Lauren F. Greenlee, Ph.D.

University of Arkansas
Ralph E. Martin Department of Chemical Engineering
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PROFESSIONAL EXPERIENCE

Associate Professor, Ralph E. Martin Leadership Chair *July 2019 - present*
Assistant Professor *December 2015 – June 2019*
Chemical Engineering, University of Arkansas
Fayetteville, AR

- Research group focus: Electrochemical engineering, electrocatalysis, and nanocomposite materials for water treatment, electrochemical energy conversion, and applications in agriculture

CTO & Co-Founder, CatalyzeH2O, LLC *November 2017 – present*

- Technology transfer and commercialization of early-stage water treatment technologies www.catalyzeh2o.com

Project Leader, Staff Scientist *December 2011 – December 2015*
National Institute of Standards and Technology, Applied Chemicals and Materials Division
Boulder, CO

- Led project team of ~10 people: technicians, postdocs, students, and staff scientists
- Studied synthesis, structure, performance, and chemical/mechanical stability of nanoparticles in aqueous environments, including nanoparticle-polymer/carbon composite systems

Postdoctoral Fellow *December 2009 - 2011*
National Institute of Standards and Technology, Applied Chemicals and Materials Division
Boulder, CO

Graduate Research Assistant
The University of Texas at Austin *September 2004 – December 2009*
Université Paul Cézanne (Aix en Provence, France) *September 2007 – August 2008*
Dissertation research: "Enhancing recovery of reverse osmosis desalination: Side-stream oxidation of antiscalants to precipitate salts"

EDUCATION

Ph.D. in Chemical Engineering *August 2009*
The University of Texas at Austin/Université Paul Cézanne (GPA 4.0/4.0)
Advisors: Desmond F. Lawler, Benny D. Freeman, Philippe Moulin

M.S. in Environmental Engineering *August 2006*
The University of Texas at Austin, EWRE (GPA 3.95/4.0)

B.S.E. in Chemical Engineering *May 2001*
University of Michigan, College of Engineering (GPA 3.6/4.0)

AWARDS AND HONORS

2020	Ralph E. Martin Dept. of Chemical Engineering Research Award
2019	Ralph E. Martin Leadership Chair, University of Arkansas
2018	University of Arkansas Dept. of Chemical Engineering research award
2017	University of Arkansas Faculty Gold Medal, support of undergraduate researchers
2017	Dean's Award of Excellence, Rising Star Research Award, University of Arkansas
2017	3M Non-Tenured Faculty Award
2017	ACS PRF Doctoral New Investigator award
2017	Distinguished Seminar Speaker, Imperial College London
2015	Louis Owen Professorship in Chemical Engineering, University of Arkansas
2014	Embassy Science Fellow to the U.S. Consulate in Guangzhou, China
2013	"Rookie of the Year" Rocky Mountain Eagle Award, Colorado Federal Executive Board
2010	Best speaker award and awarded a two-week visit in 2011 to another participating metrology institute – WMRIF 2nd International Workshop for Young Materials Scientists
2010	Nominated by NIST to attend the World Materials Research Institute Forum 2nd International Workshop for Young Materials Scientists
2010	Best Poster Award: NanoMemCourse 2010: Nanostructured Materials and Membranes for Health and Sustainable Water
2009	Travel grant to attend a Marie Curie Conference and Training Course: Nanostructured Materials and Membranes for Health and Sustainable Water, University of Twente
2009-2011	National Research Council (NRC) 2-year post-doctoral fellowship at NIST
2008	NAMS (North American Membrane Society) Student Travel Award
2007	PEO Scholar Award
2006	National Science Foundation International Research & Education in Engineering Fellowship
2005	National Science Foundation Graduate Research Fellowship
2004	The University of Texas Thrust Fellowship
2004	The University of Texas, Department of Civil Engineering, Research Assistantship

PROFESSIONAL ACTIVITIES

Proposal Review Board, Stanford Synchrotron Radiation Lightsource, *2020 - present*

International Conference on Catalysis, Session Co-Organizer & Co-Chair, Environmental Catalysis, *June 2020*

American Institute of Chemical Engineers (AIChE)

- Session Chair/Organizer, Electrochemical Fundamentals Area, *2017 - present*
- Director, AIChE Separations Division, *2016 - 2020*
- Program Chair, Membrane-Based Separations Area, AIChE Separations Division, *2013 – 2015*
- Program Vice Chair, Membrane-Based Separations Area, Separations Division, *2011 – 2013*

Electrochemical Society (ECS)

- Symposium Chair/Organizer, Electrochemical Nitrogen Conversion & First Row Transition Metal Electrocatalysts for the OER, *2016 - present*
- Graduate Student Awards Co-Chair, Energy Technology Division, *2018 - present*
- Programming/Planning Committee Member, Energy Technology Division, *2016 - present*

American Chemical Society (ACS)

- Organizer, 2018 ENFL Storch Award symposium for Prof. Andrew Herring

- Organizer, ACS Workshop "Advances in Materials and Processes for Polymeric Membrane Mediated Water Purification", *2013 - 2015*

NIST

- Organizer, NIST Summer High School Internship Program (SHIP) Boulder, *2012 - 2015*
- Committee member, NIST Summer Undergraduate Research Fellowship (SURF), *2012 - 2015*
- Chair, Materials Reliability Division Colloquium Series, *September 2010 – 2011*
- Chair, NIST Workshop "Measuring Up to Sustainable Water", *September 9-10, 2010*

PATENT ACTIVITY

1. G. Qing, Z. Anari, L. Greenlee. *Electrochemical Flow Cell for Water Treatment*. Invention disclosure filed November 2019.
2. M.H. Beyzavi, J. Duffield, J.-Y. Hu, S.L. Foster, D. Hess, L.F. Greenlee. *Mechanochemical Synthesis of Amorphous Organic Polymers (AOM) and Use as a Water Treatment Technology*. Invention disclosure filed June 2019.
3. S.L. Foster, D. Hess, L.F. Greenlee. *Mechanochemical Synthesis Process for Nanoporous Functional Materials*. Invention disclosure filed May 2019.
4. J. Chen, L. Greenlee, R. Manso, P. Acharya, C. Crane. *Synthesis of Ultrafine Metal Oxide Core-Shell Nanoparticles for Water Electrolysis*. Invention disclosure filed January 2019.
5. P. Acharya, L.F. Greenlee. *Iron-Nickel Alloy Mixed Oxide Shell Nanoparticles*. Non-provisional utility patent application filed May 2018. Provisional patent filed May 2017.
6. C. Griggs, J. Mattei-Sosa, L. Gurtowski, L.F. Greenlee, M. Abolhassani. *Flat Sheet and Spiral Wound Chitosan Graphene Oxide Membranes*. Continuation in part patent filed July 2018. Patent Application #16/050425.
7. L. Greenlee, A. Carpenter, M. Abolhassani, C. Humphreys. *Stabilized Iron-Nickel Nanoparticle-Containing Composite for Sorption and Degradation of Environmental Contaminants*. Utility patent application filed September 2018. Provisional patent application filed September 2017.
8. L.F. Greenlee. *Iron-Nickel Core-Shell Nanoparticles*. U.S. Patent # 9,138,727, awarded September 22, 2015.

PUBLICATIONS

(Google Scholar: https://scholar.google.com/citations?user=2KsNLKIAAAAJ&hl=en)

[#]Denotes publications with first authorship and corresponding author responsibility from graduate students or postdocs from the Greenlee research group and Lauren Greenlee, respectively.

[$]Denotes publications from work at NIST.

1. [#]S.L. Foster, S. Watson, S. Shinn, E.B.A.S. Santos, V.C. dos Santos, L.F. Greenlee. Efficiency of iron-nickel nanoparticles for treatment of azo dyes, *in preparation*.

2. K. Roberts, V. Klaus, M. Abolhassani, S. Servoss, J.C. Wolchok, L. Greenlee, and J. Hestekin. Evapore: A Python GUI Tool for Evapoporometry Data Processing, *in preparation*.

3. [#]M. Abolhassani, A. W. Carpenter, D. Meyer-Arrivillaga, E. D. Pollock, Y. Moriizumi, P. Acharya, L. F. Greenlee. Comparative study of trichloroethylene removal by different carbons and FeNi-carbon composites, *in preparation*.

4. [#]M. Abolhassani, A. W. Carpenter, D. Meyer-Arrivillaga, E. D. Pollock, Y. Moriizumi, P. Acharya, L. F. Greenlee. The Effect of Ni and Carbon Ratio on Ni Leaching and TCE Removal by FeNi-Carbon Composites, *in preparation*.

5. [#]L. Kékedy-Nagy, L.A. English, M. Abolhassani, R. Sultana, J. P. Moore II, J. Popp, L. F. Greenlee. Scaled Production and Economic Assessment of Electrochemically Precipitated Struvite, *Chemical Engineering Journal* (2020) submitted.

6. B. Petery, K. Nye, C. Thomas, M. Abolhassani, L.F. Greenlee, V.F. Medina, C.S. Griggs. Physical and oxidative antimicrobial properties of chitosan-graphene oxide composites for water treatment. *ACS Applied Nano Materials* (2020), submitted.

7. M. Bafarani, M. Jafarzadeh J. Ozdemir, M. Abolhassani, j.-Y. Hu, L.F. Greenlee, M.H. Beyzavi. An Efficient CO_2 Capture Approach Using Modified Zirconium-based Metal–Organic Framework (MOF) Nanostructures with Ethylamine and Melamine, *Crystal Growth and Design* (2020), accepted.

8. R. Tejada-Vaprio, I. Mosleh, R.P. Mukherjee, H. Aljewari, M. Fruchtl, A. Elmasheiti, N. Bedford, L. Greenlee, M.H. Beyzavi, R. Beitle. Recombinant peptide fusion construction for protein-templated catalytic palladium nanoparticles, *Biotechnology Progress* (2020), e2956. DOI: 10.1002/btpr.2956.

9. #L. Kekedy-Nagy, A. Teymouri, A.M. Herring, L.F. Greenlee. Electrochemical removal and recovery of phosphorus as struvite in an acidic environment using pure magnesium vs. the AZ31 magnesium alloy as the anode, *Chemical Engineering Journal* (2020), 380, 122480. DOI: 10.1016/j.cej.2019.122480.

10. F. Foroughi, M.H. Islam, J.J. Lamb, L. Kékedy-Nagy, L.F. Greenlee, B.G. Pollet. The Use of Ultrasound for the Electrochemical Precipitation of Struvite, *ECS Transactions* (2019), 92, 47. DOI: 10.1149/09210.0047ecst.

11. I. Wu, A. Teymouri, R. Park, L.F. Greenlee, and A.M. Herring. Simultaneous Electrochemical Nutrient Recovery and Hydrogen Generation from Model Wastewater Using a Sacrificial Magnesium Anode, *Journal of the Electrochemical Society* (2019), 166(16), E576-E583. DOI: 10.1149/2.0561916jes.

12. #P. Acharya, Z. Nelson, M. Benamara, R.H. Manso, S.I.P. Bakovic, M. Abolhassani, S. Lee, B. Reinhart, A. Gankanda, J. Chen, L.F. Greenlee. Iron-nickel nanoparticles for efficient oxygen evolution reaction (OER) electrocatalysis: Role of iron-nickel molar ratio. *ACS Omega* (2019), 4(17), 17209-17222. DOI: 10.1021/acsomega.9b01692.

13. J. Ozdemir, I. Mosleh, M. Abolhassani, L.F. Greenlee, R.R. Beitle Jr., and M.H. Beyzavi. Covalent organic frameworks for the capture, fixation or reduction of CO_2, *Frontiers in Energy Research* (2019), 7(77), 1-32. DOI: 10.3389/fenrg.2019.00077.

14. #L. Kekedy-Nagy, J.P. Moore II, F. Attarzadeh, J.A. Hestekin, L.F. Greenlee. The passivating layer influence on Mg-based anode corrosion and implications for electrochemical struvite precipitation, *Journal of the Electrochemical Society* (2019), 166(12), E358-E364. DOI: 10.1149/2.0901912jes.

15. #C. Loney, S.I.P. Bakovic, L.F. Greenlee,* J.N. Renner*. Self-assembled polyproline II peptide monolayers on iron(III) oxide. *Chemistry Select* (2019), 4(22), 6784-6789. DOI: 10.1002/slct.201901817.

16. A. Mosleh, R.T. Vaprio, M. Benamara, N. Bedford, L.F. Greenlee, R. Beitle. Recombinant peptide fusion proteins enable palladium nanoparticle growth. *Materials Letters* (2019), 252, 68-71. DOI: 10.1016/j.matlet.2019.05.080.

17. #S.L. Foster, K. Estoque, M. Voecks, N. Rentz, L.F. Greenlee. Removal of synthetic azo dye using bimetallic nickel-iron nanoparticles. *Journal of Nanomaterials* (2019), 2019, 9807605. DOI: 10.1155/2019/9807605.

18. #R.H. Manso, P. Acharya, S. Deng, C.C. Crane, B. Reinhart, S. Lee, X. Tong, D. Nykypanchuk, J. Zhu, Y. Zhu, L.F. Greenlee,* and J. Chen.* Controlling 3-D Morphology of Ni-Fe-Based Nanocatalysts for Enhanced Oxygen Evolution Reaction. *Nanoscale* (2019) 11, 8170 - 8184. DOI: 10.1039/C8NR10138H. *Co-corresponding authors.

19. #A. Gankanda, N.S. Rentz, L.F. Greenlee. Influence of ligand size and chelation strength on zero valent iron nanoparticle adsorption and oxidation behavior in the presence of water vapor and liquid water. *Journal of Physical Chemistry C* (2019) 123(4), 2474-2487. DOI: 10.1021/acs.jpcc.8b07850.

20. M.R. Esfahani, S.A. Aktij, Z. Dabaghian, M.D. Firouzjaei, A. Rahimpour, J. Eke, I.C. Escobar, M. Abolhassani, L.F. Greenlee, A.R. Esfahani, A. Sadmani, N. Koutahzadeh. Nanocomposite membranes for water purification: Fabrication, modification, and applications. *Separation and Purification Technology* (2019), 213, 465-499. DOI: 10.1016/j.seppur.2018.12.050.

21. C. Walden, L.F. Greenlee, W. Zhang. Real-time interaction of mixed species biofilm with silver nanoparticles using QCM-D. *Colloid and Interface Science Communications* (2019), 28, 49-53. DOI: 10.1016/j.colcom.2018.11.007.

22. #L.F. Greenlee, J.N. Renner, S.L. Foster. The use of controls for consistent and accurate measurements of electrocatalytic ammonia synthesis from dinitrogen. *ACS Catalysis* (2018), 8(9), 7820-7827. ***invited viewpoint***, DOI: 10.1021/acscatal.8b02120.

23. #S.L. Foster, S.I.P. Bakovic, R. Duda, S. Maheshwari, R.D. Milton, S.D. Minteer, M.J. Janik, J.N. Renner, L.F. Greenlee. Catalysts for nitrogen reduction to ammonia. *Nature Catalysis* (2018) 1, 490-500. DOI: 10.1038/s41929-018-0092-7.

24. #P. Acharya, J.N. Burrow, M. Abolhassani, L.F. Greenlee. Role of surface area on the performance of iron nickel nanoparticles for the oxygen evolution reaction (OER). *ECS Transactions* (2018) 85(11), 81-89. DOI: 10.1149/08511.0081ecst.

25. #M. Abolhassani, C.S. Griggs, L. Gurtowski, J. Mattei-Sosa, M. Nevins, V.F. Medina, L.F. Greenlee. Scalable chitosan-graphene oxide membranes: The effect of GO size on properties and cross-flow filtration performance. *ACS Omega* (2017) 2(12), 8751–8759. DOI: 10.1021/acsomega.7b01266.

26. I.A. Ike, S.L. Foster, S.R. Shinn, S.T. Watson, J.D. Orbell, L.F. Greenlee, M. Duke. Advanced oxidation of orange G using phosphonic acid stabilised zerovalent iron. *Journal of Environmental Chemical Engineering* (2017) 5, 4014 - 4023. DOI: 10.1016/j.jece.2017.07.069.

27. #L.F. Greenlee, P. Acharya, Z. Nelson. Compositional optimization of alloy $Fe_xNi_y(OH)_2$ nanoparticles for alkaline electrochemical oxygen evolution. *ECS Transactions* (2017) 77, 25-38. DOI: 10.1149/07709.0025ecst.

28. $S. Candelaria, N.M. Bedford, A.R. Showalter, S. Pylypenko, B.A. Bunker, S. Lee, B. Reinhart, Y. Ren, S.P. Ertem, E.B. Coughlin, N.A. Sather, J.L. Horan, A.M. Herring, L.F. Greenlee. Multi-component Fe-Ni hydroxide nanocatalyst for oxygen evolution and methanol oxidation reactions under alkaline conditions. *ACS Catalysis* (2017) 7, 365-379. DOI: 10.1021/acscatal.6b02552.

29. $S.J. Wilson, L.F. Greenlee. Post-synthesis separation and storage of zero-valent iron nanoparticles. *Journal of Nanoscience and Nanotechnology* (2017) 17, 2413-2422. DOI: doi.org/10.1166/jnn.2017.13041.

30. $L.F. Greenlee, N.S. Rentz. Influence of nanoparticle processing and additives on PES casting solution viscosity and cast membrane characteristics. *Polymer* 103 (2016) 498-508. DOI: 10.1016/j.polymer.2016.04.021.

31. $J.N. Renner, L.F. Greenlee, A.M. Herring, K.E. Ayers. Electrochemical synthesis of ammonia: A low pressure, low temperature approach. *The Electrochemical Society Interface* 24(2) (2015) 51-57. DOI: 10.1149/2.F04152IF.

32. $S. Meng, L.F. Greenlee, YR Shen, E Wang. Basic science of water: Challenges and current status towards a molecular picture. *Nano Research* (2015). DOI: 10.1007/s12274-015-0822-y.

33. $I. Sriram, A.E. Curtin, A.N. Chiaramonti, J.H. Cuchiaro, A.D. Weidner, T.M. Tingley, L.F. Greenlee, K.M. Jeerage. Stability and phase transfer of catalytically active platinum nanoparticle suspensions. *Journal of Nanoparticle Research* 17 (2015) 230. DOI: 10.1007/s11051-015-3034-1.

34. $J.D. Torrey, J.P. Killgore, N.M. Bedford, L.F. Greenlee. Oxidation behavior of zero-valent iron nanoparticles in mixed matrix water purification membranes. *Environmental Science: Water Research & Technology* 1 (2015) 146-152. DOI: 10.1039/c4ew00068d. (**Inside cover**)

35. $J.D. Torrey, T.L. Kirschling, L.F. Greenlee. Processing and characterization of nanoparticle coatings for quartz crystal microbalance measurements. *Journal of Research of the National Institute of Standards & Technology* (2015) 120, 1-10. DOI: 10.6028/jres.120.001.

36. $L.F. Greenlee, N.S. Rentz. ATMP-stabilized iron nanoparticles: Chelator-controlled nanoparticle synthesis. *Journal of Nanoparticle Research* 16 (2014) 2712. DOI: 10.1007/s11051-014-2712-8.

37. $J.L. Horan, A. Lingutla, H. Ren, M.-C. Kuo, S. Sachdeva, Y. Yang, S. Seifert, L.F. Greenlee, M.A. Yandrasits, S.J. Hamrock, M.H. Frey, A.M. Herring. Fast proton conduction facilitated by minimum water in a series of divinylsilyl-11-silicotungstic acid-co-butyl acrylate-co-hexanediol diacrylate polymers. *Journal of Physical Chemistry C* 188(1) (2014) 135-144. DOI: 10.1021/jp4089657.

38. L.F. Greenlee, B.D. Freeman, D.F. Lawler. Ozonation of phosphonate antiscalants used for reverse osmosis desalination: Parameter effects on the extent of oxidation. *Chemical Engineering Journal* 244 (2014) 505-513. DOI: 10.1016/j.cej.2014.02.002.

39. [$]L.F. Greenlee, J.D. Torrey, R.L. Amaro, J.M. Shaw. Kinetics of zero valent iron nanoparticle oxidation in oxygenated water. *Environmental Science & Technology* 23 (2012) 12913-12920. DOI: 10.1021/es303037k.

40. [$]N. Goldstein, L.F. Greenlee. Influence of synthesis parameters on iron nanoparticle size and zeta potential. *Journal of Nanoparticle Research* 14 (2012) 760. DOI: 10.1007/s11051-012-0760-5.

41. [$]L.F. Greenlee, S. Hooker. Development of stabilized zero valent iron nanoparticles. *Desalination and Water Treatment* 37 (2012) 114-121. DOI: 10/5004/dwt.2012.2526.

42. [$]L.F. Greenlee, S. Hooker. Characterization of stabilized zero valent iron nanoparticles, in *Materials Challenges and Testing for Supply of Energy and Resources*, Boellinghaus, T.; Lexow, J.; Kishi, T.; Kitagawa, M., Eds. Springer Verlag: Berlin, Germany, 2012; pp 173-188. DOI: 10.1007/978-3-642-23348-7_16.

43. L.F. Greenlee, F. Testa, D.F. Lawler, B.D. Freeman, P. Moulin. Effect of antiscalant degradation on salt precipitation and solid/liquid separation of RO concentrate. *Journal of Membrane Science* 366(1-2) (2011) 48-61. DOI: 10.1016/j.memsci.2010.09.040.

44. L.F. Greenlee, F. Testa, D.F. Lawler, B.D. Freeman, P. Moulin. The effect of antiscalant addition on calcium carbonate precipitation for a simplified synthetic brackish water reverse osmosis concentrate. *Water Research* 44(9) (2010) 2957-2969. DOI:10.1016/j.watres.2010.02.024.

45. L.F. Greenlee, F. Testa, D.F. Lawler, B.D. Freeman, P. Moulin. Effect of antiscalants on precipitation of an RO concentrate: Metals precipitated and particle characteristics for several water compositions. *Water Research* 44(8) (2010) 2672-2684. DOI:10.1016/j.watres.2010.01.034.

46. L.F. Greenlee, D.F. Lawler, B.D. Freeman, B. Marrot, P. Moulin. Reverse osmosis desalination: Water sources, technology, and today's challenges. *Water Research* 43(9) (2009) 2317-2348. DOI:10.1016/j.watres.2009.03.010.

47. J.P. Nicot, S. Walden, L. Greenlee, J. Els. A Desalination Database for Texas. Bureau of Economic Geology, The University of Texas at Austin, prepared for the Texas Water Development Board (Contract No. 2004-483-021): Austin, TX, 2005.

48. N.S. Brown, A. Smart, V. Sharma, M.L. Brinkmeier, L. Greenlee, S.A. Camper, D.R. Jensen, R.H. Eckel, W. Krezel, P. Chambon, B.R. Haugen. Thyroid hormone resistance and increased metabolic rate in the RXR-gamma-deficient mouse. *Journal of Clinical Investigation* 106(1) (2000), 73-79. DOI:10.1172/JCI9422.

RECENT PRESENTATIONS

P. Acharya, R. Manso, Z. Nelson, M. Benamara, A. Hoffman, S. Bare, J. Chen, L.F. Greenlee. "$Fe_xNi_{1-x}O(H)_y$ Electrocatalysts for the Oxygen Evolution Reaction: Role of Electrochemical History and As-Synthesized Properties on Atomic Structure", **invited seminar**, Colorado School of Mines, Golden, CO, February 4, 2020.

P. Acharya, R. Manso, Z. Nelson, M. Benamara, A. Hoffman, S. Bare, J. Chen, L.F. Greenlee. "$Fe_xNi_{1-x}O(H)_y$ Electrocatalysts for the Oxygen Evolution Reaction: Role of Electrochemical History and As-Synthesized Properties on Atomic Structure", **invited seminar**, The Pennsylvania State University, State College, PA, January 23, 2020.

Greenlee, L. F.; Qing, G.; Kékedy-Nagy, L. "Electrochemical Wastewater Treatment: Nutrient Recovery and Selective Contaminant Removal", Solar World Congress, Santiago, Chile, November 3 – 7, 2019.

Qing, G.; Anari, Z.; Foster, S. L.; Thoma, G.; Matlock, M.; Greenlee, L. F. "Electrochemical System for Disinfection of Irrigation Water and Disinfection/Ammonia Removal from Aquaculture Wastewater", **invited talk**, Hawaii Farm Bureau Annual Meeting, Maui, HI, October 28-30, 2019.

S. I.P. Bakovic, S.F. Foster, J. N. Renner, M. J. Janik, L. F. Greenlee. "Low Temperature Electrochemical Ammonia Synthesis: Status, Questions, Measurements, and Catalysts", **invited seminar**, National Renewable Energy Laboratory, Golden, CO, October 23, 2019.

P. Acharya, R. Manso, Z. Nelson, M. Benamara, S. Lee, S. Bare, J. Chen, L.F. Greenlee. "$Fe_xNi_{1-x}O(H)_y$ nanoparticles for alkaline electrocatalysis: Understanding the chemical structure of complex nanocatalysts", American Chemical Society National Meeting, San Diego, CA, August 25-29, 2019.

S. I.P. Bakovic, C. Loney, S. Maheshwari, J. N. Renner, M. J. Janik, L. F. Greenlee. "A Bimetallic Electrocatalyst Platform for Understanding the Roles of Surface Chemistry and Functionalization on Nitrogen Reduction to Ammonia", Electrochemical Society meeting, Dallas TX, May 26-30, 2019.

P. Acharya, R. Manso, Z. Nelson, M. Benamara, S. Lee, S. Bare, J. Chen, L.F. Greenlee. "In Pursuit of Questions at the Intersection of Water Chemistry, Materials Chemistry, and Electrochemical Systems", **invited seminar**, Norwegian University of Science and Technology, Trondheim, Norway, May 19, 2019.

L.F. Greenlee. "Management of Nutrients for Reuse", Waste to Worth conference, Minneapolis, MN, April 24, 2019.

L.F. Greenlee. **Invited speaker and panelist**. Case Water Initiative Spring Speaker Panel, Case Western Reserve University, April 15, 2019.

P. Acharya, R. Manso, Z. Nelson, M. Benamara, S. Lee, S. Bare, J. Chen, L.F. Greenlee. "$Fe_xNi_{1-x}O(H)_y$ nanoparticles for alkaline electrocatalysis: Understanding the chemical structure of complex nanocatalysts", **invited seminar**, Ohio University, Athens, OH, March 25, 2019.

L.F. Greenlee, K. Brye, J. Popp, G. Thoma, A.H. Herring, J. Renner, L. Kekedy-Nagy, R. Sultana, K. Morrissey, R. Anderson, N. Omidire, Z. Su, A. Teymouri, L. English. "Phosphorus from Wastewater: A Systems Approach to Electrochemical Nutrient Recovery", Molecular Foundry, **invited seminar**, Spring 2019 Seminar Series, Lawrence Berkeley National Laboratory, Berkeley, CA, March 12, 2019.

P. Acharya, S. Candelaria, N. Rentz, Z. Nelson, E. Koch, M. Benamara, S. Lee, L.F. Greenlee. "$Fe_xNi_{1-x}O(H)_y$ Nanocatalysts for Alkaline Electrocatalysis", University of Colorado, Boulder, **invited seminar**, Boulder, CO, October 9, 2018.

P. Acharya, S. Candelaria, N. Rentz, Z. Nelson, E. Koch, M. Benamara, S. Lee, L.F. Greenlee. "$Fe_xNi_{1-x}O(H)_y$ Nanocatalysts for Alkaline Electrocatalysis", Georgia Institute of Technology, **invited seminar**, Atlanta, GA, September 12, 2018.

P. Acharya, S. Candelaria, N. Rentz, Z. Nelson, E. Koch, M. Benamara, S. Lee, L.F. Greenlee. "Understanding the Structure of Fe-Ni Hydroxide Nanoparticle Catalysts", American Chemical Society, **invited talk**, Boston MA, August 19-23, 2018.

L.F. Greenlee, "A Systems Approach to Electrochemical Nutrient Recovery", Eckenfelder Lecture Series, Water Environment Association of Texas, **invited talk**, University of Houston, Houston, TX, July 26th, 2018.

P. Acharya, S. Candelaria, N. Rentz, Z. Nelson, E. Koch, M. Benamara, S. Lee, L.F. Greenlee. "$Fe_xNi_{1-x}O(H)_y$ Nanocatalysts for the Oxygen Evolution Reaction of Alkaline Electrocatalysis", Catalysis Gordon Research Conference, New London, NH, June 24-29, 2018.

D. Suttmiller, S. Bakovic, S. Foster, Z. Ford, M. Kleinlauth, C. Loney, J.N. Renner, S. Maheshwari, M.J. Janik, L.F. Greenlee. "Bimetallic Nanoparticle Catalyst Synthesis and Design: Progress Toward Electrochemical Nitrogen Reduction", Electrochemical Society, Seattle WA, May 13-17, 2018.

P. Acharya, S. Candelaria, N. Rentz, Z. Nelson, M. Benamara, S. Lee, L.F. Greenlee. "$Fe_xNi_{1-x}O(H)_y$ Nanocatalysts for Alkaline Electrocatalysis", **invited seminar**, Louisiana State University, Baton Rouge, LA, April 13, 2018.

M. Abolhassani, S. Foster, A. Carpenter, C. Gause, I.A. Ike, M. Duke, L.F. Greenlee. "Materials for water contaminant removal: Understanding chemistry to meet the challenges of cost, performance efficacy and lifetime", **invited talk**, American Chemical Society, New Orleans, LA, March 18-22, 2018.

P. Acharya, Z. Nelson, M. Benamara, S. Lee, L.F. Greenlee. "Tackling Challenges in Catalyst Design: Interdisciplinary Lessons on Iron-Based Nanomaterials for Efficient Water Treatment and Electrochemical Energy Conversion", American Chemical Society, New Orleans, LA, March 18-22, 2018.

N. Rentz, R. Geiss, I.A. Ike, M. Duke, S. Shinn, S. Watson, S. Foster, D.F. Lawler, B.D. Freeman, P. Moulin, L.F. Greenlee. "Utilizing Organophosphates to Control Particle Properties: From Antiscalants in Desalination to Iron-Mediated Persulfate Oxidation", **invited talk**, American Chemical Society, New Orleans, LA, March 18-22, 2018.

P. Acharya, M. Abolhassani, A. Gankanda, S. Foster, S. Candelaria, Z. Nelson, N. Rentz, L.F. Greenlee. "$Fe_xNi_{1-x}O_y$ Nanocatalysts for Alkaline Electrocatalysis and Reactive Water Treatment", **invited seminar**, University of South Carolina, Columbia, SC, February 1, 2018.

S.L. Foster, D. Suttmiller, P. Acharya, Z. Ford, J. Burrow, M. Kleinlauth, C. Loney, L. Wiles, J. Renner, W. Gellett, K. Ayers, L.F. Greenlee. "Design of Iron-Nickel Nanocatalysts for Low-Temperature Electrochemical Ammonia Generation", American Institute of Chemical Engineers annual conference, Minneapolis, MN, October 29 – November 3, 2017.

P. Acharya, M. Abolhassani, A. Gankanda, Z. Nelson, S. Lee, L.F. Greenlee. "Design of Iron-Based Nanomaterials as Catalysts for Efficient Water Treatment and Electrochemical Energy Conversion", Electrochemical Society, Washington, D.C., October 1-4, 2017.

P. Acharya, Z. Nelson, M. Benamara, S. Lee, L.F. Greenlee. "Characterization of $Fe_xNi_y(OH)_2$ Alloy Nanoparticles for the Oxygen Evolution Reaction as a Function of Iron-Nickel Composition", Electrochemical Society, Washington, D.C., October 1-4, 2017.

M. Abolhassani, P. Acharya, A. Gankanda, S. Foster, S. Candelaria, Z. Nelson, N. Rentz, L.F. Greenlee. "$Fe_xNi_{1-x}O_y$ Nanocatalysts for Alkaline Electrocatalysis and Reactive Water Treatment", **invited seminar**, Sandia National Laboratory, Albuquerque, NM, September 14, 2017.

M. Abolhassani, P. Acharya, A. Gankanda, S. Foster, S. Candelaria, Z. Nelson, N. Rentz, L.F. Greenlee. "$Fe_xNi_{1-x}O_y$ Nanocatalysts for Alkaline Electrocatalysis and Reactive Water Treatment", **invited seminar**, University of New Mexico, Albuquerque, NM, September 13, 2017.

M. Abolhassani, P. Acharya, A. Gankanda, S. Foster, S. Candelaria, Z. Nelson, N. Rentz, L.F. Greenlee. "$Fe_xNi_{1-x}O_y$ Nanocatalysts for Alkaline Electrocatalysis and Reactive Water Treatment", **invited seminar**, Los Alamos National Laboratory, Los Alamos, NM, September 12, 2017.

M. Abolhassani, A. Gankanda, P. Acharya, S. Foster, J. Ficut, R. Gilker, S. Candelaria, Z. Nelson, N. Rentz, L.F. Greenlee. "Opportunities for Non-Precious Metal Oxides and Electrochemistry in Water Treatment and Energy Conversion", **invited seminar**, NASA Ames Research Center, Moffett Field, CA, August 3, 2017.

M. Abolhassani, P. Acharya, A. Gankanda, S. Foster, S. Candelaria, Z. Nelson, N. Rentz, L.F. Greenlee. "$Fe_xNi_{1-x}O_y$ Nanocatalysts for Alkaline Electrocatalysis and Reactive Water Treatment", **invited seminar**, Lawrence Berkeley National Laboratory, Berkeley, CA, August 2, 2017.

M. Abolhassani, A. Gankanda, S. Shinn, S. Watson, P. Acharya, Z. Nelson, S. Candelaria, L.F. Greenlee. "Balancing Advanced Materials Design with Scalability for Efficient Water Treatment and Water Splitting

Technologies", **invited talk**, RE3 Workshop 2017: Renewable Energy & Energy Efficiency, Louisville, KY, May 21-24, 2017.

P. Acharya, S. Candelaria, N. Rentz, L.F. Greenlee. "X-Ray Absorption Spectroscopy Characterization of Bimetallic Iron-Nickel Nanoparticle Electrocatalysts", **invited talk**, American Chemical Society National Meeting, San Francisco, CA, April 2-6, 2017.

L.F. Greenlee. "Fe-Ni Bimetallic Nanoparticles as an Electrocatalyst and a Reactive Water Treatment Material", **invited seminar**, Distinguished Seminar Series 2017, Imperial College London, March 1, 2017.

L.F. Greenlee, J. N. Renner, M. Janik, W. Gellett, K. Ayers, N. Rentz, S. Foster, S. Perez, P. Acharya, "Heterogeneous Catalysts for Low-Temperature Electrochemical Reduction of Nitrogen to Ammonia", **invited talk**, 9th Annual CEC Workshop on Electrochemistry, The University of Texas at Austin, Center for Electrochemistry, Austin, TX, February 11-12, 2017.

L.F. Greenlee. "Fe-Ni Bimetallic Nanoparticles as an Electrocatalyst and a Reactive Water Treatment Material", **invited seminar**, University of Nevada, Las Vegas, February 2, 2017.

L.F. Greenlee. "Catalytic Nanocomposites for Water Treatment Applications", **invited talk**, 5th Annual R&D Symposium, De Nora Tech, Concord, OH, November 9, 2016.

L.F. Greenlee. "Fe-Ni Bimetallic Nanoparticles as an Electrocatalyst and a Reactive Water Treatment Material", **invited seminar**, Oklahoma State University, Stillwater, OK, August 30, 2016.

L.F. Greenlee. "Nanostructured Catalysts & Nanoparticle-Carbon Composites", **invited seminar**, U.S. Army Engineer Research and Development Center, Vicksburg, MS, August 15, 2016.

L.F. Greenlee. "Fe-Ni Bimetallic Nanoparticles as an Electrocatalyst and a Reactive Water Treatment Material", **invited seminar**, Environmental and Water Resources Engineering, University of Texas at Austin, Austin, TX, April 14, 2016.

K. Estoque, M. Voecks, H. Weinstein, K. Lawrence, K. Younglove, N. Rentz, L.F. Greenlee. "Role of Morphology and Composition in Reactivity of FeNi Nanoparticles", **invited talk**, American Chemical Society, San Diego, CA, March 13-17, 2016.

L.F. Greenlee, S. Candelaria, N. Bedford, N. Rentz, T. Woehl, K. Estoque, M. Voecks. "Development of $FeNiO_x$ nanoparticles for water and energy applications", **invited talk**, The 4th International Symposium on Advanced Polymer Materials and Fiber Science, Kyoto Institute of Technology, Kyoto, Japan, June 29 – 30, 2015.

L.F. Greenlee, H.A. Weinstein, M. Voecks, K. Estoque, N.S. Rentz, T.J. Woehl, N.M. Bedford. "Nanoparticle Embedded Water Filtration Membranes", **invited talk**, American Chemical Society National Meeting, Denver, CO, March 22 – 26, 2015.

L.F. Greenlee, H.A. Weinstein, M. Voecks, K. Estoque, N.S. Rentz, N.M. Bedford. "Iron Nanoparticle Synthesis and Immobilization", **invited talk**, Advances in Materials and Processes for Polymeric Membrane Mediated Water Purification, Pacific Grove, CA, February 15 – 18, 2015.

EXTERNAL FUNDING PROGRAM

University of Arkansas

W. Gellett, K. Ayers, A.M. Herring, L.F. Greenlee (co-PI). "High Efficiency Low Cost Electrochemical Ammonia Production" $500,000, 2015-2017, USDA SBIR Phase II. (**Greenlee group: $109,950**)

L.F. Greenlee (PI), W. Zhang, J. Chen, S. Servoss, R. Wickramasinghe, J.-W. Kim, R. Henry, X. Qian. "Instrument User Proposal: A High-Resolution Quartz Crystal Microbalance with Dissipation and A Multi-Function Cell Suite & Sensor Suite" $111,540, 2016. Arkansas Biosciences Institute (ABI). (**Greenlee group: $111,540**)

A. Carpenter, L.F. Greenlee (co-PI). "Bimetallic Zero Valent Iron-Carbon Composites for In Situ Remediation: Improving Particle Lifetime, Reactivity and Transport" $99,516, 2016-2017, NIST SBIR Phase I. (**Greenlee group: $29,685**)

W. Gellett, K. Ayers, J. Renner, L.F. Greenlee (co-PI). "Nitrogenase Inspired Peptide-Functionalized Catalysts for Efficient, Emission-Free Ammonia Production" $150,000, 2016-2017, DOE AMO SBIR Phase I. (**Greenlee group: $24,999**)

L.F. Greenlee (PI), J. Renner, M. Janik. "Peptide Control of Electrocatalyst Surface Environment and Catalyst Structure: A Design Platform to Enable Mechanistic Understanding and Synthesis of Active and Selective N_2 Reduction Catalysts" $599,373, 2016-2019, DOE BES. (**Greenlee group: $209,060**)

L.F. Greenlee (PI). "Direct Measurement of Electron Mobility in Carbon-Nanocatalyst Composites" $60,000, 2016-2017, ARO STIR. (**Greenlee group: $60,000**)

L.F. Greenlee (PI). "Influence of Metal Incorporation on the Organizational Structure of Sulfonated Block Copolymers in Solution" $110,000, 2017-2019. ACS PRF. (**Greenlee group: $110,000**)

L.F. Greenlee (PI). "Nanostructured $Fe_xNi_y(OH)_2$ Catalysts for Water Treatment and Electrochemical Energy Conversion" $45,000, 2017-2020. 3M. (**Greenlee group: $45,000**)

A. Carpenter, L.F. Greenlee (co-PI). "Bimetallic Zero Valent Iron-Carbon Composites for In Situ Remediation" $299,994, 2017-2019. NIST SBIR Phase II. (**Greenlee group: $79,320**)

L.F. Greenlee (PI). "RII Track 4: In Situ and Surface Sensitive Characterization of Fe-Ni$(OH)_2$ Bimetallic Catalysts" $267,507, 2017-2019. NSF EPSCoR Fellowship. (**Greenlee group: $267,507**)

L.F. Greenlee (PI), A.M. Herring, J. Renner, J. Popp, G. Thoma, K. Brye. "INFEWS/T3: Critical Nutrient Recovery and Reuse: N & P Recycling from Wastewaters as Struvite Fertilizer" $2,430,597, 2017-2021. NSF INFEWS. (**Greenlee group: $892,260**)

J. Chen, L.F. Greenlee (co-PI). "INFEWS N/P/H2O - SusChEM: Collaborative: Controlling Spatial Composition of Nonprecious Metal-based Heteronanostructures for Enhanced Electrocatalytic Performance" $449,983, 2017-2020. NSF CBET. (**Greenlee group: $223,763**)

S. Servoss, L.F. Greenlee (co-PI). "Electrochemical Detection of Biomolecules using Peptoid-Functionalized Nanoparticles" $8,582, 2017-2018. ABI. (**Greenlee group: $4,291**)

L.F. Greenlee (PI). W. Zhang. "An In Situ Approach to Harmful Algal Blooms: Simultaneous Treatment of Cyanobacteria and Cyanotoxins in Natural Water Sources Using Catalytic Nanoparticle-Fiber Nets" $24,996. 2018-2019. Arkansas Water Resources Center (AWRC). (**Greenlee group: $24,996**)

S. Servoss, L.F. Greenlee (co-PI). "Electrochemical Detection of Biomolecules using Peptoid-Functionalized Nanoparticles" $14,067, 2018-2019. ABI. (**Greenlee group: $7,030**)

L.F. Greenlee. "The Role of Iron in Alkaline Electrochemical C-C Bond Oxidation", $59,991, 2018-2019. Army Research Office STIR. (**Greenlee group: $59,991**)

L.F. Greenlee (PI), A.M. Herring, J. Renner, J. Popp, G. Thoma, K. Brye, T. Lim, R. Stowell. "Water and Nutrient Recycling: A Decision Tool and Synergistic Innovative Technology", $4,342,280. 2018-2023. USDA NIFA/AFRI Water for Food Program. (**Greenlee group: $837,752**)

L.F. Greenlee (PI), G. Thoma, M. Matlock. "Modular, Off-Grid Electrochemical System for Disinfection of Irrigation Water and Disinfection/Ammonia Removal from Aquaculture Wastewater", $75,000. 2019-2020. Hawaii Dept. of Agriculture/Hawaii Farm Bureau. (**Greenlee group: $75,000**).

S.L. Foster, L.F. Greenlee. "Anti-Microbial Graphene Oxide Nanofiltration Membrane", $250,000. 2019-2020. NSF SBIR Phase I. (**Greenlee group: $74,999**)

L.F. Greenlee (PI), G. Thoma. "Membrane Separation of Nitrogen and Phosphorus Nutrients with Downstream Recovery as Struvite Fertilizer", $50,896, 2019-2020. MAST Center (NSF-funded U/UCRC). (**Greenlee group: $50,896**)

S.L. Foster, L.F. Greenlee. "Catalyst Embedded Nanoporous Material for the Remediation of Energetic Compounds", $1,200,000. 2020 – 2022. US Army SBIR program, Phase II award. (**Greenlee group: $210,000**)

J. Chen (PI), L.F. Greenlee (co-PI). NSF INTERN supplement. "INFEWS N/P/H2O - SusChEM: Collaborative: Controlling Spatial Composition of Nonprecious Metal-based Heteronanostructures for Enhanced Electrocatalytic Performance", NSF CBET. 2019 – 2020. **Greenlee group: $44,322**.

L.F. Greenlee (PI), W. Zhang. "In Situ Harmful Algal Bloom Mitigation: Net Design to Enhance Coagulation and Photocatalytic Degradation Mechanisms", AWRC, 2020 – 2021. **Greenlee group: $20,000**.

Total, Greenlee group: $3,572,991

Total awards funded as PI: $8,197,180

Total awards funded as a co-PI: $3,016,464

CatalyzeH2O, LLC

S.L. Foster, L.F. Greenlee, H. Beyzavi. "Covalent organic frameworks based nanoporous structures for explosive remediation", $150,000, 2018-2019. US Army SBIR program, Phase I award.

S.L. Foster, L.F. Greenlee. "Anti-Microbial Graphene Oxide Nanofiltration Membrane", $250,000. 2019-2020. NSF SBIR Phase I.

S.L. Foster, L.F. Greenlee. "Catalyst Embedded Nanoporous Material for the Remediation of Energetic Compounds", $1,200,000. 2020 – 2022. US Army SBIR program, Phase II award.

STUDENT RESEARCH FELLOWSHIPS & AWARDS

2019

NSF INTERN supplement: Prashant Acharya, internship at Resolute Marine

SURF: Lauren Shepard

Gilman International Scholarship: Patricia Means

NSF GRFP, Honorable Mention: Suzana Ivandic

AIChE Best Poster Award, Environmental: Suzana Ivandic

2018

SURF: Tobias Dwyer, James Burrow

2017

SURF: Tobias Dwyer, Zakary Ford

REU: James Burrow, Tobias Dwyer, Skylar Watson

Awards: Suzana Ivandic, Undergraduate Best Poster Award, AIChE Annual Conference, Minneapolis, MN, October 29 – November 3, 2017.

TEACHING SCORES

Note: I did not teach in Spring 2018, nor did I teach in Fall of 2019, because of the NSF EPSCoR Fellowship award (2017-2020). Instead, I am spending 2-3 months of the year each of these semesters working with Prof. Clemens Heske at the University of Nevada, Las Vegas, and the Advanced Light Source at Berkeley National Laboratory.

1. Courses Taught Since Initial Appointment:

Course Number	Title	Enrollment	Enrollment Year	Purdue Rating /5.0
				Likert Mean
CHEG 3144	Heat and Mass Transfer	72	Fall 2016	4.50
CHEG 3713	Materials Technology	96	Spring 2017	4.22
CHEG 3144	Heat and Mass Transfer	61	Fall 2017	4.77
CHEG 3144	Heat and Mass Transfer	62	Fall 2018	4.70
CHEG 6123	Transport II	12	Spring 2019	4.70

2. Course Evaluation Results for University Core Questions

Course-specific questions available upon request.

CHEG 3144, Fall 2016

Question	Ind.	CHEG	Univ.
Overall, I would rate this course as:	4.30	4.17	4.14
My instructor is fluent in English:	4.94	4.86	4.62
Overall, I would rate this instructor as:	4.44	4.30	4.27

CHEG 3713, Spring 2017

Question	Ind.	CHEG	Univ.
Overall, I would rate this course as:	3.89	4.11	4.13
My instructor is fluent in English:	4.94	4.93	4.71
Overall, I would rate this instructor as:	4.24	4.27	4.25

CHEG 3144, Fall 2017

Question	Ind.	CHEG	Univ.
Overall, I would rate this course as:	4.70	4.21	4.09
My instructor is fluent in English:	4.97	4.93	4.70
Overall, I would rate this instructor as:	4.75	4.30	4.23

CHEG 3144, Fall 2018

Question	Ind.	CHEG	Univ.
Overall, I would rate this course as:	4.82	4.24	4.08
My instructor is fluent in English:	4.98	4.92	4.70
Overall, I would rate this instructor as:	4.84	4.27	4.22

CHEG 6123, Spring 2019

Question	Ind.	CHEG	Univ.
Overall, I would rate this course as:	4.56	4.06	4.03
My instructor is fluent in English:	5.00	4.84	4.70
Overall, I would rate this instructor as:	4.67	4.21	4.19