feb. 10, 2012.

90. * "New Polymers for Water Treatment and Energy Storage," Invited lecture at King Abdulla University of Science and Technology (KAUST), Saudi Arabia, Jan. 22, 2012.

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89. * "Polymer Assemblies for Ion Transport and Anti-fouling Surfaces," Invited lecture at Penn State University, Department of Civil and Environmental Engineering, University Park, PA, Jan. 18, 2012.

88. * "Water in Ion-Containing Polymer Membranes," Invited lecture at Penn State University, Department of Chemical Engineering, University Park, PA, Jan. 12, 2012.

87. * "Ion-Conducting Polymers for Electrochemical Applications," Invited lecture at Queen's University, Department of Chemical Engineering, Kingston, ON Canada, Nov. 17, 2011.

86. * "Water in Ion-Containing Polymers," Invited lecture at University of Akron, Department of Polymer Engineering, Akron, OH, Oct. 21, 2011.

85. * "Block Copolymers for Fast Ion Transport," Invited lecture at Michigan Technological University, Department of Chemistry, Houghton, MI, Oct. 14, 2011.

84. * "Block Copolymers for Fast Ion Transport," Invited lecture at Case Western Reserve University, Department of Macromolecular Science and Engineering, Cleveland, OH, Sept. 30, 2011.

83. * "Surface charge and molecular adsorption on poly(ethylene oxide)-containing multilayer assemblies," Invited talk at 242nd American Chemical Society Fall 2011 National Meeting & Exposition, Polyelectrolyte Complexes and Multilayers, Denver, CO Sept. 1st, 2011.

82. * "Structure property relationships of anion exchange membranes," Invited talk at 242nd American Chemical Society Fall 2011 National Meeting & Exposition, Fuel Cells Chemistry and Operation, Denver, CO Aug. 29th, 2011.

81. * "Block Copolymers as Ion Transport Membranes," Invited lecture at Clark University, Department of Chemistry, Worchester, MA, April 6, 2011.

80. * "Ionic nanopores as ion and water transport pathways in polymer membranes," Invited talk at American Chemical Society Spring 2011 National Meeting & Exposition, Aerogels, Foams, and other Nanoporous Materials, Anaheim, CA, March 29th, 2011.

79. * "Designing selective membranes for energy storage applications," Invited talk at American Chemical Society Spring 2011 National Meeting & Exposition, Polymers for Energy Storage and Delivery, Anaheim, CA, March 29th, 2011.

78. * "Surface Charge and Fouling of Ion-Containing Nanofiltration Membranes and Coatings," Invited talk at Advances in Materials and Processes for Polymeric Membrane Mediated Water Purification, an ACS POLY Division workshop, Pacific Grove, CA, Feb. 28, 2011.

77. * "Block Copolymers as Ion Transport Membranes," Invited lecture at Colorado School of Mines, Department of Chemistry, Golden, CO, Feb. 25, 2011.

76. * "Ion-Conducting Polymers for Electrochemical Applications," Invited talk at Golden Gate Polymer Forum, Mountain View, CA, Feb. 23, 2011.

75. * "Block Copolymers for Ion-Conducting Membranes," Advances in Materials for Proton Exchange Membrane Fuel Cell Systems, an ACS POLY Division workshop, Pacific Grove, CA, Feb. 22, 2011.

74. * "Hydration and Nanostructure in Ion-Containing Polymers," Invited lecture at University of Nevada Las Vegas, Department of Chemistry, Las Vegas, NV, Oct 13th, 2010.

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73. * "Mechanisms of Morphology and Water Motion in Proton Exchange Membranes," Plenary lecture at 218th Meeting of the Electrochemical Society Meeting, Las Vegas, NV, Oct 11th, 2010.

72. * "Liquid-Like Conductivity in a Solid Polymer: Features of Fast Ion Conduction," Invited lecture at Pennsylvania State University, Department of Chemistry – Analytical Division, State College, PA, September 29th, 2010.

71. "Ion and Water Motion in Anion Exchange Membranes," Contributed talk presented at Progress MEA 2010 - CARISMA meeting, La Grande Motte, France, Sept. 13th, 2010.

70. * "Designing Polymers for Fast Ion Transport," Invited lecture at University of Wisconsin Madison, Department of Materials Science and Engineering, Madison, WI, September 16th, 2010.

69. * "Poly(thiophene)/Carbon Nanotube Composites for Solar Cells," Invited lecture at the Center for Nanophase Materials Sciences, Oak Ridge National Laboratory, Users Week, September 14th, 2010.

68. "Anion and Water Mobility in Poly(sulfone) Anion Exchange Membranes," Contributed talk at the 12th International Symposium on Polymer Electrolytes, Padova, Italy, Aug. 31st, 2010.

67. * "Nanostructured Polymeric Membranes for Fuel Cell and Water Treatment Applications," Invited lecture at ACS Fall National Meeting, WCU International Symposium on Energy Storage and Conversion, Boston, MA, August 22nd, 2010.

66. * "The Role of Water in Proton Exchange Membranes," Invited lecture at 1st International Summer Seminar for Young Scientists, Lake Kawaguchiko, Japan, Aug. 19th, 2010.

65. * "Ion-Conducting Membranes for Electrochemical Applications," Invited lecture at Pacific Northwest National Laboratory, Richland, WA, Aug. 16th, 2010.

64. * "Poly(thiophene)-Carbon Nanotube Composites for Solar Cells," Invited lecture at Illinois Institute of Technology, Department of Chemical Engineering, Chicago, IL, April 21st, 2010.

63. * "Poly(thiophene)-Carbon Nanotube Composites for Solar Cells," Invited talk at Polymer Nanocomposites 2010, Lehigh University, Bethlehem, PA, March 9th, 2010.

62. * "Polymer-Water Interactions and Transport Properties in Fuel Cell and Reverse Osmosis Membranes," Invited lecture at Drexel University, Department of Chemical Engineering, Philadelphia, PA, Jan. 15th, 2010.

61. * "Polymers, Water, and Ions: Interesting Observations on Morphology, Diffusion, and Conductivity," Invited talk at the National Institute of Standards and Technology, Gaithersburg, MD, Jan. 14th, 2010.

60. * "Interactions Between Ion-containing Polymers and Water - Applications Towards Water Treatment Membranes and Antifouling Surfaces," Invited talk at the Naval Research Lab, Washington, DC, Jan. 12th, 2010.

59. * "Ion-Containing Polymers and Their Interactions with Water," Invited lecture at Rochester Institute of Technology, Department of Chemistry, Rochester, NY, Jan. 5th, 2010.

58. "Morphology Control in Mid-block Sulfonated Triblock Copolymers," Contributed talk at MRS Fall Meeting, Boston, Nov. 30th 2009.

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57. * "Well-controlled Block Copolymer Architectures for Ion-conducting Membranes," Invited talk at LANL-NEDO-AIST workshop, Palm Springs, CA, Nov. 19th, 2009.

56. * "Thiophene Polymerization and Polythiophene-Carbon Nanotube Composites for Solar Cells," Invited talk at Waseda University, Department of Chemistry, Tokyo, Japan August 22nd, 2009.

55. * "Anion Exchange Membranes for Electrochemical Applications," Invited talk at Polymer Batteries and Fuel Cells 2009, Yokohama, Japan, Aug. 6th, 2009.

54. * "Proton and Anion Exchange Membranes for Electrochemical Applications: Nanophase Structure and Ion-Transport," Invited talk at Waseda University, Department of Chemistry, Tokyo, Japan August 5th, 2009.

53. * "Structured Poly(thiophene)/Carbon Nanotube Thin Films for Organic Photovoltaic Applications," Invited lecture at Virginia Tech Polymer Alumni Symposium, Blacksburg, VA July 17th, 2009.

52. * "Morphology and Transport Properties of Anion and Cation Exchange Membranes," Invited lecture at 3M Corporation Tech Forum for Polymers and Energy, St. Paul, MN, June 16th, 2009.

51. * "Ion-Containing Polymers and Their Application Towards Water Treatment," Invited lecture at Dow Water Solutions, Edina, MN, June 15th, 2009.

50. * "Synthesis, Structure, and Properties of Ion-Containing Polymers," Invited lecture at WL Gore & Associates, Newark, DE, May 13th, 2009.

49. * "Morphology and Transport Properties of Ion-Containing Polymers," Invited lecture at the Army Research Lab, Aberdeen Proving Grounds, MD, April 21st, 2009.

48. * "Transport Properties of Proton Exchange Membrane Nanocomposites," Invited talk at American Chemical Society Spring 2009 National Meeting & Exposition, Functional Polymer Nanocomposites for Energy Storage and Conversion, Salt Lake City, UT, March 23rd, 2009.

47. "Efficient Synthesis and Properties of Anion Exchange Membranes," Contributed talk at American Chemical Society Spring 2009 National Meeting & Exposition, Ion-containing Polymers for New Technologies, Salt Lake City, UT, March 22nd, 2009.

46. * "Ion-Containing Polymers: Cutting-Edge Energy Applications Enabled by Insights into Chemistry, Morphology, and Transport Properties," Invited talk at the joint meeting of the Polymers and Power/Energy panels of the Materials group of the Technical Cooperation Program (TTCP), Victoria, BC, March 10th, 2009.

45. * "Nanostructured Polymers: Using Chemistry and Morphology to Tune Transport Properties ," Invited lecture at Oak Ridge National Laboratory, Center for Nanophase Materials Sciences, Oak Ridge, TN, March 4th, 2009.

44. * "Cation and Anion Transport in Functionalized Polymers," Invited lecture at University of Tennessee, Knoxville, Department of Chemical & Bimolecular Engineering, Knoxville, TN, March 3rd, 2009.

43. * "Flux and Rejection in Ion-containing and Surface-modified Polymer Membranes," Invited talk at Advances in Materials and Processes for Polymeric Membrane Mediated Water Purification, an ACS Polymer Chemistry Division workshop, Asilomar, CA, Feb. 23rd, 2009.

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42. * "Water Binding and Transport in Anionic and Cationic Membranes," Invited talk at Advances in Materials for Proton Exchange Membrane Fuel Cell Systems, an ACS Polymer Chemistry Division workshop, Asilomar, CA, Feb. 16th, 2009.

41. * "Functional Materials for Fuel Cells," Invited lecture for ASM Local Chapter, University Park, PA, Jan. 20th, 2009.

40. "Water uptake characteristics and backbone flexibility of novel polymers for proton exchange membranes," Contributed talk presented at the Electrochemical Society Fall Meeting, Honolulu, HI, Oct. 15th, 2008.

39. "Water Uptake and Transport in Flexible Proton Exchange Membrane Networks," Contributed talk presented at Progress MEA 2008 - CARISMA meeting, La Grande Motte, France, Sept. 22nd, 2008.

38. * "Functionalized Polymers for Fuel Cells," Invited lecture at The Pennsylvania University, Department of Engineering Science and Mechanics, University Park, PA, Sept. 17th, 2008.

37. * "Cation and Anion Transport in Fuel Cell Membranes," Invited lecture at University of Connecticut, Polymer Program, Storrs, CT, Sept. 12th, 2008.

36. "Bulk Heterojunction Morphology Control by Electro-deposition of Polythiophene," Physical Chemistry of Interfaces and Nanomaterials VII, SPIE NanoScience + Engineering, San Diego, CA, Aug. 11th, 2008.

35. * "Cation and Anion Transport in Functionalized Polymers," Invited lecture at University of Yamanashi, Clean Energy Research Center, Kofu, Japan, July 7th, 2008.

34. * "Polymers with Tethered Anionic and Cationic Groups as Membranes for Fuel Cells," Invited lecture at Macro 2008, 42nd IUPAC World Polymer Congress, Taipei, Taiwan, July 1st, 2008.

33. * "Ion Transport Membranes," Invited lecture at Virginia Tech, Macromolecules and Interfaces Institute, Blacksburg, VA, April 23rd, 2008.

32. * "Fuel Cells," Materials Day Tutorial, The Pennsylvania State University, University Park, PA, April 14th, 2008.

31. * "Polymers for Fuel Cells," American Chemical Society Spring 2008 National Meeting & Exposition, ACS Award in Polymer Chemistry: Symposium in Honor of James McGrath, New Orleans, LA, April 8th, 2008.

30. * "Membranes for Acidic and Basic Fuel Cells: Examples, Limits, and Directions," NRC Institute for Fuel Cell Innovation, US-Canada Fuel Cell Workshop, Vancouver, BC, Canada, March 16th, 2008.

29. * "Morphology and Transport in Ion-containing Polymers," Invited lecture at University of Illinois at Urbana-Champaign, NSF STC WaterCAMPWS, Champaign, IL, March 7th, 2008.

28. * "Cation and Anion Transport in Functionalized Polymers," Invited lecture at Colorado School of Mines, Department of Chemical Engineering, Golden, CO, Jan. 18th, 2008.

27. * "Functional Polymers: Transport and Nanophase Morphology for Fuel Cell Applications," Invited lecture for Materials Advantage, University Park, PA, Sept. 10th, 2007.

26. * "Neutron Imaging of Liquid Water in Fuel Cells," Invited talk at the Gordon Research Conference – Fuel Cells, Smithfield, RI, July 22-27, 2007.

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25. * "Neutron Imaging of Liquid Water Transport in Proton Exchange Membrane Fuel Cells: Heat Transfer and Fluid Dynamics," Invited lecture at Michigan Technological University, Department of Mechanical Engineering, Houghton, MI, Nov. 30th, 2006.

24. * "Neutron Imaging Studies of Liquid Water Transport in PEM Fuel Cells," Invited lecture presented to the San Francisco Local Section of the Electrochemical Society, Berkeley, CA, Nov. 20, 2006.

23. Hickner, M., N. Siegel, K. Chen, D. Hussey, D. Jacobson, M. Arif, "Neutron Imaging Studies of Water and Heat Transport in PEM Fuel Cells," Contributed talk presented at the Fuel Cell Seminar & Exhibition, Honolulu, HI, Nov. 13–17, 2006.

22. Hickner, M., N. P. Siegel, K. Chen, D. Hussey, D. Jacobson, M. Arif, "Exploring Liquid Water Distribution and Local Heating Effects in an Operating PEM Fuel Cell," Contributed talk at the World conference on neutron radiography, National Institute of Standards and Technology Gaithersburg, MD, Oct. 16-19, 2006.

21. * Hickner, M., C. J. Cornelius, M. R. Hibbs, C. H. Fujimoto1, T. M. Alam, "Water Binding and Transport in Polymer Membranes with High Ion Content," Invited talk presented at the 232nd ACS National Meeting, San Francisco, CA, Sept. 10-14 2006.

20. Hickner, M., K. Chen, N. Siegel, D. McBrayer, "Water and Heat Transport in PEM Fuel Cells," Poster presented at The Gordon Research Conference - Fuel Cells, Smithfield, RI, July 23-28, 2006.

19. Hickner, M. C. J. Cornelius, M. R. Hibbs, C. H. Fujimoto, T. M. Alam, "The Nature of Water and Transport in Functionalized Poly(phenylene)s," Contributed talk at the MRS 2006 Spring Meeting, San Francisco, CA, April 17 - 21, 2006.

18. * "Novel Polymeric Membranes for Fuel Cells," Invited lecture at the University of Texas at Austin, Department of Chemical Engineering, Austin, TX, Oct. 27th, 2005.

17. * Hickner, M., K. Chen, "PEM Fuel Cell Water Management," Invited lecture presented at the National Research Council of Canada's Institute for Fuel Cell Innovation, Vancouver, BC, Aug. 1st, 2005.

16. Hickner, M., K. Chen, N. Siegel, D. McBrayer, "Key Phenomena in PEM Fuel Cells Liquid Water Transport," Poster presented at the Gordon Research Conference – Fuel Cells, Smithfield, RI, July 17-22, 2005.

15. Hickner, M., K. Chen, N. Siegel, D. McBrayer, "Key Phenomena in PEM Fuel Cells Liquid Water Transport," Contributed talk presented at the 2nd International Conference on Polymer Batteries and Fuel Cells Las Vegas, NV, June 13-17, 2005.

14. * "Elucidating the Key Phenomena of Water Transport in Proton Exchange Membrane Fuel Cells," Invited lecture at the New Mexico State University, Department of Chemical Engineering, Las Cruces, NM, Feb. 17th, 2005.

13. * "Polymer electrolytes for fuel cell applications," Invited lecture at Highlands University, Department of Chemistry, Las Vegas, NM, Nov. 5th, 2004.

12. Hickner, M., K. Grossarth, K. S. Chen, D. R. Noble, "Liquid water droplet instability and removal at the GDL/Gas flow channel interface," Poster presented at The Gordon Research Conference - Fuel Cells, Bristol, RI, July 25-30, 2004.

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11. Hickner, M., J. E. McGrath, "The Role of Inorganic Additives in Determining Transport Properties of Organic-Inorganic Composite Proton Exchange Membranes," Contributed talk at the 203rd Meeting of The Electrochemical Society, Paris, France, April 27-May 2, 2003.

10. Hickner, M., B. Pivovar, F. Wang, T. Zawodzinski, J. E. McGrath, "Transport of methanol and protons in proton exchange membranes," Contributed talk at the 201st Meeting of The Electrochemical Society, Philadelphia, PA, May 12-17, 2002.

9. "Fuel cell research at Virginia Tech: A student's perspective," Contributed talk at the ACS 2002 Spring National Meeting, Orlando, FL, April 7-11, 2002.

8. Hickner, M., F. Wang, Y. S. Kim, B. Pivovar, T. Zawodzinski, J. E. McGrath, "Influencing the transport of water, methanol, and protons through a fuel cell ion exchange membrane," Contributed talk at the AIChE Spring National Meeting, New Orleans, LA, March 10-14, 2002.

7. Hickner, M., F. Wang, Y. Kim, B. Pivovar, T. Zawodzinski, J. E. McGrath, "Development of thin-film fuel cell electrodes containing novel polymers," Contributed talk at the 200th Meeting of The Electrochemical Society, San Francisco, CA, Sept. 2-7, 2001.

6. Hickner, M., F. Wang, Y. Kim, J. E. and McGrath, "Chemistry-morphology-property relationships of novel proton exchange membranes," Contributed talk at the 200th Meeting of The Electrochemical Society, San Francisco, CA, Sept. 2-7, 2001.

5. Hickner, M., F. Wang, Y. Kim, T. Zawodzinski, J.E. McGrath, "Chemistry-morphology-property relationships of novel proton exchange membranes for direct methanol fuel cells," Contributed talk at the ACS 2001 Fall National Meeting, Chicago, IL, Aug. 26-30, 2001.

4. Hickner, M., F. Wang, H. Shohba, N. Gunduz, J. Mecham, J. E. McGrath, T. Zawodzinski, "New proton exchange membranes via direct step or polycondensation," Contributed talk at the 199th Meeting of The Electrochemical Society, Washington D. C., March 25-30, 2001.

3. Hickner, M., F. Wang, H. Shobha, N. Gunduz, J. B. Mecham, J. E. McGrath, "Synthesis of proton exchange membranes via direct step or polycondensation," Contributed talk at the AIChE 2000 Fall National Meeting, Los Angeles, CA, Nov. 12-17, 2000.

2. Hickner, M. A., M. Sankarpandian, T. Zawodzinski, J. E. McGrath, "Adhesion issues within PEM membrane electrode assemblies," Contributed talk at the AIChE 2000 Fall National Meeting, Los Angeles, CA, Nov. 12-17, 2000.

1. Hickner, M. A., A. Banthia, J. E. McGrath, "Synthesis and characterization of phosphine oxide diol modified epoxy adhesives," Contributed talk at the ACS 2000 Fall National Meeting, Washington, D.C., Aug. 20-25, 2000.

Scientific Collaborators (Last Five Years)

C. Bae (RPI), C.J. Cornelius (UNebraska), C.H. Fujimoto (Sandia), E. Gomez (Penn State), Y.A. Elabd (TAMU), M.R. Hibbs (Sandia), D.S. Hussey (NIST), I. Ivanov (ORNL), D.A. Jacobson (NIST), M. Janik (Penn State), S. Kim (PNNL), Y.S. Kim (LANL), J. Liu (PNNL), B.E. Logan (Penn State), J.L. Lutkenhaus (TAMU), M.K. Mahanthappa (U. Wisconsin, Madison), D. Pickel (ORNL), S. Paddison (UT-Knoxville), B.S. Pivovar (NREL), R. Schaak (Penn State), G. Tew (UMass), C.-Y. Wang (Penn State), D. Wang (Penn State), Q. Wang (Penn State), A.Z. Weber (LBNL), Z. Yang (PNNL)

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Graduate Advisor **Principal Postdoctoral Sponsor**

James E. McGrath (Virginia Tech) (deceased) Ken S. Chen (Sandia National Laboratories)

Synergistic Activities

Teaching

I developed a new course at Penn State entitled "Materials in Energy Research" which focuses on the uses of advanced materials for the conversion and utilization of energy. Research topics in important fields such as photovoltaics, fuel cells, solar thermal energy, and CO_2 conversion are stressed with an emphasis on energy transfer at the molecular/nanoscale and state-of-the-art materials research. The class is discussion-driven and covers fundamental materials science, energy transfer processes at the molecular scale, thermodynamics of energy conversion, and economic and political issues that influence energy choices. This class has been adapted for both first year and senior students depending on the need.

I have also developed "Polymer Materials II". This is a lecture-based course, but covers modern research topics such as conducting polymers, ionic polymers, super-tough gels, and other relevant topics from the polymer science literature that the students will be exposed to in graduate school.

A new senate-approved course was developed in Fall 2016 – Polymers in 3D Printing as an elective in the Master's Program in Additive Manufacturing. The purpose of the class is to educate students at the intersection of polymer science and additive manufacturing. Polymers-focused students will what is unique about 3D printing processes as they relate to polymer science, and additive manufacturing specialists will get a deeper look into the polymer science of 3D printing and the macromolecular nature of polymeric materials as applied in additive manufacturing.

Outreach

I have worked towards developing exciting hands-on units for two week-long residential camps for secondary educators and high school students (drawn from around the Northeast and the country) on Penn State's University Park campus. These experimental activities focus on using the tools of chemistry and physical science to synthesize polymeric materials and explore their structure and function for water treatment and alternative energy applications. The student camp, which attracts 20-30 high school students annually, is sponsored by the ASM Materials Education Foundation and is designed to immerse students in exciting discovery-based learning and expose them to advanced scientific concepts. The teacher camp, sponsored by the Pennsylvania NASA Space Grant Consortium, gives approximately 20 high school teachers a chance to engage with college-level educators on new technical topics to both hone their own knowledge and develop new activities and modules to take back to their classrooms. The week is designed so that the teachers leave with information, materials, and demonstrations that can directly supplement their current courses.

Students and Researchers Currently Supervised

Graduate Students (8 current, 30 total)
Clara Cappirelli (Chem E)
Nayan Sakia (Chem E)
Raymond Lopez-Hallman (MATSE)
Richard Wiencek (Chemistry)
Preeya Kuray (MATSE)
Megan Matta (Chemistry)
Sarah Sheffield (Chemistry)
Harrison Cassady (Chem E)

Undergraduate Researchers (5 current, 42 total)
Hannah Pohlmann (MATSE), Schreyer thesis
Teague Williams (MATSE), Senior thesis
Lachlan Peeke (MATSE)
Kenneth Kimmons (MATSE)
Natalie Mamrol (MATSE)

Post-Doctoral Researchers (2 current, 18 total)
Jing Pan (PhD Wuhan University)

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Tawanda Zimudzi (Chemistry)

Visiting Researchers and Staff (4 current, 11 total)
Matthias Park (postgraduate researcher)
Carlos Rolando Fernandez Pulido (postgraduate researcher)
Hafis Graha (Tokyo Tech)
Saima Shabbir (Institute of Space Technology, Islamabad, Pakistan)

Hickner Group Alumni

Graduate Students

- Karan Doss (MS MATSE, August 2018), currently a PhD candidate in MATSE.
- Yifan Deng (MS MATSE, August 2018), currently a researcher in the Hickner Group.
- Tawanda Zimudzi (PhD Chemistry, August 2016), currently a staff researcher in MCL, Penn State.
- Liang Zhu (PhD MATSE, March 2016), currently a staff scientist at Dioxide Materials.
- Sean Nunez (PhD MATSE, August 2015), currently a staff scientist at Arkema.
- Douglass Kushner (PhD MATSE, August 2016), currently a postdoc at Lawrence Berkeley National Laboratory.
- Harrison Cassady (MS Chemical Engineering, March 2015), currently an entrepreneur in Portland, OR.
- Jiho Seo (MS MATSE, February 2016), currently a PhD candidate with Ralph Colby at PSU MATSE.
- Caroline Christensen (MS Chemistry, November 2015), currently a lab supervisor at University of Delaware.
- Clara Capparelli (MS MATSE, July 2015), currently in Argentina with the Fulbright Commission.
- Sarah Black (PhD Chemistry, July 2015), currently a staff member at the Center for Naval Analyses.
- Brian Chaloux (PhD MATSE, August 2014), currently a National Research Counsel Postdoc at the Naval Research Lab.
- Changwoo Nam. Currently a PhD candidate at Penn State.
- David Jones (MS MATSE, August 2014), currently resides in Knoxville, TN.
- Lizhu Wang (PhD MATSE, December 2013), postdoc at University of Nebraska Medical Center. Currently a research scientist at Missouri University of Science and Technology.
- Melanie Disabb-Miller (PhD MATSE, December 2013), currently resides in Baltimore, MD.
- Stephanie Petrina (MS MATSE, April 2010, PhD MATSE August 2013), currently employed with Georgia Pacific.
- Zhaoyan Ai (MS candidate), currently a PhD candidate in PSU Chemistry.
- Romesh Patel (PhD MATSE, December 2011), Postdoc in the PV group at AFRL in Dayton, OH. Currently at Nike.
- Alfonso Mendoza (PhD MATSE, December 2012), currently an entrepreneur in San Francisco, CA.
- Xie He (PhD MATSE, December 2012), postdoc at Penn State. Currently resides in Boston, MA.
- Matthew Gross (MS MATSE, Aug 2010), currently MGL Consulting, Boulder, CO.
- Hunter Moore (MS MATSE, April 2011), currently Virginia Western Community College, Roanoke, VA.

Post-Doctoral Researchers

- Liang Zhu March 2016-December 2017 (Ph.D. Penn State), currently at Dioxide Materials.
- Chris Lyon March 2017-November 2017 (Ph.D. UNH), current at Vantage Chemicals.
- Sean Nunez September 2015-February 2017 (Ph.D. Penn State), currently at Arkema.
- Brandon Calitree November 2012 – March 2015 (Ph.D. University of Buffalo), currently at University of Delaware.
- Geoff Geise, September 2012 – June 2014, (Ph.D. University of Texas) currently faculty in Chemical Engineering at University of Virginia.
- Praveen Meduri January 2013 – May 2014, (Ph.D. University of Kentucky) – PSIEE Postdoctoral Fellow. Currently a professor at IIT India.
- Ian Sines, January 2012 – August 2013, (Ph.D. The Pennsylvania State University, joint with Manish Kumar, PSU CHE). Currently a research scientist at St. Gobain.
- Nanwen Li, February 2012 – December 2013, currently a postdoc at Georgia Tech.

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- Shudipto Dishari, October 2010 – August 2013, currently a postdoc at Penn State University.
- Dongyang Chen, August 2011 – August 2013, currently a postdoc at Northwestern University.
- Min Zhang, August 2012-March 2013, currently a postdoc at National University of Singapore.
- Guang Chen, August 2011-March 2013, currently a postdoc at National University of Singapore.
- Youngjin Cho, Feb. 2011-Jul. 2012, currently a staff scientist at DGIST, Korea.
- Timothy B. Tighe, Oct. 2009-Dec. 2011, currently a staff scientist at Penn State Materials Characterization Laboratory.
- Tomonori Saito, June 2008-July2010, currently a staff member at Oak Ridge National Laboratory.
- Jingling Yan, Feb. 2008-Oct. 2010, currently a research associate at Changchun Institute of Applied Chemistry, Chinese Academy of Sciences, China.

Visiting Researchers and Staff

- Hideaki Ono, March 2015-October 2015, Graduate Researcher, Yamanashi University.
- Juanjuan Han, August 2015-June 2016, Graduate Researcher, Wuhan University.
- Fang Chen, December 2012-December 2013, Professor, Department of Applied Chemistry, School of Natural and Applied Science, Northwestern Polytechnic University, Xi'an, China.
- Bencai Lin, October 2015-March 2016, Professor, School of Materials Science and Engineering, Changzhou University, China.
- Masaki Koike, January 2009-June 2009, visiting graduate researcher, Yamanashi University.
- Shinya Kawamura, January 2009-June 2009, visiting graduate researcher, Yamanashi University.

Undergraduate Research Students

- Xuedi Yu (MATSE), research student and visiting researcher – currently employed at Aleo BME, Inc.
- Franky Bernal (REU student), finishing degree at Cal State LA.
- Jessi Purawic (MATSE), undergraduate researcher – currently a senior in MATSE.
- Robert Kaminsky (MATSE), undergraduate researcher – currently employed at Arkema.
- Emma Vetland (MATSE), senior thesis – currently employed at NASA.
- Lindsay Erndwine (MATSE), senior thesis – currently a graduate student at University of Delaware.
- Kaitlyn Eckert (Chem E), undergraduate researcher.
- Christopher Malencia (Chem E), Schreyer Honors Thesis.
- Will Ferrell (MATSE), senior thesis – graduate student at UT Knoxville.
- Nichole Baer (MATSE), currently at First Quality Enterprises.
- Ziyi (Kent) Miao (MATSE), Schreyer Honors Thesis, currently a graduate student at Northwestern University.
- Emily Cimino (MATSE), senior thesis – currently employed at PPG.
- Sumant Kalidindi (MATSE), undergraduate research in PSU MATSE.
- Victoria Christensen (MATSE), undergraduate in PSU MATSE.
- John Nese (MATS, senior thesis student), currently employed at AK Steel.
- Will Salem (BS PSU MATSE), currently employed at PPG.
- Rebecca Balaj (NSF Soft Materials REU), finishing degree at Columbia University.
- Christopher Rodriguez (NSF Soft Materials REU), finishing degree at Univ. Puerto Rico.
- Charles Michaelis (PSU CHE), currently at U. Virginia for graduate school.
- Kathleen Murzynski (PPG Fellow MATSE), finishing degree in PSU MATSE.
- Ying-Hsun "Mindy" Lin (MATSE), finishing degree in PSU MATSE.
- Jie "Jenny" Mou (MATSE), finishing degree in PSU MATSE.
- Andrew DeCarlo (PSU MATSE)
- Eric Fuemmeler (NSF Soft Materials REU, BS Chemistry Truman State University) currently graduate student at University of Illinois.
- Zach Johnson (NSF REU), finishing degree in PSU MATSE.
- Andrew Curtis (NSF Soft Materials REU, BS Chemistry Drake University).
- Rich Schatz (PSU Chemistry 2010).
- Kevin Dicker (BS PSU MATSE 2011, senior thesis student) currently a graduate student at UDEL MATSE.

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- Julianne Carlson (BS PSU MATSE, senior thesis student).
- Colin Smith (BS PSU CHE) currently on coop with Medtronic.
- Tim Roberts (BS PSU CHE 2011) currently at Sunoco, Memphis TN.
- Matthew Menyo (BS PSU MATSE May 2009) currently a graduate student at UCSB, MATSE/BIO.
- Ernesto Martinez (NSF Soft Materials REU 2011) currently an undergraduate student at MIT.
- Rebecca Nolin (NSF Soft Materials REU, summer 2010) currently and undergraduate student at Virginia Tech.
- Kyle Bryson (BS PSU MATSE May 2010). PhD and NSF Graduate Fellowship recipient at UMASS-Amherst, PMSE. Currently employed at 3M Company.
- Chris Ewing (BS PSU CHE May 2010) currently graduate student at PITT, CHE.
- Patrick Mangiagli (BS PSU MATSE May 2010) currently a graduate student at Georgia Tech.
- Amy Beasten (NSF NNIN REU, summer 2008) CHE Tulane May 2009, currently a graduate student at North Carolina State University.
- Matthew Gross (BS PSU MATSE 2009, senior thesis student) currently at Ball Aerospace, Boulder CO.
- Kevin Donaher (NSF NNIN REU, summer 2009) currently an undergraduate student at Columbia University.
- Titi Shodiya (BS PSU MATSE May 2010). PhD Duke University. Currently a staff member at NIST.

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