Ethan B. Secor
esecor@iastate.edu

Assistant Professor
Department of Mechanical Engineering
Iowa State University

2016 Black Engineering
2529 Union Drive
Ames, IA 50011

Education

Northwestern University, Evanston, IL — 2012-2017
Ph.D. in Materials Science and Engineering, 2017
Advisor: Professor Mark C. Hersam

Drake University, Des Moines, IA — 2008-2012
B.S. in Chemistry, B.S. in Physics, 2012, *summa cum laude*

Select Honors

- 3M Non-Tenured Faculty Award — 2022
- Harry S. Truman Fellowship, Sandia National Laboratories — 2017-2020
- Cabell Terminal Year Fellowship, Northwestern University — 2016-2017
- IIN Outstanding Researcher Award, Northwestern University — 2016
- Ryan Fellowship, Northwestern University — 2014-2017
- National Defense Science and Engineering Graduate Fellowship — 2013-2016
- Barry M. Goldwater Scholarship — 2011-2012
- Drake Physics Prize, Drake University — 2008-2012

Research Interests

- Nanomaterial ink development for liquid-phase patterning methods
- Aerosol-based multimaterial additive printing technologies
- Printed and flexible electronic devices, energy conversion and storage

Publications

[44] **Secor, E.B.;** Bell, N.S.; Romero, M.P.; Tafoya, R.R.; Nguyen, T.H.; Boyle, T.J. Titanium hydride nanoparticles and nanoinks for aerosol jet printed electronics. *Nanoscale,* **2022**, D2NR03571E.

[43] Tafoya, R.R.; Gallegos, M.A.; Downing, J.R.; Gamba, L.; Kaehr, B.; Coker, Eric N.; Hersam, M.C.; **Secor, E.B.** Morphology and electrical properties of high-speed flexography-printed graphene. *Microchim. Acta,* **2022**, *189*, 123.

[42] Naik, A.R.; Zhou, Y.; Dey, A.A.; Arellano, D.L.G.; Okoroanyanwu, U.; **Secor, E.B.**; Hersam, M.C.; Morse, J.; Rothstein, J.P.; Carter, K.R.; Watkins, J.J. Printed microfluidic sweat sensing platform for cortisol and glucose detection. *Lab Chip,* **2022**, D1LC00633A.

[41] **Secor, E.B.** Light scattering measurements to support real-time monitoring and closed-loop control of aerosol jet printing. *Addit. Manuf.,* **2021**, *44,* 102028.

[40] Martinez-Acosta, A.; Tafoya, R.R.; Quinones, S.A.; **Secor, E.B.** Modular motion control software development to support a versatile, low-cost aerosol jet platform for printed electronics.

Addit. Manuf., **2021**, *40,* 101932.

[39] Tafoya, R.R.; Cook, A.W.; Kaehr, B.; Downing, J.R.; Hersam, M.C.; **Secor, E.B.** Real-time optical process monitoring for structure and property control of aerosol jet printed functional materials. *Adv. Mater. Technol.,* **2020**, 2000781.

[38] Tafoya, R.R.; **Secor, E.B.** Understanding Effects of Printhead Geometry in Aerosol Jet Printing. *Flex. Print. Electron.,* **2020**, *5*, 035004.

[37] Gallegos, M.A.; Garcia, C.M.; Schunk, P.R.; White, B.C.; Boyce, B.L.; **Secor, E.B.**; Kaehr, B. Investigating Porous Media for Relief Printing Using Micro-Architected Materials. *Adv. Eng. Mater.,* **2020**, 2000548.

[36] Fu, Y.-M.; Chou, M.-C.; Kang, C.-H.; Cheng, Y.-T.; Wu, P.-W.; Chen, G.-Y.; **Secor, E.B.**; Hersam, M.C. An Inkjet Printing Technique for Scalable Microfabrication of Graphene-Based Sensors. *IEEE Access,* **2020**, *8*, 79338.

[35] Tafoya, R.R.; **Secor, E.B.** Understanding and Mitigating Process Drift in Aerosol Jet Printing. *Flex. Print. Electron.,* **2020**, *5*, 015009.

[34] Parate, K.; Rangnekar, S.V.; Jing, D.; Mendivelso-Perez, D.L.; Ding, S.; **Secor, E.B.**; Smith, E.A.; Hostetter, J.M.; Hersam, M.C.; Claussen, J.C. Aerosol-Jet-Printed Graphene Immunosensor for Label-Free Cytokine Monitoring in Serum. *ACS Appl. Mater. Interfaces,* **2020**, *12*, 8592.

[33] Jabari, E.; Ahmed, F.; Liravi, F.; **Secor, E.B.**; Lin, L.; Toyserkani, E. 2D Printing of Graphene: A Review. *2D Mater.,* **2019**, *6*, 042004.

[32] Song, D.; Bidoky, F.Z.; **Secor, E.B.**; Hersam, Mark C.; Frisbie, C.D. Freestanding Ion Gels for Flexible, Printed, Multifunctional Microsupercapacitors. *ACS Appl. Mater. Interfaces,* **2019**, *11*, 9947.

[31] Seo, J.-W. T.; Zhu, J.; Sangwan, V.K.; **Secor, E.B.**; Wallace, S.G.; Hersam, Mark C. Fully Inkjet-Printed, Mechanically Flexible MoS_2 Nanosheet Photodetectors. *ACS Appl. Mater. Interfaces,* **2019**, *11*, 5675.

[30] **Secor, E.B.** Guided Ink and Process Design for Aerosol Jet Printing Based on Annular Drying Effects. *Flex. Print. Electron.,* **2018**, *3*, 035007.

[29] Hyun, W.J.; **Secor, E.B.**; Bidoky, F.Z.; Walker, S.B.; Lewis, J.A.; Hersam, M.C.; Francis, L.F.; Frisbie, C.D. Self-Aligned Capillarity-Assisted Printing of Top-Gate Thin-Film Transistors on Plastic. *Flex. Print. Electron.,* **2018**, *3*, 035004.

[28] **Secor, E.B.** Principles of Aerosol Jet Printing. *Flex. Print. Electron.,* **2018**, *3*, 035002.

[27] Hyun, W.J.; **Secor, E.B.**; Hersam, M.C. Printable Graphene Inks Stabilized with Cellulosic Polymers. *MRS Bulletin,* **2018**, *43*, 730.

[26] Choi, Y.; Kang, J.; **Secor, E.B.**; Sun, J.; Kim, H.; Lim, J.A.; Kang, M.S.; Hersam, M.C.; Cho, J.H. Capacitively Coupled Hybrid Ion Gel and Carbon Nanotube Thin-Film Transistors for Low Voltage Flexible Logic Circuits. *Adv. Funct. Mater.,* **2018**, *28*, 1802610.

[25] Song, D.*; **Secor, E.B.***; Wang, Y.; Hersam, M.C.; Frisbie, C.D. Transfer Printing of Sub-5μm Graphene Electrodes for Flexible Microsupercapacitors. *ACS Appl. Mater. Interfaces,* **2018**, *10*, 22303.

[24] **Secor, E.B.**; Dos Santos, M.H.; Wallace, S.G.; Bradshaw, N.P.; Hersam, M.C. Tailoring the Porosity and Microstructure of Printed Graphene Electrodes via Polymer Phase Inversion. *J. Phys. Chem. C,* **2018**, *122*, 13745.

[23] Naik, A.; Kim, J.J.; Usluer, O.; Arellano, D.L.G.; **Secor, E.B.**; Facchetti, A.; Hersam, M.C.;

Briseno, A.; Watkins, J.J. Direct Printing of Graphene Electrodes for High-Performance Organic Inverters. *ACS Appl. Mater. Interfaces,* **2018**, *10*, 15988.

[22] **Secor, E.B.***; Cook, A.B.*; Tabor, C.E.; Hersam, M.C. Wiring Up Liquid Metal: Stable and Robust Electrical Contacts Enabled by Printable Graphene Inks. *Adv. Electron. Mater.,* **2018**, *4*, 1700483.

[21] Zhu, M.; Liu, W.; Ke, W.; Clark, S.; **Secor, E.B.**; Song, T.-B.; Kanatzidis, M.; Li, X.; Hersam, M.C. Millisecond-Pulsed Photonically-Annealed Tin Oxide Electron Transport Layers for Efficient Perovskite Solar Cells. *J. Mater. Chem. A,* **2017**, *5*, 24110.

[20] **Secor, E.B.***; Gao, T.Z.*; Dos Santos, M.H.; Wallace, S.G.; Putz, K.W.; Hersam, M.C. Combustion-Assisted Photonic Annealing of Printable Graphene Inks via Exothermic Binders. *ACS Appl. Mater. Interfaces,* **2017**, *9*, 29418.

[19] Hyun, W.J.; **Secor, E.B.**; Kim, C.-H.; Hersam, M.C.; Francis, L.F.; Frisbie, C.D. Scalable, Self-Aligned Printing of Flexible Graphene Micro-Supercapacitors. *Adv. Energy Mater.,* **2017**, 1700285.

[18] Song, D.; Mahajan, A.; **Secor, E.B.**; Hersam, M.C.; Francis, L.F.; Frisbie, C.D. High-Resolution Transfer Printing of Graphene Lines for Fully Printed, Flexible Electronics. *ACS Nano*, **2017**, *11*, 7431.

[17] Chen, K.-S.; Xu, R.; Luu, N. S.; **Secor, E. B.**; Hamamoto, K.; Li, Q.; Kim, S.; Sangwan, V. K.; Balla, I.; Guiney, L. M.; Seo, J.-W.T.; Yu, X.; Liu, W.; Wu, J.; Wolverton, C.; Dravid, V.P.; Barnett, S.A.; Lu, J.; Amine, K.; Hersam, M.C. Comprehensive Enhancement of Nanostructured Lithium-Ion Battery Cathode Materials via Conformal Graphene Dispersion. *Nano Lett.* **2017**, *17*, 2539.

[16] **Secor, E.B.***; Gao, T.Z.*; Islam, A.E.; Rao, R.; Wallace, S.G.; Zhu, J.; Putz, K.W.; Maruyama, B.; Hersam, M.C. Enhanced Conductivity, Adhesion, and Environmental Stability of Printed Graphene Inks with Nitrocellulose. *Chem. Mater.,* **2017**, *29*, 2332.

[15] Fu, Y.-M.; Chou, M.-C.; Chang, Y.-T.; **Secor, E.B.**; Hersam, M.C. An Inkjet Printed Piezoresistive Back-to-Back Graphene Tactile Sensor for Endosurgical Palpation Applications. *Proc. IEEE MEMS,* **2017**, *30*, 612.

[14] Gonzalez Arellano, D.L.; Lee, H.; **Secor, E.B.**; Burnett, E.K.; Hersam, M.C.; Watkins, J.J.; Briseno, A.L. Graphene Ink as a Conductive Templating Interlayer for Enhanced Charge Transport of C_{60}-Based Devices. *ACS Appl. Mater. Interfaces,* **2016**, *8*, 29594.

[13] Li, L.*; **Secor, E.B.***; Chen, K.-S.; Zhu, J.; Liu, X.; Gao, T.Z.; Seo, J.-W.T.; Zhao, Y.; Hersam, M.C. High-Performance Solid-State Supercapacitors and Microsupercapacitors Derived from Printable Graphene Inks. *Adv. Energy Mater.,* **2016**, *6*, 1600909.

[12] **Secor, E.B.**; Smith, J.; Marks, T.J.; Hersam, M.C. High-Performance Inkjet-Printed Indium-Gallium-Zinc-Oxide Transistors Enabled by Embedded, Chemically Stable Graphene Electrodes. *ACS Appl. Mater. Interfaces,* **2016**, *8*, 17428.

[11] Hyun, W.J.; **Secor, E.B.**; Rojas, G.A.; Hersam, M.C.; Francis, L.F.; Frisbie, C.D. All-Printed, Foldable Organic Thin-Film Transistors on Glassine Paper. *Adv. Mater.* **2015**, *27*, 7058.

[10] **Secor, E.B.**; Ahn, B.Y.; Gao, T.Z.; Lewis, J.A.; Hersam, M.C. Rapid and Versatile Photonic Annealing of Graphene Inks for Flexible Printed Electronics. *Adv. Mater.* **2015**, *27*, 6683.

[9] Jakus, A.E.; **Secor, E.B.**; Rutz, A.L.; Jordan, S.W.; Hersam, M.C.; Shah, R.N. Three-Dimensional Printing of High-Content Graphene Scaffolds for Electronic and Biomedical Applications. *ACS Nano* **2015**, *9*, 4636.

[8] **Secor, E.B.**; Hersam, M.C. Emerging Carbon and Post-Carbon Nanomaterial Inks for Printed Electronics. *J. Phys. Chem. Lett.* **2015**, *6*, 620.

[7] Hyun, W.J.*; **Secor, E.B.***; Hersam, M.C.; Frisbie, C.D.; Francis, L.F. High-Resolution Patterning of Graphene by Screen Printing with a Silicon Stencil for Highly Flexible Printed Electronics. *Adv. Mater.* **2015**, *27*, 109.

[6] **Secor, E.B.***; Lim, S.*; Zhang, H.; Frisbie, C.D.; Francis, L.F.; Hersam, M.C. Gravure Printing of Graphene for Large-Area Flexible Electronics. *Adv. Mater.* **2014**, *26*, 4533.

[5] Pol, V.G.; Li, Y.; Dogan, F.; **Secor, E.**; Thackeray, M.M.; Abraham, D.P. Pulsed Sonication for Alumina Coatings on High-Capacity Oxides: Performance in Lithium-Ion Cells. *J. Power Sources* **2014**, *258*, 46.

[4] **Secor, E.B.**; Prabhumirashi, P.L.; Puntambekar, K.; Geier, M.L.; Hersam, M.C. Inkjet Printing of High Conductivity, Flexible Graphene Patterns. *J. Phys. Chem. Lett.* **2013**, *4*, 1347.

[3] Guan, X.; **Secor, E.B.**; DuToit, R.C.; Bartschat, K. Diffraction Patterns in the Ionization of the Heteronuclear HeH^{2+} Ion by Attosecond X-Ray Radiation. *Phy. Rev. A* **2012**, *86*, 053425.

[2] Guan, X.; **Secor, E.B.**; Bartschat, K.; Schneider, B.I. Double-Slit Interference Effect in Electron Emission from H_2^+ Exposed to X-ray Radiation. *Phy. Rev. A* **2012**, *85*, 043419.

[1] Guan, X.; **Secor, E.**; Bartschat, K.; Schneider, B. Multiphoton Ionization of the H_2^+ Molecule in XUV Laser Pulses. *Phy. Rev. A* **2011**, *84*, 033420.

* Indicates equal contribution

Patents

[11] U.S. Patent Number 11,220,112 B12, 2022: Secor, E.B. In-Line Mixing Printhead for Multimaterial Aerosol Jet Deposition.

[10] U.S. Patent Number 11,088,392, 2021: Hersam, M.C.; Chen, K.-S.; Secor, E.B. Nanostructured Lithium-Ion Battery Electrode Composite Materials via Conformal Graphene Dispersion.

[9] U.S. Patent Number 11,057,994, 2021. Hersam, M.C.; Secor, E.B.; Cook, A.B.; Tabor, C.. Conductive Graphene Interfacial Barriers for Liquid Metal Electronics.

[8] U.S. Patent Number 10,800,939, 2020. Hersam, M.C.; Liang, Y.T.; Secor, E.B.; Prabhumirashi, P.L.; Puntambekar, K.P.; Geier, M.L. Methods for Preparation of Concentrated Graphene Ink Compositions and Related Composite Materials.

[7] U.S. Patent Number 10,676,629, 2020. Hersam, M.C.; Secor, E.B.; Prabhumirashi, P.L.; Puntambekar, K.P.; Geier, M.L; Liang, Y.T. Methods for Preparation of Concentrated Graphene Ink Compositions and Related Composite Materials.

[6] U.S. Patent Number 10,590,294, 2020. Hersam, M.C.; Liang, Y.T.; Secor, E.B.; Prabhumirashi, P.L.; Puntambekar, K.P.; Geier, M.L; Ahn, B.Y.; Lewis, J.A. Methods for Preparation of Concentrated Graphene Ink Compositions and Related Composite Materials.

[5] U.S. Patent Number 10,350,329, 2019. Shah, R.N.; Jakus, A.E.; Hersam, M.C.; Secor, E.B. Enhanced Conductivity, Graphene-Based Ink Compositions for Three-Dimensional Printing Applications.

[4] U.S. Patent Number 10,280,317, 2019. Hersam, M.C.; Secor, E.B.; Gao, T.Z. Enhanced Conductivity, Adhesion and Environmental Stability of Printed Graphene Inks with Nitrocellulose.

[3] U.S. Patent Number 9,902,866, 2018. Hersam, M.C.; Secor, E.B.; Liang, Y.T.; Prabhumirashi, P.L.; Puntambekar, K.P.; Geier, M.L; Ahn, B.Y.; Lewis, J.A. Methods for Preparation of

Concentrated Graphene Ink Compositions and Related Composite Materials.

[2] U.S. Patent Number 9,840,634, 2017. Hersam, M.C.; Secor, E.B.; Lim, S.; Frisbie, C.D.; Francis, L.F.; Hyun, W.J. High-Resolution Patterning of Graphene by Screen and Gravure Printing for Highly Flexible Printed Electronics.

[1] U.S. Patent Number 9,834,693, 2017. Hersam, M.C.; Secor, E.B.; Prabhumirashi, P.L.; Puntambekar, K.P.; Geier, M.L; Liang, Y.T. Methods for Preparation of Concentrated Graphene Ink Compositions and Related Composite Materials.

Patent Applications

[4] U.S. Patent Application 17/114,839, 2020: Boyle, T.J.; Bell, N.S.; Cook, A.; Rimsza, J.; Secor, E.B. Metal Hydride Nanoinks.

[3] U.S. Patent Application 17/102,011, 2020: Kaehr, B.J.; Gallegos, M.A.; Garcia, C.M.; Schunk, P.R.; Secor, E.B. Architected Stamps for Liquid Transfer Printing.

[2] U.S. Patent Application 16/935,823, 2020: Secor, E.B.; Cook, A.W.; Kaehr, B.; Tafoya, R.R. Optical Measurement System for Real-Time Process Monitoring of Aerosol Jet Printing.

[1] U.S. Patent Application 15/646,761, 2017: Hersam, M.C.; Secor, E.B.; Li, L. High-Performance Solid-State Supercapacitors and Microsupercapacitors Derived from Printable Graphene Inks.

Presentations

[15] ***Secor, E.B.** Graduate Seminar at University of Texas at Austin, October 2022. Aerosol jet printing: Fundamentals, process control, and multimaterial patterning.

[14] ***Secor, E.B.** 3M NTFA Symposium, August 2022. Aerosol jet printing: Fundamentals, process control, and multimaterial patterning.

[13] ***Secor, E.B.** Graduate Seminar at University of Iowa, September 2021. Aerosol jet printing: Fundamentals, process control, and multimaterial patterning.

[12] ***Secor, E.B.** Panelist for ASME InterPACK 2020 Materials for Additive Manufacturing, October 2020. Ink Development for Printed Electronics.

[11] ***Secor, E.B.** Seminar at Corporate Research Process Laboratory, 3M Company, September 2019. Aerosol Jet Printing: From Fundamentals to Graded Multimaterial Patterning.

[10] ***Secor, E.B.**; Tafoya, R.R.; Kaehr, B.J.; Cook, A.W. Rio Grande Symposium on Advanced Materials, Albuquerque, NM, September 2019. Aerosol Jet Printing of Functionally-Graded Materials.

[9] ***Secor, E.B.** Seminar at Corporate Research Process Laboratory, 3M Company, July 2017. Production, Patterning, and Application of Graphene Inks.

[8] **Secor, E.B.** Hilliard Symposium, Northwestern University, May 2017. Production, Patterning, and Application of Graphene Inks.

[7] **Secor, E.B.**; Gao, T.Z.; Hersam, M.C. Materials Research Society Meeting, April 2017. Scalable and Versatile Liquid-Phase Production and Patterning of Two-Dimensional Nanomaterials.

[6] ***Secor, E.B.** Chemistry and Physics Colloquium, Drake University, March 2017. Production, Patterning, and Applications of Graphene Inks.

[5] ***Secor, E.B.** Truman Fellowship Interview Presentation, Sandia National Laboratories, February 2017. Nanomaterial Ink Development for Smart Manufacturing.

[4] ***Secor, E.B.** SPIE Student Seminar Series, Northwestern University, January 2017. Production,

Patterning, and Applications of Graphene Inks.

[3] **Secor, E.B.**; Hyun, W.J.; Lim, S.; Prabhumirashi, P.L.; Puntambekar, K.; Geier, M.L.; Zhang, H.; Frisbie, C.D.; Francis, L.F.; Hersam, M.C. Materials Research Society Meeting, April 2015. Versatile and High-Performance Graphene Inks for Printed and Flexible Electronics.

[2] ***Secor, E.B.** Seminar at Corporate Research Process Laboratory, 3M Company, November 2014. Development and Application of Graphene Inks.

[1] **Secor, E.**; Guan, X.; Bartschat, K.; Schneider, B. American Physical Society Division of Atomic, Molecular and Optical Physics 42nd Annual Meeting, June 2011. Multiphoton Ionization of the H_2^+ Molecule by a Laser Pulse.

* Indicates invited presentations

Teaching and Advising

Assistant Professor 2020-present

Department of Mechanical Engineering, Iowa State University

- Led research lab with diverse team of graduate and undergraduate students
- Taught core courses in Engineering Dynamics and Manufacturing Engineering

Research Mentor 2014-2020

Department of Materials Science and Engineering, Northwestern University

- Mentored two undergraduate students in Materials Science and Engineering for a total of nine semesters
- Guided both students through senior thesis work resulting in co-authored publications
- Taught laboratory practices, safety protocols, and experimental design

Advanced Materials Laboratory, Sandia National Laboratories

- Advised three summer undergraduate students and one graduate student, culminating in presentations and posters at the 2018 Solid Freeform Fabrication Symposium and the 2018 Rio Grande Symposium
- Worked closely with year-round undergraduate and graduate students to design research projects and analyze results

Teaching Assistant 2014, 2015

Department of Materials Science and Engineering, Northwestern University

- Led office hours and assisted in coursework assessment for Energy Materials and Thin Films courses for graduate students and upper-level undergraduates
- Designed and implemented a new solar energy conversion laboratory project
- Developed and presented a lecture on advanced solar energy technologies

Academic Tutor 2010-2011

Drake University

- Tutored students in physics, general chemistry, and physical chemistry

Research Experience

Assistant Professor 2020-present

Department of Mechanical Engineering, Iowa State University

- Developed process monitoring and control technologies for aerosol jet printing
- Established more holistic fundamental understanding of aerosol jet printing
- Developed hardware and software to support multi-material aerosol jet printing
- Performed research across nanomaterial ink formulation, deposition and patterning technologies, and electronic device fabrication and testing

Harry S. Truman Fellowship 2017-2020

Advanced Materials Laboratory, Sandia National Laboratories

- Performed original study of fundamental principles of aerosol jet printing
- Developed multimaterial aerosol jet printing system, including printhead design and flow modeling
- Worked with colleagues across inorganic chemistry, colloidal dispersion engineering, additive manufacturing, and materials processing to print novel materials

Graduate Research Assistant 2012-2017

Department of Materials Science and Engineering, Northwestern University

- Developed and scaled up graphene production platform for ink development
- Designed graphene inks for inkjet, aerosol jet, gravure, screen, and extrusion printing
- Developed device applications for graphene inks in flexible electronics, liquid metal electronics, microsupercapacitors, and lithium-ion batteries
- Distributed inks to broader research community through Millipore-Sigma
- Performed ten weeks of research over one year at the Air Force Research Laboratory focused on materials characterization and printed electronics
- Collaborated with researchers across five institutions and within Northwestern
- Drafted successful proposals for funding from two industry sources and a Northwestern-based start-up initiative, and contributed significantly to successful DURIP and NSF proposals

Undergraduate Research Assistant 2009-2012

Department of Chemistry, Department of Physics and Astronomy, Drake University

- Engaged in semester-long, full-time external research focused on lithium-ion battery materials at Argonne National Laboratory
- Developed post-processing algorithms for numerical quantum mechanics calculations
- Performed organic, inorganic, and physical chemistry research
- Engaged in summer research projects at the University of Minnesota, Sandia National Laboratories, and 3M Company

Service

Professional Service

- Reviewed manuscripts for *Nature, Nature Communications, ACS Nano, Advanced Materials, Advanced Functional Materials, Advanced Electronic Materials, Advanced Materials Technologies, Advanced Materials Interfaces, Additive Manufacturing, Flexible and Printed Electronics, ACS Omega, ACS Applied Electronic Materials, ACS Applied Materials &*

Interfaces, ACS Industrial & Engineering Chemistry Research, ACS Applied Nano Materials, Journal of Energy Storage, Journal of Materials Chemistry C, Nanoscale, Nanoscale Advances, IEEE Sensors Letters, MRS Advances, Advanced Intelligent Systems, Chemical Engineering Journal, Smart Materials and Structures, Microchimica Acta, Nanomaterials, Communications Engineering, and *Materials Chemistry and Physics*

- Symposium co-organizer for Fall 2021 MRS Meeting: 3D Printing of Functional Materials and Devices.
- Reviewed proposals for the U.S. Army AMRDEC, the DOE Center for Integrated Nanotechnologies, and the Irish Research Council
- Session chair at the 2019 Rio Grande Symposium on Advanced Materials
- Active member of the Materials Research Society

Outreach and Service

- Developed and led activity station for the Advanced Materials Laboratory's CSI Dognapping, a scientific outreach event reaching several hundred elementary school students annually
- Prepared materials and media for an exhibit at the Museum of Science and Industry in Chicago based on graduate school thesis work
- Led nanotechnology-themed demonstrations for K-12 students as part of STEM and Sports Day and the French-American Science Festival at Northwestern University
- Volunteered with Sandia Serves, a community service program for Sandia employees
- Volunteered as a judge for the FIRST LEGO League state-wide competition in robotics and STEM