

Joshua L. Hertz

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Professional Experience	2022 – present	Teaching Professor
	2018 – 2022	Associate Teaching Professor
	2014 – 2018	Assistant Teaching Professor <i>Northeastern University, First Year Engineering Program</i>
	2008 – 2014	Assistant Professor <i>University of Delaware, Department of Mechanical Engineering</i>
	2006 – 2008	National Research Council Postdoctoral Fellow <i>National Institute of Standards and Technology</i>

Education	2006	Ph.D. in Materials Science and Engineering <i>Massachusetts Institute of Technology</i> Thesis: “Microfabrication Methods to Improve the Kinetics of the Yttria Stabilized Zirconia – Platinum – Oxygen Electrode”
	1999	B.S. in Ceramic Engineering <i>Alfred University</i> Thesis: “Visualization and Manipulation of Domain Structure in Ferroelectric Thin-Films by Scanning Piezo-Response Microscopy”

Awards	<ul style="list-style-type: none">• 2023 College of Engineering Martin W. Essigman Outstanding Teaching Award• 2020 College of Engineering Outstanding Teacher of First Year Engineering Students• Best Paper (2nd place), First-year Programs Division, 2019 American Society for Engineering Education annual conference• 2017 Joint Faculty Award, Northeastern University student chapters of Society of Women Engineers, Society of Hispanic Professional Engineers, Black Engineering Student Society, Society of Asian Scientists and Engineers• 2015 College of Engineering Outstanding Teacher of First Year Engineering Students• Best Poster, 19th International Conference on Solid State Ionics (2013)• 2012 College of Engineering Excellence in Teaching Award, Honorable Mention• 2012 University of Delaware Excellence in Undergraduate Academic Advising and Mentoring Award, Nominee
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Publications	Patents
	1. J.L. Hertz, H.L. Tuller, “Micro fuel cell,” <i>US Patent 7,871,734</i>
	Book Chapters
	1. J.L. Hertz, “Introduction to the Design Process,” and J.L. Hertz, L. Keyvani, “Programming for Engineering,” in <i>Cornerstone of Engineering e-text</i> , TopHat (2018)
	2. J.L. Hertz and H.L. Tuller, “Micro-Fuel Cells,” in <i>Microfabricated Power Generation Devices</i> , P.I. Barton and A. Mitsos, eds., Wiley-VCH (2009)
	Journal Articles (<i>h-index = 22</i>)
	1. J.L. Hertz, “gruepr, a software tool for optimally partitioning students onto teams,” <i>Computers in Education Journal</i> , 12 , No. 2, (2021)
	2. B.E. McNealy, J. Jiang, J.L. Hertz, “A precise, reduced-parameter physical model of thin film electrolyte impedance,” <i>J. Electrochem. Soc.</i> , 162 , p. F537 (2015)

3. W. Shen, J. Jiang, J.L. Hertz, "Using thin films to investigate heterogeneous defect chemistry," *J. Electroceramics*, **34**, p. 74 (2015)
4. W. Shen, J.L. Hertz, "Ionic conductivity of YSZ/CZO multilayers with variable lattice mismatch," *J. Mater. Chem. A*, **3**, p. 2378 (2015)
5. N. Ye, A. Hasbani, J. Jiang, J.L. Hertz, "Zn, Ga, and Ca substituted transition-metal-free oxides with K_2NiF_4 structure," *J. Mater. Chem. A*, **2**, p. 7563 (2014)
6. W. Shen, J.L. Hertz, "Beneficial lattice strain in heterogeneously doped ceria," *J. Phys. Chem. C*, **118**, p. 22904 (2014)
7. J. Jiang, J.L. Hertz, "Intermediate temperature surface proton conduction on dense YSZ thin films," *J. Mater. Chem. A*, **2**, p. 19550 (2014)
8. W. Shen, J. Jiang, J.L. Hertz, "Reduced ionic conductivity in biaxially compressed ceria," *RSC Adv.*, **4**, p. 21625 (2014)
9. J. Jiang, X. Hu, N. Ye, J.L. Hertz, "Microstructure and ionic conductivity of yttria-stabilized zirconia thin films deposited on MgO," *J. Am. Ceram. Soc.*, **97**, p. 1131 (2014)
10. J. Jiang, J.L. Hertz, "On the variability of reported ionic conductivity in nanoscale YSZ thin films," *J. Electroceramics*, **32**, p. 37 (2014)
11. B.E. McNealy, J.L. Hertz, "On the use of the constant phase element to understand variation in grain boundary properties," *Solid State Ionics*, **256**, p. 52 (2014)
12. W. Shen, J. Jiang, C. Ni, Z. Voras, T.P. Beebe, J.L. Hertz, "Two-dimensional vacancy trapping in yttria-doped ceria," *Solid State Ionics*, **255**, p. 13 (2014)
13. J. Jiang, D. Clark, W. Shen, J.L. Hertz, "The effects of substrate surface structure on yttria stabilized zirconia thin films," *Appl. Surf. Sci.*, **293**, p. 191 (2014)
14. N. Ye, J.L. Hertz, "Creation of ionic defects in transition-metal-free oxides with K_2NiF_4 structure," *Acta Mater.*, **63**, p. 123 (2014)
15. B.E. McNealy, J.L. Hertz, "Extended Poisson-Nernst-Planck modeling of membrane blockage via insoluble reaction products," *J. Math. Chem.*, **52**, p. 430 (2014)
16. J. Jiang, W. Shen, J.L. Hertz, "Structure and ionic conductivity of nanoscale gadolinia-doped ceria thin films," *Solid State Ionics*, **249-250**, p. 139 (2013)
17. J. Jiang, X. Hu, W. Shen, C. Ni, J.L. Hertz, "Improved ionic conductivity in strained yttria-stabilized zirconia thin films," *Appl. Phys. Lett.*, **102**, 143901 (2013)
18. B.E. McNealy, J.L. Hertz, "Numerical modeling of a non-flooding hybrid polymer electrolyte fuel cell," *Int. J. Hydrogen Energy*, **38**, p. 5357 (2013)
19. E. Fischer, W. Shen, J.L. Hertz, "Measurement of the surface exchange and diffusion coefficients of thin film $LaCoO_3$ and $SrCoO_x$," *J. Electroceramics*, **29**, p. 262 (2012)
20. J. Jiang, W. Shen, J.L. Hertz, "Fabrication of epitaxial zirconia and ceria thin films with arbitrary dopant and host atom composition," *Thin Solid Films*, **522**, p. 66 (2012)
21. E. Fischer, J.L. Hertz, "Measurability of the diffusion and surface exchange coefficients using isotope exchange with thin film and traditional samples," *Solid State Ionics*, **218**, p. 18 (2012)
22. J.L. Hertz, D. Lahr, S. Semancik, "Combinatorial characterization of chemiresistive films using microhotplate platforms," *IEEE Sens. J.*, **12**, p. 1459 (2012)
23. W. Shen, A.K. Prasad, J.L. Hertz, "A non-flooding hybrid polymer electrolyte fuel cell," *Electrochem. Solid-State Lett.*, **14**, p. B121 (2011) **[Highlighted Article]**
24. L.F. Pease, D.-H. Tsai, R.A. Zangmeister, J.L. Hertz, M.R. Zachariah, M.J. Tarlov, "Packing and size determination of colloidal nanoclusters," *Langmuir*, **26**, p. 11384 (2010)
25. D. Lahr, J.L. Hertz, S. Semancik, "A combinatorial study of thin film process variables using microhotplates," *J. Microelectromech. Syst.*, **19**, p. 239 (2010)

26. N. Yamamoto, D.J. Quinn, N. Wicks, J.L. Hertz, J. Cui, H.L. Tuller, B. Wardle, "Nonlinear thermomechanical design of microfabricated thin plate devices in the post-buckling regime," *J. Micromech. Microeng.*, **20**, 035027 (2010)
27. J.L. Hertz, A. Rothschild, H.L. Tuller, "Highly enhanced electrochemical performance of silicon-free platinum—yttria stabilized zirconia interfaces," *J. Electroceramics*, **22**, p. 428 (2009)
28. R. Artzi-Gerlitz, K.D. Benkstein, D.L. Lahr, J.L. Hertz, C.B. Montgomery, J.E. Bonevich, S. Semancik, M.J. Tarlov, "Fabrication and gas sensing performance of parallel assemblies of metal oxide nanotubes supported by porous aluminum oxide membranes," *Sens. Actuators B*, **136**, p. 257 (2009)
29. W.C. Jung, J.L. Hertz, H.L. Tuller, "Enhanced ionic conductivity and phase meta-stability of nano-sized thin film yttria-doped zirconia," *Acta Mater.*, **57**, p. 1399 (2009)
30. B. Raman, J.L. Hertz, K.D. Benkstein, S. Semancik, "Bioinspired methodology for artificial olfaction," *Anal. Chem.*, **80**, p. 8364 (2008) **[Highlighted Article]**
31. S.J. Litzelman, J.L. Hertz, W.C. Jung, H.L. Tuller, "Opportunities and challenges in materials development for thin film solid oxide fuel cells," *Fuel Cells*, **8**, p. 294 (2008)
32. A. Bieberle-Hütter, J.L. Hertz, H.L. Tuller, "Fabrication and electrochemical characterization of planar Pt-CGO microstructures," *Acta Mater.*, **56**, p. 177 (2008)
33. J.L. Hertz and H.L. Tuller, "Measurement and finite element modeling of triple phase boundary-related current constriction in YSZ," *Solid State Ionics*, **178**, p. 915 (2007)
34. J.L. Hertz and H.L. Tuller, "Nanocomposite platinum-yttria stabilized zirconia electrode and implications for micro solid oxide fuel cell operation," *J. Electrochem. Soc.*, **154**, p. B413 (2007)
35. T. Hyodo, A. Bieberle-Hütter, J.L. Hertz, H.L. Tuller, "Three dimensional arrays of hollow gadolinia-doped ceria microspheres prepared by R.F. magnetron sputtering employing PMMA microsphere templates," *J. Electroceramics*, **17**, p. 695 (2006)
36. J.L. Hertz and H.L. Tuller, "Electrochemical characterization of thin films for a micro-solid oxide fuel cell," *J. Electroceramics*, **13**, p. 663 (2004)
37. G.J. La O, J. Hertz, H. Tuller, Y. Shao-Horn, "Microstructural features of RF-sputtered SOFC anode and electrolyte materials," *J. Electroceramics*, **13**, p. 691 (2004)
38. C.D. Baertsch, K.F. Jensen, J.L. Hertz, H.L. Tuller, S.T. Vengallatore, S.M. Spearing, M.A. Schmidt, "Fabrication and structural characterization of self-supporting electrolyte membranes for a micro-solid oxide fuel cell," *J. Mater. Res.*, **19**, p. 2604 (2004)

Peer-Reviewed Conference Proceedings

1. R. Whalen, J.L. Hertz, "What to teach first, hardware or software? improving success in introductory programming courses," *2023 ASEE Annual Conference and Exposition*, paper ID#44620 (2023)
2. J.L. Hertz, "Work-in-progress: technical consulting as an experiential form of peer tutoring," *2022 ASEE Annual Conference and Exposition*, paper ID#37832 (2022)
3. K.P. Fuller, A.J. Lopreiato, R.L. Schodowski, A.W. Silverman, S.L. Bowman, C.E. Tov, J.L. Hertz, "Development of a Surgical Lamp for Ethiopia by Undergraduate Innovators for Global Health" *ASEE Middle Atlantic Section 2021 Conference*, paper ID#35270 (2021)
4. J.L. Hertz, S.F. Freeman, "gruepr, an open source tool for creating optimal student teams," *2020 ASEE Annual Conference and Exposition*, paper ID#29362 (2020)
5. J.L. Hertz, R. Whalen, C. Mukasa, J. Sangster, "4th time around: do classes get better with instructor repetition?" *2020 ASEE Annual Conference and Exposition*, paper ID#29367 (2020)

6. J.L. Hertz, N. Daviero, "We own this: a class patent system as experiential learning," *2019 ASEE Annual Conference and Exposition*, paper ID#25363 (2019)
7. J.L. Hertz, D. Davis, B. O'Connell, C. Mukasa, "Gruepr: an open source program for creating student project teams," *2019 ASEE Annual Conference and Exposition*, paper ID#26537 (2019)
8. J.L. Hertz, "Confidently uncomfortable: first year student ambiguity tolerance and self-efficacy on open-ended design problems," *2018 ASEE Annual Conference and Exposition*, paper ID#23114 (2018)
9. R. Whalen, S.F. Freeman, J.O. Love, K. Schulte Grahame, J.L. Hertz, "Evolution of cornerstone: creating a first-year culture with a multifaceted approach," *2018 ASEE Annual Conference and Exposition*, paper ID#22932 (2018)
10. S.F. Freeman, C. Pfluger, R. Whalen, K. Schulte Grahame, J.L. Hertz, C. Variawa, J.O. Love, M.L. Sivak, B. Maheswaran, "Cranking up cornerstone: lessons learned from implementing a pilot with first-year engineering students," *2016 ASEE Annual Conference and Exposition*, paper ID#16898 (2016)
11. W. Shen, J. Jiang, J. Hertz, "Nanoengineered model systems for solid oxide fuel cells," *Abstracts Of Papers Of The American Chemical Society*, Vol. 245, Abs. 824-ENFL (2013)
12. B.E. McNealy, J.L. Hertz, "Detailed numerical modeling of a hybrid polymer electrolyte fuel cell," *Electrochemical Society Transactions*, Vol. 50(2), p. 137 (2013)
13. B. Raman, J. Hertz, K. Benkstein, S. Semancik, "Odor recognition vs. classification in artificial olfaction," *American Institute of Physics Proceedings*, Vol. 1362, p. 69 (2011)
14. W. Shen, F. Zhang, A. Prasad, J. Hertz, "Non-flooding hybrid polymer fuel cell," *Electrochemical Society Transactions*, Vol. 33(1), p. 2011 (2010)
15. B. Raman, J.L. Hertz, K.D. Benkstein, D.C. Meier, C.S. Mungle, S. Semancik, "Generating and using data of higher dimension for gas-phase chemical sensing," *Electrochemical Society Transactions*, Vol. 19(6), p. 255 (2009)
16. J.L. Hertz, C. Montgomery, D. Lahr, S. Semancik, "Relative resistance chemical sensors built on microhotplate platforms," *Microelectromechanical Systems—Materials and Devices*, Materials Research Society Proceedings, Vol. 1052, p. 1052-DD05-03 (2007)
17. T. Hyodo, J.L. Hertz, H.L. Tuller, "Preparation of macroporous noble metal films by R.F. magnetron sputtering for electrochemical device applications," *Chemical Sensors VI: Chemical and Biological Sensors and Analytical Methods*, Electrochemical Society Proceedings, Vol. 2004-08, p. 10 (2004)
18. J.L. Hertz, J. Lappalainen, D. Kek, T. Stefanik, H.L. Tuller, "Progress towards an all thin film fuel cell for portable power generation," *Micropower and Microdevices*, Electrochemical Society Proceedings, Vol. 2002-25, p. 137 (2002)

Invited Presentations

1. "Ion conduction at engineered junctions," *Harry L. Tuller Symposium at MIT*, Cambridge, MA, May 26, 2023
2. "Heterogeneous, ion-conducting thin films," *Oxide Thin Films for Advanced Energy & Information Applications*, Chicago, IL, Jul. 14, 2014
3. "Heterogeneous thin films to model and improve solid electrolytes," *Princeton University Department of Mechanical and Aerospace Engineering Seminar*, Princeton, NJ, Feb. 21, 2014
4. "Using thin films to investigate heterogeneous (defect) chemistry," *The 19th International Conference on Solid State Ionics*, Kyoto, Japan, June 7, 2013
5. "Nanoengineered model systems for solid oxide fuel cells," *American Chemical Society National Meeting*, New Orleans, LA, Apr. 11, 2013

6. "Multilayer films for solid oxide fuel cell electrolytes," *Composites at Lake Louise*, Banff, Canada, Oct. 30, 2011
7. "Combinatorial optimization of solid oxide fuel cell cathode composition," *THERMEC 2011*, Quebec, Canada, Aug. 2, 2011
8. "Bioinspired methodology for odor recognition using chemical sensor arrays," *SPIE Bioinspiration, Biomimetics, & Bioreplication Conference*, San Diego, CA, Mar. 7, 2011
9. "Ceramic materials and coatings for fuel cells and sensors," *Weapons and Materials Research Directorate, U.S. Army Research Laboratory*, Aberdeen, MD, Jan. 27, 2010
10. "Nanomaterials-megawatts: the use of microfabrication within solid oxide fuel cells," *Condensed Matter Group, University of Delaware Department of Physics and Astronomy*, Newark, DE, Nov. 10, 2009
11. "Nanocomposite thin films for solid oxide fuel cells," *Composites at Lake Louise*, Banff, Canada, Oct. 28, 2009
12. "Nanomaterials-megawatts," *University of Delaware Academy of Lifelong Learning*, Rehoboth Beach, DE, May 27, 2009
13. "High temperature microsystems," *University of Delaware Department of Materials Science and Engineering*, Newark, DE, Jan. 28, 2009
14. "Nanomaterials-megawatts: the use of microfabrication within solid oxide fuel cells," *Center for Catalytic Science and Technology, University of Delaware Department of Chemical Engineering*, Newark, DE, Oct. 28, 2008
15. "Measurement of the transport mechanism of YSZ thin films with nm-sized grain structure," *29th International Conference on Advanced Ceramics and Composites*, Cocoa Beach, FL, Jan. 24, 2005

Research Grants

1. J.L. Hertz, "Improved Electrochemical Performance of Strained Lattice Electrolytes via Modulated Composition," *US Department of Energy Office of Basic Energy Sciences*, Aug. 2010 – Feb. 2015: \$548,000
2. J.L. Hertz, "STIR: Improved Electrolyte Surface Exchange via Atomically Strained Surfaces," *Army Research Office*, Jun. 2014 – Jan. 2015: \$50,000
3. J.L. Hertz, D.L. Burris, "A Sputtered PTFE Nanocomposite Coating as a Route to Extend NASA's Space Exploration Envelope," *NASA/EPSCoR RID Seed Grant Program*, Feb. 2010 – Jan. 2011: \$28,000
4. J.L. Hertz, A.K. Prasad, "Development and Characterization of a Novel Floodless Fuel Cell," *University of Delaware Research Foundation*, Dec. 2009 – Sep. 2011: \$45,000

Research Advisement

Graduate Students, Thesis Advisor

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|-------------------|-------------------|------|
| 1. Ben McNealy | PhD | 2017 |
| 2. Jun Jiang | PhD | 2014 |
| 3. Weida Shen | PhD | 2014 |
| 4. Philip Zandona | MSME (co-advised) | 2014 |
| 5. Eric Fischer | MSME | 2012 |

Graduate Students, Thesis Committee Member (*all PhD in Mech. Eng. except as noted*)

Cedric Jacobs, Nian-Tzu Suen (Chemistry and Biochemistry), Jiaxin Ye, Harman Khare, Qing Zhang, Jie Fu, Erik Koepf, Gaurav Pandey, Songwei Zheng, (MSME), Xin Li (MSME), Jiepeng Rong (MSME), Melissa Lugo (MSME)

Undergraduate and High School Students (* - co-author; † - high school student)

Jonathan Chen, Noah Daviero (*), Adam Bitar, Alexandra Hasbani (*,†), Yannick Hutson, Michael Meck, Daniel Clark (*), Inji Yeom, Rachel Lehr, Mike Marra-Powers, Anna D'Alessio, Yang Yu, Martha Serna, Peter Bocchini, James White, Andrew Baker

Courses Taught**Northeastern University**

- Cornerstone of Engineering I & II Fall & Spring 2015-2023

With colleagues, I developed a reimagined pair of first year engineering courses as a year-long Cornerstone experience. In addition to co-developing the general curriculum, I created content for three themed versions of the course: Security, Music, and Games, and I developed connections to community partners, Kadence Arts and the Boston Children's Museum, to serve as clients for the students' final projects.
- Ceramic Science and Engineering Summer 2018 & 2020

I developed a new upper-level undergraduate elective course. Content extended knowledge of materials science into one of its principle branches: ceramics. Course enrollment was 9 students in 2018 and 8 students in 2020.
- Dialogue of Civilizations Summer 2016 & 2019

I planned and led 2, 30-day "Dialogue of Civilizations" trips. The first was to Brazil, where students took one course on alternative energy technologies, led by me, and a course on Brazilian culture, led by an in-country partner. The second was to Belize and Guatemala, where students took courses in archaeological materials science and ceramic science, both courses created and led by me. In addition to classes, each trip included a variety of unique and enriching educational and cultural excursions.
- Engineering Computation and Analysis Various semesters 2015-2023

Multiple times, I have led sections of this project-based, hands-on introduction to computer programming with MATLAB and C++. I created a themed version of the course, with the students acting as secret agents working on weekly espionage-related missions.
- Engineering Design Fall 2014 & Summer 2017

I led three sections of a project-based, hands on introduction to engineering design, with additional focus on AutoCAD and SolidWorks software. New projects I introduced to the class were design of musical instruments playable by persons with upper-body impairment, and innovative means for public education of STEM topics.

University of Delaware

- Statics Spring 2009 – 2014

This was a required freshman course for Mechanical Engineers. I developed a new, stand-alone honors section of this course for years 2009-2012, incorporating innovative teaching concepts: on-line wiki-based group work to find and solve "statics in the real world" problems, and MATLAB-based numerical problem solving. I then switched to much larger (80-90 students), non-Honors sections of Statics in 2013. I maintained an interactive classroom despite the size using clickers. Partnering with other faculty, team-based Design and Build Challenges were incorporated through the semester to reinforce lecture content and complementary engineering skills.
- Introduction to Microsystems Fall 2009 – 2013

I developed this new upper-level undergraduate elective course. In 2012, I entirely restructured it to use a Problem Based Learning approach centered on five open-ended microdevice design problems. The problems require independent student investigation into microfabrication techniques, small scale sensing and actuating mechanisms, and emerging application areas. Lectures were provided only upon student request on topics they felt would help in answering the current problem.

- Solid State Electrochemistry Spring 2012
I developed this lecture course for advanced graduate students in collaboration with Prof. Bingqing Wei. Topics include mass and charge transport in solids, point defect equilibria, electrode kinetics, and common measurement techniques. Particular attention is given to principles relevant to batteries and fuel cells.
 - Independent Study/Senior Thesis
I led research-based independent studies for 10 undergraduate students, totaling 14 student-semester. Students generally collaborated with a graduate student, maintained a lab notebook, presented results orally at group meeting(s) and at a general poster session, and authored a final document.
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Pedagogical Grants

1. J.L. Hertz, "From Program to App: Developing gruepr for Worldwide Use," *Provost's Full Time Faculty Development Fund*, Sept. 2021 – Apr. 2022: \$2,000
 2. J.L. Hertz, "A New, Experiential Form of Peer Tutoring in the Engineering Cornerstone," *Provost's Full Time Faculty Development Fund*, Jan. 2019 – Apr. 2020: \$2,000
 3. J.L. Hertz, "Arts and Community Outreach in the Engineering Cornerstone," *Provost's Full Time Faculty Development Fund*, Jan. – Apr. 2017: \$2,000
 4. J.L. Hertz, "Spying on MATLAB: A Curriculum Development Microgrant," *Northeastern University—Mathworks Microgrant*, July – Dec. 2015: \$20,000
 5. E.T. Thostenson, T.-W. Chou, J.W. Gillespie, J.L. Hertz, B.Q. Wei, "Nanotechnology Undergraduate Education in Engineering: Interdisciplinary Research-Based Education," *National Science Foundation Nanotechnology Undergraduate Education*, Sep. 2011 – Aug. 2014: \$200,000
 6. "Summer Undergraduate Research Fellowship," *National Institute of Standards and Technology SURF Program*:
 - May – Sep. 2012: \$8,281
 - May – Sep. 2011: \$7,550
 - May – Sep. 2010: \$7,097
 - May – Sep. 2009: \$6,101
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Pedagogical Presentations

1. "Work-in-progress: technical consulting as an experiential form of peer tutoring," *2022 ASEE Annual Conference and Exposition*
2. "Activity with impact – Operation: Codenames" *2020 ASEE Annual Conference and Exposition*.
3. "gruepr, an open source tool for creating optimal student teams," *2020 ASEE Annual Conference and Exposition*.
4. "4th time around: do classes get better with instructor repetition?" *2020 ASEE Annual Conference and Exposition*.
5. "We own this: a class patent system as experiential learning," *2019 ASEE Annual Conference and Exposition*.
6. "Gruepr: an open source program for creating student project teams," *2019 ASEE Annual Conference and Exposition*.
7. "We own this: a class patent system as experiential learning," *2019 Conference for Advancing Evidence-Based Learning*.
8. "Confidently uncomfortable: first year student ambiguity tolerance and self-efficacy on open-ended design problems," *2018 ASEE Annual Conference and Exposition*
9. "Evolution of cornerstone: creating a first-year culture with a multifaceted approach," *2018 ASEE Annual Conference and Exposition*

10. "Improving first year students' self-efficacy and ability on open-ended problems," *2017 Conference for Advancing Evidence-Based Teaching*.
11. "Improv Engineering: games to improve student risk tolerance," *2016 Conference for Advancing Evidence-Based Teaching*.
12. "Shall I try this? An interactive workshop on assessing hands-on teaching," *2015 ASEE Northeast Section Conference*.
13. "Our local writing culture: Reading the NSSE writing survey," (panelist) *2014 UD Winter Workshop*.
14. "Using wikis to facilitate collaborative student learning," *2009 Lilly-East Conference on College and University Teaching*.

Pedagogical Development and Activities

- Faculty Scholar, *Northeastern University Center for Advancing Teaching and Learning through Research*, 2015-2016 and 2016-2017
- Technical Editor of Wiley's *Statics for Dummies*
- Reviewer for Pearson's *Calculus, 2e* textbook and MyMathLab interactive eText
- Participant:
 1. 2020 National Educator Anti-Racism Conference
 2. 2019 National Conference on Race and Ethnicity in Higher Education
 3. "Student learning through writing," *UD Writing Center*, June 18 – 20, 2012
 4. "Introduction to problem-based learning," *UD Institute for Transforming Undergraduate Education*, Jan. 4 – 6, 2012
- Co-organizer of "Materials Science of Renewable Energy" Lecture Series, 2006 Winter term at the Massachusetts Institute of Technology
- Reviewer for Pearson's *Engineering Mechanics: Statics* textbook proposal
- Reviewer for Elsevier's on-line learning assistance program "Engineering Mechanics: Concepts, Applications, and Assessment"

University Service

Northeastern University

- University:
 - 2023 – present Engineering Ethics Teaching Faculty Search Committee
 - 2023 Research Leadership Development Initiative (ReDI) participant
 - 2021 – 2023 Senator, Faculty Senate
 - 2022 – 2023 Faculty Handbook Ad-Hoc Committee
 - 2018 – 2019 Faculty Senate Information Technology Policy Committee
- College:
 - 2020 – present Global Opportunities Committee
 - 2019 – 2022 Diversity, Equity, and Inclusion Committee
 - 2020 – 2021 Merit Review Committee
 - 2018 – 2019 NTT Promotion Committee
 - 2016 – 2017 Teaching Innovation Task Force
- Unit:
 - 2018 – present New Faculty Mentor
 - 2017 – present Engineering Minor Committee
- Student Group Advisement:
 - 2022 – present Give A Hand (co-advisor)
 - 2020 – present Innovators for Global Health
 - 2019 – present Tau Beta Pi (co-advisor)

University of Delaware

- University:
 - 2012 – 2014 Nanofabrication Core Facility Faculty Advisory Board
 - 2012 Nanofabrication Facility Manager Search Committee
 - 2011 – 2012 ISE Lab Clean Room Task Force
 - College:
 - 2013 – 2014 Junior Faculty Advisory Council
 - 2013 – 2014 Faculty Search Committee: Interdisciplinary (Nanofabrication)
 - Department:
 - 2013 – 2014 Graduate Curriculum Committee
 - 2012 – 2014 Seminar Committee (chair, 2013 – 2014)
 - 2008 – 2014 Safety Committee (chair, 2009 – 2014)
 - 2008 – 2014 Publicity Committee (co-chair, 2008 – 2009)
 - 2012 – 2013 Faculty Search Committee
 - 2008 – 2009 Strategic Planning
 - University Honors Program:
 - 2010 – 2014 Departmental Honors Student Advisor
 - 2011 Curriculum Strategic Planning Committee
 - Planning Committee, UD-Tsinghua Workshop on Nanotechnology
 - Student Group Advisement:
 - Tau Beta Pi (co-advisor)
 - Mechanical Engineering Graduate Association
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Professional Service

- Program Chair, ASEE First Year Programs Division, 2023 – present
 - Executive Board Member, ASEE First Year Programs Division (Program Chair Elect, At-Large Member, Secretary, Newsletter Editor), 2018 – present
 - ASEE Conference Session Moderator and Reviewer for the Divisions of First-Year Programs, Computers in Education, Engineering Physics & Physics (2015 – present)
 - International Advisory Board Member, *The 21st International Conference on Solid State Ionics*, Padua, Italy, June 18-23, 2017
 - Local Organizing Committee Member, *The 20th International Conference on Solid State Ionics*, Keystone, Colorado, June 15-19, 2015
 - Member, Volunteerism Subcommittee, Materials Research Society, 2014 – 2015
 - Symposium Co-organizer, "Materials for Fuel Cells," *Euromat 2013, Biennial Meeting of the Federation of European Materials Societies*
 - Principal Editor, "Focus Issue: Advanced Materials for Fuel Cells," *Journal of Materials Research* (Aug. 2012)
 - Principal Editor, *Advanced Materials for Fuel Cells*, Materials Research Society Proceedings, Vol. 1384 (2012)
 - Symposium Co-organizer, "Advanced Materials for Fuel Cells," *Materials Research Society 2011 Fall Meeting*
 - Symposium Co-organizer, "Fuel Cells and Hydrogen Storage Technologies," *THERMEC 2011: 7th International Conf. on Processing & Manufacturing of Advanced Materials*
 - Conference Program Committee, *Bioinspiration, Biomimetics, and Bioreplication: SPIE Conference 7975* (2011) and *SPIE Conference SSN01* (2012)
 - Guest Editor, *Journal of Electroceramics*, Vol. 13 (2004)
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Outreach**

- Developed and ran on multiple occasions a workshop for grade 7-12 students teaching about fuel cells, water electrolysis, and hydrogen, culminating in a fuel cell car race
- 4-H Adventures in Science: led 2 hands-on workshops for grade 5-8 students on: 1) the science of ice crystallization, snow, road salt, and ice cream, and 2) microchips, MEMS, and photolithography