

Joshua L. Hertz

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Professional Experience	2018 – present	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">• 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	Book Chapters
	<ol style="list-style-type: none">1. J.L. Hertz, “Introduction to the Design Process,” 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)

Patents

1. J.L. Hertz, H.L. Tuller, “Micro fuel cell,” *US Patent 7,871,734*

Journal Articles (*h-index = 19*)

1. B.E. McNealy, J. Jiang, J.L. Hertz, “A precise, reduced-parameter physical model of thin film electrolyte impedance,” *J. Electrochem. Soc.*, **162**, p. F537 (2015)
2. W. Shen, J. Jiang, J.L. Hertz, “Using thin films to investigate heterogeneous defect chemistry,” *J. Electroceramics*, **34**, p. 74 (2015) **[Invited Article]**
3. W. Shen, J.L. Hertz, “Ionic conductivity of YSZ/CZO multilayers with variable lattice mismatch,” *J. Mater. Chem. A*, **3**, p. 2378 (2015)

4. 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)
5. W. Shen, J.L. Hertz, "Beneficial lattice strain in heterogeneously doped ceria," *J. Phys. Chem. C*, **118**, p. 22904 (2014)
6. J. Jiang, J.L. Hertz, "Intermediate temperature surface proton conduction on dense YSZ thin films," *J. Mater. Chem. A*, **2**, p. 19550 (2014)
7. W. Shen, J. Jiang, J.L. Hertz, "Reduced ionic conductivity in biaxially compressed ceria," *RSC Adv.*, **4**, p. 21625 (2014)
8. 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)
9. J. Jiang, J.L. Hertz, "On the variability of reported ionic conductivity in nanoscale YSZ thin films," *J. Electroceramics*, **32**, p. 37 (2014)
10. 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)
11. 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)
12. 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)
13. 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)
14. 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)
15. 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)
16. 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)
17. 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)
18. 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)
19. 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)
20. 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)
21. J.L. Hertz, D. Lahr, S. Semancik, "Combinatorial characterization of chemiresistive films using microhotplate platforms," *IEEE Sens. J.*, **12**, p. 1459 (2012)
22. 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]**
23. 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)
24. D. Lahr, J.L. Hertz, S. Semancik, "A combinatorial study of thin film process variables using microhotplates," *J. Microelectromech. Syst.*, **19**, p. 239 (2010)
25. 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)

26. 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)
27. 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)
28. 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)
29. B. Raman, J.L. Hertz, K.D. Benkstein, S. Semancik, "Bioinspired methodology for artificial olfaction," *Anal. Chem.*, **80**, p. 8364 (2008) **[Highlighted Article]**
30. 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)
31. A. Bieberle-Hütter, J.L. Hertz, H.L. Tuller, "Fabrication and electrochemical characterization of planar Pt-CGO microstructures," *Acta Mater.*, **56**, p. 177 (2008)
32. 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)
33. 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)
34. 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)
35. 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)
36. 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)
37. 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)

Conference Proceedings

1. 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)
2. 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)
3. 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)
4. 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)
5. 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)
6. 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)

7. 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)
8. 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)
9. W. Shen, F. Zhang, A. Prasad, J. Hertz, "Non-flooding hybrid polymer fuel cell," *Electrochemical Society Transactions*, Vol. 33(1), p. 2011 (2010)
10. 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)
11. 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)
12. J.L. Hertz, A. Bieberle, H.L. Tuller, "Characterization of the electrochemical performance of YSZ thin films with nanometer-sized grain structure," *MIT-Tohoku Joint Workshop on Nano-Science in Energy Technology*, p. O-11-1 (2004)
13. 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)
14. 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. "Heterogeneous, ion-conducting thin films," *Oxide Thin Films for Advanced Energy & Information Applications*, Chicago, IL, Jul. 14, 2014
2. "Heterogeneous thin films to model and improve solid electrolytes," *Princeton University Department of Mechanical and Aerospace Engineering Seminar*, Princeton, NJ, Feb. 21, 2014
3. "Using thin films to investigate heterogeneous (defect) chemistry," *The 19th International Conference on Solid State Ionics*, Kyoto, Japan, June 7, 2013
4. "Nanoengineered model systems for solid oxide fuel cells," *American Chemical Society National Meeting*, New Orleans, LA, Apr. 11, 2013
5. "Multilayer films for solid oxide fuel cell electrolytes," *Composites at Lake Louise*, Banff, Canada, Oct. 30, 2011
6. "Combinatorial optimization of solid oxide fuel cell cathode composition," *THERMEC 2011*, Quebec, Canada, Aug. 2, 2011
7. "Bioinspired methodology for odor recognition using chemical sensor arrays," *SPIE Bioinspiration, Biomimetics, & Bioreplication Conference*, San Diego, CA, Mar. 7, 2011
8. "Ceramic materials and coatings for fuel cells and sensors," *Weapons and Materials Research Directorate, U.S. Army Research Laboratory*, Aberdeen, MD, Jan. 27, 2010
9. "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
10. "Nanocomposite thin films for solid oxide fuel cells," *Composites at Lake Louise*, Banff, Canada, Oct. 28, 2009
11. "Nanomaterials-megawatts," *University of Delaware Academy of Lifelong Learning*, Rehoboth Beach, DE, May 27, 2009

12. "High temperature microsystems," *University of Delaware Department of Materials Science and Engineering*, Newark, DE, Jan. 28, 2009
13. "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
14. "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 (* - paper co-author; † - high school student)

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

Courses at Northeastern University

- Cornerstone of Engineering I & II Fall & Spring 2015-2019
 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. Each year, I have taken an overload schedule to teach four sections. I developed connections to community partners, Kadence Arts and the Boston Children's Museum, to serve as clients for the students' final projects.

Avg. student evaluation scores shown: 1=strongly unfavorable, 5=strongly favorable	<u>Question</u>	<u>'15-'16</u>	<u>'16-'17</u>	<u>'17-'18</u>	<u>'18-'19</u>
	1) I learned a lot in this course	4.6	4.6	4.7	4.6
	2) The instructor is someone I would recommend to other students	4.7	4.8	4.9	4.8
	3) Overall rating of instructor's teaching effectiveness	4.7	4.9	4.9	5.0

- Ceramic Science and Engineering Summer 2018

I developed a new upper-level undergraduate elective course. Content extended knowledge of materials science into one of its principle branches: ceramics. In the first year of it being offered, 9 students completed the course.

<u>Question</u>	<u>'18</u>
1) I learned a lot in this course	4.9
2) The instructor is someone I would recommend to other students	4.8
3) Overall rating of instructor's teaching effectiveness	4.9

- Alternative Energy Technologies Abroad Summer 2016

I planned and led a Dialogue of Civilizations trip to Brazil. Students took two courses: one on Brazilian culture, led by an in-country partner, and this course, led by me. In addition to classes, we had many site visits, including a hydroelectric dam, a bioethanol plant, and the Secretary of Energy for the State of São Paulo.

<u>Question</u>	<u>'16</u>
1) I learned a lot from this experience	4.7
2) I would recommend the instructor to other students	5.0
3) Overall, my instructor's teaching was effective	4.7

- Engineering Computation and Analysis Spring 2015, Summer 2016

I led three sections of a 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.

<u>Question</u>	<u>'15</u>	<u>'16</u>
1) I learned a lot in this course	4.7	4.6
2) The instructor is someone I would recommend to other students	4.7	4.6
3) Overall rating of instructor's teaching effectiveness	4.8	4.8

- 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.

<u>Question</u>	<u>'14</u>	<u>'17</u>
1) I learned a lot in this course	4.4	3.9
2) The instructor is someone I would recommend to other students	4.6	4.1
3) Overall rating of instructor's teaching effectiveness	4.8	4.6

Courses at the 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 the larger, non-Honors sections of Statics: 1 section of ~80 students in 2013 and two sections of ~90 students in 2014. Despite the size, I maintained an interactive classroom, in part by using i>clickers. Partnering with other faculty, team-based Design and Build Challenges were incorporated through the semester to reinforce both lecture content and complementary engineering skills.

<u>Question</u>	<u>'09</u>	<u>'10</u>	<u>'11</u>	<u>'12</u>	<u>'13</u>	<u>'14</u>
1) Instructor has a thorough knowledge of the subject	4.6	4.9	4.9	5.0	4.8	4.8
2) Instructor communicates the subject well	4.4	4.5	5.0	4.9	4.6	4.6
3) Instructor is one of my best teachers	4.2	4.4	4.9	4.9	4.3	4.3

- Introduction to Microsystems Fall 2009 – 2013

I developed this new upper-level undergraduate elective course and then in 2012 completely restructured it to use a Problem Based Learning approach centered on five highly open-ended microdevice design problems. The problems require investigation into microfabrication techniques; small scale sensing and actuating mechanisms; and the main mechanical, thermal, fluidic, chemical, and biological applications. Lectures were provided upon student request on topics they feel will help in answering the current problem.

<u>Question</u>	<u>'09</u>	<u>'10</u>	<u>'11</u>	<u>'12</u>	<u>'13</u>
1) Instructor has a thorough knowledge of the subject	4.6	4.6	4.8	4.7	4.7
2) Instructor communicates the subject well	4.6	4.6	4.7	4.4	4.5
3) Instructor is one of my best teachers	4.7	4.4	4.8	4.3	4.4

- 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.

<u>Question</u>	<u>'12</u>
1) Instructor has a thorough knowledge of the subject	4.6
2) Instructor communicates the subject well	4.4
3) Instructor is one of my best teachers	4.2

- Independent Study/Senior Thesis

I led research-based independent studies for 10 undergraduate students, totaling 14 student-semesters. Students generally collaborated with a graduate student to perform research in my lab, maintained a lab notebook, presented results orally at group meeting(s) and at a general poster session, and authored a final document. One student authored a proceedings article based upon external research.

Pedagogical Grants

1. J.L. Hertz, "Arts and Community Outreach in the Engineering Cornerstone," *Provost's Full Time Faculty Development Fund*, Jan. – Apr. 2017: \$2,000
 2. J.L. Hertz, "Spying on MATLAB: A Curriculum Development Microgrant," *Northeastern University—Mathworks Microgrant*, July – Dec. 2015: \$20,000
 3. 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
 4. "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. "We own this: a class patent system as experiential learning," *Conference for Advancing Evidence-Based Learning*, April 30, 2019
 2. "Confidently uncomfortable: first year student ambiguity tolerance and self-efficacy on open-ended design problems," *2018 ASEE Annual Conference and Exposition*
 3. "Evolution of cornerstone: creating a first-year culture with a multifaceted approach," *2018 ASEE Annual Conference and Exposition*
 4. "Improving first year students' self-efficacy and ability on open-ended problems," *Conference for Advancing Evidence-Based Teaching*, May 2, 2017
 5. "Improv Engineering: games to improve student risk tolerance," *Conference for Advancing Evidence-Based Teaching*, May 3, 2016
 6. "Shall I try this? An interactive workshop on assessing hands-on teaching," *ASEE Northeast Section Conference*, Apr. 30, 2015 (co-presenter)
 7. "Our local writing culture: Reading the NSSE writing survey," *UD Winter Workshop*, Jan. 9, 2014 (panelist)
 8. "Using wikis to facilitate collaborative student learning," *Lilly-East Conference on College and University Teaching*, Apr. 17, 2009
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Pedagogical Development and Activities

- 2016-2017 Faculty Scholar, *Northeastern University Center for Advancing Teaching and Learning through Research*
 - Reviewer for Pearson's *Calculus, 2e* textbook and MyMathLab interactive eText
 - 2015-2016 Faculty Scholar, *Northeastern University Center for Advancing Teaching and Learning through Research*
 - Reviewer for Pearson's *Engineering Mechanics: Statics* textbook proposal
 - Reviewer for Elsevier's on-line learning assistance program "Engineering Mechanics: Concepts, Applications, and Assessment"
 - Technical Editor of Wiley's *Statics for Dummies*
 - Workshop Participant:
 1. "i>clicker back-to-school SAIL," *UD Academic Technology Services*, Aug. 21, 2012
 2. "Improving student learning through writing," *UD Writing Center*, June 18 – 20, 2012
 3. "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
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University Service**Northeastern University**

- University:
 - 2018 – present Information Technology Policy Committee
- College:
 - 2018 – present SAIL pilot educator
 - 2018 FTNTT Promotion Committee
 - 2016 – 2017 Teaching Innovation Task Force
- Unit:
 - 2018 – present New Faculty Mentor
 - 2017 – present Engineering Minor Committee
- Student Group Advisement:
 - 2017 – present Alpha Epsilon Pi

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
 - 2009 – 2013 Class registration assistant for incoming freshman
 - 2011 Curriculum Strategic Planning Committee
- Planning Committee, UD-Tsinghua Workshop on Nanotechnology
- Student Group Advisement:
 - Tau Beta Pi (co-advisor)
 - Mechanical Engineering Graduate Association

Professional Service

- ASEE First Year Programs Division Secretary and Newsletter Chair (2018 – present)
- ASEE Conference Session Moderator and Submission Reviewer for the Divisions of First-Year Programs and Engineering Physics & Physics (2015, 2016, 2018)
- 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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**K - 12
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