

# JUSTIN L. HESS, PhD, MSCE

## SEIRI Assistant Director, IUPUI

SEIRI: STEM EDUCATION INNOVATION & RESEARCH INSTITUTE

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### HIGHER EDUCATION

Doctor of Philosophy, Engineering Education, Purdue University, 2015

Dissertation Title: A multi-phase exploration of conceptualizations, perceived importance, and the development of empathy within engineering

Dissertation Committee:

1. Johannes Strobel, Co-Chair, Director of Educational Outreach Programs, Engineering Technology & Industrial Distribution, *Texas A&M University*
2. Şenay Purzer, Co-Chair, School of Engineering Education, *Purdue University*
3. Andrew Brightman, School of Biomedical Engineering, *Purdue University*
4. Monica Cardella, School of Engineering Education, *Purdue University*
5. Morgan Hynes, School of Engineering Education, *Purdue University*
6. Joyce Main, School of Engineering Education, *Purdue University*
7. Nadia Kellam, Polytechnic Engineering Program, *Arizona State University*

Master of Science, Civil Engineering, Purdue University, 2015

Bachelor of Science, Civil Engineering, Philosophy Minor, Purdue University, 2011

### PRIMARY RESEARCH INTERESTS

My research is primarily in the domain of engineering education, where my foci include:

1. Exploring the functional role of **empathy** within design, ethics, and innovation
2. Designing theory and pedagogy to enhance **ethical reasoning** and commitment
3. Synthesizing the influence of societal and individual **worldviews** on decision-making

### ACADEMIC APPOINTMENTS

2016-present Assistant Director, STEM Education Innovation & Research Institute, IUPUI  
2016 Postdoctoral Researcher, STEM Education Research Institute, IUPUI  
2015 Postdoctoral Researcher, School of Biomedical Engineering, Purdue University  
2013-2015 National Science Foundation Graduate Research Fellow, Purdue University  
2012-2015 Education Director, Engineers for a Sustainable World  
2012-2014 Teaching Assistant / Faculty Apprentice, Purdue University  
2011-2013 Graduate Research Assistant, Purdue University  
2010-2011 Undergraduate Research Assistant, Purdue University

### HONORS, AWARDS, & RECOGNITIONS

*Division Best Research Paper, 3<sup>rd</sup> Place, ASEE's Entrepreneurship & Engineering Innovation Division (2018)*

*Division Best Paper Award, ASEE's Computing & Information Technology Division (2016)*

*Apprentice Faculty Grant, ASEE's Engineering Research Methods Division (2016)*

*Exemplary Ethics Program, PRIME Ethics team, National Academy of Engineering (2016)*

*College of Engineering Outstanding Service Award, Purdue University (2014)*

*Study Abroad & International Learning Grant, Purdue University (2014)*  
*College of Engineering Travel Grant, Purdue University College of Engineering (2014)*  
*College of Engineering Request for Proposals, Engineering Education Graduate Student Association, Purdue University (2012)*  
*India Global Design Team, Purdue University Student Grant Program for Community Service/Service Learning (2012)*  
*Summer Undergraduate Research Fellowship, Purdue University (2010).*

### **GRANTS & FELLOWSHIPS**

<b>Org.</b>	<b>Program Title</b>	<b>Project Title (Shortened)</b>	<b>PI</b>	<b>Role</b>	<b>Total Amount</b>	<b>Years</b>
NSF	Cultivating Cultures of Ethical STEM	Enhancing IUPUI STEM Curriculum through the Community Engaged-Learning and Ethical Reflection Framework	Johnson (IUPUI)	Co-PI	\$588,561	2017-2022
NSF	Cultivating Cultures of Ethical STEM	Understanding and Evaluating Ethical Engineering Practice	Brightman (Purdue)	Co-PI	\$246,908	2017-2020
NSF	Improving Undergraduate STEM Education - GEOPATHS	GP-EXTRA: Building a New Generation of Urban Environmental Scholar-Citizens	Filippelli (IUPUI)	Co-PI	\$449,497	2017-2020
NSF	Research Experiences for Undergraduates	REU Site: Data Risk and Human Activity	Mohler (IUPUI)	Internal Evaluator	\$287,377	2017-2020
NSF	National Research Traineeship: IGE	Promoting Creativity in Engineering/Technology Graduate Education through Integration of Arts/Design	Anwar (IUPUI)	Senior Personnel	\$452,958	2016-2019
NSF	Research Experiences for Teachers	Research Experiences for Teacher Advancement In Nanotechnology	Rizkalla (IUPUI)	Co-PI	\$494,220	2014-2017
ONR	Office of Naval Research STEM Education Program	3D Visualizations of RF Signals in Electronic Warfare	Christopher (IUPUI)	Internal Evaluator	\$377,487	2016-2017
NSF	Ethics Education in Science and Engineering	SIRA Modules for Effectively Engaging Engineers in Ethical Reasoning	Brightman (Purdue)	Post-Doctoral Researcher	\$300,000	2012-2015
NSF	Graduate Research Fellowship	Deconstructing Engineering Worldviews	Hess (Purdue)	Principal Investigator	\$96,000	2013-2015

### JOURNAL PUBLICATIONS

- Hess, J. L., Zoltowski, C. B., Beever, J., & Brightman, A. O. (in press). Enhancing engineering students' ethical reasoning: Situating reflexive principlism within the "SIRA" framework. *Journal of Engineering Education*.
- Hess, J. L., Fore, G., Chase, A., & Sorge, B. (in press). Measuring interpersonal competence and emotion regulation: A validation study. *International Journal of Engineering Education*.
- Hess, J. L. & Fore, G. (2018). A systematic literature review of US engineering ethics interventions. *Science and Engineering Ethics*. doi:10.1007/s11948-017-9910-6
- Hess, J. L., Strobel, J. & Brightman, A. (2017). The development of empathic perspective-taking in an engineering ethics course. *Journal of Engineering Education*, 106(4), 534-563. doi:10.1002/jee.20175
- Hess, J. L., Strobel, J., Pan, R., & Wachter Morris, C. A. (2017). Insights from industry: Analysis of engineers' conceptualizations and perceptions of empathy and care. *European Journal of Engineering Education*, 42(6), 1128-53. doi:10.1080/03043797.2016.1267717
- Hess, J. L., Strobel, J., & Pan, R. (2016). Voices from the workplace: Practitioners' perspectives on the role of empathy and care within engineering. *Engineering Studies*, 8(3), 212-242.
- Hess, J. L. & Fila, N. D. (equal authorship, 2016). The manifestation of empathy within design: Findings from a service-learning course. *CoDesign: International Journal of CoCreation in Design and the Arts*, 12(1-2), 93-111.
- Hess, J. L., Fila, N. D., & Purzer, S. (2016). The relationship between empathic and innovative tendencies among engineering students. *International Journal of Engineering Education*, 32(3A), 1236-1249.
- Fila, N. D., Hess, J. L., Purzer, S., & Dringenberg, E. (2016). Engineering students' utilization of empathy during a non-immersive conceptual design task. *International Journal of Engineering Education*, 32(3B), 1336-1348.
- Weatherton, Y. & Hess, J. L. (2016). Thinking globally, acting locally: Efforts towards immersion of sustainability in civil engineering education. *IDEAS Engineering Education Journal*, 19, 74-89.
- Dale, A. T., Best, R. E., Hess, J. L., Lennox, E. R., McKhan, D., & Jensen, M. (2014). Connections without command: ESW's service learning approach. *International Journal for Service Learning in Engineering, Humanitarian Engineering, and Social Entrepreneurship*, 48-61.
- Hess, J. L., Strobel, J., Pan, R. C., & Wachter Morris, C. A. (Hess & Strobel shared equal authorship, 2013). Empathy and care within engineering: Qualitative perspectives from engineering faculty and practicing engineers. *Engineering Studies*, 5(3), 137-159.
- Hess, J. L. & Strobel, J. (equal authorship, 2013). Indigenous ways of doing: Synthesizing scholarly literature on ethno-engineering. *International Journal of Social Justice, Engineering, and Peace*, 2(2), 55-80.

### **BOOK CHAPTERS**

- Hess, J. L. & Fila, N. D. (2017). Empathy in design: A discourse analysis of industrial co-creation practices. In *Analysing Design Thinking: Studies of Cross-Cultural Co-Creation*, edited by Bo T. Christensen, Linden J. Ball, and Kim Halskov, 483-498. Boca Raton, FL: CRC Press.
- Hess, J. L., Beever, J., Strobel, J., & Brightman, A. O. (2017). Empathic perspective-taking and ethical decision-making in engineering ethics education. In *Philosophy and Engineering: Exploring Boundaries, Expanding Connections*, edited by Diane Michelfelder, Byron Newberry, and Qin Zhu, 163-179. Switzerland: Springer.
- Fila, N. D. & Hess, J. L. (equal authorship, 2015). Exploring the role of empathy in a service-learning design project. In *Analyzing Design Review Conversations*, edited by Robin S. Adams and Junaid Siddiqui, 135-154. West Lafayette, IN: Purdue University Press.

### **MANUSCRIPTS PUBLISHED IN CONFERENCE PROCEEDINGS**

- Brightman, A. O., Fila, N. D., Hess, J. L., Kerr, A. J., Kim, D., Loui, M. C., & Zoltowski, C. B. (2018). *Applying phenomenography to develop a comprehensive understanding of ethics in engineering practice*. Paper presented at the IEEE Frontiers in Education Annual Conference.
- Hess, J. L., Sathyanarayanan Rao, A., Fore, G., Wu, J., Tovar, A., & Anwar, S. (2018). *Quantifying changes in creativity: Findings from an engineering course on the design of complex and origami structures*. Paper presented at the ASEE Annual Conference & Exposition, Salt Lake City, UT.
- Fila, N. D. & Hess, J. L. (2018). *Critical incidents in engineering students' development of more comprehensive ways of experiencing innovation*. Paper presented at the ASEE Annual Conference & Exposition, Salt Lake City, UT.
- Fore, G. A., Hess, J. L., Sorge, B., Price, M. F., Coleman, M. A., Hahn, T. W., & Hatcher, J. A. (2018). *An Introduction to the Integrated Community-Engaged Learning and Ethical Reflection Framework (I-CELER)*. Paper to be presented at the ASEE Annual Conference & Exposition, Salt Lake City, UT.
- Piroozi, H. R., Hess, J. L., & Feldhaus, C. (2018). *The Engineering-Science Intellectual Property (ESIP) Project: A novel method for promoting innovation*. Paper to be presented at the ASEE Annual Conference & Exposition, Salt Lake City, UT.
- Hess, J. L., Chase, A., Minner, D., Rizkalla, M., & Agarwal, M. (2017). *An evaluation of a Research Experience for Teachers in Nanotechnology*. Paper presented at the Frontiers in Education Annual Conference, Indianapolis, IN.
- Sorge, B. & Hess, J. L. (2017). *Developing an understanding of the implementation and impacts of high school pre-engineering programs: Making the case for a benefit-cost analysis*. Paper presented at the Frontiers in Education Annual Conference, Indianapolis, IN.
- Hess, J. L., Feldhaus, C., Rizkalla, M., & Agarwal, M. (2017). *An Evaluation of a Research Experience Traineeship (RET) Program for Integrating Nanotechnology into Pre-College Curriculum*. Paper presented at ASEE Annual Conference & Exposition, Columbus, OH.

- Hess, J. L. & Fila, N. D. (2016). *Empathy in design: A discourse analysis of industrial co-creation practices*. Paper presented at the 11th Design Thinking Research Symposium, 13-15 November, Copenhagen, Denmark.
- Hess, J. L. & Fila, N. D. (2016). *The development and growth of empathy among engineering students*. Paper presented at the American Society of Engineering Education Annual Conference, New Orleans, LA.
- Hess, J. L., Kisselburgh, L., Zoltowski, C. B., & Brightman, A. O. (2016). *The development of ethical reasoning: A comparison of online versus hybrid delivery modes of ethics instruction*. Paper presented at the American Society of Engineering Education Annual Conference, New Orleans, LA.
- Hess, J. L., Sorge, B., & Feldhaus, C. (2016). *The efficacy of Project Lead the Way: A systematic literature review*. Paper presented at the American Society of Engineering Education Annual Conference, New Orleans, LA.
- Fila, N. D. & Hess, J. L. (2016). *In their shoes: Student perspectives on the connection between empathy and engineering*. Paper presented at the American Society of Engineering Education Annual Conference, New Orleans, LA.
- Beever, J. & Hess, J. L. (2016). *Deepwater Horizon oil spill: An ethics case study in environmental engineering*. Paper presented at the American Society of Engineering Education Annual Conference, New Orleans, LA.
- Kisselburgh, L., Hess, J. L., Zoltowski, C. B., Beever, J., & Brightman, A. O. (2016). *Assessing a Scaffolded, Interactive, and Reflective Analysis framework for developing ethical reasoning in engineering students*. Paper presented at the American Society of Engineering Education Annual Conference, New Orleans, LA.
- Hess, J. L., Fila, N. D., Strobel, J. & Purzer, S. (2015). *Exploring the relationship between empathy and innovation amongst engineering students*. Paper presented at the American Society of Engineering Education Annual Conference, Seattle, WA.
- Fila, N. D., Hess, J. L., & Purzer, S. (2015). *A dialectic data integration approach for mixed methods survey validation*. Paper presented at the American Society of Engineering Education Annual Conference, Seattle, WA.
- Hess, J. L., Brownell, S., House, R. A., & Dale, A. T. (2015). *Development and application of the Sustainability Skills and Dispositions Scale to the Wicked Problems in Sustainability Initiative*. Paper presented at the American Society of Engineering Education Annual Conference, Seattle, WA.
- Fila, N. D., Hess, J. L., & Purzer, S. (2015). *Challenges to and development of innovation discovery behaviors among engineering students*. Paper presented at the American Society of Engineering Education Annual Conference, Seattle, WA.
- Dale, A. T., House, R. A., Brownell, S. E., Best, R. E., & Hess, J. L. (2015). *Scaling support for teaching sustainability: Reflections, barriers and opportunities*. Paper presented at the 7<sup>th</sup> International Conference on Engineering Education for Sustainable Development, Vancouver, Canada.

- Fila, N. D. & Hess, J. L. (equal authorship, 2014). *Exploring the role of empathy in a service-learning design project*. Paper presented at the 10<sup>th</sup> Design Thinking Research Symposium, Purdue University, West Lafayette, IN.
- Hess, J. L., Beaver, J., Iliadis, A., Kisselburgh, L. G., Zoltowski, C. B., Krane, M. J. M., & Brightman, A. O. (2014). *An ethics transfer case assessment tool for measuring ethical reasoning abilities of engineering students using reflexive principlism approach*. Paper presented at the IEEE Frontiers in Education Annual Conference, Madrid, Spain.
- Jaycox, H., Hess, J. L., Zoltowski, C. B., & Brightman, A. O. (2014). *Developing novel practices of somatic learning to enhance empathic perspective-taking for ethical reasoning and engineering design*. Paper presented at the IEEE Frontiers in Education Annual Conference, Madrid, Spain.
- Fila, N. D., Hess, J. L., Hira, A., Joslyn, C., Tolbert, D., & Hynes, M. H. (2014). *The people part of engineering: Engineering for, with, and as people*. Paper presented at the IEEE Frontiers in Education Annual Conference, Madrid, Spain: IEEE.
- Dale, A. T., Hess, J. L., Best, R. E., & Lennox, E. (2014). *Beyond professional development: The value proposition of multi-disciplinary networks for creating global engineers*. Paper presented at Engineering Leaders for Grand Challenges, Doha, Qatar.
- Hess, J. L., Brownell, S., & Dale, A. (2014). *The wicked problems in sustainable engineering (WPSE) initiative: Pilot results of a cross-institutional project-based course offering*. Paper presented at the American Society of Engineering Education Annual Conference, Indianapolis, IN.
- Hess, J. L., Strobel, J., Pan, R., & Wachter Morris, C. W. (2014). *Practicing engineers' perceptions of empathy and care: Findings from a 37-Item survey*. Paper presented at the American Society of Engineering Education Annual Conference, Indianapolis, IN.
- Kisselburgh, L., Zoltowski, C. B., Beaver, J., Hess, J. L., Iliadis, A., Krane, M., & Brightman, A. O. (2014). *Effectively engaging engineers in ethical reasoning about emerging technologies: A cyber-enabled framework of scaffolded, integrated, and reflexive analysis of cases*. Paper presented at the American Society of Engineering Education Annual Conference, Indianapolis, IN.
- Hess, J. L., & Strobel, J. (2013). *Sustainability and the engineering worldview*. Paper presented at the IEEE Frontiers in Education Annual Conference, Oklahoma City, OK.
- Kisselburgh, L., Zoltowski, C. B., Beaver, J., Hess, J. L., Krane, M., & Brightman, A. O. (2013). *Using scaffolded, integrated, and reflexive analysis (SIRA) of cases in a cyber-enabled learning infrastructure to develop moral reasoning in engineering students*. Paper presented at the IEEE Frontiers in Education Annual Conference, Oklahoma City, OK.
- Hess, J. L. (2013). *Global portrayals of engineering ethics education*. Paper presented at American Society of Engineering Education National Conference, Atlanta, GA.
- Hess, J. L., Sprowl, J. E., Pan, R., Dyehouse, M., Wachter Morris, C. A., & Strobel, J. (2012). *Empathy and caring as conceptualized inside and outside of engineering: Extensive literature review and faculty focus group analyses*. Paper presented at ASEE Annual Conference & Exposition, San Antonio, TX.

## SCHOLARLY PRESENTATIONS

*Note: This list does not include conference papers listed above.*

- Mohsen, J. P. & Hess, J. L. (2018, April). *Engineering education and the UN Sustainable Development Goals: Continuing the conversation*. Presentation at the ABET Symposium, San Diego, CA.
- Coleman, M., Fore, G. A., Hahn, T. W., Hatcher, J. A., Hess, J. L., Johnson, K. E., Price, M. F., & Sorge, B. *CCE STEM Institutional Transformation: Integrated Community-Engaged Learning and Ethical Reflection (I-CELEER)*. (2018, March). Presentation at the Workshop on Engaged Scholarship for Ethics and Responsible Innovation in STEM Fields, NC State University.
- Hess, J. L. (2017, October). *An Overview of Mixed Methods Research Approaches*. Presentation at the Assessment Institute in Indianapolis, IN.
- Hess, J. L., Strobel, J., & Pan, R. (2016, October). *Voices from the workplace: Practitioners' perspectives on the role of empathy and care within engineering*. Presentation at the IUPUI School of Engineering and Technology 1<sup>st</sup> Annual Leadership Symposium, Indianapolis, IN.
- Hess, J. L., Sorge, B., & Feldhaus, C. (2016, August). *The effects of Project Lead the Way on students' design thinking*. Presentation at the P-12 Engineering & Design Education Research Summit, Chicago, IL.
- Hess, J. L. & Beever, J. (2016, May). *The Deepwater Horizon Oil spill: An ethics case study*. Presentation at the Indiana Association of College and University Business Officers Annual Meeting, Indianapolis, IN.
- Hess, J. L., Fila, N. D., & Purzer, S. (2016, April). *The relationship between empathic and innovative tendencies among engineering students*. Presentation at the Industrial/Organizational Psychology Graduate Program Seminar Series.
- Hess, J. L. & Fila, N. D. (2016, April). *Exploring the manifestation of empathy within engineering innovation and design*. Poster presented at IUPUI's Research Day.
- Beever, J. B., Hess, J. L., & Brightman, A. O. (2016, February). *Deepwater Horizon Oil spill: An ethics case study in environmental engineering*. Presentation at the Association for Practical and Professional Ethics Annual Conference, Reston, VA.
- Brightman, A. O., Hess, J. L., & Jaycox, H. (2015, September). *Exploring embodied strategies for enhancing empathic perspective-taking in ethical reasoning and engineering design*. Presentation at the 11th annual Engineering, Social Justice, and Peace (ESJP) Conference at University of Puerto Rico, Mayagüez.
- Fila, N. D., Hess, J. L., Purzer, S. & Dringenberg, E. (2015, May). *Exploring the role of empathy in a decontextualized engineering design task*. Presentation at the Harvey Mudd Design Workshop, Claremont, CA.
- Hess, J. L. (2015, April). *Teaching sustainability*. Facilitated presentation and discussion at the Engineers for a Sustainable World Annual Conference, Rochester, NY.

- Hess, J. L., Beaver, J., Brightman, A. O., Iliadis, A., Zoltowski, C. B., & Kisselburgh, K. (2014, October). *A novel engineering ethics case study designed in the SIRA framework using reflexive principlism to engage students and teach ethical reasoning*. Presentation at the Society for Ethics Across the Curriculum's 16<sup>th</sup> Annual Conference, Scottsdale, AZ.
- Dale, A. & Hess, J. L. (2014, June). *The wicked problems in sustainability initiative: Teaching complex topics through shared resources*. Presentation at Seventh Symposium on Engineering and Liberal Education, Schenectady, NY.
- Hess, J. L., Strobel, J., Beaver, J., & Brightman, A. O. (2014, May). *Empathy and ethical decision-making in engineering ethics education*. Presentation at 2014 Forum on Philosophy, Engineering and Technology, Blacksburg, VA.
- Hess, J. L., & Dale, A. (2014, April). *Wicked problems in sustainability initiative*. Presentation at Engineers for a Sustainable World Annual Conference, Evanston, IL.
- Lennox, E. & Hess, J. L. (2014, April). *Human-Centered Design*. Educational Webinar hosted by Engineers for a Sustainable World.
- Hess, J. L., & Brightman, A. O. (2013, October). *Using scaffolded, interactive, and reflective analysis of cases in a cyber-enabled learning infrastructure to develop moral reasoning and empathy in engineering ethics education*. Presentation at Purdue University School of Engineering Education Research Seminar Series, West Lafayette, IN.
- Beaver, J., Brightman, A. O., Hess, J. L., Hiles, M., Iliadis, A., Kisselburgh, K., Krane, M., & Zoltowski, C. B. (2013, September). *S.I.R.A. Modules for Effectively Engaging Engineers in Moral Reasoning*. Ethics and Education in Science and Engineering Program. National Science Foundation, Washington D.C.
- Dale, A., & Hess, J. L. (2013, June). *Wicked Problems in sustainable engineering (WPSE)*. Poster presented at the ASEE National Conference, Atlanta, GA.
- Lennox, E., Dale, A., & Hess, J. L. (2013, June). *Engineers for a Sustainable World: Interdisciplinary education through student-driven sustainability projects*. Poster presented at Union College Sixth Symposium on Engineering and Liberal Education, Schenectady, NY.
- Beaver, J., Brightman, A. O., Hess, J. L., Hiles, M., Kisselburgh, L., Krane, M., & Zoltowski, C. B. (2013, May). *Reflexive principlism for biomedical engineering ethics education*. Poster presentation at the Values in Medicine, Science, and Technology conference, UT Dallas, Texas.
- Hess, J. L., & Strobel, J. (2013, January). *Indigenous engineering: Learning from sustainable practices*. Presentation at Purdue University School of Engineering Education Research Seminar Series, West Lafayette, IN.
- Strobel, J., & Hess, J. L. (2013, January). *Indigenous engineering: Learning from sustainable practices*. Presentation at Purdue University ABE-GSA Professional Development Seminar, West Lafayette, IN.



- Hess, J. L., Sprowl, J., Pan, R. C., Wachter Morris, C., & Strobel, J. (2012, March). *Understanding the role of empathy and care within engineering*. Poster presented at Annual Graduate Student Educational Research Symposium, Purdue University, West Lafayette, IN.
- Hess, J. L., Pan, R. C., Klingler, L., Wachter Morris, C., Dyehouse, M., Weber, N., et al. (2011, November). *Empathy & care: Attributes underlying sustainable engineering practice?* Poster presented at Ecological Sciences and Engineering Annual Symposium: "Solutions for 7", Purdue University, West Lafayette, IN.
- Weber, N., Dyehouse, M., Wachter Morris, C., Klingler, L., Pan, R., Stephens, M., Hess, J. L., & Strobel, J. (2011, October). *Engineering as a caring and empathetic discipline: Conceptualizations and comparisons*. Poster presented at Engineer of 2020 Annual Workshop, Purdue University, West Lafayette, IN.
- Hess, J. L., Lee, N., & Strobel, J. (2010, November). *Indigenous engineering and the intersection of indigenous feminism*. Presentation at National Women's Studies Association Annual Conference, Denver, CO.
- Hess, J. L., Lee, N., & Strobel, J. (2010, August). *Indigenous engineering and technology: Their value in engineering education*. Poster presented at Purdue's Annual Summer Undergraduate Research Symposium, West Lafayette, IN.

### **WORKSHOPS, WEBINARS, & INFORMATION SESSIONS**

- Hess, J. L. & Chin, S. B. (2018, April; 2017, August; 2017, April; 2016, August). *National Science Foundation: Graduate Research Fellowship Program*. Multiple workshops co-hosted by the Office of the Vice Chancellor for Research, IUPUI.
- Hess, J. L. & Chin, S. B. (2017, September). *Focus on the National Science Foundation*. Information Session hosted by the Office of the Vice Chancellor for Research, IUPUI.
- Tarr, T., Chase, A., & Hess, J. L. (2017, May). *Evaluating your Curriculum Enhancement Grant Project*. Workshop hosted by the Center for Teaching and Learning, IUPUI
- Fore, G. & Hess, J. L. (2017, April). *Teaching@IUPUI: An introduction to course evaluation and assessment*. Webinar hosted by the Center for Teaching and Learning, IUPUI.
- Varma-Nelson, P., Hess, J. L., Nguyen, K., & Fore, G. (2017, February). *Writing Competitive Education Proposals for NSF*. Workshop hosted by the STEM Education Innovation & Research Institute, IUPUI.
- Hess, J. L. & Chin, Steven B. (2017, February). *NSF Faculty Early Career Development (CAREER) Program*. Workshop hosted by the Office of the Vice Chancellor for Research, IUPUI.
- Beever, J., Brightman, A. O., Hess, J. L., Kisselburgh, L. G., and Zoltowski, C. B. (2015, June). *New paradigms for teaching engineering ethics*. Workshop hosted at the American Society for Engineering Education Annual Conference, Seattle, WA.
- Hess, J. L., Dale, A. T. (2015, April). *Wicked Problems in Sustainability Initiative (WPSI) Summit II*. Workshop hosted at Engineers for a Sustainable World National Conference, Rochester Institute of Technology, Rochester, NY.

Hess, J. L., Dale, A. T. (2014, April). *Wicked Problems in Sustainability Initiative (WPSI) Summit*. Workshop hosted at Engineers for a Sustainable World National Conference, Northwestern University, Evanston, IL.

Hess, J. L. (2013, November). *Instructional design for K-12 education and outreach*. Workshop hosted at Engineers for a Sustainable World Regional Conference, Pittsburgh, PA.

### **RESEARCH EXPERIENCES**

Assistant Director, STEM Education Innovation and Research Institute, IUPUI, *Dec. 2016 - now*  
 Postdoctoral Researcher, STEM Education Research Institute, IUPUI, *January – November 2016*

- Developed and implemented educational innovations in the spaces of ethics, design, and nanotechnology, both in secondary and pre-college curriculum
- Sought and collaborated on STEM education grants, most prominently with the National Science foundation, as an educational researcher (e.g., IUSE) and evaluator (e.g., REU)
- Consulted STEM faculty with respect to educational research design, evaluation, curricular innovations, and proposal writing
- Designed and administered the SEIRI Seed Grant internal competition (ongoing)
- Mentored SEIRI undergraduate and graduate students on various research projects

Postdoctoral Researcher, Weldon School of Biomedical Engineering, Purdue University, mentored by Andrew Brightman, *August 2015 – December 2016*

- Worked on an Ethics Education in Science and Engineering NSF grant titled *SIRA Modules for Effectively Engaging Engineers in Ethical Reasoning about Emerging Technologies*, led by PI Andrew O. Brightman.
- Developed, refined, and explored the efficacy of modules for enhancing students' empathic perspective taking and ethical reasoning skills

Graduate Research Fellow, Purdue University, School of Engineering Education, mentored by Johannes Strobel and Senay Purzer, *May 2013 – August 2015*

- Fellowship funded through the National Science Foundation's Graduate Research Fellowship Program
- Created a scholarly research agenda aimed at synthesizing and exploring how engineering worldviews influence engineering practices, with a specific focus on the core disposition or skill of empathy

Graduate Research and Teaching Assistant, Purdue University, School of Biomedical Engineering, working alongside PI Dr. Andrew Brightman, *January 2012 – May 2013*

- Contributed to the project funded by an NSF Ethics Education in Science and Engineering grant
- Led the implementation of multiple engineering ethics course offerings
- Refined the pedagogical design for better alignment with program and learning objectives

Graduate Research Assistant, Purdue University, School of Engineering Education, supervised by PI Dr. Johannes Strobel, *August 2011 – May 2013*

- Contributed to the project titled *Creating a concerned engineer in a changing environment*, funded by the Engineer of 2020 Internal SEED Grant through the College of Engineering at Purdue University
- Analyzed literature and interviews with engineering and non-engineering faculty
- Produced scholarly publications and presentations

Undergraduate Research Assistant working with Dr. Johannes Strobel, *May 2010- July 2011*

- Contributed to the project titled *A different engineering: Indigenous Knowledge Structures, Technologies and Sustainability Design*, Purdue University
- Performed a systematic literature review and produced scholarly research products, including a peer reviewed journal publication and a number of presentations

### TEACHING EXPERIENCES

**OLS595: Careers in Nanotechnology and Other STEM Fields**, Indiana University Purdue University Indianapolis, *Summer 2016, 2017*

- Lead instructor for a graduate-level organizational leadership and supervision course offered to high school STEM teachers
- Helped teachers develop nanotechnology-centric curricular modules, intended to promote student interest in STEM and for integration within their own classrooms
- Facilitated assessment components of course, including concept mapping and rubrics for course presentations
- Managed content delivery, reflection posts, and discussion forums using IU Canvas as a content management systems

**BME595: Global Experience of Medical Device Design**, Purdue University, *Summer 2014 and Summer 2015*

- Faculty Apprentice for a study abroad course, led by Andrew Brightman and Holly Jaycox, situated in Ireland and that focused on inculcating an empathic design process to develop assistive technologies for people suffering from cardiovascular disease (with Croi House) and individuals with limited sensory abilities (with Enable Ireland)
- Developed course activities in relation to the EPICS design process, empathic design, engineering ethics, somatic awareness practices, and engineering worldviews
- Facilitated course assessment, including design reviews, peer evaluations, course evaluations, and formative feedback on students' written assignments

**BME595: Solving Ethical Problems in Engineering**, Purdue University, *Spring 2015, Summer 2014, Spring 2014, Summer 2013, and Spring 2013*

- Teaching Assistant for a hybrid course offering led by Dr. Andrew Brightman
- Students participated in one of two modes: in-class/hybrid or online only
- Developed and implemented pedagogical techniques to scaffold students' understanding of principism of ethical issues and promote reflexivity in their reasoning processes
- Developed an assessment framework to measure students' changes in empathic perspective taking and ability to apply reflexive principism to a transfer case
- Managed content delivery and discussion forums using GlobalHub (2013) and Pearson OpenClass (2014) as content management systems

**ENGR 1060/2060: Social Entrepreneurship**, Pittsburgh, *Fall 2013 and 2014*

**CMDS-333: Wicked Problems in Sustainability**, RIT, *Fall 2013 and 2014*

**RH-330: Technical and Professional Communication**, Rose-Hulman, *Fall 2014*

- External evaluator for three 3 separate courses offered at the University of Pittsburgh led by Alexander Dale, Rochester Institute of Technology led by Sarah Brownell, and Rose-Hulman Institute of Technology led by Richard A. House, respectively per above order  
*Note: Each of these courses are part of the Wicked Problems in Sustainability Initiative through Engineers for a Sustainable World*
- Developed and implemented an assessment framework which included (a) using Denny Davis's IDEALs framework for design reviews, (b) the development of a pre-post survey measuring students attainment of learning objectives, and (c) using concept maps to develop and assess students' meta-cognitive awareness of sustainability
- Worked alongside instructors throughout course offerings, providing feedback to instructors on assessment techniques, and providing feedback to students on submitted preliminary, interim, and final design review submissions

### **SERVICE EXPERIENCE**

#### **Journal Reviewing and Editing**

- Engineering Studies Assistant Editor, *2012-present*
- CoDesign Manuscript Reviewer, *2017-present*
- European Journal of Engineering Education Manuscript Reviewer, *2017*
- IEEE Explore Manuscript Reviewer, *2016-present*
- International Journal of Engineering, Social Justice, and Peace Reviewer, *2014-2017*
- Journal of Engineering Education Manuscript Reviewer, *2016-present*
- Journal of Pre-College Engineering Education Research Manuscript Reviewer, *2013*
- Journal of Professional Issues in Engineering Education & Practice Reviewer, *2014-present*
- Science & Engineering Ethics Manuscript Reviewer, *2018*
- Science Education Manuscript Reviewer, *2014*

#### **Conference Volunteering, Reviewing, and Moderating**

- American Society of Engineering Education (ASEE) Liberal Education/Engineering & Society (LEES) Division; Engineering Research Methods Division; DEED Division; and Entrepreneurship & Engineering Innovation Paper Reviewer, *2012-present*
- Design Thinking Research Symposium Manuscript Reviewer, *2014, 2016*
- Frontiers in Education Ethics Division Manuscript Reviewer, *2013*

#### **Professional Organizations**

- ASEE LEES Division Webmaster and Newsletter Editor, *2014-present*
- Committee on Sustainability, Formal Engineering Education Subcommittee, Corresponding Member, *2015-present*
- Engineers for a Sustainable World (ESW), National Team Education Director, *2013-2015*
- ESW, National Team Director of Technology and Events, *2012-2013*

#### **IUPUI/Purdue University**

- Research Day, *2016, 2017, 2018*
- EPICS Design Team Reviewer, *2014, 2015*

- First-Year Engineering Project Reviewer, 2013, 2014
- Purdue University School of Engineering Education Faculty Search Committee, 2013
- Engineering Education Graduate Student Association (ENEGSA) President, 2012-2013
- ENEGSA Communications committee chair, 2011-2012
- ESW Purdue Chapter Graduate Advisor, 2012-2013
- India Global Design Team (GDT) Participant and Team Leader, 2011-2012
- Big Brothers Big Sisters Purdue Chapter (BBBS) member, 2007-2009
- BBBS “Cool Kids” After School program leader, 2008-2009

### **ENGINEERING PRACTICE**

#### **Opus West Engineering Professional Practice Program, 2009**

- Assisted in project management of a nine-story shell office structure in Tempe, AZ
- Managed and coordinated scheduling, the final punch list, and change orders
- Compiled safety documentation and conducted safety orientation meetings
- Fabricated final clean bid package, submitted and evaluated subcontractors’ submissions and supervised the implementation of the final clean

### **INTERNATIONAL EXPERIENCE**

#### **Ireland Design Course Faculty Apprenticeship, 2014, 2015**

- Led a study abroad course offering through Purdue University
- Mentored students in their projects that sought to help patients with cardiovascular disease, working alongside project partners – Croi House in Galway and Enable Ireland in Dublin

#### **India Global Design Team, 2012**

- Developed fluoride treatment prototype for rural farms near Bhubaneswar, Odisha, India
- Visited local farms and inhabitants to collect water samples for testing
- Tested collected water samples using activated alumina prototype

#### **London Facilities and Infrastructure Engineering Study Abroad, 2010**

- Analyzed engineering and construction issues linked to the facilities and infrastructure being developed for the 2012 Olympics in London, United Kingdom
- Met with engineers working on large scale infrastructure projects such as the Crossrail and the London Tideway Tunnels

### **PROFESSIONAL MEMBERSHIPS**

- American Society for Engineering Education (ASEE)
- American Society of Civil Engineering (ASCE)
- Chi Epsilon Civil Engineering Honors Fraternity (XE)
- Engineers for a Sustainable World (ESW)

### **SOFTWARE EXPERTISE**

*Autodesk Software:*

AutoCAD, Autodesk Inventor

*Qualitative Data Analysis:*

MAXQDA, NVivo11

*Project Management:*

MS Project, Primavera P6, TRIRIGA

*Statistical Packages:*

SAS, SPSS, StataSE

*Website Management:*

Adobe Dreamweaver, Drupal, Google Sites, WordPress