

JULIE RENNER

Climo Associate Professor
Dean's Fellow for Diversity, Equity and Inclusion
Department of Chemical and Biomolecular Engineering
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HIGHLIGHTED ACHIEVEMENTS

- **Demonstrated success in obtaining funding and research awards**
 - Authored 13 funded research proposals as PI or co-PI with a *career total of \$3.3 M*
 - Estimated direct federal funding at CWRU: \$2.6M including an NSF CAREER
 - Total direct federal funding value in industry: \$600,000
 - Other funding: \$78,600 includes an internationally competitive fellowship from ECS sponsored by Toyota, and CWRU-sponsored awards for innovations in teaching and research
 - Won the Case School of Engineering Research award in 2021
- **Active publication, invention, and presentation history**
 - Part of 41 articles, 2 book chapters, and 2 published conference proceedings
 - h-index: 18, i10-index: 24, total citations 2822
 - Delivered 35 invited presentations, including the Mellichamp Distinguished Lectureship at Georgia Tech and an AIChE Topical Plenary
 - Part of 1 issued patent since starting at CWRU
- **Commitment to student mentorship and teaching**
 - Mentored 7 doctoral graduate students and 6 master's students and 1 postdoc to date
 - Passionate about undergraduate research: 27 undergraduate students at CWRU, with 6 currently active
 - Winner of the Case School of Engineering Undergraduate Teaching Award (2022), Graduate Teaching Award (2017) and Glennan Fellowship (2017-2018), which is awarded to untenured faculty for demonstrated potential for a career that combines both teaching and scholarship
 - Founder and organizer of the Widening Opportunities for Women in Science (WOWS) summer research program at CWRU in collaboration with John Hay High School
- **Commitment to professional service and administration**
 - Appointed Dean's Fellow for Diversity Equity and Inclusion for DEI efforts across CSE
 - Chair of the CWRU CSE Gender Minority Faculty Forum, which provides a supportive community for gender minority faculty through regular social meetings, programming, and fostering an inclusive CSE atmosphere and works to amplify the voices of the gender minority community and advocate for their needs
 - Co-chair of the Chemical and Biomolecular Engineering Department DEI Committee
 - Past Chair of the AIChE Women's Initiative Committee (WIC) who's mission is to promote the entry, development, and full participation of women in the Institute
 - Organizer and chair of technical sessions at AIChE and ECS professional societies
 - Active reviewer for high impact journals (e.g. Nature, Journal of the American Chemical Society, ACS Catalysis, Journal of Membrane Science) as well as proposal and research programs (NSF, PRF, DOE)

EDUCATION

Purdue University West Lafayette, IN
Doctor of Philosophy in Chemical Engineering 2007-2012
Overall GPA 3.64/4.00
Thesis Title: Modular Protein Matrices for Cartilage Repair
Advisor: Dr. Julie Liu

University of North Dakota Grand Forks, ND
Bachelor of Science in Chemical Engineering 2003-2007
Overall GPA 3.95/4.00 Major GPA 4.00/4.00 Graduated *summa cum laude*

ACADEMIC APPOINTMENTS

Case Western Reserve University, Chemical and Biomolecular Engineering Cleveland, OH
Dean's Fellow for Diversity Equity and Inclusion March 2023 – June 2024
Climo Associate Professor July 2022 – present
Climo Assistant Professor July 2018 – July 2022
Assistant Professor Aug 2016 – July 2018

Research Synopsis: The central aim of our research is to develop biomolecular platforms to control solid-liquid interfaces and thin film assemblies. In doing so, we are enabling a new generation of technologies with applications in resource recovery, biomaterials and energy.

INDUSTRY EXPERIENCE

Proton OnSite, Research and Development Wallingford, CT
Supervisor: Dr. Katherine Ayers
Research Engineer 2014 – 2016
Postdoctoral Research Fellow 2012 – 2014

Research Synopsis: Led research projects in advanced proton exchange membrane electrolysis technologies and emerging electrochemical technologies, including ultra-low loaded platinum group metal electrodes, membranes for low-hydrogen permeation, electrochemical ammonia production and microbial fuel cells for nitrate remediation.

PROFESSIONAL SOCIETIES

American Institute of Chemical Engineers The Electrochemical Society
The Society for Biomaterials The American Peptide Society

SELECTED AWARDS

MRS Communications Early Career Distinguished Presenter (2023)
CWRU Innovation Week Inventor Award (2023)
Case School of Engineering Undergraduate Teaching Award (2022)
NSF CAREER Award (2021)
Case School of Engineering Research Award (2021)
Mellichamp Distinguished Lectureship, Georgia Tech (2021)
ECS Toyota Young Investigator Fellowship (2017-2018)
CWRU Glennan Fellowship (2017-2018)
Case School of Engineering Graduate Teaching Award (2017)
Great Lakes Energy Institute Sponsored Faculty in Energy (2016-2017)
NSF/ASEE Small Business Postdoctoral Research Diversity Fellowship (2012-2014)
Purdue School of Chemical Engineering Faculty Lecture Award (2013)
Purdue University Outstanding Service Award (2010)
NSF Graduate Research Fellowship (2009)
US EPA Greater Research Opportunities Undergraduate National Fellowship (2006)

RESEARCH SUPPORT

Current Externally Funded Proposals

1. NSF ERC: NSF Engineering Research Center for Advancing Sustainable and Distributed Fertilizer Production (CASFER). Gerardine Botte (PI, Texas Tech University); Roger French (co-PI, Case Western Reserve University); Julie Renner (participant). Estimated amount to group: \$260,000. Active dates 1/23 – 1/28.
2. NSF: ECO-CBET: Putting entropy to work: Leveraging the role of water organization in peptide binding events to selectively recover rare earths. Christine Duval (PI, CWRU); Julie Renner (co-PI, *Thrust 2 Lead*); Lauren Greenlee (co-PI, Penn State); Rui Shi (co-PI, Penn State); Rachel Getman (co-PI, Clemson). \$848,799 total to CWRU, \$421,714 to Renner Group. Active dates 08/21 – 08/25.
3. NSF Biomaterials Program: CAREER: Controlling Responsive Biointerfaces by Understanding Elastin Self-Assembled Monolayers. Julie Renner (PI, Case Western Reserve University). \$523,006, Active dates 1/15/21 – 12/31/25.
4. NSF Nanoscale Interactions Program: Tuning the Interactions between Biomolecules and Surfaces via a Peptide Self-Assembled Monolayer Framework. Julie Renner (PI, Case Western Reserve University). \$298,826, Active dates 9/1/20-8/31/23.

Past Externally Funded Proposals

1. USDA AFRI: Water and Nutrient Recycling: A Decision Tool and Synergistic Innovative Technology. Lauren Greenlee (PI), Greg Thoma, Jennie Popp, Kristofor Brye (University of Arkansas); Andrew Herring (Colorado School of Mines); Teng Lim (University of Missouri); Rick Stowell, (University of Nebraska-Lincoln); Julie Renner (co-PI, Case Western Reserve University). \$4,342,279 total, \$500,000 to CWRU. Active dates 10/1/18 – 9/30/23.
2. NSF INFEWS/T3: Critical Nutrient Recovery and Reuse: Nitrogen and Phosphorus Recycling from Wastewaters as Struvite Fertilizer. Lauren Greenlee (PI), Greg Thoma, Jennie Popp, Kristofor Brye (University of Arkansas); Andrew Herring (Colorado School of Mines); Julie Renner (co-PI, Case Western Reserve University). \$2,430,597 total, \$405,000 to CWRU. Active dates 9/17-9/21.
3. ECS Toyota Young Investigator Fellowship: Self-assembled Templates for Ultra-high Utilization of Noble Metals in Electrolysis Membrane Electrode Assemblies. Julie Renner (PI, Case Western Reserve University). \$50,000. Active dates 9/17-9/18.
4. DOE BES: Peptide Control of Electrocatalyst Surface Environment and Catalyst Structure: A Design Platform to Enable Mechanistic Understanding and Synthesis of Active and Selective N₂ Reduction Catalysts. Lauren Greenlee (PI, University of Arkansas); Michael Janik (Pennsylvania State University); Julie Renner (co-PI, Case Western Reserve University). \$600,000 total, \$192,464 to CWRU. Active dates 9/16 – 9/19.
5. DOE Phase I SBIR: Nitrogenase Inspired Peptide-Functionalized Catalysts for Efficient, Emission-Free Ammonia Production. Wayne Gellett (PI, Proton OnSite); Lauren Greenlee (University of Arkansas); Julie Renner (co-PI, Case Western Reserve University). \$150,000 total, \$25,000 to CWRU. Active dates 6/16–3/17.
6. USDA Phase II SBIR: High Efficiency Low Cost Electrochemical Ammonia Production. Julie Renner (PI, Proton OnSite); Lauren Greenlee (NIST); Andy Herring (Colorado School of Mines). \$500,000 total. Active dates 9/15-8/17.
7. USDA Phase I SBIR: Emission-free, Low-maintenance and Low-energy Nitrate Water Remediation Using Microbial Fuel Cell Technology. Julie Renner (PI, Proton OnSite); Shelley Minter (University of Utah). \$100,000 total. Active dates 6/15 – 1/16.

Past Internally Funded Proposals

1. Case School of Engineering Faculty Investment Fund: Electrochemical Ammonia Production from Plasma-Generated High-Energy Solvated Electrons. Julie Renner (co-PI) and Mohan Sankaran (PI). \$22,100. Active dates 3/18-3/19.
2. Case Western Reserve University UCITE Glennan Fellowship, Improving Graduate Student Preparedness for Entering the Workforce: Developing an Industry Module for a Graduate-Level Protein Engineering Class. Julie Renner (PI). \$6,500. Active dates 9/17-8/18.

P A T E N T S

1. "Ammonia Synthesis Using Plasma-Produced Solvated Electrons," JN Renner, RM Sankaran, U.S. 1 Patent Number 20230286820, 2023

R E F E R E E D P U B L I C A T I O N S

- Single underlined names are graduate students in the CWRU Renner Laboratory
- Double underlined names are undergraduates in the CWRU Renner Laboratory
- A list of citations can be found at: <https://scholar.google.com/citations?user=T0vP6XQAAAAJ&hl=en>
- *, #, represent equally contributing authors

1. G Verma, S Asaei, and JN Renner, A Synergistic Approach to Outreach and Teaching: Combining Service Learning at the College Level with a Summer Hands-on Outreach Program in Chemical and Biomolecular Engineering for Female High School Students, submitted to *Chemical Engineering Education*, 2023, **accepted**
2. MW Issa, D Calderon, O Kamlet, S Asaei, JN Renner, and CL Wirth, Engineered Polypeptides as a Tool for Controlling Catalytic Active Janus Particles, *ACS Applied Engineering Materials*, 2023.
3. JD Hostert,[#] Q Spitzer,[#] P Giammattei and JN Renner, Scalable production of peptides for enhanced struvite formation via expression on the surface of genetically engineered microbes, *ACS Materials Au*, 2023. ***Special Issue on Innovations in Bioengineering**
4. JD Hostert, M Sepsy, CE Duval,^{*} and JN Renner,^{*} Clickable membrane adsorbers enable Ce recovery with peptide ligands. *Soft Matter*, 2023, 19, 2823 – 2831.
5. N Pramounmat, S Asaei,[#] JD Hostert,[#] K Young, HA von Recum, and JN Renner, Grafting of short elastin-like peptides using an electric field, *Scientific Reports*, 2022, 12:18682
6. I Wu, JD Hostert,[#] G Verma,[#] M-C Kuo, JN Renner,^{*} and AM Herring,^{*} Electrochemical struvite precipitation enhanced by an amelogenin peptide for nutrient recovery, *ACS Sustainable Chemistry & Engineering*, 2022.
7. N Pramounmat, K Yan, J Wolf, and JN Renner, Platinum-Binding Peptides: Understanding of Selective Binding and Overview of Applications, *Multifunctional Materials*, 2022, 5 012002.
8. J Hostert,^{*} C Loney,^{*} N Pramounmat,[#] K Yan,[#] Z Su, and JN Renner, Self-assembly and rearrangement of a polyproline II helix peptide on gold, *Langmuir*, 2021, 37, 20, 6115–6122.
9. Z Su, CO Kim, JN Renner, Quantification of the Effects of Hydrophobicity and Mass Loading on the Effective Coverage of Surface-Immobilized Elastin-like Peptides, *Biochemical Engineering Journal*, 2021, 168, 107933.
10. J Hostert, O Kamlet, Z Su, N Kane, JN Renner, Exploring the effect of a peptide additive on struvite formation and morphology: a high-throughput method, *RSC Advances*, 2020, 10, 64, 39328 - 39337. ***Won 2021 CWRU Department of Chemical Engineering Outstanding Journal Article Award**
11. J Toth, N Abuyazid, D Lacks, JN Renner, MR Sankaran, A plasma-water droplet reactor for process-intensified, continuous nitrogen fixation at atmospheric pressure, *ACS Sustainable Chemistry & Engineering*, 2020, 8, 39, 14845–14854.

12. X Gong, K Rohm, Z Su, B Zhao, JN Renner, I Manas-Zloczower, D Feke, Porous Hydrogels Templated from Soy-Protein Stabilized High Internal Phase Emulsions, *Journal of Materials Science*, 2020, 55, 17284–1730.
13. Z Su, J Hostert, JN Renner, Phosphate Recovery by a Surface-immobilized Cerium Affinity Peptide, *ACS ES&T Water*, 2020, 1,1, 58-67.
14. J Toth, R Hawtof, D Matthiesen, JN Renner, SR Sankaran, On the non-faradaic hydrogen gas evolution from electrolytic reactions at the interface of a cathodic atmospheric-pressure microplasma and liquid water surface, *Journal of The Electrochemical Society*, 2020, 167, 11, 116504.
15. M Yu, JN Renner* and CE Duval*, A lysine-modified polyethersulfone (PES) membrane for the recovery of lanthanides, *Frontiers in Chemistry*, 2020, 8, 512. ***Invited Special Collection - Women in Science: Chemistry**
16. N Pramounmat and JN Renner, Improving Graduate Student Preparedness for Entering the Workforce: A Hands-On Experience in Project Management for a Graduate-Level Protein Engineering Class, *Chemical Engineering Education*, 2020, 54, 4.
17. C Loney, S Maheshwari, N Pramounmat, MJ Janik, and JN Renner, Effects of Peptide-Functionalized Surfaces on the Electrochemical Hydrogen Evolution Reaction, *Journal of Electrochemical Energy Conversion and Storage*, 2020, 17, 4, 040801. ***Invited Emerging Investigators Special Issue**
18. N Pramounmat, C Loney, CO Kim, LH Wiles, KE Ayers, A Kusoglu, and JN Renner, Controlling the Distribution of Perfluorinated Sulfonic Acid Ionomer with Elastin-like Polypeptide, *ACS Applied Materials & Interfaces*, 2019, 11, 46, 43649-43658.
19. Z Su,[#] S Kole,[#] LC Harden, VM Palakkal, CO Kim, CO Nair, CG Arges,* and JN Renner,* Peptide-modified electrode surfaces for promoting anion exchange ionomer microphase separation and ionic conductivity, *ACS Materials Letters*, 2019, 1, 4, 467–475. ***Won 2020 CWRU Department of Chemical Engineering Outstanding Journal Article Award**
20. M Xu, Z Su, and JN Renner, Characterization of cerium (III) ion binding to surface-immobilized EF-hand loop I of calmodulin, *Peptide Science*, 2019, e24133.
21. CN Loney, SIP Bakovic, C Xu, A Graybill, LF Greenlee,* and JN Renner,* Interactions of Polyproline II Helix Peptides with Iron(III) Oxide, *ChemistrySelect*, 2019, 4, 22, 6784-6789.
22. R Hawtof, S Ghosh, E Guarr, C Xu, RM Sankaran,* and JN Renner,* Catalyst-free, highly selective synthesis of ammonia from nitrogen and water by a plasma electrolytic system, *Science Advances*, 2019, 5, 1, eaat5778.
23. D Xu, M Stevens, M Cosby, S Oener, A Smith, L Enman, K Ayers, C Capuano, JN Renner, N Danilovic, Y Li, H Wang, Q Zhang, S Boettcher, Earth-Abundant Oxygen Electrocatalysts for Alkaline Anion Exchange Membrane Water Electrolysis: Effects of Catalyst Conductivity and Comparison with Performance in Three-Electrode Cells, *ACS Catalysis*, 2019, 9, 1, 7–15.
24. LF Greenlee, JN Renner, SL Foster, The Use of Controls for Consistent and Accurate Measurements of Electrocatalytic Ammonia Synthesis from Dinitrogen, *ACS Catalysis*, 2018, 8, 9, 7820–7827.
25. SL Foster, SIP Bakovic, R Duda, S Maheshwari, RD Milton, SD Minter,* MJ Janik,* JN Renner,* LF Greenlee,* Catalysts for Nitrogen Reduction to Ammonia, *Nature Catalysis*, 2018, 1, 7, 490-500.
26. Z Su, N Pramounmat,* S Watson,* and JN Renner, Engineered Interaction Between Short Elastin-Like Peptides and Perfluorinated Sulfonic-acid Ionomer, *Soft Matter*, 2018, 14, 3528-3535.
27. Z Ma, Y Zhang, S Liu, W Xu, L Wu, Y-C Hsieh, P Liu, Y Zhu, K Sasaki, JN Renner, KE Ayers, RR Adzic, an JX Wang, Reaction mechanism for oxygen evolution on RuO₂, IrO₂, and RuO₂@IrO₂ core-shell nanocatalysts, *Journal of Electroanalytical Chemistry*, 2017, 819, 296-305.
28. JN Renner and SD Minter, The use of engineered protein materials in electrochemical devices. *Experimental Biology and Medicine*, 2016, 241, 980-985.

29. WA Rigdon, TJ Omasta, C Lewis, MA Hickner, JR Varcoe, JN Renner, KE Ayers, and WE Mustain, Carbonate dynamics and opportunities with low temperature, AEM-based electrochemical CO₂ separators, *Journal of Electrochemical Energy Conversion and Storage*, 2016, 14, 2, 02090.
30. KL Knoche, JN Renner, W Gellett, KE Ayers, SD Minter, A self-sufficient nitrate groundwater remediation system: *Geobacter sulfurreducens* microbial fuel cell fed by hydrogen from a water electrolyzer, *The Journal of the Electrochemical Society*, 2016, 163, 7, F651-F656.
31. KE Ayers, JN Renner, N Danilovic, JX Wang, Y Zhang, R Maric, and H Yu, Pathways to Ultra-Low Platinum Group Metal Catalyst Loading in Proton Exchange Membrane Electrolyzers, *Catalysis Today*, 2016, 262, 121-132.
32. J Roller, JN Renner, H Yu, C Capuano, T Kwak, T Wang, CB Carter, KE Ayers, WE Mustain, and R Maric, Flame-based Processing as a Practical Approach for Manufacturing Hydrogen Evolution Electrodes, *Journal of Power Sources*, 2014, 271, 66-376.
33. Y Kim, JN Renner, and JC Liu, Incorporating the BMP-2 Peptide in Genetically-engineered Biomaterials Accelerates Osteogenic Differentiation, *Biomaterials Science*, 2014, 2, 8, 1110-1119.
34. JN Renner and JC Liu, Investigating the Effect of Peptide Agonists on the Chondrogenic Differentiation of Human Mesenchymal Stem Cells using Design of Experiments, *Biotechnology Progress*, 2013, 29, 6, 1550-1557.
35. RS-C Su, JN Renner, and JC Liu, Synthesis and Characterization of Recombinant Abductin-based Proteins, *Biomacromolecules*, 2013, 14, 12, 4301-4308.
36. JN Renner, HN Emady, RJ Galas, R Zhang, CD Baertsch, and JC Liu, Analyzing the Function of Cartilage Replacements: A Laboratory Activity to Teach High School Students Chemical and Tissue Engineering Concepts, *Chemical Engineering Education*, 2013, 47, 2, 99-106.
37. JN Renner, KM Cherry, RS-C Su, and JC Liu, Characterization of Resilin-based Materials for Tissue Engineering Applications, *Biomacromolecules*, 2012, 13, 11, 3678-3685.
38. JN Renner, Y Kim, and JC Liu, BMP-derived Peptide Promotes Chondrogenic Differentiation of Human Mesenchymal Stem Cells, *Tissue Engineering Part A*, 2012, 18, 23-24, 2581-2589.
39. JN Renner, Y Kim, KM Cherry, and JC Liu, Modular Cloning and Protein Expression of Long, Repetitive Resilin-based Proteins, *Protein Expression & Purification*, 2012, 82, 1, 90-96.
40. SR Phutane, JN Renner, SL Nelson, WS Seames, J Páca, TJ Sundstrom, and EI Kozliak, Removal of 2,4-Dinitrotoluene from Concrete Using Bioremediation, Agar Extraction, and Photocatalysis, *Folia Microbiologica*, 2007, 52, 3, 53-260.

Under Review

1. G Verma, JD Hostert, S Summerville, AS Robang, AK Paravastu, RB Getman, and JN Renner, Investigation of Rare Earth Element Binding to a Surface-Bound Affinity Peptide Derived from EF-Hand Loop I of Lanmodulin, *under review*.

BOOK CHAPTERS

1. JN Renner, KE Ayers, and EB Anderson, "Proton Exchange Membrane Electrolyzer Stack and System Design" chapter in PEM Electrolysis for Hydrogen Production: Principles and Applications. Eds. Dmitri Bessarabov, Haijiang Wang, Hui Li, and Nana Zhao. CRC Press, Taylor & Francis Group, October 2015.
2. EI Kozliak, WS Seames, GV Baglayeva, SL Nelson, JN Renner, NN Jalan, and J Páca, "Novel Approaches to The Remediation of Building Materials (Wood and Concrete) Contaminated with Chemicals," chapter in Soil Remediation, Eds. Lukas Aachen and Paul Eichmann, Nova Science Publishers Inc, August 2009.

NOTABLE NON-REFEREED PUBLICATIONS

Articles

1. JJ Gray, P Clancy, R Hernandez, BS Akpa, JN Renner, AS Robinson and VL Young, Effective Practices in Equity and Inclusion for ChE Academic Departments, Chemical Engineering Progress, February 2023.
2. JN Renner, LF Greenlee, AM Herring, and KE Ayers, Electrochemical Synthesis of Ammonia: A Low Pressure, Low Temperature Approach, Electrochemical Society *Interface*, Summer 2015, 24, 2, 51-55. **Interface Top 10 Most Read Article in March and May 2019*

Conference Proceedings

1. N Danilovic, KE Ayers, C Capuano, JN Renner, L Wiles and M Pertoso, Challenges in Going from Laboratory to Megawatt Scale PEM Electrolysis, ECS Transactions, 2016, 75, 14, 385-402.
2. JN Renner and KE Ayers, Exploring Electrochemical Technology: A Perspective on the ASEE/NSF Small Business Postdoctoral Research Diversity Fellowship, Proceedings of the 2014 Zone 1 Conference of the American Society for Engineering Education, 2014.

INVITED PRESENTATIONS

- Author in **bold** is presenting author

1. **JN Renner**, Peptides with polyproline II helix secondary structure and their potential role in biomaterials engineering, November 2023, MRS Fall Meeting, SB09 Biomaterials for Regenerative Engineering, Boston MA. **MRS Communications Early Career Distinguished Presenter*
2. **JN Renner**, There and Back Again: Polypeptides as an Adventurous Platform for Engineering Surfaces with Applications in Biomaterials, Resource Recovery and Green Energy, November 2023, Biomaterials Days, Cleveland, OH.
3. **JN Renner**, Z Su, and N Pramounmat, Biomolecular Engineering for Electrochemical Applications in Fuel Cells - Electrolyzers and Beyond, October 2023, MS&T Conference, Columbus, OH.
4. **JN Renner**, The Emerging Role of Peptides in Nutrient Recycling and Recovery, September 2023, Department of Biomedical Engineering, University of Arkansas, Fayetteville, AR.
5. **JN Renner**, Engineering Elastin-like Peptides to Control Solid Surface Properties: A Biomaterials Research Platform and Education Tool, January 2023, Department of Biomedical Engineering, Case Western Reserve University, Cleveland, OH.
6. **JN Renner**, Engineering Elastin-like Peptides to Control Solid Surface Properties: A Biomaterials Research Platform and Education Tool, November 2022, Department of Chemical and Bioengineering, Northeastern University, Boston, MA.
7. **JN Renner**, Controlling Solid Surface Properties Using Engineered Peptides: Applications in Biomaterials and Beyond, November 2022, CWRU Musculoskeletal Research Program 2022-2023 Seminar Series, Cleveland, OH.
8. **JN Renner**, Z Su, N Pramounmat, and CG Arges, Biomolecular Engineering for Electrochemical Applications in Fuel Cells/Electrolyzers and Beyond, October 2022, 242nd ECS Meeting in Atlanta GA.
9. **JN Renner**, The Emerging Role of Peptides in Resource Recovery, September 2022, Department of Chemical and Biomolecular Engineering, Clemson University, Clemson, SC.
10. **JN Renner**, Protein Engineering for Electrochemical Systems, June 2022, Gordon Research Conference: Metallocofactors, New Port, RI.

11. **JN Renner**, Z Su, N Pramounmat, and CG Arges, Engineering Polypeptides for Controlled Assembly of Ionomer Thin Films: Expanding Beyond Typical Assembly Tools, May 2022 at the 241st ECS Meeting in Vancouver Canada.
12. **JN Renner**, Biodirected Assembly of Ionomer Thin Films for Fuel Cells and Electrolyzers, Topical Plenary: Frontiers in Green Process and Product Engineering, AIChE Annual Meeting Fall 2021.
13. **JN Renner**, Engineering Peptides to Control Solid Surface Properties: Applications in Biomaterials and Beyond, 3M Corporation Technical Community, September 2021.
14. J Toth, N Abuyazid, D Lacks, **J Renner** and M Sankaran, A Continuous, Atmospheric-Pressure Plasma-Water Droplet Reactor for Nitrogen Fixation, May 2021, 239th ECS Meeting, Virtual Conference.
15. **JN Renner**, The Emerging Role of Peptides in Resource Recovery, April 2021, School of Chemical Engineering, Georgia Tech University, Mellichamp Lecture, Virtual.
16. **JN Renner**, What I Learned in My Industrial Postdoc: Project Management Skills for Academia, November 2020, AIChE Annual Meeting, Virtual Conference.
17. **JN Renner**, Engineering Polypeptides for Controlled Assembly of Ionomer Thin Films, October 2020, ECS PRiME, Virtual Conference.
18. **JN Renner**, Bridging Biomaterials and Electrochemical Devices using Protein Engineering, October 2019, Biomaterials Days, Cleveland, OH.
19. **JN Renner**, Engineering Proteins for Controlled Assembly of Ionomer Thin Films, October 2019, Department of Chemical Engineering, Penn State University, State College, PA.
20. **JN Renner**, Biodirected Assembly of Ionomer Thin Films, September 2019, Department of Chemical Engineering, University of South Carolina, Columbia, SC.
21. **JN Renner**, Biodirected Assembly of Ionomer Thin Films, August 2019, The Pittsburgh-Cleveland Catalysis Society Symposium, University of Pittsburg, Pittsburg, PA.
22. **JN Renner**, Control of Ionomer-metal Assembly using Engineered Proteins, April 2019, Chemical and Biomolecular Engineering, Ohio University, Athens, OH.
23. **JN Renner**, Engineered Elastin-like Materials to Control the Self-Assembly of Ionomer at the Nanoscale, March 2019, Nanoscale & Quantum Phenomena Institute (NQPI) Colloquium, Ohio University, Athens, OH.
24. **JN Renner**, Engineered Elastin-like Materials to Control the Self-Assembly of Ionomer and Catalyst Particles, February 2019, Institute of Materials Science & Engineering, Washington University, St. Louis, MO.
25. **JN Renner**, Biomolecular Control of Ionomer-metal Interfaces for Electrode Manufacturing Applications, November 2018, Chemical Engineering & Materials Science Department, Michigan State University, East Lansing, MI.
26. **JN Renner**, Biomolecular Approaches to Electrode Engineering: Facilitating Electrochemical Production of Renewable Fuels, August 2018, Energy & Fuels Storch Award in Fuel Science: Symposium in honor of Andrew Herring, 256th ACS National Meeting in Boston, MA.
27. **JN Renner**, Enabling Renewable Energy Technologies through Biomolecular Control of Electrode Properties, April 2018, Department of Chemical Engineering, University of Toledo, Toledo, OH.
28. **JN Renner**, The Role of Protein Engineering in Electrode Design for the Energy and Medical Fields, November 2017, Department of Chemical and Biomolecular Engineering, University of Akron, OH.

29. **JN Renner**, W Gellett, LF Greenlee, SD Minter and KE Ayers, Session Keynote: Utilizing Proton Exchange Membrane (PEM) Electrolyzers as a Robust Platform for Emerging Electrochemical Technologies, October 2017, AIChE Annual Meeting, Minneapolis MN.
30. **JN Renner**, How Engineers Develop Technology in Areas from Energy, to Water and Medicine, October 2017, STEM Career Day, Cuyahoga Community College West, Parma, OH.
31. **JN Renner** and K Ayers, Building a Research Career in Electrochemical Technology: The Benefits of a Postdoctoral Experience in Industry, August 2017, Annual ISE Meeting, Providence, RI.
32. **JN Renner**, C Loney, S Foster, P Acharya, D Suttmiller, L Wiles, K Ayers, LF Greenlee, W Gellett, Strategies for Low-Temperature Electrochemical Ammonia Production, Renewable Energy and Energy Efficiency (RE3) Workshop, May 2017, Louisville, KY.
33. **JN Renner**, Exploring Tissue Engineering, Electrochemical Technology and Industrial Postdoctoral Experiences: A Perspective on a Multidisciplinary Engineering Career, April 2017, Department of Chemical and Biomedical Engineering, Cleveland State University, Cleveland, OH.
34. **JN Renner**, Hydrogen Generation Systems as a Platform for Emerging Electrochemical Technologies, Connecticut Microelectronics and Optoelectronics Symposium, April 2016, Storrs CT.
35. **JN Renner**, Modular Protein Matrices for Cartilage Repair, April 2013, Purdue School of Chemical Engineering Faculty Lecture Award, West Lafayette, IN.
36. **JN Renner**, Graduate Student Leadership: Practical Applications. CEGRA Young Professionals Seminar, April 2010, Department of Chemical Engineering, Tennessee Technological University, Cookeville, TN.

CONTRIBUTED PRESENTATIONS

- Author in **bold** is presenting author
- Single underlined names are graduate students in the Renner Laboratory
- Double underlined names are undergraduates in the Renner Laboratory

Conference Presentations

1. S Asaei and JN Renner, EF-Hand Peptide Aptamer Sensing of Rare Earth Elements, November 2022, AIChE Annual Meeting, Orlando, FL.
2. G Verma and JN Renner, Improving Cerium (III) Ion Binding Affinity of Designed Peptides Based on EF-1 Hand Loop of Lanmodulin, November 2022, AIChE Annual Meeting, Orlando, FL.
3. **JN Renner**, Z Su, N Pramounmat, and S Asaei, Engineering Elastin-like Peptides to Control Solid Surface Properties, October 2023, MS&T Conference, Columbus OH.
4. J Hostert, O Kamlet, Q Spitzer, P Giammattei, Z Su, N Kane, and JN Renner, From Screening to a Scalable System: Investigating the Impact of a Peptide Additive on Struvite Formation and Morphology, November 2022, AIChE Annual Meeting, Phoenix, AZ
5. R Ahn and JN Renner, Thermodynamic Properties of Antifouling Polyproline II Helix Peptide Monolayers on Gold, November 2022, AIChE Annual Meeting, Phoenix, AZ.
6. G Verma, J Hostert, and JN Renner, Understanding Cerium Binding Affinity in Lanmodulin Derived Peptides, November 2022, AIChE Annual Meeting, Phoenix, AZ.
7. J Hostert, M Sepsy, C Duval, and JN Renner, Rare Earth Element Recovery Is Only a 'Click' Away: Recovering Lanthanides with Peptide-Functionalized Polyvinylidene (PVDF) Membranes, November 2022, AIChE Annual Meeting, Phoenix, AZ.

8. **S Asaei**, **N Pramounmat**, and JN Renner, The Investigation of the Transition Temperature of Charged and Uncharged Elastin-like Polypeptides in Water and Salt Solutions By QCM-D, November 2022, AIChE Annual Meeting, Phoenix, AZ.
9. **M Issa**, D Calderon, **O Kamlet**, JN Renner and CL Wirth, Specific and Non-Specific Molecular Control of Catalytic Active Janus Particles, November 2022, AIChE Annual Meeting, Phoenix, AZ.
10. **A. Emdadi**, J. N. Renner, and L. F. Greenlee, Nitrate Reduction By Hydrophobic, Negatively, and Positively Charged Peptide-Coated Au Electrode, May 2022 at the 241st ECS Meeting in Vancouver Canada.
11. **JN Renner**, **N Pramounmat**, and **Z Su**, Controlling Surface-Immobilized Elastin-like Peptides for Electrochemical Sensing Applications, May 2022 at the 241st ECS Meeting in Vancouver Canada.
12. **JN Renner**, Improving Student Preparedness for Entering the Workforce: A Hands-On Experience in Project Management for a Protein Engineering Class, April 2022, Society for Biomaterials Annual Meeting, Baltimore, MD.
13. **Z Su**, **J Hostert**, and JN Renner, Phosphate Recovery By a Surface-Immobilized Cerium Affinity Peptide, November 2021, AIChE Annual Meeting, Boston, MA.
14. **J Hostert**, **C Loney**, **N Pramounmat**, **K Yan**, **Z Su**, and JN Renner, Self-Assembly and Rearrangement of a Polyproline II Helix Peptide on Gold, November 2021, AIChE Annual Meeting, Boston, MA.
15. **Z Su**, **CO Kim**, and JN Renner, Quantification of Effects of Hydrophobicity and Mass Loading on the Effective Coverage of Surface-Immobilized Elastin-like Peptides for Electrochemical Applications, May 2021, 239th ECS Meeting, Virtual Conference.
16. **K Yan**, **C Loney**, HA von Recum, and JN Renner, Investigation of the Antifouling Properties of Polyproline Self-Assembled Monolayers, November 2020, AIChE Annual Meeting, Virtual Conference.
17. **J Hostert**, **O Kamlet**, **Z Su**, JN Renner, A High-Throughput Method for Analyzing Struvite Formation and Morphology: Exploring the Effect of Peptide Additives, November 2020, AIChE Annual Meeting, Virtual Conference.
18. **N Pramounmat** and JN Renner, Toward Understanding of Adsorption of Platinum Metal-Binding Peptide and Its Potential Applications, Nov 2020, AIChE Annual Meeting, Virtual Conference.
19. **Z Su**, S Kole, C Arges, JN Renner, Peptide-Controlled Assembly of Anion Exchange Ionomer Thin Films on Electrode Surfaces for Promoting Microphase Separation and Ionic Conductivity, November 2020, AIChE Annual Meeting, Virtual Conference.
20. R Hawtof, S Ghosh, E Guarr, RM Sankaran, **JN Renner**, Plasma-Based Electrolytic Synthesis of Ammonia from Nitrogen and Water, November 2019, AIChE Annual Meeting, Orlando, FL.
21. **J Pejavar**, JN Renner, Development of a Hyaluronic Acid Sensor, Undergraduate Research Presentations: Materials and Biotechnology, AIChE Annual Meeting, November 2019, Orlando, FL.
22. **N Pramounmat**, **CO Kim** and JN Renner, The Use of a Protein Scaffold to Control the Structure of Electrodes and Ionomer in Proton Exchange Membrane Electrolyzers, May 2019, 235th ECS Meeting, Dallas, TX.
23. **LF Greenlee**, SIP Bakovic, **C Loney**, JN Renner, S Maheshwari, and MJ Janik, A Bimetallic Electrocatalyst Platform for Understanding the Roles of Surface Chemistry and Functionalization on Nitrogen Reduction to Ammonia, May 2019, 235th ECS Meeting, Dallas, TX.

24. R Hawtof, J Toth, S Ghosh, E Guarr, C Xu, JN Renner, and **RM Sankaran**, Electrolytic Synthesis of Ammonia at Ambient Conditions from Nitrogen and Acidic Water by a Catalyst-Free, Plasma Process, May 2019, 235th ECS Meeting, Dallas, TX.
25. J Toth, R Hawtof, S Ghosh, D Lacks, JN Renner, and **RM Sankaran**, Plasma-based electrolytic synthesis of ammonia from nitrogen and water, April 2019, ACS Annual Meeting, Orlando, FL.
26. **C Loney**, D Suttmiller, LF Greenlee, M Janik, and JN Renner, Enhanced Electrochemical Ammonia Production Via Peptide-Bound Metal, October 2018, AIChE Annual Meeting, Pittsburg, PA.
27. **N Pramounmat** and JN Renner, Organizing Platinum Metal and Ionomer with Engineered Protein. October 2018, AIChE Annual Meeting, Pittsburg, PA.
28. **Z Su**, **N Pramounmat**, S Watson, and JN Renner, Short Elastin-like Peptides Engineered to Control Ionomer on Metal Surfaces for Electrode Manufacturing Applications, October 2018, AIChE Annual Meeting, Pittsburg, PA.
29. **N Pramounmat** and JN Renner, Making Hydrogen from Water with a Protein Organized Electrode: Ultra-High Utilization of Noble Metal in Proton Exchange Membrane Electrolysis for Capital Cost Reduction, October 2018, AIChE Annual Meeting, Pittsburg, PA.
30. **S Maheshwari**, G Rostamikia, Y Li, LF Greenlee, JN Renner, and M Janik, DFT Analysis of Elementary N₂ Electro-Reduction Kinetics on Transition Metal Surfaces, October 2018, AIChE Annual Meeting, Pittsburg, PA.
31. **Z Su**, ST Watson, and JN Renner, Controlled Interactions between Engineered Proteins and Acidic Polymer Electrolytes, May 2018, 233rd ECS Meeting, Seattle, WA.
32. **C Loney**, D Suttmiller, P Acharya, S Maheshwari, L Wiles, KE Ayers, WL Gellett M J Janik, LF Greenlee, and JN Renner, Enhanced Electrochemical Ammonia Production Via Peptide-Bound Metals and Effects on the Hydrogen Evolution Reaction, May 2018, 233rd ECS Meeting, Seattle, WA.
33. D Suttmiller, SL Foster, SIP Bakovic, C Loney, S Maheshwari, M J Janik, JN Renner, and **LF Greenlee**, Bimetallic Nanoparticle Catalyst Synthesis and Design: Progress Toward Electrochemical Nitrogen Reduction, May 2018, 233rd ECS Meeting, Seattle, WA.
34. **C Loney**, A Graybill, C Xu, P Acharya, D Suttmiller, L Wiles, KE Ayers, W Gellett, LF Greenlee and JN Renner, Exploring Peptide-Bound Catalysts for Electrochemical Ammonia Generation, November 2017, AIChE Annual Meeting, Minneapolis, MN.
35. **S Foster**, P Acharya, D Suttmiller, C Loney, JN Renner, W Gellett, KE Ayers and LF Greenlee, Design of Iron-Nickel Nanocatalysts for Low-Temperature Electrochemical Ammonia Generation, November 2017, AIChE Annual Meeting, Minneapolis, MN.
36. **Z Su**, S Watson, and JN Renner, Characterizing Interactions Between Elastin and Acidic Polymer Electrolytes, October 2017, Society for Biomaterials - Biomaterials Day, Ann Arbor, MI.
37. **LF Greenlee**, JN Renner, M Janik, W Gellett, K Ayers, N Rentz, S Foster, SIP Bakovic and P Acharya, Heterogeneous Catalysts for Low-Temperature Electrochemical Reduction of Nitrogen to Ammonia, February 2017, 9th Annual CEC Workshop on Electrochemistry, Austin, TX.
38. **JN Renner**, LF Greenlee, AM Herring, L Wiles, S Foster, K Ayers and W Gellett, High Efficiency, Low Cost Electrochemical Ammonia Production: Challenges and Opportunities, November 2016, AIChE Annual Meeting, San Francisco, CA.
39. **KL Knoche**, JN Renner and SD Minter, *Geobacter Sulfurreducens* Electrodes for Nitrate Reduction in Ground Water, May 2016, 229th ECS Meeting, San Diego, CA.

40. **MS Burke**, JN Renner, CA Gaber, S Zou, J Kellon, E Pledger, K Ayers, SW Boettcher, Impurity free activity trend of 1st row transition metal(oxy)hydroxides for the oxygen evolution reaction and insight in catalyst integration into anion exchange membrane electrolysis systems, November 2015, MRS Annual Fall Meeting, Boston MA.
41. **LF Greenlee**, NS Rentz, JN Renner and K Ayers, Electrochemical Synthesis of Ammonia at Low-Temperature with Fe-Ni Nanocatalysts, Nov 2015, AIChE Annual Meeting, Salt Lake City, UT.
42. **LF Greenlee**, NS Rentz, JN Renner, KE Ayers, and N Bedford, Low-temperature Electrochemical Ammonia Synthesis with Nanoscale Fe-Ni Bimetallic Catalysts, October, 2015, 228th ECS Meeting, Phoenix, AZ.
43. **Y Kim**, J Renner, J Liu, Bioinspired Proteins Designed as Microenvironments for Cell Differentiation, October 2015, BMES Annual Meeting, Tampa, FL.
44. **JN Renner**, S Szymanski and LF Greenlee, High Efficiency Low Cost Electrochemical Ammonia Production, September 2015, NH₃ Fuel Conference, Chicago, IL.
45. MJ Brennan, **JC Liu**, JK Roman, JN Renner, RS-C Su and JJ Wilker, Adhesive Elastin-Based Proteins as Soft Tissue Glues, November 2014, AIChE Annual Meeting, Atlanta, GA.
46. **JN Renner** and KE Ayers, Exploring Electrochemical Technology: A Perspective on the ASEE/NSF Small Business Postdoctoral Research Diversity Fellowship, April 2014, ASEE Zone 1 Conference, Bridgeport, CT. **Won the ASEE Zone 1 Conference Digital Marketing Award*
47. **KA Ayers**, E Anderson, C Capuano, M Niedzwiecki, and JN Renner, Proton Exchange Membranes for Hydrogen Generation - A Tutorial On Research Needs and Challenges for PEM Electrolysis vs. Fuel Cells, May, 2013, 223rd ECS Meeting, Toronto, Ontario Canada.

Selected Poster Presentations

1. **R Ahn** and JN Renner, Identifying Fouling Mechanisms of Polyproline II Helix Peptides on a Gold Surface, October 2023, MS&T Conference, Columbus, OH.
2. **S Asaei** and JN Renner, Electrochemical Performance of EF-hand Peptide Conjugated with Tyrosine as an Aptamer for the Biosensing of Rare Earth Elements, October 2023, MS&T Conference, Columbus, OH.
3. **J Hostert**, **Q Spitzer**, **P Giammattei**, **G Verma** and JN Renner From screening to a scalable system: investigating the impact of a peptide additive on struvite formation and morphology, January 2023, Peptide Materials Gordon Research Conference, Galveston, TX.
4. **J Hostert**, M Sepesy, C Duval, and JN Renner, Rare earth element recovery is only a ‘click’ away: recovering lanthanides with peptide-functionalized polyvinylidene difluoride (PVDF) membranes, August 2021, North American Membrane Society, Estes Park, CO
5. **Z Su**, **E Ising**, **CO Kim**, and JN Renner, Effective Coverage Characterization of Surface-Immobilized Elastin-like Peptides (ELP) for Electrochemical Applications in Varying Conditions, November 2021, AIChE Annual Meeting, Boston, MA
6. **J Pejavar**, **Z Su**, B Tury, P Shiller and JN Renner, Development of a Hyaluronic Acid Electrochemical Sensor, November 2020, AIChE Annual Meeting, Virtual Conference.
7. **J Hostert**, and JN Renner, High Throughput Method for Quantifying the Kinetic Parameters of Struvite Formation, July 2019, Arkansas Water Resources Center Annual Water Conference, Fayetteville AR.
8. **Z Su**, and JN Renner, Phosphate Recovery from Wastewater by Immobilized EF-hand Peptide, July 2019, Arkansas Water Resources Center Annual Water Conference, Fayetteville AR.

9. **N Pramounmat**, **C Loney**, A Kusoglu and JN Renner, Development of an Elastin Protein Scaffold for Ionomer, June 2019, Bioelectronics Gordon Research Conference, Andover, NH.
10. **Z Su**, S Kole, **CO Kim**, CG Arges and JN Renner, Engineered Short Elastin-Like Peptides to Control Ionomer on Metal Surfaces for Electrode Manufacturing Applications, June 2019, Bioelectronics Gordon Research Conference, Andover, NH.
11. **CO Kim**, **Z Su**, **T Miki**, and JN Renner, Engineered interaction between perfluorinated sulfonic-acid ionomer (Nafion®) and elastin-like peptides through peptide length and guest residue, May 2019, 235th ECS Meeting, Dallas, TX.
12. **J Pejavar**, **Z Su**, B Fowler, P Shiller and JN Renner, Development of a Hyaluronic Acid Electrochemical Sensor, April 2019, AIChE North Central Regional Student Conference, Toledo, OH. ** Won 1st Place Poster Award*
13. **J Pejavar**, **Z Su**, **S Kamath**, B Fowler, P Shiller and JN Renner, Development of a Hyaluronic Acid Electrochemical Sensor, October 2018 AIChE Annual Meeting, Pittsburg PA. **Won 2nd Place in the Undergraduate Student Poster Competition: Food, Pharmaceutical and Biotechnology IX Section*
14. **CS Gillette**, **CD Sonnefeld**, **Z Su**, **S Kamath**, LF Greenlee and JN Renner, Engineering Fertilizer: Struvite Precipitation Utilizing Ion-Binding Peptides, October 2018, AIChE Annual Meeting, Pittsburg PA. *Won 3rd Place in the Undergraduate Student Poster Competition: Environmental Science and Engineering II Section*
15. **CS Gillette**, **CD Sonnefeld**, LF Greenlee and JN Renner, Engineering Struvite Precipitate Utilizing Ion Binding Peptides, October 2017, AIChE Annual Meeting, Minneapolis, MN.
16. **Z Zhong** and JN Renner, Peptide Expression and Purification by Using a TEV-containing Elastin Fusion Protein, Oct 2017, SFB Biomaterials Day, Poster Number 55, Ann Arbor, MI.
17. **JN Renner**, U Landau, R Savinell, CC Liu, J Wainright, R Akolkar, H Martin, and B Gurkan, The Electrochemical Engineering Program at Case Western Reserve University, August 2017, Annual ISE Meeting, Providence, RI.
18. **JN Renner**, Developing Industry-like Classroom Modules at the Graduate Level, July 2017, ASEE Chemical Engineering Division Summer School for Chemical Engineering Faculty, Raleigh, NC.
19. **C Loney**, **A Graybill**, **C Xu**, P Acharya, D Suttmiller, L Wiles, L Greenlee, W Gellett, and JN Renner, Exploring Catalysts Bound with Nitrogenase-based and non-Nitrogenase-based Peptides as an Approach toward Electrochemical Ammonia Production, May 2017, Renewable Energy and Energy Efficiency (RE3) Workshop, Louisville, KY.
20. **A Graybill**, **C Loney**, **C Xu**, W Gellett, L Greenlee, and JN Renner, Characterization of the Binding Behavior and Gas Adsorption Properties of Peptide-Functionalized Catalysts for Electrochemical Ammonia Generation, April 2017, AIChE North Central Regional Student Conference, Chicago, IL. **Won 1st Place Poster Award*
21. **R Hawtof**, S Ghosh, **C Xu**, MR Sankaran, and JN Renner, Ammonia synthesis from nitrogen gas and water by solvated electrons generated at a plasma-liquid interface, April 2017, AIChE North Central Regional Student Conference, Chicago, IL. *Won 2nd Place Poster Award*
22. **C Loney**, S Foster, **A Graybill**, **C Xu**, **E Rybak**, W Gellett, M Janik, L Greenlee, and JN Renner, Designing Peptide Sequences to Mimic the General Function of the Naturally-Occurring Nitrogenase Enzyme and to Enable Experimental Determination of the N₂ Reduction Reaction, November 2016, Cleveland State Interdisciplinary Research Conference, Cleveland, OH.

TEACHING ACTIVITIES

University-Level Award Nominations

- John S. Diekhoff Award for Distinguished Graduate Student Mentoring/Teaching (2022, 2024)

Courses Taught

Case Western Reserve University, Department of Chemical Engineering Cleveland, OH

- ECHE 486/386: Protein Engineering, *New Graduate Course in 2016, Opened as New Undergraduate Course in 2020*, Taught 2016-2022
 - Course provides an in-depth examination of protein engineering topics and applications
 - Implemented unique Project Planning Module featuring hands-on protein design and characterization in 2018-present
 - Utilized successful project planning module to implement service learning opportunities in 2021-present
 - Adjusted the course to highlight scientists with a variety of backgrounds
 - Most recent class evaluations: Overall instructor rating: 4.82/5.00, overall course rating: 4.27/5.00, response rate 85%
- ECHE 313: Statistical Analysis of Chemical Processes, *New Undergraduate Course Fall 2019*, Taught 2019, 2021-2022
 - This course familiarizes students with statistical analysis of data, six sigma and lean manufacturing concepts
 - Most recent class evaluations: Overall instructor rating: 4.40/5.00, overall course rating: 4.47/5.00, response rate 60%
- ECHE 398: Process Analysis and Design, Core Undergraduate Course, Fall 2017
 - Students learn practical aspects of economic analysis, scale, cost estimation, process safety, ethics and environmental impact to design an integrated chemical processing plant

MENTORING

University-Level Award Nominations

- Bruce Jackson Award for Excellence in Undergraduate Mentoring (2017)

Academic Research Mentor

Case Western Reserve University, Department of Chemical Engineering

August 2016 – Present
Cleveland, OH

Postdoctoral Scholars

Current

- Bernadette Schneider (Fall 2022 – present)

PhD Graduate Students

Current

- Terril Vallikalam (Fall 2023 – present)
- Sogol Asaei (Spring 2022 – present)
- Rebecca Ahn (Fall 2021 – present, Musculoskeletal Training Fellow)
- Geeta Verma (Fall 2021 – present)

Alumni

- Jacob Hostert (Fall 2018 – Defended Spring 2023) – Thesis Title: Peptides for Rare Earth and Nutrient Recovery
- Nuttanit Pramounmat – (Fall 2017 – Defended Fall 2021) – Thesis Title: Study of Elastin-Like Polypeptides Grafted on Electrode Surfaces

- Zihang Su (Fall 2018 – Defended Summer 2021) – Thesis Title: Surface-immobilized Short Elastin-like Peptides for Electrochemical Applications: Controlling Ionomers on Solid Surfaces
- Chuck Loney (Fall 2016 – Defended Summer 2020) - Thesis title: Characterizations of Polyproline Peptide Monolayers on Metal/Metal Oxide Substrates, Position after Graduation: Process Engineering III at ASM Nexx

Masters Students (thesis)

Alumni

- Chul-Oong Kim (Graduated Spring 2019) – Thesis title: Engineered interaction between perfluorinated sulfonic-acid ionomer (Nafion[®]) and elastin-like peptides through peptide length and guest residue, Position after Graduation: Colorado School of Mines, PhD Program
- Royce Duda (Graduated Spring 2018) – Thesis title: Genetic Manipulation and Culturing of *Azotobacter Vinelandii* for the Production of Nitrogenase for use in Protein Engineered Electrochemical Systems, Position after Graduation: Engineer at Regeneron

Masters Students (non-thesis)

Current

- Henry Grome (Spring 2023- present)

Alumni

- Jadon Wolf, BS-MS student (Graduated Spring 2021) – Project title: The purification of elastin-like polypeptide fusion protein and its comparison to other methods, Position after Graduation: Engineer at Nexus Engineering Group
- Ming Yu (Graduated Spring 2020, co-advised with Dr. Christine Duval) – Project title: A lysine-modified polyethersulfone (PES) membrane for the recovery of lanthanides, Position after Graduation: University of Melbourne PhD Program
- Mingyuan Xu (Graduated Spring 2019) – Project title: Characterization of cerium (III) ion binding to EF-hand loop I of calmodulin in solution and when surface-bound, Position after Graduation: Engineer at Quaker.
- Zhiqiang Zhong (Graduated Spring 2018) – Project title: Nonchromatographic Purification of Tobacco Etch Virus (TEV) using elastin fusion tag, Position after Graduation: Working for a DNA sequencing company.

Undergraduate Students

Current

- Elena Ising (Summer - Fall 2021, SOURCE Summer Student 2021, Spring 2023-present)
- Benjamin Kau (Summer 2023- present)
- Ceaden Couch (Spring 2023 – present)
- Sophia Chan (Spring 2023 – present)
- Zijian Wang (Spring 2023 – present)

Alumni

- Alex Summerville (Fall 2022 – Fall 2023)
- Henry Grome (Summer 2021- Spring 2023, SOURCE Summer Student 2021)
- Christina Dang (Spring 2021-Spring 2023)
- Quincy Spitzer (Spring 2021 – Spring 2023)
- Adam Knorz (Fall 2022 – Spring 2023)
- Paola Giammattei (Summer 2021 – Spring 2023, James Family Undergraduate Research Fellow)
- Olivia Kamlet (Fall 2019 – 2023, NSF REU Summer 2021)

- D'Juan Taylor (Summer 2021, NSF REU Summer 2021)
- Katherine Yan (Spring 2019 – Spring 2021, Beckman Scholar)
- Jahnvi Pejavar (Fall 2017 – Spring 2021, SOURCE Summer Student 2018, 2020)
- Nicole Chen (Fall -2019 – Spring 2020)
- Jacob Thomas Pabia (Fall 2019 – Spring 2020)
- Takaaki Miki (Spring 2019- Spring 2020)
- Anna Currin (Spring 2019 - Spring 2020)
- Naomi Kane (Spring 2018 – Spring 2020, James Family Undergraduate Research Fellow)
- Benjamin Stawicki (Spring 2019 – Fall 2019)
- Christian Mcilvenna (NSF REU student, Summer 2019)
- Sanjana Kamath (Fall 2017 – Spring 2018)
- Caroline Gillette (Fall 2016 – Spring 2019)
- Colin Sonnefeld (Fall 2016 – Spring 2019)
- Aparna Paul (Spring 2018-Fall 2018)
- Leigh Harden (NSF REU student, Summer 2018)
- David Miller (Fall 2017-Spring 2018)
- Skylar Watson (NSF REU student, Summer 2017)
- Ashely Graybill (Fall 2016 – Spring 2017)
- Cheyan Xu (Fall 2016 – Spring 2017)
- Emily Rybak (Fall 2016)

Proposition Committees/Qualifying Exam Committees

- Ben Holcomb, A Catalytic Anode for Chlorine Evolution for Rare Earth Electrowinning in Chloride Molten Salts, Advisor: Rohan Akolkar, 2024
- Yuanman Ma, Electrodeposition of Lithium Thin-Film for Lithium Metal Battery Electrode Fabrication, Advisor: Rohan Akolkar, 2023
- Brittany Roopnarine, Macromolecular Science & Engineering Department, Advisor: Dr. Svetlana Morozova, 2023
- William Dean, Deep Eutectic Solvents as Electrolytes and Their Interfacial Behavior, Advisor: Burcu Gurkan, 2022
- Drace Penley, Understanding Li-ion Solvation in Ionic Liquid Mixtures for Lithium Battery Applications, Advisor: Burcu Gurkan, 2022
- Carter Heinert, Spatially Specific Measurements of Charge in Single Component Granular Systems, Advisors: Mohan Sankaran and Dan Lacks, 2021
- Xuehui Gong, Study of the Preparation and Application of Novel Poly(high internal phase emulsions), Advisor: Donald Feke, 2018
- Phwey (Dan) S. Gil, Molecular Simulation Studies of Surface Phenomena, Advisor: Dan Lacks, 2017
- Adriaan Riet, The Effects of Temperature, Pressure and Impurity Concentration on Grain Boundary Diffusion in MgO, Advisor: Dan Lacks, 2017

PhD Thesis Committees

- Maura Sepesy, Membrane Adsorbers for use in Medical Isotope, Copper-67, Production, Advisor: Christine Duval
- Joseph Toth, Study of Plasma and Electrostatic Processes in Environmentally Relevant Phenomena, Advisors: Mohan Sankaran, Daniel Lacks
- Xuehui Gong, Preparation and Performance of Functional Poly-High Internal Phase Emulsions Porous Materials, Advisor: Donald Feke

- Yi Zhong, Effects of Glucose Metabolism on Chondrogenesis of Human Mesenchymal Stem Cells, Advisor: Hari Baskaran
- Elizabeth Stricker (Freund), Cuprous Halide Reduction Kinetics and Electronucleation Study for an All-Copper Flow Battery, Advisor: Robert Savinell

MS Thesis Committees

- Emerson Lai, Analyzing the Effects of Non-thermal Plasma Treatments on Polymeric Hernia Mesh and Suture Materials to Increase Coating Adherence and Mitigate Biofouling, Advisor: Horst von Recum

S E R V I C E

Professional Service

- Editorial Boards
 - Biochemical Engineering Journal (2022-present)
- Advisory Boards
 - University of North Dakota Department of Chemical Engineering Academic Advisory Board Member (2019 – present)
- Professional Organization Leadership Roles
 - American Institute of Chemical Engineers Area 15C
 - Cell Culture Engineering and Biopharmaceutical Manufacturing Theme Leader (2024)
 - American Institute of Chemical Engineers Women's Initiative Committee (WIC)
 - Past Chair (2020), Chair (2019), Vice Chair (2018), Communications Chair (2017)
 - Electrochemical Society Organic and Bioelectrochemistry
 - Member at large (2021)
- Professional Meeting Support
 - Session Chairing and Organizing
 - AIChE Area 15C Theme Leader: Cell Culture Engineering and Biopharmaceutical Manufacturing, 2024
 - Co-chair, Biomolecules at Interfaces, AIChE Annual Meeting; November 2023, Orlando, FL.
 - Lead Symposium Organizer and Chair, K03 - Biomolecular Engineering of Electrochemical Phenomena, 243rd ECS Meeting; May 2022, Boston, MA.
 - Co-chair, I04 - Energy Conversion Based on N, P, and Other Nutrients, 243rd ECS Meeting; May 2022, Boston, MA.
 - Organizing committee and meeting volunteer for the first Chemical Engineering National Diversity Equity Workshop, June 2022, Baltimore, MD.
 - Lead Symposium Organizer and Chair, I08 - Energy Conversion Based on N, P, and Other Nutrients, 241st ECS Meeting; May 2022, Vancouver, Canada.
 - Co-chair, I06 - Polymer Electrolyte Membrane Fuel Cells 6, 241st ECS Meeting; May 2022, Vancouver, Canada.
 - Co-chair, Enhancing Metabolic Processes by Chassis Engineering and Electrocatalysis, AIChE Annual Meeting; November 2020, Virtual Conference
 - Co-chair, Interfacial Phenomena in Electrochemical Systems, AIChE Annual Meeting; November 2020, Virtual Conference
 - Chair, Municipal Systems and Nutrient Recovery, Arkansas Water Resources Center Water Conference; July 2019, Fayetteville, AR
 - Symposium Organizer and Chair, I04 - Energy Conversion Systems Based on Nitrogen 2, 235th ECS Meeting, May, 2019, Dallas, TX.

- Co-chair, Integrated Process Engineering and Economics Analysis, AIChE Annual Meeting; October 2018, Pittsburg, PA
- Chair, Advanced Fuel Cell, Fuel Cells, Electrolyzers, and Electrochemical Devices, AIChE Annual Meeting; October 2018, Pittsburg, PA
- Chair, Advanced Fuel Cell, Hydrogen Generation & Storage Technologies, AIChE Annual Meeting; October 2018, Pittsburg, PA
- Co-Chair, Symposium: I07 - Energy Conversion Systems Based on Nitrogen, 233rd ECS Meeting; May, 2018, Seattle, WA.
- Chair, Advanced Fuel Cell, Hydrogen Generation & Storage Technologies, AIChE Annual Meeting; October 2017, Minneapolis, MN
- Co-chair, Integrated Process Engineering and Economics Analysis, AIChE Annual Meeting; October 2017, Minneapolis, MN
- Panel Moderator, WIC Leadership and Team Management Panel AIChE Annual Meeting; November 2017, Minneapolis, MN
- Co-chair, Modeling Economics & Technologies for Sustainable Energy and Advanced Systems II, AIChE Annual Meeting; Nov. 2016, San Francisco, CA
- Women's Initiative Committee Graduate Student Panel, AIChE Annual Meeting; AIChE Annual Meeting; October 2011, Minneapolis, MN
- Women's Initiative Committee Graduate Student Panel, AIChE Annual Meeting; November 2010, Salt Lake City, UT
- Judging
 - Poster Session Judge; NE Ohio Musculoskeletal Research Conference, 2022, Cleveland OH
 - Poster Session Judge; 235th ECS Meeting; May 2019, Dallas, TX
 - Renewable Energy and Energy Efficiency (RE3) Workshop Poster Competition Judge; May 2017, Louisville, KY
 - AIChE National Student Paper Competition (NSPC) Judge; AIChE Annual Meeting; November 2016, San Francisco, CA
- Invited Panelist
 - Kickoff Presentation for GLEI Water Seed Sprint brainstorming session on Water and Technology and Data Analytics, 2019, Cleveland, OH
 - CWRU AIChE Industry Panel, 2019, Cleveland, OH
 - Roundtable Discussions for the Developing Your Career for Women Graduate Students and Beyond, AIChE WIC, 2018, Pittsburg, PA
 - Academic Mythbusters, CWRUECS and ChEGSO Career Development Event, 2018, Cleveland, OH
 - Women of Innovation: Career Lessons, Challenges and Successes, Mfg4 Conference; 2014, Hartford, CT
- Technical Reviewing
 - Ad-hoc Manuscript Reviewer
 - Biochemical Engineering Journal (2017-2024), Bioconjugate Chemistry (2023) ACS Applied Polymer Materials (2023), Resources, Conservation & Recycling Advances (2023), ACS Applied Engineering Materials (2022), Applied Surface Science (2022), Environmental Science Nano (2022), Journal of the American Chemical Society (2016-2020), ACS Catalysis (2018, 2020), ACS Applied Energy Materials (2020), Pakistan Journal of Zoology (2020), Nature (2019), Science (2019), Research, A Science Partner Journal (2019), Journal of Materials Chemistry A (2019), The Journal of the Electrochemical Society (2019), Catalysis Science and Technology (2019), AIChE Journal (2019), Journal of Membrane

Science (2018), Industrial & Engineering Chemistry Research (2018),
ChemBioChem (2017)

- Proposal Reviewer
 - NSF Panel, Division of Materials Research (2023)
 - NSF Panel, Division of Engineering (2022)
 - DOE, Basic Energy Sciences (2022)
 - NSF Panel, Division of Materials Research (2021)
 - NSF Panel, Division of Chemistry (2021)
 - NSF Panel, Division of Industrial Innovation and Partnerships (2020)
 - American Chemical Society Petroleum Research Fund (2018, 2021)
 - NSF Panel, Division of Civil, Mechanical & Manufacturing Innovation (2017)
 - Kentucky Science and Engineering Foundation (2017)
- Project Reviewer
 - NSF On-site NSF Reviewer (2023)
 - DOE Annual Merit Review and Peer Evaluation Meeting for the Hydrogen and Fuel Cells Program and the Vehicle Technologies Office (2017)

Institutional Service

- Case Western Reserve University
 - Department Service
 - Department of Chemical Engineering Faculty Search Chair (2023) and Committee Member (2018, 2021)
 - Department of Chemical Engineering Diversity Equity and Inclusion Committee (Chair, 2022 – present)
 - Department of Chemical Engineering Graduate Admissions Committee (Member, 2017-2018; Chair, fall 2020-spring 2022, co-Chair spring 2023)
 - Department of Chemical Engineering Social Media Team (2020- present)
 - Department Open House Presenter (2022)
 - Department of Chemical Engineering Graduate Recruiting Committee (2019-2021)
 - Department of Chemical Engineering Undergraduate Committee (2016-2017)
 - AIChE Student Chapter Advisor (2016-2017)
 - Chemical Engineering Promotional Activities:
 - Choices Fair (Fall 2018, Fall 2019, Fall 2022)
 - Engineering Dean’s Welcome for new undergraduate students (Fall 2017, Fall 2019, Fall 2020)
 - Organized Panel for Graduate Students: “Graduate Student Success” (Fall 2021)
 - School of Engineering Service
 - Case School of Engineering Representative for the SACNAS National Diversity in STEM Conference (2023)
 - Case School of Engineering Gender Minority Faculty Forum Chair (2022 – present)
 - Case School of Engineering Budget Committee Chair (2022-present) and Member (2018–2020, 2022-present)
 - Case School of Engineering Open House Presenter (2022-2023)
 - Case School of Engineering Awards Selection Committee (2022)
 - Case School of Engineering Graduate Studies Committee (2017)
 - University Service
 - CWRU Committee on Women Faculty (2023 – present)
 - Member of Reproductive Health Recruitment and Retention Working Group (2022-present)
 - Interviewer for Founding Executive Director of the Roth Leadership Institute (2021)

- Invited Panelist
 - Office of Faculty Development Tenure Track and Promotion Panel, 2023
 - CWRU NSF CAREER Workshop Panelist, 2022
- Purdue University
 - Purdue Women in Engineering Program School of Chemical Engineering Ambassador and Graduate Women's Gatherings Organizer (2010-2011)
 - Purdue Chemical Engineering Graduate Student Organization President (2009-2010) and First Year Representative (2008-2009)
 - Purdue School of Chemical Engineering Strategic Planning Committee Student Representative (2009)

Outreach Service

- Founder and organizer of the Widening Opportunities for Women in Science (WOWS) summer research program at CWRU in collaboration with John Hay High School, Summer 2017-2019, 2022
- Speaker for GiSTEM Engineering Day, July 2021
- GE Girls Program Lecturer/Demonstration Leader, October 2016
- Purdue University Women In Engineering Program Exciting Discoveries for Girls Camp, Summer 2009-2011
 - Developed a tissue engineering lab for female high school students published in *Chemical Engineering Education*.

PROFESSIONAL DEVELOPMENT

- 1) Women Faculty Leadership Development Institute, Fall 2022, CWRU, Cleveland, OH.
- 2) Chemical Engineering National Diversity Equity Workshop, June 2022, Baltimore, MD.