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Program Lead of Energy Engineering  
Non-Tenure Line Assistant Professor  
Energy and Mineral Engineering  
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### DEREK M. HALL

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### PROFESSIONAL EXPERIENCE

***Non-Tenure Line Assistant Professor and Program Lead of Energy Engineering*** (2020-present)

Department of Energy and Mineral Engineering  
The Pennsylvania State University

***Oak Ridge Institute for Science and Education Faculty Fellow*** (2020-present)

National Energy Technology Laboratory, Reaction Engineering Team

***Non-Tenure Line Assistant Research Professor*** (2016-2019)

EMS Energy Institute  
The Pennsylvania State University

### EDUCATION

Penn State	Energy and Mineral Engineering	Ph.D., 2015
Penn State	Energy Engineering	B.S., 2012

### HONORS AND CERTIFICATES:

2019-2020 ORISE Postdoctoral Fellowship  
2016 EMS Energy Institute Postdoctoral Fellowship

### LEAD OR CORRESPONDING\* AUTHOR PEER-REVIEW PUBLICATIONS

1. N.R. Cross, M.J. Rau, S.N. Lvov, C.A. Gorski, B.E. Logan, **D.M. Hall.\*** (2022). Discharge performance tradeoffs in the all-aqueous copper thermally regenerative ammonia battery. *Journal of Power Sources*. 531, 231339.
2. R. Springer, N.R. Cross, S.N. Lvov, B.E. Logan, C.A. Gorski, **D.M. Hall.\*** (2021). An all-aqueous thermally regenerative ammonia battery chemistry using Cu(I, II) redox reactions, *J. Electrochem. Soc.* 168. 070523.
3. **D.M. Hall,\*** J. Grenier, T.S. Duffy, S.N. Lvov. (2020) The Energy Storage Density of Redox Flow Battery Chemistries: A Thermodynamic Analysis, *J. Electrochem. Soc.* 167. 11.
4. **D.M. Hall**, T. Duffy, M. Ziomek-Moroz, S. N. Lvov. (2019). Electrochemical Impedance Spectroscopy and Finite Element Analysis Modeling of a 4-Electrode Humidity Sensor for Natural Gas Transportation Pipelines. *Review of Scientific Instruments*. 90. 1-9
5. **D.M. Hall**, J. Beck, E. Brand, M. Ziomek-Moroz, S. N. Lvov. (2016). Copper-Copper Sulfate Reference Electrode (CSE) for Operating in High Temperature Aqueous Environments. *Electrochimica Acta*. 221. 96-106.

6. **D.M. Hall**, S. N. Lvov. (2016). Modeling a CuCl(aq)/HCl(aq) Electrolyzer using Thermodynamics and Electrochemical Kinetics. *Electrochimica Acta*. 190, 1167-1174.
7. **D.M. Hall**, J. Beck, S. N. Lvov. (2015). Electrochemical Kinetics of the Hydrogen Reaction on Platinum in Concentrated HCl(aq). *Electrochemistry Communications*. 57. 74-77.
8. **D.M. Hall**, E. LaRow, R. Schatz, J. Beck, S. N. Lvov. (2015). Electrochemical Kinetics of CuCl(aq)/HCl(aq) Electrolyzer for Hydrogen Production via a Cu-Cl Thermochemical Cycle, *Journal of the Electrochemical Society*. 1, F108-F114.
9. **D.M. Hall**, N. Akinfiev, E. LaRow, R. Schatz, S. N. Lvov. (2014). Thermodynamics and Efficiency of a CuCl(aq)/HCl(aq) Electrolyzer. *Electrochimica Acta*. 143. 70-82.

### **CO-AUTHORED PEER-REVIEW PUBLICATIONS**

10. L. Shi, X. Bi, E. Newcomer, **D.M. Hall**, C.A. Gorski, A. Galal, B.E. Logan. (2022). Co-precipitation synthesis control for sodium ion adsorption capacity and cycle life of copper hexacyanoferrate electrodes in battery electrode deionization. *Chemical Engineering Journal*. 135001.
11. Y Cheng, **D.M. Hall**, J. Boualavong, R.J. Hickey, S.N. Lvov, C.A. Gorski. (2021). Influence of hydrotropes on the solubilities and diffusivities of redox-active organic compounds for aqueous flow batteries. *ACS OMEGA*. 6, 45, 30800–30810
12. R. Rossi, **D.M. Hall**, L. Shi, N. Cross\*, C.A. Gorski, M.A. Hickner, B.E. Logan. (2021). Using a vapor-fed anode and saline catholyte to manage ion transport in a proton exchange membrane electrolyzer. *Energy & Environmental Science*. 14 (11), 6041-6049
13. T. S. Duffy, **D.M. Hall**, M. Ziomek-Moroz, S. N. Lvov. (2021). Monitoring X65 Steel Internal Corrosion in Humidified N<sub>2</sub> containing H<sub>2</sub>S using Membrane-based Electrochemical Sensors. *Corrosion* 77 (6) 593-599.
14. N.R. Cross, **D.M. Hall**, S. N. Lvov, and B.E. Logan, M.J. Rau. (2021). The Impact of Fiber Arrangement and Advective Transport in Porous Ag-TRAB Electrodes. *Electrochimica Acta* 388. 138527.
15. L. Shi, R. Rossi, M. Son, **D.M. Hall**, M. Hickner, C.A. Gorski, B.E. Logan. (2020) Using reverse osmosis membranes to control ion transport during water electrolysis. *Energy and Environmental Science*. 13 (9), 3138-3148
16. R. Rossi, **D.M. Hall**, X. Wang, J.M. Regan, B.E. Logan, (2020) Quantifying the factors limiting performance and rates in microbial fuel cells using the electrode potential slope analysis combined with electrical impedance spectroscopy, *Electrochim. Acta*. 348. 136330.
17. T. Duffy, B. Raman, **D.M. Hall**, M. Machesky, R. Johns, S. Lvov. (2019). Experimentation and Modeling of Surface Chemistry of The Silica-Water Interface for Low Salinity Waterflooding at Elevated Temperatures. *Colloids and Surfaces A*, 570. 233-243.
18. R. Feng, J. Beck, **D.M. Hall**, A. Buyuksagis, M. Ziomek-Moroz & S. N. Lvov. (2018). Effects of CO<sub>2</sub> and H<sub>2</sub>S on Corrosion of Martensitic Steels in NaCl at Low Temperature. *Corrosion*, 74. (3) 276-287.

19. S. N. Lvov, **D.M. Hall**, A. Bandura, & I. Gamwo. (2018). A Semi-Empirical Molecular Statistical Thermodynamic Model for Calculating Standard Molar Gibbs Energies of Aqueous Species Above and Below the Critical Point of Water. *Journal of Molecular Liquids*. 270. 62-73.
20. J. Beck, **D.M. Hall**, M. Ziomek-Moroz, & S. N. Lvov. (2017). Membrane-Coated Electrochemical Sensor for Corrosion Monitoring in Natural Gas Pipelines. *Sensors & Transducers*. 214 (7). 28–33.
21. B. Raman, **D.M. Hall**, S. Shulder, M. Caravaggio, & S. N. Lvov. (2016). An Experimental Study of Deposition of Suspended Magnetite in High Temperature-High Pressure Boiler Type Environments. *Colloids Surfaces A: Physicochemical Engineering Aspects*. 508. 48–56.
22. S. Khurana, **D.M. Hall**, R. Schatz, M. Fedkin, & S. N. Lvov. (2015). State-of-health of a CuCl Electrolyzer during a 168-h Test. *International Journal of Hydrogen Energy*. 40. 62–69.
23. S. Khurana, **D.M. Hall**, R. Schatz, & S. N. Lvov. (2015). Effect of Clamping Pressure and Temperature on the Performance of a CuCl(aq)/HCl(aq) Electrolyzer. *ECS Electrochemistry Letters*. 4. F21–F23.
24. D. Chandra, C. Conrad, **D.M. Hall**, N. Montebello, A. Weiner, S. Pisupati, U. Turaga, G. Izadi, A. Mohan & D. Elsworth. (2012). Pairing Integrated Gasification and Enhanced Geothermal Systems (EGS) in Semiarid Environments. *Energy and Fuels*. 26. 7378–7389.

#### **SUBMITTED MANUSCRIPTS**

25. L. Shi, X. Bi, E. Newcomer, **D.M. Hall**, C.A. Gorski, B.E. Logan. (2022). Thermodynamic and kinetic analysis of ion intercalation/deintercalation on NiHCF electrodes for battery electrode deionization. *Environmental Science and Technology*. Submitted.
26. T. Duffy, **D.M. Hall**, S.L. Lvov, Ziomek-Moroz. (2022). Membrane-Based Corrosion Sensors for Natural Gas Pipelines. *Materials Performance*. Submitted.

#### **MANUSCRIPTS IN PREPARATION**

27. A. Ganesan, R. Springer, S.N. Lvov, S. Shulder, A. Howell, B. Burns, **D.M. Hall\***. local and general corrosion rates from water chemistry contaminants in power generation water cycles using computed tomography and electrochemical techniques. In-Progress
28. **D.M. Hall**, S.N. Lvov, I.K. Gamwo. Extending the reliability of standard partial molar Gibbs energy predictions for aqueous species into subcritical and supercritical regimes. In-Progress.
29. A. Ganesan, T.J. Zimudzi, V. Pothanamkandathil, C. Gorski, **D.M. Hall\***. Using Attenuated Total Reflectance FTIR for an in-operando spectroelectrochemical investigation of the ferri-ferrocyanide redox reaction. *Journal of the Electrochemical Society*. In-Progress.
30. L. Gong, N. Khodaparastasarabad, **D.M. Hall\***, J. Greener. Controlling concentration profiles at the interface of electroactive biofilms in a microfluidic three-electrode cell. *Electrochimica Acta*. In-Progress.
31. T. Duffy, **D.M. Hall**, S.L. Lvov. Increasing the Lifespan of Reference Electrodes by Increasing the Diffusion Length. *Journal of the Electrochemical Society*. In-Progress.

#### **BOOK CHAPTERS**

1. **D.M. Hall**, S.N. Lvov, I.K. Gamwo, (2022). Prediction of Barium Sulfate Deposition in Petroleum and Hydrothermal Systems, In Solid-Liquid Separation Technologies: Application for Produced Water, ed. O. I. Ogunsola, and I. K. Gamwo, 355–403. CRC Press/Taylor & Francis.

### **PATENTS AND PATENT APPLICATIONS**

1. Inventors: T. Duffy, **D.M. Hall**, S.N. Lvov. Assignee: Pennsylvania State University. Increasing the lifespan of reference electrodes by increasing the diffusion length. (2022, Submitted), U.S. Patent Office: Provisional application number: 63/269,941.
2. Inventors: **D.M. Hall**, S.N. Lvov, B.E. Logan, C.A. Gorski. Assignee: Pennsylvania State University. All-Aqueous Thermally-Regenerative Battery, (2021, Submitted), U.S. Patent Office: Application number: PCT/US2021/045940.

### **INDUSTRIAL TECHNICAL REPORTS**

1. **D.M. Hall**, R. Springer, A. Ganesan, S.N. Lvov, S. Shulder, A. Howell, B. Burns. (2021). An Assessment of Chemistry Action Level Limits for Chloride and Sulfate in Simulated Boiler Water Using Electrochemical Techniques. Technical Report. Product ID: 3002019044.
2. **D.M. Hall**, S. N. Lvov, S. Shulder. (2021). In Situ Corrosion Studies of Film-Forming Product Protection in Online and Offline Conditions. Final Report. Product ID: 3002016987.
3. **D.M. Hall**, S. N. Lvov, S. Shulder. (2019). Surface Analysis of Corrosion Coupons Exposed to Film Forming Products: Electron Microscopy Studies of Film Forming Product Protection for Carbon Steels. EPRI Technical Report. Product ID: 3002017493.
4. **D.M. Hall**, S. N. Lvov, S. Shulder. (2018). Corrosion Studies of Tubing Samples Exposed to Film-Forming Products: Corrosion Studies of Film-forming Product Protection for Online Hydrogen Damage and Off-Line Pitting. EPRI Technical Report. Product ID: 3002013955.
5. **D.M. Hall**, S. N. Lvov, S. Shulder. (2017). Corrosion Studies of Tubing Samples Treated with Film-Forming Amines and Products: Corrosion Studies of Film-Forming Product Protection for On-Line Hydrogen Damage and Off-Line Pitting 2017 Progress. EPRI Technical Report. Product ID: 3002011566.
6. **D.M. Hall**, S.N. Lvov, M. Carravagio, S. Shulder. (2016). Corrosion Studies of Tubing Samples Treated with Film-Forming Amines and Products: Corrosion Studies of Film-Forming Product Protection for Online Hydrogen Damage and Offline Pitting. EPRI Technical Report. Product ID: 3002008137.
7. B. Raman, **D.M. Hall**, S.N. Lvov, M. Carravagio, S. Shulder. (2016). Deposition Mechanisms and Control of Lower Orifice Header Fouling in Forced Circulation Units. EPRI Technical Report. Product ID: 3002009262.

### **FUNDING HISTORY**

1. **Principal Investigator**. \$300,000. Development of an All-Aqueous Thermally Regenerative Redox Flow Battery to Support Fossil Fuel Assets. Department of Energy. 2021-2023.

2. **Principal Investigator.** \$300,000. A Critical Assessment of Chemistry Action Level Limits for Chloride and Sulfate in Simulated Boiler Water Using Electrochemical Techniques. Electric Power Research Institute. 2020-2022.
3. **Co-Principal Investigator.** \$65,000. Effects of Surface Functionalization on the Performance of Carbon-Based Electrodes for Vanadium Redox Flow Battery Applications. Morgan Advanced Materials. 2021-2022.
4. **Principal Investigator.** \$12,000. Improving the Performance of Grid-Scale Batteries by Developing Advanced Carbon Electrocatalysts. EMS Sustainability Fund, Penn State. 2020-2022.
5. **Research Associate & Proposal Author.** \$550,000. Miniaturized and Cost-Effective Membrane-Coated Electrochemical Sensors for Corrosion and Environmental Monitoring in Natural Gas Pipelines. U.S. Department of Energy. 2017-2022.
6. **Principal Investigator.** \$40,000. New Low-Cost Flow Battery Chemistries via Ligand-Enhanced Redox Reactions. Materials for Enhancing Energy and Environmental Stewardship Seed Grant Program, Penn State. 2019-2021.
7. **Co-Principal Investigator.** \$50,000. Increasing Power Densities and Cycle Efficiencies of Novel, Thermally-Charged Flow Batteries Using Advanced Flow Cell Topologies. Institutes of Energy and the Environment Seed Grant Program, Penn State. 2019-2020.
8. **Research Associate & Proposal Author.** \$600,000. In-Situ Corrosion Studies of Film-Forming Product Protection on Online Hydrogen Damage and Offline Pitting. Electric Power Research Institute. 2016-2020.

### **CONFERENCE PROCEEDINGS**

1. T. Duffy, **D.M. Hall**, N. Serguei, (2021). Novel Membrane-Based Corrosion Sensors For Operating In Natural Gas Pipelines, NACE - Int. Corros. Conf. Ser. 1–12.
2. T. Duffy, **D.M. Hall**, S.N. Lvov, M. Ziomek-Moroz, (2020). Monitoring Localized and General Corrosion using Membrane-based Electrochemical Sensors, NACE - Int. Corros. Conf. Ser. 1–11.
3. T. Duffy, **D.M. Hall**, M. Ziomek-Moroz, S.N. Lvov. (2019) “Electrochemical Sensors for Multiphase Environments.” Materials Science and Technology Conference Series.
4. T. Duffy, **D.M. Hall**, S. N. Lvov, & M. Ziomek-Moroz. (2019) “Modeling of Current Paths in Advanced Electrochemical Sensors for Improving Corrosion Data Interpretation” CORROSION 2019.
5. T. Duffy, **D.M. Hall**, Ziomek-Moroz, & S. N. Lvov. (2018). Advancing Reliability of Membrane-Based Corrosion and Environmental Sensors in Simulated Natural Gas. ECS Transactions 85. (13). 635-643.
6. J. Beck, R. Feng, **D.M. Hall**, A. Buyuksagis, S. N. Lvov, & M. Ziomek-Moroz. (2018). Corrosion of 13Cr Steel at the Cement/Casing Interface in CO<sub>2</sub>/H<sub>2</sub>S Environments at 4, 85 and 200 °C. CORROSION 2018. Paper No. 11015.
7. **D.M. Hall**, S. N. Lvov, & S. Shulder. (2018). Development of Exposure Tests to Evaluate the Corrosion Processes of Tubing Samples from Fossil Fuel Powerplants. Conference

Proceedings for the 12<sup>th</sup> International Conference on Cycle Chemistry in Fossil and Combined Cycle Plants. June 25-29.

8. J. Beck, **D.M. Hall**, M. Ziomek-Moroz, & S. N. Lvov. (2017). Membrane-Based Electrochemical Sensor for Corrosion Monitoring in Natural Gas Pipelines. ECS Transactions. 77. (11). 681-691.
9. **D.M. Hall**, S. Shulder, M. Caravaggio, & S. N. Lvov. "Electrochemical Properties of Carbon Steel Corrosion in Boiler Water at Elevated Temperatures". 231<sup>st</sup> ECS Meeting, May 2017.
10. R. Feng, J. Beck, **D.M. Hall**, A. Buyuksagis, S. N. Lvov, & M. Ziomek-Moroz. (2016). Effects of CO<sub>2</sub> and H<sub>2</sub>S on Corrosion of Martensitic Steels in NaCl at Low Temperature. CORROSION 2016. Paper no.7659.
11. R. Feng, J. Beck, **D.M. Hall**, I. Wolfe, A. Buyuksagis & S. N. Lvov. (2016). Corrosion Behavior of Ultra-high Strength Drilling Steel in Alkaline Brines Containing Hydrogen Sulfide at High Temperature. CORROSION 2016. Paper no. 7657.
12. D. Das, **D.M. Hall**, & S. N. Lvov. (2016). Electrochemical Frequency Modulation for Estimating Exchange Current Density in Solid Oxide Fuel Cells. ECS Transactions. 72. (7). 173-181.
13. J. Beck, R. Feng, **D.M. Hall**, A. Buyuksagis, M. Ziomek-Moroz, & S. N. Lvov. (2016). Effects of H<sub>2</sub>S and CO<sub>2</sub> on Cement/Casing Interface Corrosion Integrity for Cold Climate Oil and Gas Well Applications. ECS Transactions. 72. (17). 107-122.
14. B. Raman, **D.M. Hall**, S. N. Lvov, S. Shulder & M. Caravaggio. (2015). Electrochemical Impedance Spectroscopy as a Tool to Link Cycle Chemistry Properties to Fouling in Power Generating Systems. Conference Proceedings for the 11<sup>th</sup> International Conference on Cycle Chemistry in Fossil and Combined Cycle Plants. July 14-17.
15. B. Raman, **D.M. Hall**, S. Shulder, M. Caravaggio, & S. N. Lvov. (2015). Deposition of Suspended Magnetite in High Temperature High Pressure Boiler Environments. ECS Transactions. 66. (21). 43-56.
16. S.N. Lvov, **D.M. Hall**, & I. Gamwo. (2015). Molecular Statistical Thermodynamics to Model Quartz Solubility in Ultra High-Enthalpy Geothermal Systems. GEOS 2015. 69-72.
17. **D.M. Hall**, R. Lotfi, S. Kim, & S. N. Lvov. (2015). Membrane Transport in a CuCl(aq)/HCl(aq) Electrolytic Cell. ECS Transactions. 66. (24). 103-119.
18. R. Feng, J. Beck, **D.M. Hall**, A. Buyuksagis, M. Ziomek-Moroz, & S. N. Lvov. (2015). Corrosion Behavior of 13Cr Casing Steel in Cement-Synthetic Pore Solution Exposed to High Pressure CO<sub>2</sub> and H<sub>2</sub>S. ECS Transactions. 69. (26). 27-40.
19. **D.M. Hall**, J. Beck, S. N. Lvov, & M. Ziomek-Moroz. (2015). Review of pH and Reference Electrodes for Monitoring Corrosion in HPHT Extreme Environments. CORROSION 2015. Paper no. 6117.
20. S. Khurana, **D.M. Hall**, R. Schatz, & S. N. Lvov. (2013). Diagnosis and Modeling of the CuCl Electrolyzer Using Electrochemical Impedance Spectroscopy. ECS Transactions. 53. (9). 41-50.
21. **D.M. Hall**, R. Schatz, E. LaRow, & S. N. Lvov. (2013). CuCl/HCl Electrolyzer Kinetics for Hydrogen Production via Cu-Cl Thermochemical Cycle. ECS Transactions. 58. (2). 15-25.
22. D. Chandra, C. Conrad, **D.M. Hall**, N. Montebello, A. Weiner, Narasimharaju, Rajput, E. Phelan, S. Pisupati, U. Turaga, G. Izadi, A. Mohan, & F. Elsworth. (2011). Combined ScCO<sub>2</sub>-EGS IGCC to Reduce Carbon Emissions from Power Generation in the Desert Southwestern United

States (New Mexico). Conference Proceedings from the Annual Geothermal Resources Council Meeting and Expo 2011.

### **PROFESSIONAL SERVICES**

1. Electrochemical Society Member (2018-present), Association of Energy Engineers (2022-present)
2. 240<sup>th</sup> ECS Meeting Poster Judge.
3. Principle Organizer of an Annual Continuing Education Course on Modeling of Aqueous Systems presented by OLI Systems and Penn State (2020)
4. Referee for Advanced Materials, Advanced Energy Materials, Advanced Energy and Sustainability Research, ACS: Applied Energy Materials, Batteries, Corrosion, Corrosion and Materials Degradation, Electrochimica Acta, Energies, Joule, The Journal of the Electrochemical Society, The Maryland Industrial Partnership, Micromachines, Sensors.
5. Undergraduate Student Advisor (2020, 2021)
6. Department Executive Council Member (2020, 2021)
7. College of Earth and Mineral Sciences Fixed-Term Faculty Committee (2020, 2021)
8. Student Society of Energy Engineers Faculty Advisor (2020, 2021)
9. Masters defense exam committee member (Chemical Engineering)
10. Doctoral candidacy exam committee member (Civil and Environmental Engineering, Chemical Engineering)
11. Doctoral comprehensive exam committee member (Civil and Environmental Engineering, Chemical Engineering)

### **CURRENT GRADUATE STUDENTS**

1. Ridge Bachmann. PhD. Energy and Mineral Engineering. 2025 (expected). "Experimental and theoretical studies of VRFBs: identification and optimization of redox active sites on graphene-based electrodes." Role: Primary Advisor
2. Nicholas Cross. PhD. Chemical Engineering. 2023 (expected) "Characterization and development of thermally regenerative batteries." Role: Project Advisor
3. Akash Ganesan. MSc. Energy and Mineral Engineering. 2022 (expected). "Understanding the corrosion damage of water chemistry contaminants in power generation water cycles using computed tomography." Role: Primary Advisor
4. Timothy Duffy. PhD. Energy and Mineral Engineering. 2022 (expected). "Development of membrane-based sensors for natural gas transmission lines." Role: Project Advisor

### **PREVIOUS GRADUATE STUDENTS**

5. Renaldo Springer. MSc. Energy and Mineral Engineering. (2022). "Development of an all-aqueous thermally regenerative battery." Role: Primary Advisor

### **PANELS AND ORAL PRESENTATIONS**

1. Gamwo, I. K., Hall, D.M., Lvov, S.N, Baled, H.O. Modeling Barium Sulfate Precipitation in High Temperature Systems based on Molecular Statistical Thermodynamics Model, paper 425c, AIChE Annual Meeting, Boston, MA, November 7-11, 2021.
2. A Numerical Investigation of the All-Aqueous Copper Thermally Regenerative Battery., N. Cross, R. Springer S. Lvov, B. Logan, C. Gorski, D. M. Hall. ECS Meeting. (2021)
3. An all-aqueous thermally regenerative ammonia battery chemistry using Cu(I, II) redox reactions. R. Springer, N. Cross, S. Lvov, B. Logan, C. Gorski, D. M. Hall. ECS Meeting. (2021)
4. Corrosion Inhibition Effects of Amine Based and Non-Amine Based Film-Forming Products. 13<sup>th</sup> International Conference on Cycle Chemistry, D. M. Hall, R. Springer, S. Lvov, and S. Shulder. Electric Power Research Institute. (2021) **Speaker**
5. The Impact of Fiber Arrangement on Power Density and Electrodeposition in Porous Ag-Trab Electrodes. N. Cross, D.M. Hall, S. Lvov, B. Logan, M. Rau. ECS meeting (2021)
6. The Role of Electrochemical Science and Engineering in Our Transition to a More Sustainable Energy Infrastructure. Morgan Lecture Series, Materials Research Institute, Pennsylvania State University. (2021) **Invited Speaker**
7. Drawdown: Electricity & Renewable Energy. Drawdown DCIS Lecture Series, Delaware County Institute of Science. (2021). **Invited Speaker**
8. Novel Batteries That Can Generate Electricity from Low-Grade Waste Heat to Reduce Our Carbon Emissions. Millennium Café Lecture Series, Materials Research Institute, Pennsylvania State University. (2021) **Invited Speaker**
9. Novel Membrane-Based Corrosion Sensors for Operating In Natural Gas Pipelines. T. Duffy, D.M. Hall, N. Serguei, M. Ziomek-Moroz, NACE CORROSION. (2021)
10. Energy Education Panel Discussion. Energy University Community Forum Series, Pennsylvania State University. (2021) **Panelist**
11. Status of Modeling and Visual Observation of Mineral Scaling in High Temperature Aqueous Solutions. I. Gamwo D. Hall, H. Baled, S.Lvov. AIChE Annual Meeting. (2020)
12. Monitoring Localized and General Corrosion Using Membrane-Based Electrochemical Sensors. T.S. Duffy, D.M. Hall, M. Ziomek-Moroz, S.N. Lvov. NACE CORROSION. (2020)
13. Electrochemical Sensors for Multiphase Environments. T.S. Duffy, D.M. Hall, M. Ziomek-Moroz, S.N. Lvov, MST. (2019)
14. Modeling of Current Paths in Advanced Electrochemical Sensors for Improving Corrosion Data Interpretation T. Duffy, D.M. Hall, N. Serguei, M. Ziomek-Moroz, NACE CORROSION (2019)
15. Advancing Reliability of Membrane-Based Corrosion and Environmental Sensor in Simulated Natural Gas, T. Duffy, D.M. Hall, M. Ziomek-Moroz, S.N. Lvov, ECS meeting. (2018)
16. Corrosion of 13Cr Steel at the Cement/Casing Interface in CO<sub>2</sub>/H<sub>2</sub>S Environments at 4, 85 and 200 °C, J. Beck, R. Feng, D.M. Hall, A. Buyuksagis, S.N. Lvov, M. Ziomek-Moroz, NACE CORROSION (2018)
17. Development of Exposure Tests to Evaluate the Corrosion Processes of Tubing Samples from Fossil Fuel Powerplants, D.M. Hall, S.N. Lvov, S. Shulder, 12th Int. Conf. Cycle Chem. Foss. Comb. Cycle Plants (2018) **Speaker**
18. Filming-Forming Products Panel Discussion. 12th International Conference on Cycle Chemistry in Fossil and Combined Cycle Plants. (2018) **Panelist**



19. Opportunities and Challenges in Electrochemical Energy Storage. D.M. Hall, State University, Department of Energy and Mineral Engineering Colloquium. (2018) **Invited Speaker**
20. Sensor Development and Corrosion Mitigation for power Plant Water Cycles. DM. Hall, S. Lvov. Seminar: Annual Boiler Operations, Maintenance & Performance Conference. Sponsor: Council of Industrial Boiler Owners. (2018) **Invited Speaker**
21. Low Salinity Water Flooding: Zeta Potential Measurements and Surface Interaction Models. T. Duffy D. Hall S. Lvov R. Johns. EOR JIP Workshop. (2017)
22. Electrochemical Properties of Carbon Steel Corrosion in Boiler Water at Elevated Temperatures D.M. Hall, S. J. Shulder, M. Caravaggio, S. N. Lvov. ECS Meeting. (2017)
23. Effects of CO<sub>2</sub> and H<sub>2</sub>S on Corrosion of Martensitic Steels in NaCl at Low Temperature, J. Beck, R. Feng, D. Hall, A. Buyuksagis, S. Lvov, M. Ziomek-Moroz. NACE CORROSION. (2016)
24. R. Feng, J. Beck, D.M. Hall, I. Wolfe, A. Buyuksagis, S.N. Lvov, M. Ziomek-Moroz, Corrosion Behavior of Ultra-high Strength Drilling Steel in Alkaline Brines Containing Hydrogen Sulfide at High Temperature, NACE CORROSION. (2016)
25. Investigation of Sweet/Sour Corrosion at the Cement-Casing Interface for Low Temperature Oil and Gas Wells. J. Beck, R. Feng, D.M. Hall, S. N. Lvov, A. Buyuksagis, M. Ziomek-Moroz. ECS meeting (2016)
26. Deposition of Magnetite on 304 SS under Phosphate & Caustic Treatment Regimes in Boiler Environments. B. Raman, D.M. Hall, S. J. Shulder, M. Caravaggio, S. N. Lvov. ECS meeting (2016). **Speaker**
27. Electrochemical Impedance Spectroscopy as a Tool to Link Cycle Chemistry Properties to Fouling in Power Generating Systems. Conference Proceedings for the 11<sup>th</sup> International Conference on Cycle Chemistry in Fossil and Combined Cycle Plants. B. Raman, D.M. Hall, S. N. Lvov, S. Shulder, M. Caravaggio. (2015).
28. Electrophoretic Mobility and Deposition in High Pressure High Temperature Boiler Environments. Raman, D.Hall, S. Shulder, M. Caravaggio, S. Lvov. ECS meeting. (2015). **Speaker**
29. Molecular Statistical Thermodynamics to Model Quartz Solubility in Ultra High-Enthalpy Geothermal Systems. S.N. Lvov, D.M. Hall, I. Gamwo. GEOS (2015)
30. Membrane Transport in a CuCl(aq)/HCl(aq) Electrolytic Cell. ECS meeting. D.M. Hall, R. Lotfi, S. Kim, S. N. Lvov. (2015) **Speaker**
31. Behavior of <sup>13</sup>Cr Casing Steel in Cement-Synthetic Pore Solution Exposed to High Pressure CO<sub>2</sub> and H<sub>2</sub>S. R. Feng, J. Beck, D.M. Hall, A. Buyuksagis, M. Ziomek-Moroz, S. N. Lvov. Corrosion. ECS meeting. (2015).
32. Review of pH and reference electrodes for monitoring corrosion in HPHT extreme environments. D.M. Hall, J Beck, S Lvov, M Ziomek-Moroz NACE CORROSION. (2015) **Speaker**
33. Development and Characterization of Membrane and Catalyst Materials for the CuCl (aq)/HCl (aq) Electrolytic Cell. D.M. Hall, R Lotfi, S Kim, SN Lvov ECS meeting. (2015) **Speaker**
34. Diagnosis and modeling of the CuCl electrolyzer using electrochemical impedance spectroscopy. S Khurana, D.M. Hall, R Schatz, SN Lvov. ECS meeting (2013)
35. CuCl/HCl electrolyzer kinetics for hydrogen production via Cu-Cl thermochemical cycle. D.M. Hall, RS Schatz, EG LaRow, SN Lvov. ECS meeting. (2013) **Speaker**

### TEACHING HISTORY

EGEE 102 – Energy and The Environment: 2021 (Summer, Fall)  
 EGEE 304 – Heat and Mass Transfer: 2021 (Spring)  
 EGEE 395 – Internships: 2021 (Summer)  
 EME 407 – Electrochemical Energy Storage: 2019 (Spring)  
 EGEE 411W – Energy Science and Engineering Lab (co-taught): 2020 (Fall), 2021 (Spring)  
 EGEE 496 – Independent Studies: 2019 (Spring), 2020 (Summer), 2021 (Spring)  
 EME 596 – Independent Studies: 2021 (Spring)  
 EME 802 – Renewable and Sustainable Energy Systems: 2019 (Spring, Fall), 2020 (Spring, Fall),  
 2021 (Spring, Fall)

### STUDENT EVALUATIONS

Semester & Year	Course	Enrollment	Overall Quality of Course (out of 7)	Overall Quality of Instructor (out of 7)
Fall 2021	EGEE 802	27	Median: 7 Mode: 7	Median: 6 Mode: 7
Fall 2021	EGEE 102	409	Median: 6 Mode: 7	Median: 6 Mode: 7
Summer 2021	EGEE 102	20	Median: 7 Mode: 7	Median: 6 Mode: multi-modal
Summer 2021	EGEE 395	14	Median: 7 Mode: 7	Median: 6.5 Mode: multi-modal
Spring 2021	EGEE 304	69	Median: 6 Mode: multi-modal	Median: 5 Mode: 5
Spring 2021	EGEE 411W	8	Median: 3.5 Mode: multi-modal <i>Co-taught</i>	Median: 3.5 Mode: multi-modal <i>Co-taught</i>
Spring 2021	EGEE 496	3	Median: 6 Mode: 6	Median: 7 Mode: 7
Spring 2021	EME 802	28	Median: 6.5 Mode: 7	Median: 6.5 Mode: 7
Fall 2019	EME 802	10	Mean: 6.38	Mean: 6.38
Spring 2019	EGEE 496	5	Mean: 7	Mean: 7
Spring 2019	EME 407	33	Mean: 6	Mean: 6.17