

Marta C. Hatzell

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Education

- 2011–2014 **The Pennsylvania State University**, *PhD in Mechanical Engineering*.
- 2011–2014 **The Pennsylvania State University**, *M.Eng. in Environmental Engineering*.
- 2009–2010 **The Pennsylvania State University**, *M.S. in Mechanical Engineering*.
- 2005–2009 **The Pennsylvania State University**, *B.S. in Mechanical Engineering*.

Professional Appointments

- August 2015–
Present **Assistant Professor of Mechanical Engineering**, GEORGIA INSTITUTE OF TECHNOLOGY, Atlanta, Ga.
- August 2014 –
August 2015 **Postdoctoral Fellow**, UNIVERSITY OF ILLINOIS, Urbana-Champaign, Il, Advisor: Paul Braun.
- Jan. 2011 –
August 2014 **National Science Foundation Graduate Research Fellow**, PENN STATE UNIVERSITY, University Park, Pa, Advisor: Prof. Bruce Logan.
- August 2009 –
Dec. 2010 **Graduate Research Assistant**, PENN STATE UNIVERSITY, University Park, Pa, Advisor: Prof. Matthew Mench.

Awards and Recognition

- 2019 **US Frontiers of Engineering Symposium**, *National Academy of Engineering*.
- 2019 **NSF Faculty Early Career Development (CAREER)**, *Chemical, Bioengineering, Environmental and Transport Systems Program*.
- 2017 **Excellence in Review Award - Environmental Science and Technology Letters**, *American Chemical Society*.
- 2017 **Best Presentation Award**, *ACS Environmental Engineering Division Award*.
- 2017 **Food-Energy-Water Fellow**, *Georgia Tech*, Atlanta, Ga.
- 2015 **Center for the enhancement of learning teaching fellow**, *Georgia Tech*, Atlanta, Ga.
- 2014 **1st Place in North American ISMET Presentation Award**, *ISMET*.
- 2011-2014 **NSF Graduate Research Fellowship**, *University Park, Pa*.
- 2013-2014 **PEO Graduate Research Fellowship**, *University Park, Pa*.
- 2013 **DOW Sustainability Challenge Winner**, *DOW Chemical Company*.
- 2005-2009 **Starr Foundation Fellowship (4 years/\$25,000)**, *Philadelphia, Pennsylvania*.

Professional Memberships

- American Society of Environmental Engineering and Science Professor**, (ASEEP).
- Electrochemical Society**, (ECS).
- American Institute of Chemical Engineers**, (AIChE).
- American Society of Mechanical Engineers**, (ASME).
- American Association for the Advancement of Sciences**, (AAAS).
- North America Catalysis Society**, (NACS).

Funded Research Awards

Total Funding **\$2,773,679**, Funding as PI \$1,600,778, Funding as co-PI \$1,172,901, Pls Share: \$1,277,794.

- 2019 **PI: M.C.Hatzell**, *Role of nanominerals on photochemical derived atmospheric NH₃ and N₂O*, Division of Chemical, Bioengineering, Environmental and Transport Systems, *Biol & Envir Inter of Nano Mat*, 01/01/2020-12/31/2023.
PI Share: \$166,600
- 2019 **co-PI: M.C.Hatzell**, *MRI: Acquisition of an Energy-tunable X-ray Analytical Characterization Tool (EXACT) for Measuring Local Structure and Chemistry in Materials*, National Science Foundation, Division of Materials Research, *Major Research Initiative*, 09/01/2019-09/01/2024.
Instrument Support: \$332,500
- 2019 **PI: M.C.Hatzell**, *The role of nitrogen photofixation on agriculture and K-12 education*, National Science Foundation, Division of Chemical, Bioengineering, Environmental and Transport Systems, *Environmental Engineering*, 09/01/2019-09/01/2024.
Pls Share: \$500,000
- 2019 **PI: M.C.Hatzell**, *Evaluation of carbon radical formation on titania using EPR spectroscopy*, Pacific Northwest National Lab, *EMSL User Facility*, 01/01/2019-12/01/2020.
Pls share: \$25,000
- 2018 **co-PI: M.C.Hatzell**, *Planning Grant: Engineering Research Center for In-Situ Control of the Nitrogen Cycle (In-SINC)*, National Science Foundation, Division Of Engineering Education and Centers, 08/01/2018-09/01/2019.
Total: \$100,000
- 2018 **PI: M.C.Hatzell**, *Collaborative Research: GOALI: Evaluating thermo-electro-adsorption mechanisms for waste-heat driven ion-separation processes*, National Science Foundation, Division of Chemical, Bioengineering, Environmental and Transport Systems, *Molecular Separations Program*, 09/01/2018-09/01/2021.
Pls Share: \$254,975
- 2017 **PI: M.C. Hatzell**, *EPRI/WERF: Collaborative Research: Electrical percolation in flowable electrodes for energy-efficient water re-use applications*, National Science Foundation, Division of Chemical, Bioengineering, Environmental and Transport Systems, *Environmental Engineering Program*, 08/03/2018-08/03/2019.
Pls Share: \$69,756
- 2017 **PI: M.C. Hatzell**, *Collaborative Research: Co-Extrusion of Organic-Inorganic Colloidal Inks for Energy Conversion Applications*, National Science Foundation, Civil, Mechanical and Manufacturing Innovation Division, *Advanced Manufacturing Program*, 09/01/2017-09/01/2020.
Pls Share: \$236,397
- 2017 **PI: M.C.Hatzell**, *In Situ Ambient Pressure XPS analysis of Nitrogen Photofixation*, Lawrence Berkeley National Lab, *ALS User Facility*, 01/01/2017-12/01/2019.
Pls Share: \$25,000

Pending Research Awards

- 2019 **co-PI: M.C.Hatzell**, *DMREF: Accelerating the Discovery and Development of Nanoporous 2D Materials (N2DMs) and Membranes for Advanced Separations*, National Science Foundation, Division of Chemical, Bioengineering, Environmental and Transport Systems, *Process Separations*, 9/2019-8/2023.
\$1,156,905

- 2019 **PI: M.C.Hatzell**, *Role of nanominerals on photochemical derived atmospheric NH₃ and N₂O*, National Science Foundation, Division of Chemical, Bioengineering, Environmental and Transport Systems, 01/2020-12/2023.
\$498,651
- 2019 **co-PI: M.C.Hatzell**, *Tomography-based Measurements of Thermal Transport in Particulate Storage and Heat Transfer Media*, Department of Energy, Solar Energy Technology Office, 01/2020-12/2023.
\$1,500,000
- 2019 **co-PI: M.C.Hatzell**, *Roll-to-Roll enabled technologies: A platform for engineering education and training*, Manufacturing Engineering Education Program, Office of Naval Research, 01/2020-12/2023.
\$3,000,000

Invention Disclosures

- 2018 **M.C. Hatzell**, *J Townley, Ben Comer and A.J.Medford*, Electrochemical Nitrogen Oxidation., Filed Invention Disclosure.
June, 2018
- 2018 **M.C. Hatzell**, *Marm Dixit, and K.B.Hatzell*, Multi-material printing device for energy storage and conversion applications., U.S. Patent Application.
Sept. 2018
- 2018 **C. Seivers**, *A.J.Medford and M.C. Hatzell*, Mechanocatalytic Nitrogen Fixation., Filed Invention Disclosure.
Jan 2018
- 2016 **Y. Kim**, *B.E. Logan and M.C. Hatzell*, Capacitor circuit for arrays of power sources such as microbial fuel cells., U.S. Patent No. 9,450,437.
Sept 2016

Publications (Most Recent Publications)

H-Index **22**, i10-Index, **24**.

40. Daniel Moreno and Marta Hatzell. "Using Thermodynamics Principles to Optimize Performance of Capacitive Mixing Cycles for Salinity Gradient Energy Generation." *Journal of Electrochemical Energy Conversion and Storage* - Accepted (2019).
39. Daniel Moreno and **Marta Hatzell***. "Efficiency of Thermally Driven Capacitive Mixing and Deionization Systems." (2019) *ACS Sustainable Chemistry* - Accepted.
38. Marm Dixit, Daniel Moreno, Xianghui Xiao, **Marta Hatzell***, and Kelsey B. Hatzell. "Mapping Charge Percolation in Flowable Electrodes Used in Capacitive Deionization." (2019) *ACS Materials Letters* - Accepted.
37. Benjamin Comer, Porfirio Fuentes, Christian Dimkpa, Yu-Hsuan Liu, Carlos Fernandez, Pratham Arora, Matthew Realff, Upendra Sighn, **Marta Hatzell**, Andrew Medford. "Prospects and Challenges for Solar Fertilizers." (2019) *Joule* - Accepted May 2019.
36. Liu, Yu-Hsuan, Manh-Hiep Vu, JeongHoon Lim, Trong-On Do, and **Marta C. Hatzell***. "Influence of Carbonaceous Species on Aqueous Photo-catalytic Nitrogen Fixation by Titania." (2019) *Faraday Discussions*.
35. Andrey Gunawan, Richard Simmons, Megan W. Haynes, Daniel Moreno, Akanksha Menon, **Marta C. Hatzell** and Shannon Yee. "Techno-economic Comparison of Cogeneration Systems with Concentrated Solar Desalination and Power Operated with Rankine and Brayton Cycles." (2019) *Journal of Solar Energy Engineering*.

34. B.Comer, Y.H. Liu, M.B. Dixit, K.B. Hatzell Y. Yifan, E. Crumlin, **M.C. Hatzell***, A.J. Medford. The Role of Adventitious Carbon on Photocatalytic Nitrogen Fixation by Titania, (2018) *Journal of American Chemical Society*.
33. D. Moreno, Y. Yousef, W.Y. Tsai, N. Balke, F. Shen, K.B. Hatzell, **M.C. Hatzell***. Asymmetric chemo-mechanics during phosphate electroadsorption, (2018) *ES&T Letters*.
32. D. Moreno and **M.C. Hatzell***. Thermodynamics of Carnot and Conventional Deionization Cycles. (2018) *Journal of Physical Chemistry C*.
31. D. Moreno and **M.C. Hatzell***. Influence of Feed-Electrode Concentration Differences in Flow-Electrode Systems for Capacitive Deionization. (2018) *ACS Industrial & Engineering Chemistry Research*. **Best Presentation at Fall 2017 ACS ENVR Conference**
30. Song, Y., D. Johnson, R. Peng, D.K. Hensley, P.V. Bonnesen, L. Liang, J. Huang, F. Yang, F. Zhang, R. Qiao, A.P. Baddorf, T.J. Tschaplinski, N.L. Engle, **M.C. Hatzell**, Z. Wu, D.A. Cullen, H.M. Meyer, B.G. Sumpter, and A.J. Rondinone, A physical catalyst for the electrolysis of nitrogen to ammonia. *Science Advances*, 2018. 4(4).
29. Zhang, Jiankai, Kelsey B. Hatzell, and **Marta Hatzell*** "A combined heat and power driven membrane capacitive deionization system." *Environmental Science & Technology Letters* (2017) 4 (11), pp 470 – 474. **ACS Editors Pick**
28. **M.C.Hatzell*** and Hatzell, K., Blue Refrigeration: Electrochemical Separations for Water Deionization. *Journal of Electrochemical Energy Conversion and Storage*. (2017)15 (1). **ASME Young Investigator**
27. Biesheuvel, P.M., Bazant, M.Z., Cusick, R.D., Hatton, T.A., Hatzell, K.B., **Hatzell, M.C.**, Liang, P., Lin, S., Porada, S., Santiago, J.G. and Smith, K.C., 2017. Capacitive Deionization—defining a class of desalination technologies. *arXiv preprint arXiv:1709.05925*.
26. Andrew J. Medford and **Marta C. Hatzell***. Photon-driven Nitrogen Fixation: Current Progress, Thermodynamic Considerations, and Future Outlook. *ACS Catalysis*, 2017,7 (4), pp 262 – 2643.
25. Nazemi, Mohammadreza, James Padgett and **Marta C. Hatzell*** Acid/Base Multi-Ion Exchange Membrane-Based Electrolysis System for Water Splitting. *Energy Technology*, 2017,5,1 – 4 .
24. Bharadwaj, N. Ashwin K., Jin Gu Kang, Marta C. Hatzell, Kenneth S. Schweizer, Paul V. Braun, and Randy Ewoldt. Integration of colloids into a semi-flexible network of fibrin. *Soft Matter* (2017).
23. Nazemi M, Zhang J, **M.C. Hatzell***. Harvesting Natural Salinity Gradient Energy for Hydrogen Production Through Reverse Electrodialysis Power Generation. *ASME. J. Electrochem. En. Conv. Stor.* 2017.
22. Wallack, M.J. Geise, G. M., **Hatzell, M.C.** , Hickner, M. A., B.E. Logan Reducing Nitrogen cross over in a microbial reverse-electrodialysis cells by using adjacent anion exchange membranes and anion exchange resin. *Environmental Science Water Research and Technology* (2015).
21. Watson, V. J. **M.C. Hatzell**, B.E. Logan. Hydrogen production from continuous flow, microbial reverse-electrodialysis electrolysis cells treating fermentation wastewater. *Bioresource Technology* 195: 51 – 56 (2015).
20. K.B. Hatzell, M.C. Hatzell, K. M. Cook, M. Boota, G. M. Housel, A. McBride, E.C. Kumbur, Y. Gogotsi, The effect of oxidation of carbon material on suspension electrodes for flow-electrode capacitive deionization *Environmental Science and Technology*, DOI: 10.1021/es5055989 (2015)
19. M. C. Hatzell, K.B. Hatzell B.E. Logan, Using flow electrodes in multiple reactors in series for continuous energy generation from capacitive mixing" *Environmental Science and Technologies Letters*, 1 (12), 474 – 479 (2014).
18. M. C. Hatzell, M. Raju, V.J. Watson, A.G. Stack, A.C.T. van Duin and B. E. Logan, Effect of Strong Acid Functional Groups on Electrode Rise Potential in Capacitive Mixing by Double Layer Expansion, *Environmental Science and Technology*, 48 (23), 1401 – 14048 (2014).

17. M. C. Hatzell, X. Zhu, and B. E. Logan, Simultaneous hydrogen generation and waste acid neutralization in a Reverse Electrodialysis System," ACS Sustainable Chemistry and Engineering, 2 (9), 2211 – 2216 (2014).
16. X. Zhu, W. Yang, M. C. Hatzell, and B. E. Logan, Energy recovery from solutions with different salinities based on swelling and shrinking of hydrogels Environmental Science and Technology, 48 (12), 7157 – 7163 (2014).
15. X. Zhu, M. C. Hatzell, and B. E. Logan, Microbial Reverse-Electrodialysis Electrolysis and Chemical-Production Cell for H₂ Production and CO₂ Sequestration, Environmental Science and Technology Letters 1 (4), 231 – 235 (2014).
14. F. Zhang, J. Liu, I. Ivanov, M. C. Hatzell, W. Yang, Y. Ahn, B. E. Logan, Reference Electrode Placement Affects the Accuracy of Measurement in Microbial Electrochemical Systems, Biotechnology and Bioengineering 111 (10), 1931 – 1939 (2014)
13. M. C. Hatzell, R. D. Cusick, and B. E. Logan, Capacitive Mixing Power Production from Salinity Gradient Energy Enhanced through Exoelectrogen-Generated Ionic Currents, Energy and Environmental Science, Energy Environmental Science 7 (3), 1159 – 1165 (2014).
12. M. C. Hatzell, I. Ivanov, R. D. Cusick, X. Zhu, and B. E. Logan, Comparison of Hydrogen Production and Electrical Power Generation for energy Capture in Closed-Loop Ammonium Bicarbonate Reverse Electrodialysis Systems, Physical Chemistry and Chemical Physics, 16 (4), 1632 – 1638 (2014).
11. X. Zhu, M. D. Yates, M. C. Hatzell, H. A. Rao, P. E. Saikaly, and B. E. Logan, Microbial community composition is unaffected by anode potential. Environmental Science and Technology, 48 (2), 1452 – 1458 (2014).
10. R. D. Cusick, M. C. Hatzell, F. Zhang, and B. E. Logan, Minimal RED cell pairs markedly improve electrode kinetics and power production in microbial reverse electrodialysis cells, Environmental Science and Technology, 47(24), 14518 – 14524 (2013).
9. G. M. Geise, A. J. Curtis, M. C. Hatzell, M. A. Hickner, and B. E. Logan, Effect of salt concentration differences on membrane and reverse electrodialysis stack ionic resistances, Environmental Science and Technology Letters, 1 (1), 36 – 39 (2013).
8. M. C. Hatzell and B. E. Logan, Evaluation of Flow Fields on Bubble Removal and System Performance in an Ammonium Bicarbonate Reverse Electrodialysis Stack, Journal of Membrane Science, 446, 449 – 455 (2013).
7. X. Zhu, M. C. Hatzell, R. D. Cusick, and B. E. Logan, Microbial reverse-electrodialysis chemical-production cell for acid and alkali production, Electrochemistry Communications, 31, 52 – 55 (2013).
6. M. C. Hatzell, Y. Kim, and B. E. Logan, Powering microbial electrolysis cells by capacitor circuits charged using microbial fuel cell, Journal of Power Sources, 229, 198 – 202 (2013).
5. Y. Kim, M. C. Hatzell, A. J. Hutchinson, and B. E. Logan, Capturing power at higher voltages from arrays of microbial fuel cells without voltage reversal, Energy and Environmental Science, 4 (11), 4662 – 4667, (2011).
4. M. C. Hatzell, A. Turhan, S. Kim, D. Hussey, D. Jacobson, and M. Mench, Quantification of temperature driven flow in a polymer electrolyte fuel cell using high-resolution neutron radiography, Journal of the Electrochemical Society, 158, (6) B717 – B726 (2011).
3. M. P. Manahan, M. C. Hatzell, E. Kumbar, M. M. Mench, Laser perforated fuel cell diffusion media. Part 1: Related changes in performance and water content, Journal of Power Sources, 196 (13), 5573 – 5582, (2011).
2. Manahan M, Hatzell M, Srouji A, Chidiac N, Goldberger B, Peck N, et al. International hydrogen association for hydrogen energy design competition applied topic A: Portable fuel cell. Elsevier; 2011.

1. A. Turhan, S. Kim, M.C. Hatzell, and M. M. Mench, Impact of channel wall hydrophobicity on through-plane water distribution and flooding behavior in a polymer electrolyte fuel cell, *Electrochimica Acta*, 55 (8), 2734 – 2745 (2010).

Invited Talks

15. Marta C. Hatzell - "The effect of soluble carbonaceous species on Nitrogen Photofixation" November 19th, 2019 - Cell Symposium: Next-Generation Materials for Energy Applications, Xiamen, China.
14. Marta C. Hatzell - "Rotating ring disk exploration of catalyst for nitrogen photofixation" May, 30th, 2019 - ECS Meeting, Dallas, Tx.
13. Marta C. Hatzell - "Thermodynamics and chemo-mechanics of electrosorption based separations" May, 22nd, 2019 - CDI&E Symposium, Beijing, China.
12. Marta C. Hatzell - "Thermodynamics of electrosorption based separations" March 31st, 2019 - ACS Meeting, Orlando, FL.
11. Marta C. Hatzell - "The effect of soluble carbonaceous species on Nitrogen Photofixation" March 25th, 2019 - Artificial Photosynthesis Faraday Discussion, Cambridge England.
10. Marta C. Hatzell - "Photochemical Nitrogen Fixation" November 27th, 2018 - Department of Chemical Engineering (Ohio University), Athens OH.
9. Marta C. Hatzell - "Electrified interfaces for water treatment and fertilizer production" November 13th, 2017 - Department of Material Science and Engineering (Auburn University), Auburn AL.
8. Marta C. Hatzell - "Evaluating the potential for photocatalytic nitrogen fixation" September 21st, 2017 - Department of Chemical Engineering (University of Virginia), Charlottesville, VA.
7. Marta C. Hatzell "Electrochemical Separations and the Environment" - October 21st, 2016, Department of Environmental Engineering (Georgia Institute of Technology), Atlanta Ga.
6. Marta C. Hatzell "How to Make a Gigaton of Difference" - June 20th 2016 (ASME Power Conference), Charlotte, Nc.
5. Marta C. Hatzell "Electrochemistry and the Food-Energy-Water Nexus" - Electrochemical Society Meeting - September 20th, 2015 (Georgia Institute of Technology) Atlanta, Ga.
4. Marta C. Hatzell and Paul Braun "Evaluating thermal responsiveness of colloid-fiber systems" - October 10th 2014, Soft Matter Seminar Series, Department of Material Science- (University of Illinois Urbana Champaign) Urbana Champaign, IL.
3. Marta C. Hatzell "Capturing salinity gradient energy through capacitive mixing" - January 2014 (University of Illinois Urbana Champaign) Urbana Champaign, IL.
2. Marta C. Hatzell "Capturing salinity gradient energy through capacitive mixing" - March 2014 (University of Michigan), Ann Arbor, Mi.
1. Marta C. Hatzell "Capturing salinity gradient energy through capacitive mixing" - October 2013 (Electrochemical Society Meeting) San Francisco, Ca.

Graduate Advising (current)

1. Yu-Hsuan Liu - PhD Student in EnvrE (Spring 2021 Graduation)
2. Jeonghoon Lim - PhD Student in MechE (Spring 2021 Graduation)
3. Yousuf Bootwala - PhD Student in MechE (Spring 2021 Graduation)
4. Rodrigo Caceres Gonzalez - PhD Student in MechE (Spring 2022 Graduation)
5. Carlos Fernandez Otero - MS Student in MechE (Spring 2020 Graduation)

Undergraduate Advising (current)

1. Rajiv Patel- BS in CHBE (Spring 2019 Graduation)

2. Dylan Baxter - BS in CHBE (Spring 2020 Graduation)
4. Sara Chen - BS in MechE (Spring 2022 Graduation)
5. Annamarie Eustice - BS in EnvR (Spring 2022 Graduation)

Graduate Advising (graduated)

1. Daniel Moreno - PhD Student in MechE (Spring 2019 Graduation)

Undergraduate Advising (current)

1. Rajiv Patel- BS in CHBE (Spring 2019 Graduation)
2. Dylan Baxter - BS in CHBE (Spring 2020 Graduation)
3. Mason Hodge - BS in CHBE (Spring 2020 Graduation)