JOSHUA W. GALLAWAY, PhD

Curriculum Vitae

215 Cullinane Hall, 360 Huntington Ave, Boston, MA 02115
Northeastern University, Department of Chemical Engineering
office: (617) 373-3769 fax: (617) 373-2209
j.gallaway@northeastern.edu

RESEARCH INTERESTS

In our lab we study mechanisms within complex electrochemical systems. Practical electrochemical systems such as batteries, sensors, and fuel cells are often complex, involving engineered high surface area electrodes, starved electrolyte conditions, phase transformations, and interplay of the two electrodes. For these reasons there are significant deviations from ideal behavior as well as emergent or unexpected phenomena. We seek to understand these to engineer better devices for broad societal benefit, such as enabling the worldwide adoption of sustainable energy. Toward this end we have developed strategies for coupling electrochemical methods with materials synthesis, transport modeling, and operando analysis techniques, often based on high energy X-rays. Low cost and safe battery materials for electrical storage at the scale of the power grid are our primary interest.

EDUCATION

2007 **Columbia University**
Ph.D. Chemical Engineering (*with distinction*)
Primary area: Electrochemistry
Dissertation: *Redox Polymer Mediation for Enzymatic Biofuel Cells*
Thesis advisor: Scott Calabrese Barton

2004 **Columbia University**
M.S. Chemical Engineering

1997 **Case Western Reserve University**
B.S.E. Chemical Engineering (*summa cum laude*)

PROFESSIONAL EXPERIENCE

2017-present **Northeastern University**
William O. DiPietro Assistant Professor
Department of Chemical Engineering
Complex Electrochemical Systems Laboratory

2009-2017 **The City College of New York**
Senior Research Associate
The CUNY Energy Institute (Sanjoy Banerjee, PI)
Research description: Development of low cost and sustainable rechargeable batteries for grid scale electrical storage

2010-2017 **New York University Tandon School of Engineering**
Adjunct Professor
Department of Chemical Engineering

2007-2009 **Columbia University**
Postdoctoral Fellow
Department of Chemical Engineering (Alan West, PI)
Research description: Development of microfluidic electrochemical devices for analysis of Cu electrodeposition for semiconductor fabrication

PROFESSIONAL AFFILIATIONS

2006-present	**The Electrochemical Society** Battery Division, *Member-At-Large* (2018-present)
2008-present	**American Chemical Society**
2009-present	**Materials Research Society**
2009-present	**American Institute of Chemical Engineers**

AWARDS AND HONORS

2023	Gilda Barabino Excellence in Mentoring Award, Northeastern Chemical Eng. Dept.
2023	Søren Buus Outstanding Research Award, Northeastern College of Engineering
2021	CAREER Award, National Science Foundation
2019	Dr. R. H. Sioui Award for Excellence in Teaching, Northeastern Chemical Eng. Dept.
2019	EPA Green Chemistry Challenge Award (with CCNY)
2017	DiPietro Assistant Professorship, Northeastern University
2010	Electrochemical Society Battery Division Early Career Travel Award
2009	Wallis Foundation Fellowship for Energy Research, City College of New York
2002, 2003	Teaching Assistant Award, Columbia University
1997	Kennedy Award for Writing, Case Western Reserve University

PEER-REVIEWED PUBLICATIONS

Manuscripts in Preparation

4. Howell, B.R.; Islam, S.; and **Gallaway, J.W.** "Improving Transport Using Composite Catholytes In Polymer-Based All-Solid-State Batteries," *in preparation*.

3. Stavola, A.M.; Guida, D.P.; Sun, X.; Zhu, H.; and **Gallaway, J.W.** "A Demonstration Of Conduction Channeling Phenomena In Composite Cathodes Without Carbon Additive," *in preparation*.

2. Stavola, A.M.; Zimmerer, E.K.; Sun, X.; Wawer, K.; Kiss, A.M.; Zhu, H.; and **Gallaway, J.W.** "Studying Interfacial Lithium Transport in All-Solid-State Batteries with Electrochemical Impedance Spectroscopy (EIS)," *in preparation*.

1. Zimmerer, E.K.; Guida, D.P.; Goulart, J.E.; Somaskandan, R.; Ma, L.; Ehrlich, S.N.; and **Gallaway, J.W.** "Operando Analysis Of The Interlayer Environment Of Layered δ-MnO_2 In Rechargeable Alkaline Batteries," *in preparation.*

Publications at Northeastern University

40. Caiado, A.A.; Aravamuthan, S.R.; Howell, B.R.; **Gallaway, J.W.**; Agar, E. "Exploring the Effectiveness of Carbon Cloth Electrodes for All-Vanadium Redox Flow Batteries," *submitted*.

39. Jadhav, A.L.; Juran, T.R.; Kim, M.A.; Bruck, A.M.; Hawkins, B.E.; **Gallaway, J.W.**; Smeu, M.; Messinger, R.J. "Reversible Electrochemical Anionic Redox in Rechargeable Multivalent-Ion Batteries," *Journal of the American Chemical Society*, in press, **2023**. (IF = 16.4)

38. Guida, D.P.; Stavola, A.M.; Chuang, A.C.; Okasinski, J.S.; Wendling, M.T.; Chadderdon, X.H.; and **Gallaway, J.W.** "Methods for Tomographic Segmentation in Pseudo-Cylindrical Coordinates for Bobbin-Type Batteries," *ACS Measurement Science Au*, in press, **2023**. DOI: 10.1021/acsmeasuresciau.3c00015. (IF = new journal)

37. Kim, M.A.; Zimmerer, E.K.; Schorr, N.B.; Okasinski, J.S.; Chuang, A.C.; Lambert, T.N.; and **Gallaway, J.W.** "Li-ion and Na-ion ion intercalation in layered MnO_2 cathodes enabled by using bismuth as a cation pillar," *Journal of Materials Chemistry A*, **2023**, 11, 11272-11287. DOI:

10.1039/d3ta00684k (IF = 14.5)

36. Stavola, A.M.; Sun, X.; Guida, D.P.; Bruck, A.M.; Cao, D.; Okasinski, J.S.; Chuang, A.C.; Zhu, H.; and **Gallaway, J.W.** "Lithiation Gradients And Tortuosity Factors In Thick NMC111-Argyrodite Solid-State Cathodes," *ACS Energy Letters*, **2023**, 8, 1273−1280. (IF = 24.0)

35. Guida, D.P.; Chuang, A.C.; Okasinski, J.S.; Wendling, M.T.; Chadderdon, X.H.; and **Gallaway, J.W.** "Discharge intermittency considerably changes ZnO spatial distribution in porous Zn anodes," *J Power Sources*, **2023**, 556, 232460. DOI: 10.1016/ j.jpowsour.2022.232460 (IF = 9.8)

34. Patil, B.H.; Howell, B.R.; and **Gallaway, J.W.** "A Multiscale Hollow Spherical LATP Active Filler Improves Conductivity and Mechanical Strength in Composite Solid Electrolytes for Li Batteries," *J. Phys Chem C*, **2022**, 126, 15104−15117. DOI:10.1021/acs.jpcc.2c04870 (cover art feature) (IF = 4.2)

33. Schorr, N.B.; Arnot, D.J.; Bruck, A.M.; Duay, J.; Kelly, M.; Habing, R.L.; Ricketts, L.S.; Vigil, J.A.; **Gallaway, J.W.**; and Lambert, T.N., " Rechargeable Alkaline Zinc/Copper Oxide Batteries." *ACS Applied Energy Materials*, **2021**, 4, 7073-7082. DOI:10.1021/acsaem.1c01133 (IF = 7.0)

32. Zhang, Q.; Bruck, A.M.; Stavola, A.M.; Liang, W.; Aurora, P.; and **Gallaway, J.W.**, "Enhanced electrochemical stability of sulfide - based $LiNi_{0.8}Mn_{0.1}Co_{0.1}O_2$ all solid-state batteries by surface altering processes." *Batteries & Supercaps*, **2021**, 4, 529-535. DOI:10.1002/batt.202000213 (IF = 6.0)

31. Sun†, X.; Stavola†, A.M.; Cao†, D.; Bruck, A.M.; Wang, Y.; Zhang, Y.; Luan, P.; **Gallaway, J.W.**; Zhu, H., "Operando Study of All-Solid-State Lithium Batteries Coupling Thioantimonate Superionic Conductors with Metal Sulfide." *Advanced Energy Materials*, **2020**, 2002861. DOI:10.1002/aenm.202002861 †co-first authors. (IF = 29.7)

30. Bruck, A.M.; Kim, M.A.; Ma, L.; Ehrlich, S.N.; Okasinski, J.S.; and **Gallaway, J.W.**, "Bismuth Enables the Formation of Disordered Birnessite in Rechargeable Alkaline Batteries." *Journal of the Electrochemical Society,* **2020,** *167*, 110514. DOI:10.1149/1945-7111/aba075 (IF = 4.4)

29. Marschilok, A. C.; Bruck, A.M.; Abraham, A.; Stackhouse, C.; Takeuchi, K. J.; Takeuchi, E. S.; Croft, M.; **Gallaway, J.W.**, "Energy dispersive X-ray diffraction (EDXRD) for operando materials characterization within batteries." *Physical Chemistry Chemical Physics*, **2020**, 22, 20972-20989. DOI:10.1039/d0cp00778a (cover art feature) (IF = 3.7)

28. **Gallaway, J. W.**; Yadav, G. G.; Turney, D. E.; Nyce, M.; Huang, J.; Chen-Wiegart, Y.-C. K.; Williams, G.; Thieme, J.; Okasinski, J. S.; Wei, X.; Banerjee, S., "An Operando Study of the Initial Discharge of Bi and Bi/Cu Modified MnO_2." *Journal of the Electrochemical Society,* **2018,** *165* (13), A2935-A2947. DOI:10.1149/2.0221813jes (IF = 4.4)

Publications Prior to Northeastern University

27. Yadav, G. G.; Wei, X.; **Gallaway, J. W.**; Chaudhry, Z.; Shin, A.; Huang, J.; Yakobov, R.; Nyce, M.; Vanderklaauw, N.; Banerjee, S., "Rapid electrochemical synthesis of δ-MnO_2 from γ-MnO_2 and unleashing its performance as an energy dense electrode." *Materials Today Energy,* **2017,** *6* (Supplement C), 198-210. DOI:10.1016/j.mtener.2017.10.008.

26. Huang, J.; Yadav, G. G.; **Gallaway, J. W.**; Wei, X.; Nyce, M.; Banerjee, S., "A calcium hydroxide interlayer as a selective separator for rechargeable alkaline Zn/MnO_2 batteries." *Electrochemistry Communications,* **2017,** *81*, 136-140.

25. Turney, D. E.; **Gallaway, J. W.**; Yadav, G. G.; Ramirez, R.; Nyce, M.; Banerjee, S.; Chen-Wiegart, Y. C. K.; Wang, J.; D'Ambrose, M. J.; Kolhekar, S.; Huang, J. C.; Wei, X., "Rechargeable Zinc Alkaline Anodes for Long-Cycle Energy Storage." *Chemistry of Materials,* **2017,** *29* (11), 4819-4832. DOI:10.1021/acs.chemmater.7b00754

24. Yadav, G. G.; Wei, X.; Huang, J.; **Gallaway, J. W.**; Turney, D. E.; Nyce, M.; Secor, J.; Banerjee, S., "A conversion-based highly energy dense Cu^{2+} intercalated Bi-birnessite/Zn alkaline battery."

Journal of Materials Chemistry A, **2017,** *5* (30), 15845-15854. DOI:10.1039/c7ta05347a.

23. Yadav, G. G.; **Gallaway, J. W.**; Turney, D. E.; Nyce, M.; Huang, J.; Wei, X.; Banerjee, S., "Regenerable Cu-intercalated MnO_2 layered cathode for highly cyclable energy dense batteries." *Nature Communications,* **2017,** *8*, 14424. DOI:10.1038/ncomms14424

22. **Gallaway, J. W.**; Hertzberg, B. J.; Zhong, Z.; Croft, M.; Turney, D. E.; Yadav, G. G.; Steingart, D. A.; Erdonmez, C. K.; Banerjee, S., "Operando identification of the point of $[Mn_2]O_4$ spinel formation during gamma-MnO_2 discharge within batteries." *Journal of Power Sources,* **2016,** *321*, 135-142. DOI:10.1016/j.jpowsour.2016.05.002

21. Ingale, N. D.; **Gallaway, J. W.**; Nyce, M.; Couzis, A.; Banerjee, S., "Rechargeability and economic aspects of alkaline zinc-manganese dioxide cells for electrical storage and load leveling." *Journal of Power Sources,* **2015,** *276*, 7-18. DOI:10.1016/j.jpowsour.2014.11.010

20. **Gallaway, J. W.**; Menard, M.; Hertzberg, B.; Zhong, Z.; Croft, M.; Sviridov, L. A.; Turney, D. E.; Banerjee, S.; Steingart, D. A.; Erdonmez, C. K., "Hetaerolite Profiles in Alkaline Batteries Measured by High Energy EDXRD." *Journal of the Electrochemical Society,* **2015,** *162* (1), A162-A168. DOI:10.1149/2.0811501jes

19. Bhadra, S.; Hertzberg, B. J.; Hsieh, A. G.; Croft, M.; **Gallaway, J. W.**; Van Tassell, B. J.; Chamoun, M.; Erdonmez, C.; Zhong, Z.; Sholklapper, T.; Steingart, D. A., "The relationship between coefficient of restitution and state of charge of zinc alkaline primary LR6 batteries." *Journal of Materials Chemistry A,* **2015,** *3* (18), 9395-9400. DOI:10.1039/c5ta01576f.

18. **Gallaway, J. W.**; Erdonmez, C. K.; Zhong, Z.; Croft, M.; Sviridov, L. A.; Sholklapper, T. Z.; Turney, D. E.; Banerjee, S.; Steingart, D. A., "Real-time materials evolution visualized within intact cycling alkaline batteries." *Journal of Materials Chemistry A,* **2014,** *2* (8), 2757-2764. DOI:10.1039/C3TA15169G

17. **Gallaway, J. W.**; Gaikwad, A. M.; Hertzberg, B.; Erdonmez, C. K.; Chen-Wiegart, Y. C. K.; Sviridov, L. A.; Evans-Lutterodt, K.; Wang, J.; Banerjee, S.; Steingart, D. A., "An In Situ Synchrotron Study of Zinc Anode Planarization by a Bismuth Additive." *Journal of the Electrochemical Society,* **2014,** *161* (3), A275-A284. DOI:10.1149/2.037403jes

16. Turney, D. E.; Shmukler, M.; Galloway, K.; Klein, M.; Ito, Y.; Sholklapper, T.; **Gallaway, J. W.**; Nyce, M.; Banerjee, S., "Development and testing of an economic grid-scale flow-assisted zinc/nickel-hydroxide alkaline battery." *Journal of Power Sources,* **2014,** *264*, 49-58. DOI:10.1016/j.jpowsour.2014.04.067

15. Gaikwad, A. M.; **Gallaway, J. W.**; Desai, D.; Steingart, D. A., "Electrochemical-Mechanical Analysis of Printed Silver Electrodes in a Microfluidic Device." *Journal of the Electrochemical Society,* **2011,** *158* (2), A154-A162.

14. **Gallaway, J. W.**; Desai, D.; Gaikwad, A.; Corredor, C.; Banerjee, S.; Steingart, D., "A Lateral Microfluidic Cell for Imaging Electrodeposited Zinc near the Shorting Condition." *Journal of the Electrochemical Society,* **2010,** *157* (12), A1279-A1286.

13. von Gutfeld, R. J.; **Gallaway, J. W.**; West, A. C., "In Situ Immersion Plating of Copper and Nickel on Aluminum Using Laser Pulses for Oxide Removal." *Journal of the Electrochemical Society,* **2009,** *156* (12), D564-D569.

12. **Gallaway, J. W.**; Willey, M. J.; West, A. C., "Copper Filling of 100 nm Trenches Using PEG, PPG, and a Triblock Copolymer as Plating Suppressors." *Journal of the Electrochemical Society,* **2009,** *156* (8), D287-D295.

11. **Gallaway, J. W.**; West, A. C., "The effect of acid on superconformal filling in 100 nm trenches." *Journal of Vacuum Science & Technology B,* **2009,** *27* (5), 2200-2205.

10. Hudak, N. S.; **Gallaway, J. W.**; Barton, S. C., "Formation of mediated biocatalytic cathodes by electrodeposition of a redox polymer and laccase." *Journal of Electroanalytical Chemistry,* **2009,** *629* (1-2), 57-62.

9. **Gallaway, J. W.**; Willey, M. J.; West, A. C., "Acceleration Kinetics of PEG, PPG, and a Triblock Copolymer by SPS during Copper Electroplating." *Journal of the Electrochemical Society,* **2009,** *156* (4), D146-D154.

8. Hudak, N. S.; **Gallaway, J. W.**; Barton, S. C., "Mediated Biocatalytic Cathodes Operating on Gas-Phase Air and Oxygen in Fuel Cells." *Journal of the Electrochemical Society,* **2009,** *156* (1), B9-B15.

7. **Gallaway, J. W.**; Barton, S. A. C., "Effect of redox polymer synthesis on the performance of a mediated laccase oxygen cathode." *Journal of Electroanalytical Chemistry,* **2009,** *626* (1-2), 149-155.

6. Wheeldon, I. R.; **Gallaway, J. W.**; Barton, S. C.; Banta, S., "Bioelectrocatalytic hydrogels from electron-conducting metallopolypeptides coassembled with bifunctional enzymatic building blocks." *Proceedings of the National Academy of Sciences of the United States of America,* **2008,** *105* (40), 15275-15280.

5. **Gallaway, J. W.**; West, A. C., "PEG, PPG, and their triblock copolymers as suppressors in copper electroplating." *Journal of the Electrochemical Society,* **2008,** *155* (10), D632-D639.

4. **Gallaway, J. W.**; Barton, S. A. C., "Kinetics of redox polymer-mediated enzyme electrodes." *Journal of the American Chemical Society,* **2008,** *130* (26), 8527-8536. DOI:10.1021/ja0781543

3. **Gallaway, J. W.**; Wheeldon, I.; Rincon, R.; Atanassov, P.; Banta, S.; Barton, S. C., "Oxygen-reducing enzyme cathodes produced from SLAC, a small laccase from Streptomyces coelicolor." *Biosensors & Bioelectronics,* **2008,** *23* (8), 1229-1235.

2. Barton, S. C.; Deng, W.; **Gallaway, J. W.**; Levendovsky, S.; Olson, T.; Atanassov, P.; Sorkin, M.; Kaufman, A.; Gibbard, H. F., "Mixed-feed direct methanol fuel cell: Materials and design solutions." *ECS Transactions,* **2006,** *1* (6), 315-322.

1. Barton, S. C.; **Gallaway, J. W.**; Atanassov, P., "Enzymatic biofuel cells for Implantable and microscale devices." *Chemical Reviews,* **2004,** *104* (10), 4867-4886.

BOOK CHAPTERS

4. Turney, D.E.; Yadav, G.G.; **Gallaway, J. W.**; Kolhekar, S.; Huang, J.; D'Ambrose, M.J.; and Banerjee, S., " Aqueous Mn-Zn and Ni-Zn Batteries for Sustainable Energy Storage" Chapter 1, in *Energy-Sustainable Advanced Materials,* Edited by Mark Alston and Timothy N. Lambert. Springer, **2021**.

3. **Gallaway, J. W.** and Barton, S. C., "Redox hydrogels as an efficient strategy for immobilization of enzymes at electrode interfaces" Chapter 7, in *Functional Electrodes for Enzymatic and Microbial Bioelectrochemical Systems,* Edited by Victoria Flexer and Nicolas Brun. World Scientific, **2017**.

2. **Gallaway, J. W.**, "Mediated Enzyme Electrodes" Chapter 9, in *Enzymatic Fuel Cells: From Fundamentals to Applications,* Edited by Heather R. Luckarift, Plamen B. Atanassov, and Glenn R. Johnson. John Wiley & Sons, Inc., **2014**.

1. **Gallaway, J. W.** and West, A. C., "Bioelectrochemical Sensors" Chapter 11, in *Electrochemistry and Electrochemical Engineering: An Introduction* by Alan C. West, **2012**.

PATENTS and PATENT APPLICATIONS

Intellectual Property Developed at Northeastern University

Provisional applications:

2. *Bi-pillared MnO_2 cathode active material for Na-ion batteries*, Kim, M.A. and **Gallaway, J.W.** U.S. Provisional Patent Application No.: 63/378,675, **2022**.

1. *Active Filler Material For Composite Solid Electrolytes With A Hollow Spherical Morphology,* Patil, B.H.; Howell, B.R.; and **Gallaway, J.W.** U.S. Provisional Patent Application No.: 63/367,704, **2022**.

Intellectual Property Developed Prior to Northeastern University

Applications:

3. *Battery for achieving high cycle life and zinc utilization in secondary zinc anodes using electrocoagulants.* Yadav, G.G.; Wei, X.; **Gallaway, J.W.**; Nyce, M.; Banerjee, S., PCT/US2021/014627, Pub. date 29 Jul **2021**.
2. *Rechargeable Alkaline Manganese Dioxide-Zinc Bipolar Batteries*. Yadav, G.G.; Nyce, M.; Wei, X.; Yakobov, R.; **Gallaway, J.W.**; Banerjee, S., US 2019/0044129 A1, Pub. date 7 Feb **2019**.
1. *Rechargeable Alkaline Battery Comprising Metal Hydroxide Separator*. Huang, J.; Yadav, G.G.; **Gallaway, J.W.**; Nyce, M.; Banerjee, S., US 2019/0088915 A1, Pub. date 21 Mar **2019**.

Awarded Patents:

4. *Mixed Material Cathode For Secondary Alkaline Batteries*. Yadav, G.G.; **Gallaway, J.W.**; Nyce, M.; Banerjee, S., United States patent US 10,276,860 B2, issued April 30, **2019**.
3. *Mixed Material Cathode For Secondary Alkaline Batteries*. Yadav, G.G.; **Gallaway, J.W.**; Nyce, M.; Banerjee, S., United States patent US 10,199,639 B2, issued February 5, **2019**.
2. *Alkaline Battery Operational Methodology*, Sholklapper, T.; **Gallaway, J.W.**; Steingart, D.; Ingale, N.; and Nyce, M. United States patent US 9,419,289 B2, issued August 16, **2016**.
1. *Nickel-Zinc Flow Battery*, Banerjee, S.; Ito, Y.; Klein, M.; Nyce, M.E.; Steingart, D.; Plivelich, R.; **Gallaway, J.W.**, United States patent US 9,379,373 B2, issued June 28, **2016**.

SELECTED CONFERENCE PRESENTATIONS

Presentations with Northeastern University

48. Zimmerer, E.K. (speaker); Guida, D.P.; and **Gallaway, J.W.** "Operando EXAFS for observation of short-range manganese environment changes in rechargeable MnO_2 cathodes", ACS Northeast Regional Meeting (NERM), Northeastern University, Boston MA, June **2023**.
47. Stavola, A.M. (speaker); Guida, D.P.; Bruck, A.M.; Sun, X.; Zhu, H.; and **Gallaway, J.W.** "Operando Measurement of Lithiation Gradients in NMC111-Argyrodite All-Solid-State Composite Cathodes" Symposium A06: Solid State Batteries, The Electrochemical Society 243rd Meeting, Boston MA, June **2023**.
46. **Gallaway, J.W.** (speaker); Kim, M.A.; Zimmerer, E.K.; Lambert, T.N.; and Schorr, N.B. " Li-Ion and Na-Ion Intercalation in Layered MnO2 Cathodes Enabled by Using Bismuth as a Cation Pillar" Symposium A03: Large Scale Energy Storage 14, The Electrochemical Society 243rd Meeting, Boston MA, May **2023**.
45. Guida, D.P. (poster presenter); Stavola, A.M.; and **Gallaway, J.W.** "Characterizing Distribution and Morphology of ZnO Discharge Products in Commercial Alkaline Zn-MnO_2 Batteries," The Electrochemical Society 243rd Meeting, Boston MA, May **2023**.
44. Howell, B.R. (poster presenter); Patil, B.H.; and **Gallaway, J.W.** "A Multiscale Hollow Spherical LATP Active Filler Improves Conductivity and Mechanical Strength in Composite Solid Electrolytes" Symposium A06: Solid State Batteries, The Electrochemical Society 243rd Meeting, Boston MA, May **2023**.
43. Zimmerer, E.K. (speaker); Guida, D.P.; and **Gallaway, J.W.** "Operando EXAFS to Determine the Mechanism of Bi Dopant at Low Concentration in Rechargeable MnO_2 Cathodes" Symposium L05: Synchrotron Studies on Batteries and Interfaces, The Electrochemical Society 243rd Meeting, Boston MA, May **2023**.

42. Guida, D.P. (speaker); Chuang, A.C.; Okasinski, J.S.; Wendling, M.T.; Chadderdon, X.H.; and **Gallaway, J.W.** "Density and Volume Fraction Distribution of ZnO Discharge Products in Cylindrical Alkaline Battery Anodes after Intermittent Use," Symposium A02: Research and Development of Primary and Secondary Batteries: In Honor of George Blomgren, The Electrochemical Society 242nd Meeting, Atlanta GA, Oct **2022**.

41. **Gallaway, J.W.** (speaker, **Invited talk**); Stavola A.M., Patil, B.H. "Reaction Heterogeneity in All-Solid-State Li Battery Electrodes" Battery Materials & Interfaces: Anodes, Cathodes & Novel Electrolytes, The American Chemical Society Fall Meeting, Chicago, IL, Aug **2022**.

40. Guida, D.P. (speaker) and **Gallaway, J.W.** "Using High Energy X-Ray White Beam Tomography to Quantify the Location and Morphology of ZnO Discharge Products in Alkaline Batteries" Symposium A04: Battery Student Slam 6, The Electrochemical Society 241st Meeting, Vancouver BC, May **2022**.

39. **Gallaway, J.W.** (speaker, **Invited talk**) "Operando Measurement of Heterogeneities in All-Solid-State Li Battery Electrodes" Symposium I06 - Heterogeneous Functional Materials for Energy Conversion and Storage 3, The Electrochemical Society 241st Meeting, Vancouver BC, May **2022**.

38. **Gallaway, J.W.** (speaker) "Energy Dispersive X-Ray Diffraction (EDXRD) as a Synchrotron Technique for Spatially-Resolved *Operando* Study of Buried Materials and Interfaces Within Batteries" CH01 *In Situ* and *Operando* Techniques Applied to Electrochemical Systems—A Key Toolkit for Deep Understanding, Materials Research Society Fall Meeting, Boston MA, November **2021.**

37. Stavola, A.M. (poster presenter, won best poster award); Sun, X.; Bruck, A.M.; Cao, D.; Zhu, H.; and **Gallaway, J.W.** "Spatially-Resolved Operando Structural Analysis of Sulfur-Based All–Solid–State Lithium Batteries Using EDXRD" EN02 Solid-State Batteries—Electrodes, Electrolytes and Interphases, Materials Research Society Fall Meeting, Boston MA, November **2021.**

36. Stavola, A.M. (speaker); Sun, X.; Bruck, A.M.; Cao, D.; Zhu, H.; and **Gallaway, J.W.** "Operando Observation of Structural Evolution in Sulfur-Based All Solid-State Lithium Batteries" Lithium and Beyond: Fundamental Advances in High Performance Batteries II, American Institute of Chemical Engineers Fall Meeting, Boston MA, November **2021**.

35. Wawer, K. (poster presenter); Stavola, A.M.; and **Gallaway, J.W.** "Development of NMC/LFP Cathode Material Blends for Lithium-Ion Batteries" Undergraduate Student Poster Session, American Institute of Chemical Engineers Fall Meeting, Boston MA, November **2021**.

34. Owen, C. (poster presenter, won 2nd place); Guida, D.P.; and **Gallaway, J.W.** "An Equilibrium Potential Analysis of Bi and Cu Modified Rechargeable MnO_2 Cathodes" Undergraduate Student Poster Session, American Institute of Chemical Engineers Fall Meeting, Boston MA, November **2021**.

33. **Gallaway, J.W.** (speaker, **Invited talk**) "(Invited) Operando Characterization of Transient Material Changes in Battery Cathode Materials by X-Ray Diffraction and Spectroscopy" L08 - Electrochemical Studies by Synchrotron Techniques, The Electrochemical Society 239th Meeting, Virtual, May **2021**.

32. **Gallaway, J.W.** (speaker, **Invited talk**); Bruck, A.M.; Kim, M.A.; Owen, T.; Ruoff, E.; and Ripley, K. "Mechanistic Role of Dopants in Conversion Reactions of Layered Birnessite MnO_2" EN09.03: Metal Anodes and Conversion Cathodes III, Materials Research Society Spring Meeting, Virtual, April **2021**.

31. Bruck, A.M. (speaker); Kim, M.A.; and **Gallaway, J.W.** "Insights into the Design of High Energy Density MnO_2 Cathodes for Rechargeable Alkaline Batteries" F.EN04: Beyond Lithium-Ion Batteries—Materials, Architectures and Techniques, Materials Research Society Virtual Spring/Fall Meeting, December **2020**.

30. Stavola, A.M. (speaker); Bruck, A.M.; Sun, X.; Cao, D.; Zhu, H.; and **Gallaway, J.W.** "Operando Energy-Dispersive X-Ray Diffraction of Sulfur-Based All Solid-State Lithium Batteries" Lithium and Beyond: Fundamental Advances in High Performance Batteries I, American Institute of Chemical Engineers Fall Meeting, Virtual, November **2020**.

29. Bruck, A.M. (speaker, **Invited talk**); Kim, M.A.; and **Gallaway, J.W.** "(Invited) Bismuth Enables Formation of Disordered Birnessite in Rechargeable Alkaline Batteries" A06 - Progress and Critical Assessment of Large Format Batteries, The Electrochemical Society 238th Meeting, Virtual, October **2020**.

28. Bruck, A.M. (poster presenter); Kim, M.A.; and **Gallaway, J.W.** "Bismuth Enables the Formation of Disordered Birnessite in Rechargeable Alkaline Batteries" AIChE Center for Energy Initiatives, 2nd Battery and Energy Conference, Virtual, October **2020**.

27. Zhang, Q.; Stavola, A. (poster presenter); Aurora, P.; **Gallaway, J.W.** "Enhanced Electrochemical Stability of NCM811 Solid-State Batteries by Surface Altering Processes" EN02.19.79 Materials for High-Energy and Safe Electrochemical Energy Storage, Materials Research Society Fall Meeting, Boston MA, December **2019**.

26. **Gallaway, J.W.** (speaker), Banerjee, S.; Yadav, G.G.; and Turney, D.E. "Operando Studies to Enumerate the Electrochemical Phase Transformations of MnO_2" 1E - Electrochemical Fundamentals, American Institute of Chemical Engineers Fall Meeting, Orlando FL, November **2019**.

25. **Gallaway, J.W.** (speaker, **Invited talk**) "Operando Characterization of Rechargeable Alkaline MnO_2 Batteries" AIChE Center for Energy Initiatives, 1st Battery and Energy Conference, New York NY, 22 October **2019**.

24. Kim, M. (poster presenter); Jadhav, A.; Hawkins, B.E.; Messinger, R.; Okasinski, J.; and **Gallaway, J.W.** "Operando Energy Dispersive X-Ray Diffraction (EDXRD) of Bulk Cathode Material for Multivalent Secondary Batteries" The Electrochemical Society 236th Meeting, Atlanta GA, Oct **2019**.

23. Bruck, A.M. (poster presenter); Kim, M.; and **Gallaway, J.W.** "Operando Investigations of Bismuth Additives on the Rechargeability of MnO_2 in Alkaline Batteries" US Department of Energy Office of Electricity Peer Review, Albuquerque NM, Sept **2019**.

22. Howell, B.R. (speaker) and **Gallaway, J.W.** "The Electrochemistry of Low-Temperature Molten Quinones for All-Organic Redox Flow Batteries" The Electrochemical Society 235th Meeting, Dallas TX, May **2019**.

21. **Gallaway, J.W.** (speaker); Kim, M.; Jadhav, A.; Messinger, R.; Okasinski, J. "Discharge Reactions of γ-MnO_2 and Mo_6S_8 Tracked in the Electrode Bulk of Sealed Devices By Energy Dispersive X-Ray Diffraction (EDXRD)" The Electrochemical Society 235th Meeting, Dallas TX, May **2019**.

20. **Gallaway, J.W.** (speaker); Yadav, G.G.; Turney, D.E.; and Banerjee, S. "An Operando Study of Rechargeable MnO_2 Cathodes For Low Cost, High Energy Density Aqueous Batteries" CM03, 2019 Materials Research Society Fall Meeting, Boston MA, November **2018**.

19. **Gallaway, J. W.** (speaker); Yadav, G. G.; Turney, D. E.; Banerjee, S.; Chen-Wiegart, Y.-C. K.; Williams, G.; Thieme, J. "Operando XRF mapping and μ-XANES of a Cu-containing Bi-birnessite cathode for high density, low-cost aqueous batteries" 256th American Chemical Society National Meeting, Boston MA, August **2018**.

18. **Gallaway, J.W.** (speaker); Bliznakov, S.; Yadav, G.G.; Turney, D.E.; Ingale, N.; Nyce, M.; Banerjee, S.; Menard, M.; De Angelis, V.; and Couzis, A. "On the Fly EIS Tracking of Rechargeable Alkaline Zn-MnO_2 Batteries for Large-Scale Use" The Electrochemical Society 232nd Meeting, National Harbor MD, October **2017**.

Presentations Prior to Northeastern University

17. **Gallaway, J.W**. (speaker); Yadav, G.G.; Turney, D.E.; Huang, J.; Nyce, M.; Banerjee, S.; Okasinski, J.; Chen-Wiegart, Y.K.; Williams, G.; and Thieme, J. "An Operando Study of Deep-Cycling MnO_2 Cathodes for Low Cost, High Energy Density Aqueous Batteries" The Electrochemical Society 231st Meeting, New Orleans LA, May **2017**.

16. **Gallaway, J.W.** (speaker, **Invited talk**) "Battery Material Characterization as a Bridge From Fundamentals to Applications" 44th American Chemical Society Middle Atlantic Regional Meeting (MARM), 10 June **2016**.

15. **Gallaway, J.W.** (speaker, **Invited talk**); Gaikwad, A.; Sviridov, L.A.; Banerjee, S.; Hertzberg, B.; Steingart, D.A; Erdonmez, C.K.; Chen-Wiegart, Y.K.; Evans-Lutterodt, and Wang, J.K. "Electrodeposited Zinc Planarized By Bismuth at 3ppm Concentration: A Mechanistic Study" The Electrochemical Society 227th

Meeting, Chicago IL, May **2015**.

14. **Gallaway, J.W.** (speaker); Erdonmez, C.K.; Zhong, Z.; Croft, M.; Sviridov, L.A.; Banerjee, S.; and Steingart, D.A. "Transient Interface Evolution in Cycling Alkaline Batteries Resolved Using Synchrotron X-Rays" The Electrochemical Society 224th Meeting, San Francisco CA, October **2013**.

13. **Gallaway, J.W.** (speaker); Erdonmez, C.K.; Zhong, Z.; Croft, M.; Sviridov, L.A.; Banerjee, S.; and Steingart, D.A. "Transient Interfacial Zinc Oxide Formation in Cycling Alkaline Batteries Detected Using Synchrotron X-Rays" American Institute of Chemical Engineers Fall Meeting, San Francisco CA, November **2013**.

12. **Gallaway, J.W.** (speaker, **Invited talk**) "Design of Enzyme Electrodes for Sensing and Power Applications" Fundamentals of Electrode and Cell Designs: A Tutorial Session AIChE Fall Meeting, Pittsburgh PA, November **2012**.

11. **Gallaway, J.W.** (speaker); Erdonmez, C.K.; Sviridov, L.A.; Gaikwad, A.; Sholklapper, T.; Ingale, N.; Nyce, M.; Hertzberg, B.; Banerjee, S.; and Steingart, D.A. "Phase Changes in Secondary Manganese Dioxide Electrodes for Grid-Scale Batteries" American Institute of Chemical Engineers Fall Meeting, Pittsburgh PA, November **2012**.

10. **Gallaway, J.W.** (speaker); Ingale, N.; Nyce, M.; Ito, Y.; Sviridov, L.; Gaikwad, A.; Lever, S.; Firouzi, A.; Banerjee, S.; and Steingart, D. "Secondary Manganese Dioxide Electrodes for Grid-Scale Batteries" American Institute of Chemical Engineers Fall Meeting, Minneapolis MN, October **2011**.

9. **Gallaway, J.W.** (poster presenter) "Electrochemistry for Energy: Air-Breathing Enzymatic Electrodes for Batteries and Fuel Cells" American Institute of Chemical Engineers Fall Meeting, Minneapolis MN, October **2011**.

8. **Gallaway, J.W.** (speaker); Ingale, N.; Nyce, M.; Ito, Y.; Sviridov, L.; Gaikwad, A.; Lever, S.; Firouzi, A.; Banerjee, S.; and Steingart, D. "Cycle Life of Manganese Dioxide Electrodes for Grid-Scale Batteries" The Electrochemical Society 220th Meeting, Boston MA, October **2011**.

7. **Gallaway, J.W.** (speaker); Shojaei-Zadeh, S.; Gaikwad, A.; and Steingart, D. "Electrochemical and Optical Monitoring of Metal Electrodeposition Interfaces in a Microfluidic Cell" 2010 Materials Research Society Fall Meeting, Boston MA, December **2010**.

6. **Gallaway, J.W.** (speaker); Ito, Y.; Desai, D.; Nyce, M.; Banerjee, S.; and Steingart, D. "Zinc Layer Current Distribution in Secondary Zinc Metal Batteries for Grid Scale Electrical Storage" The Electrochemical Society 218th Meeting, Las Vegas NV, October **2010**.

5. **Gallaway, J.W.** (speaker); Shojaei-Zadeh, S.; and Steingart, D. "Microfluidic Electrochemistry: A Versatile Platform to Study Reactions at Electrodes" American Institute of Chemical Engineers Fall Meeting, Nashville TN, November **2009**.

4. **Gallaway, J.W.** (speaker); Willey, M.J.; and West, A.C. "PEG, PPG, and Their Triblock Copolymers as Suppressors in Copper Electroplating" The Electrochemical Society 214th Meeting, Honolulu HI, Oct. **2008**.

3. **Gallaway, J.W.** (speaker) and Calabrese Barton, S.A. "High Performance Redox Polymer Films for Enzymatic Electrodes" The Electrochemical Society 212th Meeting, Washington DC, Oct. **2007**.

2. **Gallaway, J.W.** (speaker) and Calabrese Barton, S.A. "Structure-Function Relationships in Redox Polymer-Enzyme Films for Biofuel Cell Applications" The Electrochemical Society 210th Meeting, Cancun, Mexico, Oct. **2006**.

1. **Gallaway, J.W.** (poster presenter) and Calabrese Barton, S.A. "Methanol Oxidation on High Surface Area Platinum-Ruthenium in the Presence of Oxygen" The Electrochemical Society 208th Meeting, Los Angeles CA, Oct. **2005**.

SEMINARS AND INVITED PRESENTATIONS

21. **Oklahoma State University**, School of Chemical Engineering, "Heterogeneity In All-Solid-State Li

Batteries," 25 Apr **2023**.

20. **MIT**, ECS Student Chapter Seminar, "Heterogeneity In All-Solid-State Li Batteries," 10 Nov **2022**.
19. **Princeton University**, Princeton Institute for the Science and Technology of Materials (PRISM), "Heterogeneity In All-Solid-State Li Batteries," 2 Nov **2022**.
18. **The Indian Institute of Technology Dharwad**, Global Center of Excellence in Affordable and Clean Energy (GCoE-ACE), TREES: Talks on Renewables, Empowering Earth, and Sustainability, "Pinpointing Transient Processes and Inhomogeneity Within Batteries," 15 July **2022**.
17. **Energizer**, Westlake OH, "Pinpointing Transient Processes and Inhomogeneity Within Batteries," 18 February **2022**.
16. **Case Western Reserve University**, Department of Chemical and Biomolecular Engineering, "Pinpointing Transient Processes and Inhomogeneity Within Batteries," 17 February **2022**.
15. **Vanderbilt University**, Department of Chemical and Biomolecular Engineering, "Pinpointing Transient Processes and Inhomogeneity Within Batteries," 15 November **2021**.
14. **University of Rhode Island**, Department of Chemistry, "Pinpointing Transient Processes and Inhomogeneity Within Batteries," 18 October **2021**.
13. **Clarkson University**, Department of Chemical and Biomolecular Engineering, "Pinpointing Transient Processes and Inhomogeneity Within Batteries," 29 September **2021**.
12. **City College of New York**, CUNY Energy Institute PIRE Colloquium, "Characterizing Material Interfaces with Synchrotron Light," 18 November **2020**.
11. **MIT Lincoln Laboratory**, Advanced Materials and Microsystems Group, Lexington MA, "Rechargeable Alkaline MnO_2 Batteries for Low Cost & Safe Grid Storage: In situ & Operando Characterization of MnO_2," 30 August **2019**.
10. **American Institute of Chemical Engineers Boston**, Guppy Night, Boxborough MA, "Electrochemistry as Chemical Engineering: A Report From the Front Lines of Sustainability," 9 November **2018**.
9. **Ionic Materials**, Woburn MA, "Rechargeable Alkaline MnO_2 Batteries for Low Cost & Safe Grid Storage In situ & Operando Characterization of MnO_2," 31 October **2018**.
8. **Northeastern University Convergence**, Boston MA, "What makes a successful battery? Managing length scales and hierarchical structures for high energy density, high cycle life, and low cost," 18 May **2018**.
7. **National Synchrotron Light Source II**, Upton NY, "Operando spectroscopy and diffraction to uncover complex mechanisms in electrochemical devices," 2 December **2016**.
6. **NIST**, Functional Nanostructured Materials Group, Gaithersburg MD, "Safe, Inexpensive, and Energy Dense Alkaline Batteries for the Grid Scale," 22 September **2016**.
5. **Stony Brook University**, Department of Materials Science, "Batteries for Massive-Scale Electrical Storage: Using New In Situ Techniques for Electrochemical Systems," 25 February **2015**.
4. **Michigan State University**, Department of Chemical Eng & Materials Sci, "Batteries for Massive-Scale Electrical Storage: Using New In Situ Techniques for Electrochemical Systems," 18 September **2014**.
3. **Duracell**, Danbury CT, "Microscopic, In Situ Monitoring of Electrochemical Processes for Energy Storage Applications," December **2013**.
2. **Sandia National Lab**, Power Sources Technology Group, "Microscopic, In Situ Monitoring of Electrochemical Processes for Energy Storage Applications," January **2013**.
1. **New York Nanoscience Discussion Group**, NYU, "Biological Catalysis in the Future of Energy: Electrochemistry for the 21st Century," 11 November **2011**.

RESEARCH SUPPORT

Current support

National Science Foundation, CBET, Electrochemical Systems 3/21-2/26
Gallaway, PI: $510,112
"CAREER: Engineering electrochemical reversibility in disordered materials for high energy density batteries" 2044602

US Department of Energy, Office of Electricity (OE) 9/18-12/23
Gallaway, PI: $438,943
"Understanding Phase Change Processes of Energy Storage Materials"

US Department of Defense, Army DEVCOM, via KRI 1/20-5/24
Gallaway, PI: $649,857
"Solid Polymer Electrolytes for High Energy Density Li-ion Batteries"

Energizer 3/21-5/23
Gallaway, PI: $213,000
"Distribution and Kinetics of Zinc Oxide Discharge Products in Alkaline Batteries"

NASA MUREP Institutional Research Opportunity (MIRO), via CCNY 9/19-8/23
Gallaway, PI: $131,181
"NASA-CCNY Center for Advanced Batteries for Space (ABS)"

MIT Lincoln Laboratory 10/22-9/23
Gallaway, PI: $85,000
"Zinc Fiber Batteries"

Completed support

National Science Foundation, CBET, Electrochemical Systems 9/19-8/22
Gallaway, co-PI: 50% $239,858 (Hongli Zhu, PI: $479,717 total grant)
"Engineering the Metal Sulfide Interface in All Solid State Batteries through Operando Study"

Northeastern University, DiPietro Assistant Professorship 9/17-8/22
Gallaway, PI: $75,000

Northeastern University, FY19 TIER 1 Award 5/18-9/19
Gallaway, PI: $50,000
"A Dense Anthraquinone-Based Ionic Liquid For Grid-Scale Electrical Storage"

COURSES TAUGHT

2017-present **Northeastern University**
CHME 2308 Conservation Principles (Sp 2023, Enrollment: 25)
CHME 5621 Electrochemical Engineering (Fa 2022, Enrollment: 13)
CHME 2308 Conservation Principles (Sp 2022, Enrollment: 48)
CHME 5621 Electrochemical Engineering (Sp 2021, Enrollment: 17)
CHME 2308 Conservation Principles (Fa 2020, Enrollment: 13)
CHME 5621 Electrochemical Engineering (Sp 2020, Enrollment: 20)
CHME 2308 Conservation Principles (Sp 2020, Enrollment: 60)
CHME 2308 Conservation Principles (Fa 2019, Enrollment: 19)
CHME 5621 Electrochemical Engineering (Sp 2019, Enrollment: 33), **new course**
CHME 2308 Conservation Principles (Sp 2019, Enrollment: 53)
CHME 2308 Conservation Principles (Fa 2018, Enrollment: 19)
CHME 2308 Conservation Principles (Sp 2018, Enrollment: 48)

CHME 2308 Conservation Principles (Fa 2017, Enrollment: 42)

2010-2017 **New York University Tandon School of Engineering**
CBE-UY 3313 Transport Phenomena I (Taught 7 semesters, Total enrollment: 360)
CBE-UY 3323 Transport Phenomena II (Taught 7 semesters, Total enrollment: 351)

2010 **The City College of New York**
ENGR 23000 Thermodynamics (Su 2010, Enrollment: 21)

RESEARCH SUPERVISION

Northeastern University (postdoctoral)

Dr. Saiful Islam (2023-present)
Dr. Bebi Patil (2020-2022)
Dr. Andrea Bruck (2019-2020)
Dr. Qing Zhang (2019)

Northeastern University (PhD)

Benjamin Leifer (2022-present)
PhD Student, Chemical Engineering, Northeastern University

Eric Zimmerer (2021-present)
PhD Student, Chemical Engineering, Northeastern University

Dominick Guida (2020-present)
PhD Candidate, Chemical Engineering, Northeastern University

Alyssa Stavola (2018-2023)
"Inhomogeneity in Composite Cathodes in All-Solid-State Lithium Batteries"
PhD, Chemical Engineering, Northeastern University, 2023.
Job: 24M

Benjamin Howell (2017-present)
PhD Candidate, Chemical Engineering, Northeastern University

Matthew Kim (2017-2022)
"Low-Cost MnO_2 Intercalation Cathodes Enabled By Using Bismuth As A Pillaring Agent"
PhD, Chemical Engineering, Northeastern University, 2022.
Job: Battery Scientist at Storagenergy Technologies, Inc.

Northeastern University (MS)

James Goulart (2021-2022)
"Operando Characterization of Rechargeable Alkaline Zinc-Manganese Dioxide Cells for Grid-Scale Storage"
MS, Chemical Engineering, Northeastern University, 2022.
Job: Materials Engineer II at Form Energy

Tristi Owen (2020-2021)
"Distribution of active materials in Bi-modified MnO_2 electrodes"
MS, Chemical Engineering, Northeastern University, 2021
Job: Materials Engineer at Mitra Chem

Maximilian Ulbert (2020-2021)
"Practical Fiber Batteries for Wearables Based on Thermally-Drawn Zn-MnO_2"
MS, Mechanical Engineering, Northeastern University, 2021
Job: Nuclear Submarine Officer at US Navy

Pushkar Gokhale (2018-2020)
"Current Distribution In Cylindrical And Prismatic Zinc Anodes"
MS, Chemical Engineering, Northeastern University, 2020
Job: Battery Research Associate at NexTech Batteries, Inc.

Zhicheng Lu (2017-2019)
"Mathematical Modeling Of The Initial Discharge Of Alkaline Zinc-Manganese Dioxide Batteries"
MS, Chemical Engineering, Northeastern University, 2019

Northeastern University (undergraduate)

Sanjana Sankar (2021-present), PEAK Summit Award
Yashvi Gosalia (2022), REU-POWER
Barkha Bhavsar (2021-2023), CHME 4991 Research x2, PEAK Summit Award, Huntington 100 Award
Naa Momoh Odarteifio (2021-2023), PEAK Summit Award, Huntington 100 Award
Rachana Somaskandan (2021-present), UPLIFT Program
Kamnsiyochukwu Arachie (2020-2022), Huntington 100 Award
Kamila Wawer (2020-2022), PEAK Summit Award x2
Christopher Owen (2020-2022), PEAK Summit Award x2
Sydney Morris (2019-2020), PEAK Summit Award, NSF GRFP
James Goulart (2019-2020), BS/MS
Erick Ruoff (2019-2021), CHME 5984 Research, CHME 7978 Independent Study
Shakti Katheria (2019), REU-POWER
Sofia Catalina (2018-2020), CHME 4991 Research, SSIRF Program, NSF GRFP, GEM Fellowship, Huntington 100
Katelyn Ripley (2018-2020), CHME 4991 Research, EMGT 7978 Research
Nicholas Kamm (2018-2019), CHME 4991 Research
Tristi Owen (2017-2020), BS/MS

The City College of New York (undergraduate)

Amy Shin (2015), summer student from Herricks High School, New Hyde Park NY, Paper co-author
Raven Bertot (2014-2015), visiting student from New York University
Zeeshan Chaudhry (2014-2015), visiting student from New York University, Paper co-author
Dustin Liu (2014), summer student from Herricks High School, New Hyde Park NY
Desiree Kettell (2013-2014), visiting student from New York University
Jerome Fineman (2011-2013), visiting student from New York University

Northeastern University COMMITTEE SERVICE

MS and PhD Committees

Xiao Sun, PhD (MIE), Northeastern University (Hongli Zhu, Advisor), expected 2023
David Farina, PhD (CHME), Northeastern University (Richard West, Advisor), 2022
Li Jiao, PhD (CHME), Northeastern University (Sanjeev Mukerjee, Advisor), 2022
Snehal Kolhekar, PhD (Chem Eng), The City College of New York (Sanjoy Banerjee, Advisor), 2021
Ankur Jadhav, PhD (Chem Eng), The City College of New York (Rob Messinger, Advisor), 2021
Javier Fonseca, PhD (CHME), Northeastern University (Sunho Choi, Advisor), 2020
Sawan Karumbaiah Koopadira, MS (CHME), Northeastern University (Sanjeev Mukerjee, Advisor), 2019
Ehsan Keyvani-Someh, PhD (CHME), Northeastern University (Hicham Fenniri, Advisor), 2019
Martin Kimani, PhD (CHME), Northeastern University (Edgar Goluch, Advisor), 2019
Huong Doan, PhD (CHEM), Northeastern University (Sanjeev Mukerjee, Advisor), 2019
Wenjun Zheng, MS (CHME), Northeastern University (Ming Su, Advisor), 2018
Haotian Zhang, MS (CHME), Northeastern University (Ming Su, Advisor), 2018
Deyang Li, PhD (CHME), Northeastern University (Elizabeth Podlaha-Murphy, Advisor), 2018
Miguel Angel Alvarez Sanchez, MS (CHME), Northeastern University (Thomas Webster, Advisor), 2018
Priyanka Satpute, MS (CHME), Northeastern University (Richard West, Advisor), 2018

Northeastern University Committee Service

PhD Committee, Northeastern College of Engineering, Member (2023-present)
Graduate Committee, Dept. of Chemical Engineering, Member (2017-present)
Graduate Student Council (GSC), Dept. of Chemical Engineering, Co-advisor (2018-present)
Curriculum Review Committee, Dept. of Chemical Engineering, Member (2017-2018)

PROFESSIONAL SERVICE

Ad hoc manuscript reviews

Journal of the Electrochemical Society (31)
Journal of Power Sources (23)

Joule (6)
ECS Electrochemistry Letters (4)
Materials Chemistry and Physics (4)
Batteries & Supercaps (2)
Electroanalysis (2)
Energy Storage Materials (2)
Journal of Alloys and Compounds (2)
Journal of Physical Chemistry ABC (2)
MRS Energy & Sustainability (2)
Advanced Materials (1)
Advanced Functional Materials (1)
Accounts of Materials Research (1)
ACS Applied Materials & Interfaces (1)
ACS Nano (1)
Cambridge Elements (1)
Chem (1)
ChemNanoMat (1)
ECS Solid State Letters (1)
Energy Storage Technologies (1)
Ionics (1)
Journal of the American Chemical Society (1)
Journal of Applied Electrochemistry (1)
Nature Communications (1)
npj Materials Degradation (1)
Process Safety Progress (1)
RSC Advances (1)
Scientific Reports (1)
Small Methods (1)

Symposium Organizer

8. Co-organizer, The Electrochemical Society, A03 - Large Scale Energy Storage 14, 243rd ECS Meeting, (Boston, MA, May 28-June 1, 2023).
7. Co-organizer, American Society of Chemical Engineers, Battery and Energy Storage Conference, (New York, NY, Oct 26-28, 2022).
6. **Lead Organizer**, The Electrochemical Society, A03 - Large Scale Energy Storage 13, 241st ECS Meeting, (Vancouver, BC, May 29- June 2, 2022).
5. **Lead Organizer**, American Society of Chemical Engineers, 1E, Lithium and Beyond: Fundamental Advances in High Performance Batteries I and II, 2021 AIChE Annual Meeting (Boston, MA, Nov 7-11, 2021).
4. Co-organizer, The Electrochemical Society, A06 - Next Generation Batteries, 239th ECS Meeting with 18th International Meeting on Chemical Sensors (IMCS 2021), (Virtual, May 30- June 3, 2021).
3. Co-organizer, American Society of Chemical Engineers, 1E, Lithium and Beyond: Fundamental Advances in High Performance Batteries I and II, 2020 Virtual AIChE Annual Meeting (Virtual, Nov 16-20, 2020).
2. Co-organizer, Materials Research Society, EN05 Low-Cost Aqueous Rechargeable Battery Technologies, 2020 MRS Spring/Fall Meeting (Virtual, Nov 27 - Dec 4, 2020).
1. **Lead Organizer**, The Electrochemical Society, A01 - Battery and Energy Technology Joint General Session, 236th ECS Meeting (Atlanta, GA, Oct 13-17, 2019).

Panel Speaker

3. Speaker, "Zinc and Lead Batteries," DOE Office of Electricity Peer Review, Albuquerque NM, Oct 12, 2022.
2. **Discussion Leader**, "Modes of Failure: What Is Killing My System Now?" Batteries Gordon Research Conference (GRC), Ventura CA, Feb 20, 2020.
1. Moderator, "Energy Storage For The Modern Age," 5th Annual Energy Conference, Northeastern University, Sept 27, 2019.

Editorial Work

ECS Interface, Tech Highlights writer (2019-present)

Proposal Reviews

DOE, NSF

EDUCATIONAL OUTREACH

Multimedia Outreach

4. "Storing Electricity with Batteries." A demonstration program to introduce high school students to the science and engineering of batteries. Run with the Northeastern University Center for STEM Education:

   Dec 2019, for Building Bridges Program
   Jun 2019, for Young Scholars Program
   Nov 2018, for Building Bridges Program

3. "Why It's So Hard To Make Better Batteries: Crash Course Engineering #32." Video about the engineering of batteries for the PBS series Crash Course. Technical content written with Lucas Landherr. Published **17 Jan 2019**. Views (as of Jan 18, 2020): 96,291. https://www.youtube.com/watch?v=A5GgBTFSUu4

2. "Citrus Battery." Narration accompanied by animation, from the television show *Duck Quacks Don't Echo*, National Geographic Channel. Original air date **20 Jan 2014**. https://www.youtube.com/watch?v=DnB0sFrYtrU

1. *Clear Science!* A science blog geared to high school students. "Clear Science is dedicated to straightforward science lessons in plain English everyone can understand." 130,000 followers in 2013. Active **2010-2013**. https://clearscience.tumblr.com