M. Reza Nazemi, Ph.D.

Assistant Professor

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COLORADO STATE UNIVERSITY

Walter Scott, Jr. College of Engineering
430 N College Ave., Fort Collins, CO 80524 USA

EDUCATION

Georgia Institute of Technology, Atlanta, GA 2015–2020
Ph.D. in Mechanical Engineering
Certificate: Technology Innovation through TI:GER program in Scheller College of Business
Thesis: Investigation of (photo) electrocatalytic conversion of N_2 to NH_3 using hybrid plasmonic nanostructures
Advisor: Prof. Mostafa El-Sayed (School of Chemistry and Biochemistry)

Michigan Technological University, Houghton, MI 2013–2015
M.S. in Mechanical Engineering
Thesis: Modeling and analysis of Reactivity Controlled Compression Ignition (RCCI) combustion
Advisor: Prof. Mahdi Shahbakhti

Sharif University of Technology, Tehran, Iran 2009–2013
B.S. in Aerospace Engineering
Thesis: Modeling of noise intensity based upon its connection with traffic volume in a regional airport
Advisor: Prof. Mohammad Bagher Malaek

RESEARCH SUMMARY

The scientific thrusts of our research group (Renewable Energy Conversion and Storage (RECS)) at Colorado State University are built upon **1**) materials chemistry for the synthesis of a range of heterogeneous (photo)electrocatalysts at various length scales (nanoparticles, single atoms), **2)** (photo) electrochemistry and novel cell design to study the redox processes in the (photo) electrochemical energy conversion systems, **3)** o*perando* spectroscopy and microscopy techniques to study active sites and reaction mechanisms, leading to the rational design of more efficient (photo) electrocatalysts for value-added chemicals production and resource recovery. **4)** Theoretical thermodynamics and kinetics model development to optimize the redox processes and stack design, and **5)** Techno-economic analysis and life cycle assessment of innovative technologies developed in the lab for future viability.

PROFESSIONAL APPOINTMENTS AND RESEARCH EXPERIENCE

Assistant Professor, Colorado State University, Fort Collins, CO (Aug. 2022-to present)
Department of Mechanical Engineering & School of Materials Science and Engineering

Founder and President, NitroCat Energies, Inc., Fort Collins, CO (July 2024-to present)
NitroCat Energies' mission is to recycle and valorize nitrogen contaminants from aqueous waste streams to generate clean, affordable, and sustainable fertilizers.

Postdoctoral Associate, Yale University, New Haven, CT (Sep. 2021-Aug. 2022)
PI: Prof. Jaehong Kim (Department of Chemical and Environmental Engineering)

- Designed electrochemical cells to treat reverse osmosis concentrate (ROC) from industrial and municipal wastewater.
- Unraveled the mechanism for electrode deactivation during electrochemical reclamation of ROC.

Postdoctoral Fellow, Georgia Institute of Technology, Atlanta, GA (Jun. 2020-Aug. 2021)
PIs: Profs. Mostafa El-Sayed and Thomas Orlando (School of Chemistry and Biochemistry)

- Fabricated membrane-electrode assemblies for gas-phase electrochemical ammonia synthesis prototype.
- Performed feasibility analysis of renewable ammonia synthesis and its competitiveness in various scenarios and markets.

Graduate Research Assistant, Georgia Institute of Technology, Atlanta, GA (Aug. 2015–May 2020)

PI: Prof. Mostafa El-Sayed

(Photo) Electrochemical Nitrogen Fixation for Ammonia Synthesis (Renew. Fertilizer/Fuel)

- Benchmarked the (photo)electrocatalytic activity of nitrogen reduction reaction (NRR) under ambient conditions using in-house hybrid plasmonic nanostructures in a fuel cell type electrochemical cell (gas-phase) and an H-cell system (liquid-phase).
- Developed a spectroelectrochemical setup to probe electrochemical reactions at the electrode/electrolyte interface using ultrasensitive *operando* surface-enhanced Raman spectroscopy (SERS) technique.

- Developed an optical setup to explore the structural reorganization in assembled and surface-passivated plasmonic nanoparticles and their hybrid analogs *via* femtosecond pulsed laser.

Project Leader-Fuel the World (FTW)-TI:GER Program

- Recipient of the TI:GER (Technology Innovation: Generating Economic Results) Fellowship from the Scheller College of Business at Georgia Tech to explore the commercialization potential of my Ph.D. dissertation technology in the multidisciplinary team consisting of three MBA students (Georgia Tech) and two JD students (Emory University) with following objectives:
  - Gained skills and entrepreneurial perspective to facilitate the commercialization and diffusion of my Ph.D. technology.
  - Developed market, industry, and intellectual property analyses to understand technical and market relevance.
  - Developed business models and commercial plans and deployed innovation frameworks to launch a new venture.

Membrane-based Electrolysis System for Water Splitting

- Developed a multi-ion exchange membrane water splitting system for hydrogen production using acid-base electrolytes.

Conversion of Salinity Gradient Energy into Useful forms of Energy (Renew. Electricity/Hydrogen)

- Developed a thermodynamic model for reverse electrodialysis (RED) power generation to evaluate electricity and hydrogen gas production in ion mixing processes (salinity gradient energy).

Graduate Research Assistant, Michigan Technological University, Houghton, MI (Sep. 2013-Jul. 2015)

Reactivity Controlled Compression Ignition (RCCI) Engine Combustion

- Developed a combustion model to investigate the effects of varying premixed fuel injection ratio, diesel injection timing, diesel spray angle, diesel injection pressure, and multiple injectors on the performance and emissions characteristics of the RCCI engine.

Homogeneous Charge Compression Ignition (HCCI) Engine Combustion

- Developed an accurate and computationally efficient thermo-kinetic model to study the effect of variable valve timing (VVT) on the performance of an HCCI engine.

AWARDS, HONORS, AND ACHIEVEMENTS

- DOE Office of Small and Disadvantaged Business Utilization (OSDBU) Justice, Equity, Diversity, and Inclusion (JEDI) award ($5,000) Link — Jun. 2024
- Faculty Institute for Inclusive Excellence Fellow-Colorado State University — Feb. 2023
- 2023 REACH (Regional Energy Accelerator for Commercializing Hard-Tech) incubator program- $10,000 cash award to fabricate modular electrochemical systems for renewable fuel synthesis. — Jan. 2023
- Open Educational Resources (OER) Development Grant—Colorado OER Council and the Provost's Student Success Leadership Team ($5,900) — Apr. 2023
- Electrochemical Society's 2022 ECS Colin Garfield Fink Fellowship (News) — May 2022
- American Chemical Society (ACS) Physical Chemistry (PHYS) Division Young Investigator Award (please visit this link) — May 2021
- Georgia Research Alliance (GRA) phase I grant (Funding Awarded: $50,000 to explore the commercialization potential of ammonia electrosynthesis) (Highlighted in the Georgia Tech College of Sciences News) — May 2020
- Top proposal winner for "Amazon Catalyst at ECS" program (Funding Awarded: $25,000 + $1,500 travel award) (Highlighted in the ECS News) — Oct. 2018
- Technology Innovation: Generating Economic Results (TI:GER) class of 2020 Fellow at Georgia Tech (Funding Awarded: $15,200, plus a certificate in Technology Innovation) — May 2018
- Georgia Tech-Oak Ridge National Lab (ORNL) Seed Grant Award (Funding Awarded: $4,000 for purchasing small equipment items, materials, supplies, and travel directly related to the proposed research project) — Apr. 2020
- I-Corps Site at Georgia Tech grant (Funding Awarded: $3,000 for early customer discovery of the commercial potential of my Ph.D. research) — Jun. 2019
- First place winner in Career, Research, and Innovation Development (CRIDC) innovation competition-Georgia Tech Venture Lab ($1,000 Monetary Award) (please visit this link) — Jan. 2020
- Georgia Tech Faces of Inclusive Excellence (please visit this link) — Jun. 2019
  (The program recognizes faculty, staff, and students whose accomplishments in research, teaching,

leadership and/or service endeavors have earned special awards or recognition during the academic year.)

- Technology Showcase external participant at the 2021 ARPA-E Energy Innovation Summit ("Technology Showcase participants include ARPA-E-funded project teams as well as a highly selective group of researchers and technologists from other companies and organizations.") May 2021
- Selected participant of the NSF's Alliances for Graduate Education and the Professoriate (AGEP) Research University Alliance (RUA) 2021 Faculty Job Search Bootcamp May 2021
- 2020-2021 cohort of the Future Faculty Mentoring Program-Education Division of the American Institute of Chemical Engineers (AIChE) Sep. 2020
- 2020-2021 selected coach in the American Association of Chemistry Teachers (AACT)/American Chemical Society (ACS) Science Coaches Program (will serve as a coach to support AACT teacher members in their efforts in the classroom to increase student engagement) Sep. 2020
- Participant in the American Chemical Society (ACS) postdoc to faculty (P2F) workshop Aug. 2020
- Electrochemical Society (ECS) Energy Technology Division Travel Grant Award Sep. 2020 & 2021
- Travel Grant Award to attend and present at the Association of Environmental Engineering and Science Professors (AEESP) Research and Education Conference, St. Louis, MO Jul. 2022
- Scholarship to participate in the "Gordon Research Conference, Carbon Capture, Utilization, and Storage, New London, NH. ($1,200 Monetary Award) Jun. 2017
- Second place in the student paper and presentation competition-ASME Power & Energy 2016, Charlotte, NC. ($2,000 Monetary Award) Jun. 2016
- Selected participant of the "Future Combustion Research to Mitigate Carbon Emissions" workshop. College Park, MD. Apr. 2017
- Georgia Tech student government association (SGA) and college of engineering Travel Grant Awards. ($500 Travel Award) Sep. 2016
- Selected participant of the Combustion Energy Frontier Research Center (CEFRC) summer school at Princeton University. Jun. 2014
- Michigan Tech Graduate Student Government (GSG) Travel Grants award. ($250 Travel Award) Sep. 2014

FUNDED RESEARCH PROJECTS

- **PI: M. Nazemi**, Pilot scale prototype electrochemical reactor for ammonia synthesis, Hydrofuel Canada Inc., 08/2022-07/2026. Total: $1,500,000.
- **PI: M. Nazemi**, Developing modular electrochemical systems powered by renewable electricity to produce nitrogen-based fertilizers from agricultural waste streams, the Office of Economic Development and International Trade (OEDIT), 08/2023-07/2026. Total: $200,000 (including cost share).
- **PI: M. Nazemi**, Investigation of (Photo) Electrocatalytic Conversion of N_2 to NH_3, National Science Foundation, 11/2023-04/2024. Total: $23,942.
- **PI: M. Nazemi**, Modular One Vessel Ammonia Production System "MOVAPS", CenterPoint Energy, Inc., 11/2024-11/2026. Total: $100,000.
- **PI: M. Nazemi**, A Sustainable Approach for Ammonia Fertilizer Production, National Science Foundation, 02/2025-01/2026. Total: $50,000.
- **PI: M. Nazemi**, CO_2 to Methanol Conversion Reactor (Senior Design Project), Caterpillar Inc., 08/2024-05/2025. Total: $40,000.
- **Co-PI: M. Nazemi**, Destruction of Forever Chemicals (PFAS) in Water by Electrochemical Treatment, the Office of Economic Development and International Trade (OEDIT), 03/2025-02/2027. Total: $176,000 (including cost share).
- **Co-PI: M. Nazemi**, Electrochemical Wastewater Treatment, TruClear Water Solutions Inc., 01/2024-12/2025. Total: $100,000.

PUBLICATIONS

Invention Disclosures and Patents

1. **M. Nazemi**, M.A. El-Sayed "Systems and Methods for Forming Nitrogen-Based Compounds", U.S. Patent Application 16/788,656. (**This technology has been exclusively licensed for methods of forming nitrogen-based compounds.** Link**)**
2. **M. Nazemi**, M.A El-Sayed "Systems and Methods for Forming Nitrogen-Based Compounds" US Patent Application 18/543,181, 2024.
3. **M. Nazemi**, "Systems and Methods for Formation of Ammonia Using Diverse Nitrogen-Based Feedstocks" PCT filed (July 2024).

Books

1. **M. Nazemi**, M.A. El-Sayed, "Photo-Electrochemical Ammonia Synthesis: Nanocatalyst Discovery, Reactor Design, and Advanced Spectroscopy" *CRC Press*, **2021** https://doi.org/10.1201/9781003141808.

Peer-Reviewed Journal Papers (* Corresponding author, = Equal contribution, # Mentees)

18. M. Ahmadi#, **M. Nazemi***, "Sustainable, Electrified, and Decentralized Ammonia Synthesis from Diverse Nitrogen Feedstocks", Accepted in *Cell Reports Physical Science*, **2025**.
17. R.R. Boppella#, M. Ahmadi#, B.M. Arndt#, D.R. Lustig, **M. Nazemi***, "Pulsed Electrolysis in Membrane Electrode Assembly Architecture for Enhanced Electrochemical Nitrate Reduction Reaction to Ammonia" *ACS Catalysis*, 14, 18223–18236, **2024.**
16. B. Arndt#, B. Willson, **M. Nazemi***, "Thermodynamic and Economic Assessments of Electrochemical CO_2 Conversion to Dimethyl Ether: Trade-off between Hydrogen Gas and Water Vapor as a Proton Source", *Industrial and Engineering Chemistry Research*, 63, 14582–14589, **2024.**
15. M. Ahmadi#, **M. Nazemi***, "Understanding Potential Losses and pH Distribution in Electrochemical Nitrate Reduction Reaction to Ammonia", *Industrial and Engineering Chemistry Research*, 63, 9315–9328, **2024.** (Featured on the front cover of the journal, Vol. 63, Issue 14, April 10, 2024)
14. M.T. McDowell, H. Xiong, **M. Nazemi**, J. Peng, J.L. Lutkenhaus, R. Wang, A. Djire, A. Sankaran, J. Leem, Y. Gogotsi, "Nanomaterials in the future of energy research", *Cell Reports Physical Science*, 4, 101605, **2023**. (Invited)
13. X. Wu=, **M. Nazemi=**, S. Gupta, A. Chismar, K. Hong, H. Jacobs, W. Zhang, K. Rigby, T. Hedtke, Q. Wang, E. Stavitski, M. S. Wong, C. Muhich*, and J.-H. Kim*, "Contrasting Capability of Single Atom Palladium for Thermocatalytic versus Electrocatalytic Nitrate Reduction Reaction" *ACS Catalysis*, 13, 6804–6812, **2023.**
12. **M. Nazemi***, M. A. El-Sayed, "Managing the Nitrogen Cycle *via* Plasmonic (Photo)Electrocatalysis: Towards Circular Economy" *Accounts of Chemical Research,* 54, 4294–4304, **2021. (Featured on the front cover of the Journal, Vol. 54 Issue 23, Dec. 7, 2021)**
11. **M. Nazemi**, S. R. Panikkanvalappil, C.-K. Liao, M.A. Mahmoud, M. A. El-Sayed, "Role of Femtosecond Pulsed Laser-Induced Atomic Redistribution in Bimetallic Au-Pd Nanorods on Optoelectronic and Catalytic Properties" *ACS Nano,* 15, 10241–10252, **2021**.
10. **M. Nazemi**, P. Ou, A. Alabbady, L. Soule, A. Liu, J. Song, T. A. Sulchek, M. Liu, M. A. El-Sayed, "Electrosynthesis of Ammonia using Porous Bimetallic Pd-Ag Nanocatalysts in Liquid- and Gas-Phase Systems" *ACS Catalysis,* 10, 10197−10206, **2020**.
9. **M. Nazemi***, L. Soule, M. Liu, M. A. El-Sayed, "Ambient Ammonia Electrosynthesis from Nitrogen and Water by Incorporating Palladium in Bimetallic Gold-Silver Nanocages" *Journal of The Electrochemical Society,* 167(5), p. 054511, **2020**.
(Focus issue on "Heterogeneous Functional Materials for Energy Conversion and Storage")

    Note: This work was funded by "Amazon Catalyst at ECS" program, for which M. Nazemi was the awardee (PI) and corresponding author of this manuscript.
8. **M. Nazemi**, M. A. El-Sayed, "Plasmon-Enhanced Photo (electro) chemical Nitrogen Fixation under Ambient Conditions Using Visible Light Responsive Hybrid Hollow Au−Ag_2O Nanocages" *Nano Energy*, vol. 63, 103886, **2019**.
7. **M. Nazemi**, M. A. El-Sayed, "The Role of Oxidation of Silver in Bimetallic Gold–Silver Nanocages on Electrocatalytic Activity of Nitrogen Reduction Reaction," *The Journal of Physical Chemistry C,* 123, 11422-11427, **2019**. (Invited special issue article)
6. **M. Nazemi**, M. A. El-Sayed, "Electrochemical Synthesis of Ammonia from N_2 and H_2O under Ambient Conditions Using Pore-Size-Controlled Hollow Gold Nanocatalysts with Tunable Plasmonic Properties" *The Journal of Physical Chemistry Letters*, 9, 5160-5166, **2018**.
5. **M. Nazemi**, S. R. Panikkanvalappil, M. A. El-Sayed, "Enhancing the Rate of Electrochemical Nitrogen Reduction Reaction for Ammonia Synthesis under Ambient Conditions Using Hollow Gold Nanocages" *Nano Energy,* vol. 49, pp. 316-323, **2018**.

    (*Among the most cited Nano Energy articles published since 2018 (Last update: Aug. 2021)***;** *Featured in Science Trends***)**

4. **M. Nazemi**, J. Padgett, M.C. Hatzell, "Acid/Base Multi-Ion Exchange Membrane-Based Electrolysis System for Water Splitting" *Energy Technology,* 5(8), pp.1191-1194, **2017**.

3. **M. Nazemi**, J. Zhang, M.C. Hatzell, "Harvesting Natural Salinity Gradient Energy for Hydrogen Production through Reverse Electrodialysis (RED) Power Generation", *Journal of Electrochemical Energy Conversion and Storage,* vol. 14, p. 020702, **2017**.

19. **M. Nazemi**, M. Shahbakhti, "Modeling and Analysis of Fuel Injection Parameters for Combustion and Performance of an RCCI Engine", *Applied Energy*, Vol. 165, pages 135-150, **2016**.
1. **M. Nazemi**, H. Saigaonkar, M. Shahbakhti, "Thermo-kinetic Modeling of Variable Valve Timing Effects on HCCI Engine Combustion", *Int. Journal of Automotive Engineering and Technologies*, Vol. 4, Issue 1, pp. 54 – 62, **2015**.

Refereed Conference Papers

1. **M. Nazemi**, "Electrochemical Redox Processes for Wastewater Treatment and Resource Recovery Using Single-atom Catalysts", *The Electrochemical Society Interface*, 31(4), p.36, 2022.

2. **M. Nazemi**, J. Zhang, M.C. Hatzell, "Harvesting Natural Salinity Gradient Energy for Hydrogen Production through RED Power Generation", *Proceedings of the ASME 2016 Power and Energy Conference*, June 26-30, **2016**, Charlotte, NC, USA.
   (*Highlighted in Energy-Tech E-Newsletter***)**

3. H. Saigaonkar, **M. Nazemi**, M. Shahbakhti, "Sequential Model for Residual Affected HCCI with variable valve Timing", *2015 SAE World Congress*, SAE Paper No. 2015-01-1748, Apr. 21-23, **2015**, Detroit, MI, USA.

4. **M. Nazemi**, H. Saigaonkar, M. Shahbakhti, "Thermo-kinetic Modeling of Variable Valve Timing Effects on HCCI Engine Combustion", *Int. Conference on Advanced Technology & Sciences*, 6 pages, August 12-15, **2014**, Antalya, Turkey.

Invited Presentations

1. **M. Nazemi,** "Designing materials and systems for decarbonizing the fuel and water industries", Northern Colorado Renewable Energy Society, September 24, **2024**, Fort Collins, CO.

2. **M. Nazemi,** "Understanding potential losses and pH distribution in the electrochemical nitrate reduction reaction to ammonia", Electrochemical Society Meeting, May 26-30, **2024**, San Francisco, CA.

3. **M. Nazemi,** "Designing hybrid plasmonic nanocatalysts for solar-fuel-based systems", International Conference on NextGen Solar, October 30-31, **2023,** San Francisco, CA.

4. **M. Nazemi,** "Designing materials and systems for electrochemical fuel production and resource recovery" ACS Fall 2023, August 13-17, **2023,** San Francisco, CA.

5. **M. Nazemi**, "Designing materials and systems for decarbonizing chemicals and water industries" Electrochemical Society Webinar Series, March 15, **2023.**

6. **M. Nazemi**, M.A. El-Sayed. "The role of femtosecond pulsed laser induced atomic redistribution in bimetallic Au-Pd nanorods on optoelectronic and catalytic properties" (Invited award talk) ACS Fall 2021, August 22-26, **2021**, Atlanta, GA.

7. **M. Nazemi**, M.A. El-Sayed. "(Amazon Catalyst at ECS Grant Winner) Enhancing the Rate of Electrocatalytic Conversion of N_2 to NH_3 Using Bimetallic Au-Pd Nanoparticles" (Invited award talk) Meeting Abstracts. The Electrochemical Society, October 13-17, **2019**, Atlanta, GA.

Technical Presentations (refereed abstract & oral/poster presentation) (#Mentees)

1. M. Ahmadi#, **M. Nazemi**, "Kinetic and Potential Modeling of the Electrolysis Cell for Nitrate Reduction Reaction to Ammonia," PRiME 2024, Honolulu, HI, October 6-11, **2024**.

2. M. Ahmadi#, **M. Nazemi**, "Kinetic and Potential Loss Modeling of the Electrolysis Cell for Nitrate Reduction Reaction to Ammonia," 2nd Gerischer Electrochemistry Today Symposium, Fort Collins, CO, August 6th, **2024**.

3. M. Ahmadi#, **M. Nazemi**, "Thermodynamic and economic considerations of electrochemical ammonia synthesis via nitrate reduction," ACS Fall 2024, Denver, CO, August 20th, **2024**.

4. M. Ahmadi#, **M. Nazemi**, "Economic Assessment of Renewable Paths to Ammonia," Energy Institute Weekly Seminars, Fort Collins, CO, February 29th, **2024.**

5. B. Arndt#, **M. Nazemi**, "Thermodynamic and Economic Assessments of Electrochemical CO_2 Conversion to Dimethyl Ether," PRiME 2024. Honolulu, HI, October 6-11, **2024**.

6. B. Arndt[#], **M. Nazemi**, "Techno economic assessments of electrochemical CO_2 conversion to dimethyl ether, propane, and renewable natural gas," ACS Fall 2024, Denver, CO, August 20th, **2024**.
7. B. Arndt[#], **M. Nazemi**, "Techno-economic assessments of electrochemical CO_2 conversion to dimethyl ether, propane, and renewable natural gas," 2nd Gerischer Electrochemistry Today Symposium. Fort Collins, CO, August 6th, **2024**.
8. R.R. Boppella[#], M. Ahmadi[#], B. Arndt[#], **M. Nazemi**, "Pulsed Electrolysis for Enhanced Nitrate Reduction Reaction to Ammonia at Low Concentrations," PRiME 2024. Honolulu, HI, October 6-11, **2024.**
9. **M. Nazemi**. "Modifying Hybrid Plasmonic Nanocatalysts via Femtosecond Pulsed Laser for Solar-Fuel-Based Applications". Meeting Abstracts. The Electrochemical Society, October 9-13, **2022**, Atlanta, GA.
10. **M. Nazemi**, X. Wu, H. J. Lim, K. Rigby, A. Meese, D. Kim, J. Kim, "Electrochemical Wastewater Treatment for Organic Compounds Degradation and Resource Recovery". AEESP Research and Education Conference, June 28-30, **2022**, St. Louis, MO.
11. **M. Nazemi**, M.A. El-Sayed. "Discovering Hybrid Plasmonic Nanocatalysts for Solar-Chemical Energy Conversion *via* Femtosecond Pulsed Laser-Induced Atomic Redistribution in Bimetallic Au-Pd Nanorods" Meeting Abstracts. The Electrochemical Society, October 10-14, **2021** (fully digital).
12. **M. Nazemi**, M.A. El-Sayed. "The role of femtosecond pulsed laser induced atomic redistribution in bimetallic Au-Pd nanorods on optoelectronic and catalytic properties" ACS Fall 2021, August 22 - 26, **2021**, Atlanta, GA.
13. **M. Nazemi**, M.A. El-Sayed. "Mechanistic understanding of electrochemical nitrogen reduction reaction on hybrid plasmonic nanostructures using *operando* surface-enhanced Raman spectroscopy" ACS Spring 2021, April 5-30, **2021**. (Link to online video of the talk)
14. **M. Nazemi**, M.A. El-Sayed. "Electrochemical Reduction of N_2 to NH_3 Using Porous Bimetallic Pd-Ag Nanoparticles in Liquid and Gas Phase Systems" Virtual AIChE Annual Meeting, November 16-20, **2020**.
15. **M. Nazemi**. "Electro-Synthesis of Value-Added Chemicals *via* Designing New Catalysts, Systems, and Processes" Virtual AIChE Annual Meeting, November 16-20, **2020**. (Meet the Faculty Candidates Poster Session)
16. **M**. **Nazemi**. "Electrochemical Production of Ammonia *via* Designing New Catalysts and Processes" Virtual AIChE Annual Meeting, November 16-20, **2020**. (Electrochemical Fundamentals: Faculty Candidate Session) (Link to YouTube video of the talk)
17. **M. Nazemi**, M.A. El-Sayed. "Photoelectrochemical Nitrogen Fixation for Ammonia Synthesis Using Hybrid Plasmonic Nanostructures" Meeting Abstracts. *The Electrochemical Society*, October 4-9, **2020**, Honolulu, Hawaii. (presented virtually due to COVID-19) (Link to the online video of the talk)
18. **M. Nazemi**, M.A. El-Sayed. "Enhancing the rate of electrochemical nitrogen reduction reaction for ammonia synthesis under ambient conditions by incorporating Pd in bimetallic Au-Ag nanocages" *259th ACS National Meeting & Exposition*, March 22-26, **2020**, Philadelphia, PA. (Cancelled due to COVID-19 and presented at the ACS virtual poster session)
19. **M. Nazemi**, M.A. El-Sayed. "Green Ammonia Production from Air and Water using Plasmonic Nanocages: A Medium for Renewable Energy Storage" *Career, Research, and Innovation Development Conference (CRIDC),* January **2020**, Georgia Tech, Atlanta.
20. **M. Nazemi**, M.A. El-Sayed. "Green Ammonia Synthesis from Air, Water, and Electricity using Hybrid Plasmonic Nanostructures" *Ammonia Energy Conference*, November 12-14, **2019**, Orlando, FL.
21. **M. Nazemi**, M.A. El-Sayed. "Plasmon-Enhanced Photofixation of Dinitrogen for Ammonia Synthesis Using Visible Light Responsive Hybrid Hollow Au-Ag_2O Nanocages" Meeting Abstracts. *The Electrochemical Society*, October 13-17, **2019**, Atlanta, GA.
22. **M. Nazemi**, M.A. El-Sayed. "Evaluation of (Photo) Electrocatalytic Conversion of N_2 to NH_3 under Ambient Conditions Using Hybrid Hollow Plasmonic Nanostructures" *Gordon Research Conference, Nanomaterials for Applications in Energy Technology.* February 24-March 1, **2019**, Ventura, CA.
23. **M. Nazemi**, M.A. El-Sayed, "Renewable Ammonia Production from Air, Water, and Electricity using Plasmonic Nanocages" *Career, Research, and Innovation Development Conference (CRIDC)*, February **2019**, Georgia Tech, Atlanta.
24. **M. Nazemi**, M. Shahbakhti, "Development of a New Generation of Combustion Engines to Reduce CO_2 Emissions" *Gordon Research Conference, Carbon Capture, Utilization, and Storage.* June 11-16, **2017**, New London, NH.
25. **M. Nazemi**, A. Agles, K. Dobson, and M. C. Hatzell, "Evaluating the Potential for Hydrogen Production with Donnan-Driven Multi-Ion Exchange Membrane Based Systems" Meeting Abstracts. *The Electrochemical Society*, October 1-5, **2017**, National Harbor, MD.

26. **M. Nazemi,** J. Padgett, M.C. Hatzell, "Hydrogen Production through a Multi-Ion Exchange Membrane Based Electrolysis System" Meeting Abstracts. *The Electrochemical Society*, October 2-7, **2016**, Honolulu, Hawaii.
27. **M. Nazemi**, S. Polat, M. Shahbakhti, "Advanced combustion model of RCCI Engines" *CONVERGE User Group Meeting*, September 23-25, **2014**, Madison, WI, USA.

POSTDOC AND RESEARCH SCIENTIST ADVISING (CURRENT)

1. Rami Reddy Boppella – Research Scientist in Mechanical Engineering (02/2023–Present)

GRADUATE ADVISING (CURRENT)

1. Maryam Ahmadi – Ph.D. Student in Mechanical Engineering (08/2022–Present)
2. Brenden Arndt – Ph.D. Student in Materials Science and Engineering (06/2023–Present)
3. Ojo Abraham – Ph.D. Student in Materials Science and Engineering (08/2024–Present)
4. Benjamin Lancia – Ph.D. Student in Materials Science and Engineering (08/2024–Present)
5. Aaron Phillips – Ph.D. Student in Mechanical Engineering (08/2024–Present)
6. Oluwaseun Adeleye – Ph.D. Student in Materials Science and Engineering (08/2024–Present)
7. Davor Valdez Arriaran – Ph.D. Student in Materials Science and Engineering (01/2025–Present)

UNDERGRADUATE ADVISING (CURRENT)

1. Gavin Vonalt (Undergraduate Research Assistant and SURE program, CBE Undergrad) (01/2023–Present)
2. Amanda Beutter (Undergraduate Research Assistant, Civil and Env. Undergrad) (01/2025–Present)
3. Mallory Glenn (Undergraduate Research Assistant, CBE Undergrad) (01/2025–Present)
4. Wyatt Wolff (Senior Design, CBE Undergrad) (08/2024–Present)
5. Angelica Mannino (Senior Design, CBE Undergrad) (08/2024–Present)
6. Allie Wilke (Senior Design, CBE Undergrad) (08/2024–Present)
7. Caleb Vasko (Senior Design, CBE Undergrad) (08/2024–Present)
8. Maisa Volk (SURE Program, CBE Undergrad) (01/2025–Present)
9. Alex Guthrie (SURE Program, MECH Undergrad) (01/2025–Present)

ALUMNI

1. Chloe Trujillo (NSF REU Program) (05/2024–08/2024)
2. Annie Macabobby (Undergraduate Research Assistant) (08/2024–12/2024)
3. Jack Bicksler (Undergraduate Research Assistant) (11/2023–08/2024)
4. Lauren Behar (SURE program, Biomedical Undergrad) (01/2024-05/2024)
5. Bryce Anderson (SURE program, Civil and Env. Undergrad) (01/2024-05/2024)
6. Gagandeep Sidhu (SURE program, Civil and Env. Undergrad) (01/2024-05/2024)
7. Jake Clare (SURE program, MECH Undergrad) (01/2024-05/2024)
8. Brennen Betts (SURE program, MECH Undergrad) (01/2024-05/2024)
9. Muayad Al Mohammed (Senior Design, MECH Undergrad) (08/2023–05/2024)
10. Jayden Coleman (Senior Design, MECH Undergrad) (08/2023–05/2024)
11. Malik Al Mamari (Senior Design, MECH Undergrad) (08/2023–05/2024)
12. Katie Dunteman (Senior Design, MECH Undergrad) (01/2023–12/2023)

13. Aaron Kennedy (Senior Design, MECH Undergrad) (01/2023−12/2023)
14. Ben Haggard (Senior Design, MECH Undergrad) (01/2023−12/2023)
15. Reed Westall (Senior Design, MECH Undergrad) (01/2023−12/2023)
16. Joy St. Clair (Summer Research Program student) (05/2023−08/2023)
17. Marc Smoorenburg (SURE program, CBE Undergrad) (01/2023−05/2023)

SERVICE ON THESIS OR DISSERTATION COMMITTEES

1. Ava Chard, PhD in Chemistry, Graduation Date: TBD, Advisor: Justin Sambur.
2. Hala Soliman, PhD in Chemistry, Graduation Date: TBD, Advisor: Amy Prieto.
3. Monika Perez, Ph.D. in Chemistry, Graduation Date: TBD, Advisor: Amy Prieto.
4. Austin Tews, Ph.D. in Chemistry, Graduation Datte: TBD, Advisor: Justin Sambur.
5. Shinyun Park, Ph.D. in Civil and Environmental Engineering, Graduation Datte: TBD, Advisor: Tiezheng Tong.
6. Matthew Valdiviezo, M.S. in Chemistry, Graduation Date: Fall 2022, Advisor: Amy Prieto.

MENTORING AND TEACHING EXPERIENCES (PRIOR TO CSU)

- **Undergraduate Research Mentor-Georgia Tech**

  Mentored an undergraduate student (Abdulaziz Alabbady) in Materials Science and Engineering-Georgia Tech (*recipient of the King Abdullah University of Science and Technology (KAUST) Gifted Student Program*) on a project on gas-phase photo-electrochemical ammonia production using plasmonic-based nanoparticles. Jan. 2019–Aug. 2021

  Mentored an undergraduate student (Jalen Borne-Junior in Chemistry and Biochemistry) to study the mechanical stability of hybrid plasmonic nanostructures in electrochemical energy conversion systems using *operando* atomic force microscopy. Aug 2020−Aug. 2021

  Mentored three undergraduate students (James Padgett, Avery Agles, and Kelsey Dobson) under Georgia Tech PURA (President's Undergraduate Research Award) on a project to evaluate conversion of salinity gradient energy into electricity and hydrogen. Results have been disseminated through journal publications and conference presentations. May 2016–July 2017

- **Graduate Teaching Assistant in Electrochem Storage-Georgia Tech** Aug. 2018–Dec. 2018

  Instructor: Prof. Paul Kohl

  Developed five 50-minute lectures for graduate and senior-level undergraduate students on various electrochemistry topics. Held office hours and recitations for the exams.

- **Graduate Teaching Assistant in Energy-Thermal-Fluids-1 (ETF 1)-Michigan Tech** Jan. 2015–May 2015

  Instructor: Prof. Mahdi Shahbakhti

  Gave problem-solving lectures and created and graded homework and quizzes.

- **Coach of Thermodynamics and Statics at Engineering Learning Center (ELC)-Michigan Tech** Jan. 2014–May 2014

  Director: Dr. Aneet Narendranath

  Taught and helped undergraduate students with their homework and exam problems.

LEADERSHIP & VOLUNTEER EXPERIENCES

- **ACS Symposium Co-organizer on "Nanomaterials for Electrocatalysis", Fall 2025** Aug. 2025
- **Educational Subcommittee Member-The Electrochemical Society** July 2022–Present

  Designing and developing short courses, webinars, and professional development workshops for ECS members.

- **American Chemical Society (ACS) Science Coaches program**

  Oct. 2024-Present

Serve as a coach to Ms. Erin Kennedy (erin.kennedy@tsd.org), a chemistry teacher at Loveland High School in Loveland, CO. Oct. 2022-May 2023

Served as a coach to Ms. Katie Hobbs (hobbsk@wsd3.org), a chemistry teacher at Mesa Ridge High School in Colorado Springs, CO. Oct. 2021–May 2022

Served as a coach to Ms. Amalia Klapper (arw528@gmail.com), a chemistry and science teacher at ELLIS Preparatory Academy in Bronx, New York. Oct. 2020–May 2021

Served as a coach to Ms. Dianna Kennen (dkennen@rockdale.k12.ga.us), a chemistry teacher at Rockdale Magnet School for Science and Technology in Conyers, GA, with the hope of increasing student engagement and excitement about chemistry.

- **Individual Membership Committee student member-The Electrochemical Society** Jun. 2020–Jun. 2022

  Reviewing and coordinating short- and long-range plans for retaining existing members and institutional member representatives.

  Recruiting new members and institutional member representatives of the Society.

- **Session chair of the Ammonia Synthesis: Next Generation Technology at the Ammonia Energy Conference, Orlando, FL** Nov. 12-14, 2019

  Chaired a session and organized all invited speakers' presentations.

- **President-Electrochemical Society (ECS) student chapter-Georgia Tech** Aug. 2019-Aug. 2020

  Scheduled and organized electrochemistry-related events and outreach activities within and outside of Georgia Tech.

  Co-organized the ECS Georgia Section conference took place at the Georgia Institute of Technology in September 2019.

  Led a group of engineers that focuses on K-12 outreach in proton exchange membrane (PEM) fuel cell technology.

- **Vice President-Electrochemical Society (ECS) student chapter-Georgia Tech** Sep. 2017-Jul. 2019

  Contributed to developing a schedule of events for ECS local conference on April 2018 at Georgia Tech and various STEM outreach activities.

- **Facilitator for the NH_3 Energy Implementation Conference, Pittsburgh, PA** Nov. 2018

  Organized all invited speakers' presentations and helped moderators to write a summary report.

- **Technology Chair-American Society for Engineering Education (ASEE) student chapter-Georgia Tech** Aug. 2017-May 2018

  Contributed to the organization of on-campus events to highlight research and new teaching methods in STEM education.

- **Reviewer for Undergraduate Proposals for President's Undergraduate Research Awards (PURA) fund-Georgia Tech** Jan. 2017-to present

  Evaluated and scored 6 undergraduate research proposals in Mechanical Engineering major every semester.

- **Engineers for a sustainable World Education Outreach-Atlanta, GA** Jan. 2017-May 2017

  Tutored students at Henry W. Grady High School in Atlanta to help prepare under-represented minority high school students with their exams and classes.

- **Judge for Capstone Design Expo-Georgia Tech** Spring 2017, 2018

  Judged Capstone design projects of senior undergraduate students in Mechanical Engineering at Georgia Tech.

EDITORIAL ACTIVITY

Reviewer

ACS Applied Materials and Interfaces
ACS Applied Energy Materials
Journal of Physical Chemistry
Applied Energy

Journal of Power Sources
ACS Sustainable Chemistry and Engineering
Journal of the Electrochemical Society
iScience
ACS ES&T Engineering
Energy Conversion and Management
Applied Thermal Engineering
Chemical Engineering Science
SAE World Congress (2015, 2016)
ASME Power and Energy conference (2016, 2017)

PROFESSIONAL MEMBERSHIP

Electrochemical Society (ECS)
American Chemical Society (ACS)
American Institute of Chemical Engineers (AIChE)
American Society of Mechanical Engineers (ASME)
NH_3 Fuel Association
American Society for Engineering Education (ASEE)
Society of Automotive Engineers (SAE)