

Research Interests

- Encourage more students, especially women and those from nontraditional demographic groups, to pursue interests in the field of engineering. Propel recruitment and retention efforts locally, nationally, and internationally. Broaden the image of engineering, science, and technology to include new forms of communication and problem solving for emerging grand challenges.
- Pinpoint the social and cultural impact of technological choices made by engineers in the process of designing and creating new devices and systems. Identify the intentional and unintentional consequences of durable structures, products, architectures, and standards in engineering education, to target areas for transformative change.

Education

Ph.D.	Department of Mechanical Engineering, University of Colorado Boulder Dissertation titled <i>Actor-Networks of Sophomore Engineering: Durability and Change in Required Sophomore Mathematics Courses</i> , advised by Dr. Daria A. Kotys-Schwartz. Thesis committee: Dr. Margaret Eisenhart and Dr. Kevin O'Connor, School of Education; Dr. Derek Reamon, Dr. Michael Hannigan, College of Engineering and Applied Science.	2015
M.S.	Design Center Colorado, University of Colorado Boulder Masters Design Project sponsored by Medtronic Navigation, Louisville CO	2010-12
B.S.	Mechanical Engineering, F.W. Olin College of Engineering Senior Capstone Project sponsored by Draper Laboratories, Cambridge MA	2002-06

Teaching Experience – University of Colorado Boulder

- **Instructor**, Department of Mechanical Engineering, College of Engineering and Applied Science. Faculty member teaching core courses featuring design projects and labs in the undergraduate curriculum, including MCEN3025: Component Design, MCEN4026: Manufacturing Processes & Systems, MCEN5055: Advanced Product Design, MCEN 4/5228-014: Special Topics Design For Inclusion. 2019-present
- **Instructor**, Engineering Plus Program, College of Engineering and Applied Science. Faculty member administering dynamic and new customizable undergraduate engineering program. Pioneering cross-disciplinary, design-rich coursework including GEEN3830, Engineering Mathematics. 2016-18
- **Adjunct Instructor**, College of Engineering and Applied Science, GEEN1400 and COEN 1400, First-Year Engineering Projects. Guided student teams through the engineering design process over a 15-week semester, providing support, inspiration, and a roadmap to success. 2015-16
- **Lead Graduate Teacher**, Department of Mechanical Engineering, Graduate Teacher Program (GTP). Served as liaison for graduate students to engage with the GTP while running orientations for new engineering graduate students and offering training seminars including videotape consultations to improve graduate student teaching. 2011-13
- **Adjunct Instructor**, Department of Mechanical Engineering, MCEN 5208, Introduction to Research. Transformed prior iterations of research basics course for incoming graduate students in mechanical engineering, creating a learning community through carefully planned seminars featuring senior graduate students teaching novices. Fall 2012
- **Novel Curriculum Developer**, Department of Mechanical Engineering, MCEN 2023, Statics and Structures. Initiated active learning recitations for this gateway course into mechanical engineering, using the body as foundational example to teach concepts related to equilibrium and balancing forces. Trained instructional team to successfully implement new lesson plans and support student learning. Fall 2012

- **Teaching Assistant**, Department of Mechanical Engineering
MCEN 3025, Component Design Spring 2011
MCEN 4026, Manufacturing Processes and Systems Fall 2010
- **Mentor**, Boulder Robotics Alliance Landsharks For Inspiration and Recognition of Science and Technology (FIRST) Robotics Competition Team 1157. Engaged with high school students throughout the robot-building process, sustained excitement through off-seasons and build seasons, empowered students to overcome fears and learn how to use both power tools and CAD tools effectively. 2010-present

Professional Experience

- **Systems Engineer**, Home Robots Division 2007-09
iRobot Corporation – Bedford, MA
- **International Customer Support Engineer**, International Division 2008
iRobot Corporation – Bedford, MA
- **Technical Manufacturing Liaison**, Asia Pacific Division 2006-07
iRobot Corporation – Hong Kong SAR

Research Projects

- NSF Scholarships in Science, Technology, Engineering, and Mathematics (S-STEM)** 2020-present
 - *The Redshirt in Engineering Consortium* includes the GoldShirt Program at CU Boulder and related Redshirt programs at the University of Washington; Washington State University; Boise State University; the University of Illinois, Urbana-Champaign; and the University of California, San Diego (NSF Award #1564494, \$756k). Qualitative research includes conducting focus groups and interviews with student participants in their 2nd and 3rd years of engineering undergraduate schooling.
Jana Milford (PI), Beverly Louie, Daniel Knight, Janet Tsai.
- Collaborative Research with Colorado School of Mines (CSM)** 2018-present
 - *Understanding the Formation of Sociotechnical Thinking in Engineering Education* – NSF Research in the Formation of Engineers (RFE) project (NSF Award #1838311, \$363k). Developed course interventions and assessments for use in GEEN1400: First-Year Engineering Projects to encourage sociotechnical thinking within a hands-on, project-based environment at CU, in comparison with related courses at CSM.
Kathryn Johnson (PI), Jenifer Blacklock, Stephanie Claussen, Jon Leydens, Barbara Moskal, Janet Tsai.
- Transforming Education, Stimulating Teaching and Learning Excellence (TRESTLE)** 2018-19
CU Boulder
 - *GEEN 1400: First-Year Engineering Projects to Enhance Climate of Inclusivity* – Subaward from a 7-institution NSF-funded project to support improvements in undergraduate STEM education (DUE 1525331). Locally administered by the Center for STEM Learning (\$10k). Created, refined, and facilitated course interventions, assignments, and assessments targeted at increasing awareness of differences and improve climate for all students in GEEN1400: First-Year Engineering Projects. Derek Reamon & Janet Tsai
- Postdoctoral Research: Integrated Teaching and Learning Laboratory, CU Boulder** 2016-17
 - *Inclusive Excellence to Bolster Diversity: A System of Capacity-Building Pathways To and Through Engineering* – NSF Foundation Research in Engineering Education (REE) project (NSF Award #1160264, \$540k). Analyzed and aggregated data over four years of intensive qualitative

observations, interviews, and focus groups to deliver findings related to replicating the system model at other institutions for bolstering diversity and broadening participation.

Jacquelyn F. Sullivan (PI), Daria A. Kotys-Schwartz, Beverly Louie, Kevin O'Connor, Stephanie Rivale (co-PIs)

2016-17

- *University of Colorado Teach Engineering – S.D. Bechtel, Jr. Foundation Grant*, K-12 Teacher Licensure Program (Total award amount \$1,083,184). Conducted exploratory research in the identity formation of undergraduate students pursuing engineering degrees and K-12 teaching licensure simultaneously to better understand these unique students and their particular navigational challenges and threats to their dual identities as engineers and educators. Jacquelyn F. Sullivan and Malinda Zarske (PIs).

Doctoral Research: Department of Mechanical Engineering, CU Boulder

2013-15

- *Actor-Networks of Sophomore Engineering: Durability and Change in Required Sophomore Mathematics Courses* – An intensive exploration of the student experience in the required sophomore-level engineering mathematics courses of Calculus 3 for Engineers and Differential Equations & Linear Algebra. Adopted *Actor-Network Theory* from Science and Technology Studies to observe over 150 hours of official course activities; conduct 23 in-depth interviews with students, teaching assistants, and faculty members; and facilitate focus groups to confirm emergent themes and debate contentious topics. Identified the curriculum as a product of incremental *translations* over five decades, starting from the Space Age and Cold War and remaining largely unchanged and outdated within our current era. Findings suggest a re-evaluation of the mathematics curriculum is warranted, questioning the power of exams in determining student trajectories and the utility of homework assignments in light of widely available technologies.

Advised by Daria A. Kotys-Schwartz, in collaboration with Daniel Knight

Other Graduate Research:

2010-13

- *Engineering Education Pioneers Project at the Center for Engineering Learning and Teaching (CELT), University of Washington* – Conducted personal interview with notable pioneer of engineering education, Dr. Lawrence P. Grayson. Authored profile of his work and life to published on the NSF-backed *Pioneers Project Online Portal* (NSF Award #1263512). Available at <http://depts.washington.edu/celtweb/pioneers-wp/>
- *Ken Yasuhara (PI), Brook Sattler, Cindy Atman (co-PIs)*
- *Body-Based Approach to Teaching and Learning Engineering Statics* – Developed novel curriculum to teach sophomore-level Engineering Statics via examples based in the universal element of the human body. Transformed course for 190 students during the Fall of 2012 by implementing active-learning recitations to encourage experiential learning through tangible sensation. *Advised by* Daria A. Kotys-Schwartz, in collaboration with Michael Hannigan
- *Your Own Undergraduate Research Experience at the University of Colorado Boulder (YOU'RE@CU) Program* – Assessed the efficacy of this novel undergraduate research program from the perspectives of both graduate mentors and undergraduate mentees. Using a mixed-methods approach, identified factors for program improvements (e.g. formal mentor training) and impactful differences among mentor models (e.g. boss versus coach models of mentoring). Beverly Louie and Virginia Ferguson (PIs)

Undergraduate Research: Franklin W. Olin College of Engineering, Needham MA

2005-06

- *Evaluating Effectiveness of Project-Based Learning on Retention of Women and Minority Students* – Became trained in basic qualitative analysis techniques including coding of textual data and usage of qualitative data analysis software NVivo. Yevgeniya Zastavker and Mia Ong (PIs)

Refereed Publications & Conference Proceedings

1. A. Bielefeldt, D. Godrick, and **J. Y. Tsai**, “Minority Status and Belonging: Engineering Math as a Vehicle to Build Community,” presented at the 2020 Collaborative Network for Engineering and Computing Diversity (CoNECD), Virtual On line, Jan. 2021.
2. J. Erickson, S. Claussen, J. A. Leydens, K. Johnson, and **J. Y. Tsai**, “Real-world Examples and Sociotechnical Integration: What’s the Connection?,” presented at the 2020 ASEE Virtual Annual Conference Content Access, Virtual On line, Jun. 2020.
3. **J. Y. Tsai** and B. A. Myers, “Mandatory but not Required: Examining Change in the Year Two Implementation of a Novel Engineering Mathematics Course,” in *ASEE Conference Proceedings*, Tampa, FL, 2019.
4. **J. Y. Tsai**, B. A. Myers, J. Sullivan, and K. Anderson, “Intended & Unintended Consequences of Rapidly Expanding an Engineering Mathematics Intervention for Incoming First-Year Students,” in *ASEE Conference Proceedings*, Tampa, FL, 2019.
5. S. Claussen, J. Blacklock, A. Boll, **J. Y. Tsai**, and K. Johnson, “Pain and gain: barriers and opportunities for integrating sociotechnical thinking into diverse engineering courses in *ASEE Conference Proceedings*, Tampa, FL, 2019.
6. M. Keogh, M. S. Zarske, and **J. Y. Tsai**, “Examining How Skill-building Workshops Affect Women’s Confidence over Time,” in American Society for Engineering Education Annual Conference and Exposition, Tampa, FL, 2019.
7. **J. Y. Tsai**, B. A. Myers, J. Sullivan, D. Reamon, K. Anderson, and K. O’Connor, “Scaling Up or Scale-making? Examining Sociocultural Factors in a New Model for Engineering Mathematics Education,” in *ASEE Conference Proceedings*, Salt Lake City, UT, 2018.
8. **J. Y. Tsai**, K. O’Connor, B. A. Myers, J. Sullivan, D. Reamon, and K. Anderson, “Examining the Replication – or Mutation – Processes of Implementing a National Model for Engineering Mathematics Education at a New Site,” in *ASEE Conference Proceedings*, Salt Lake City, UT, 2018.
9. M. R. Keogh, M. Zarske, and **J. Y. Tsai**, “Active Learning Group Work: Helpful or Harmful for Women in Engineering?,” in *ASEE Conference Proceedings*, Salt Lake City, UT, 2018.
10. K. Waugaman, **J. Y. Tsai**, and M. Zarske, “Connecting with First-year Engineering Students’ Interest in Social Justice Issues through Ethics Lessons to Sustain Student Retention in Engineering,” in *ASEE Conference Proceedings*, Salt Lake City, UT, 2018.
11. J.L. Segil, J.F. Sullivan, **J.Y. Tsai**, D.T. Reamon, & M.H. Forbes, “Investigation of spatial visualization skills across world regions,” in *2017 IEEE Frontiers in Education Conference (FIE) Proceedings*, 2017.
12. M. Zarske, M. Vadeen, **J.Y. Tsai**, J. Sullivan, and D. Carlson, “Undergraduate Engineers and Teachers: Can Students Be Both?” Invited paper. *Journal of Pre-College Engineering Education Research*, 7(1), 2017.
13. M. Zarske, **J. Y. Tsai**, J. Sullivan, and D. Carlson, “Seeking Engineering Undergraduates for K-12 STEM Teacher Licensure: Fuels the Soul or Too Many Barriers? (Research to Practice),” in *ASEE Conference Proceedings*, Columbus, OH, June 2017.
14. **J.Y. Tsai**, B.A. Myers, J. Sullivan, and B. Louie, “Maintaining the Individual within a Climate of Indifference: Specialization vs. Standardization in the Factory Model of Engineering Education in *ASEE Conference Proceedings*, Columbus, OH, June 2017.
15. B. Louie, T. D. Ennis, **J. Y. Tsai**, B. A. Myers, and J. Sullivan, “Fostering an Asset Mindset to Broaden Participation through the Transformation of an Engineering Diversity Program,” in *ASEE Conference Proceedings*, Columbus, OH, June 2017.
16. M. Zarske, M. Vadeen, **J.Y. Tsai**, J. Sullivan, and D. Carlson, “Undergraduate Engineers and Teachers: Can Students Be Both?” in *Proceedings of the American Society for Engineering Education Annual Conference and Exposition*, New Orleans, LA, June 2016.

17. **J.Y. Tsai**, D. Kotys-Schwartz, and D.W. Knight, “Examining Invisible Exam Dynamics in Required Sophomore Mathematics Courses,” *Advances in Engineering Education*. (in review)
18. **J.Y. Tsai**, D. Kotys-Schwartz, and D.W. Knight, “Introducing Actor-Network Theory Via the Engineering Sophomore Year,” in *Proceedings of the American Society for Engineering Education Annual Conference and Exposition*, Seattle, WA, June 2015.
19. **J.Y. Tsai**, D. Kotys-Schwartz, and D.W. Knight, “Extended Abstract – What’s fair in sophomore engineering mathematics courses? Investigating exams from an actor-network perspective,” in *First Annual Mid Years Engineering Experience (MYEEC) Conference*, College Station, TX, March 2015.
20. **J.Y. Tsai**, D. Kotys-Schwartz, and D.W. Knight, “The Powerful Construction of Norms Within Sophomore Engineering,” in *IEEE Frontiers in Education Conference*, Madrid, Spain, 2014.
21. **J. Y. Tsai**, D. Kotys-Schwartz, and M. Hannigan, “Learning Statics by Feeling: Effects of Everyday Examples on Confidence and Identity Development,” in *Proceedings of the American Society for Engineering Education Annual Conference and Exposition*, Atlanta, GA, 2013.
22. **J. Y. Tsai**, D. Kotys-Schwartz, B. Louie, V. L. Ferguson, and A. N. Berg, “Am I a Boss or a Coach? Graduate Students Mentoring Undergraduates in Research,” in *Proceedings of the American Society for Engineering Education Annual Conference and Exposition*, Atlanta, GA, 2013.
23. A. N. Berg, **J. Y. Tsai**, V. L. Ferguson, and B. Louie, “What’s trust go to do with it? Assessing a research-based mentoring program for novice engineers,” in *Proceedings of the American Society for Engineering Education Annual Conference and Exposition*, Atlanta, GA, 2013.
24. **J. Y. Tsai**, D. A. Kotys-Schwartz, B. Louie, V. L. Ferguson, and A. N. Berg, “Graduate Students Mentoring Undergraduates in Research: Attitudes and Reflections about these Experiences,” in *Proceedings of the American Society for Engineering Education Annual Conference and Exposition*, San Antonio, TX, 2012.
25. **J. Y. Tsai**, D. A. Kotys-Schwartz, B. Louie, V. L. Ferguson, and A. N. Berg, “Comparing Mentor and Mentee Perspectives in a Research-Based Undergraduate Mentoring Program,” in *Proceedings of the American Society of Mechanical Engineers 2012 International Mechanical Engineering Congress & Exposition (ASME IMECE)*, Houston TX, 2012.
26. **J. Y. Tsai**, D. A. Kotys-Schwartz, V. L. Ferguson, and B. Louie, “Assessing Efficacy of a New Research-Oriented Peer Mentoring Program: YOU'RE@CU,” in *Proceedings of the American Society of Mechanical Engineers 2011 International Mechanical Congress & Exposition (ASME IMECE)*, Denver, CO, 2011.

Grants and Fellowships

- Transforming Education, Supporting Teaching and Learning Excellence (TRESTLE) Course Transformation Award (\$10k) for proposal titled “Transforming GEEN 1400: First-Year Engineering Projects to Enhance Climate of Inclusivity” Fall 2018 – Spring 2019
- Innovative Inclusion Ideas Grant for proposal titled “Talk it Out” (\$1.5k) Fall 2017 – Spring 2018
- Engineering Excellence Fund Mini Grant Award for proposal titled “Materials Science Laboratory Equipment” (\$3k) Fall 2017
- Engineering Excellence Fund Major Grant Award for proposal titled “Engineering Math Course Equipment” (\$28.5k) Spring 2017
- Department of Mechanical Engineering Summer Fellowship 2015
- American Society of Mechanical Engineers (ASME) Graduate Teaching Fellowship (\$10k) 2014-16
- Philanthropic Educational Organization (PEO) Scholar Award (\$30k) 2014-15
- Chancellor’s Graduate Award for Excellence in STEM Education, Center for STEM Learning at University of Colorado Boulder (\$15k) 2014-15

- National Science Foundation Graduate Research Fellowship, STEM Education and Learning Research – Engineering Education (\$90k) 2011-14
- Olin College Inaugural Full-Tuition Scholarship (\$160k) 2002-06

Awards and Honors

- Best Presentation Award for “Intended & Unintended Consequences of Rapidly Expanding an Engineering Mathematics Intervention for Incoming First-Year Students,” First-Year Programs Division, American Society for Engineering Education (ASEE) Annual Conference and Exposition, Tampa, FL. Jun 2019
- Best Paper Finalist for “Intended & Unintended Consequences of Rapidly Expanding an Engineering Mathematics Intervention for Incoming First-Year Students,” First-Year Programs Division, American Society for Engineering Education (ASEE) Annual Conference and Exposition, Tampa, FL. Jun 2019
- Graduate Teacher Program Best Should Teach Gold Award 2018
- Spotlight on Research, Department of Mechanical Engineering, University of Colorado Boulder Mar 2015
- Most Attended Poster Award for “What’s ‘Proper’ in Engineering? Exploring Cultural Norms in the Sophomore Engineering Curriculum,” Graduate Engineering Annual Research and Recruitment Symposium (GEAR2S), Department of Mechanical Engineering, University of Colorado Boulder. Mar 2014
- Best Paper Award for “Learning Statics by Feeling: Effects of Everyday Examples on Confidence and Identity Development,” Mechanics Division, American Society for Engineering Education (ASEE) Annual Conference and Exposition, Atlanta, GA. Jun 2013
- Best Paper Award for “Am I a Boss or a Coach? Graduate Students Mentoring Undergraduates in Research,” Graduate Studies Division, American Society for Engineering Education (ASEE) Annual Conference and Exposition, Atlanta, GA. Jun 2013
- Best Aesthetics Award, "Active Learning at the University of Colorado Boulder," Graduate Teacher Program Poster Session, Boulder, CO. Apr 2013
- People’s Choice Award, “Retention of Women and Minorities in Science, Technology, Engineering, and Mathematics (STEM) @CU,” Graduate Teacher Program Poster Session, Boulder, CO. Apr 2012
- Kenneth Johnsen Student of the Month Award. Awarded by Department of Mechanical Engineering, University of Colorado Boulder. Oct 2011
- Dorothy Martin Doctoral Student Honorable Mention Award, University of Colorado Boulder Graduate School 2011
- Rock Award, iRobot Corporation 2007

Book Chapters

1. **J. Y. Tsai**, “‘An Engineering Approach to Feminism’: Excerpt from *Click: When We Knew We Were Feminists*,” in *Persuasive Acts: Women’s Rhetorics in the Twenty-First Century*, S. Stenberg and C. Hogg, Eds. Pittsburgh, Pa: University of Pittsburgh Press, 2020, pp. 281–286.
2. **J. Y. Tsai**, “‘An Engineering Approach to Feminism,’” in *Click: When We Knew We Were Feminists*, J. C. Sullivan and C. E. Martin, Eds. Seal Press, 2010.

Lectures and Presentationss

Invited Lectures

1. **J.Y. Tsai**, "The Power and Privilege of TA-ship: Gatekeeping and Sponsoring Undergraduates Through Engineering," Workshop for Department of Mechanical Engineering Teaching Assistants at CU Boulder. 27 January 2021, 10 October 2019
2. **J.Y. Tsai**, “Making Room for Reality in STEM Labs, Recitations, and Classes,” Graduate Teacher Program Fall Intensive Workshop, University of Colorado Boulder. 23 Aug 2019, 24 Aug 2018, 25 Aug 2017, 18 Aug 2016
3. **J.Y. Tsai & D. Reamon**, “Transforming GEEN1400 and starting an Engineering Math course,” Discipline-Based Educational Research Seminar Series, University of Colorado Boulder. 8 April 2019
4. **J. Y. Tsai**, “Opportunities and Challenges with Project-Based Learning & Student Teams, A story of potential transformation in first-year engineering projects courses," Transforming Education, Stimulating Teaching and Learning Excellence (TRESTLE) project and the Center for STEM Learning, Shared Innovation Discussion Group (ShInDiG), University of Colorado Boulder. 6 November 2018
5. **J.Y. Tsai**, M. Soltys, “Engaging First-Year Students in Active Learning,” ACTIVE: Faculty Development and Leadership Intensive convened by Dr. Robyn Sandekian, CU Boulder. 1 November 2018
6. **J.Y. Tsai**, A.Bielefeldt, K. Strange, “Opportunities and Challenges for Women STEM Faculty and Future Faculty,” Graduate Teacher Program (GTP) Friday Faculty Forum, University of Colorado Boulder. 19 October 2018
7. **J.Y. Tsai**, “Celebrating the 50th Birthday of our Engineering Sciences Center,” College of Engineering and Applied Science, University of Colorado Boulder. 5 Dec 2016
8. **J.Y. Tsai**, “Realizing Your Potential,” Keynote Speech, Society of Asian Scientists and Engineers (SASE) Regional Conference. 19 Mar 2016
9. **J.Y. Tsai**, “Our Engineering Center: How a 50-year-old Building Continues to Impact Access and Equality for Modern Students,” Graduate Teacher Program Intercultural Workshop Series, University of Colorado Boulder. 17 Feb 2016
10. **J.Y. Tsai**, “Mediating Stereotype Threat in the Classroom,” Graduate Teacher Program Teaching Institute for Graduate Education Research. 13 Oct 2015

- (TIGER) 1 Workshop Series on STEM Teaching, University of Colorado Boulder.
11. **J.Y. Tsai**, “The Brutalist Engineering Center, 1965 TO 2015,” College of Engineering and Applied Science Graduate STEMinar Series, University of Colorado Boulder. 19 Mar 2015
 12. **J.Y. Tsai**, “Tips and Tricks for Mentoring Undergraduate Students,” Graduate Teacher Program Teaching Institute for Graduate Education Research (TIGER) 2 Workshop Series, University of Colorado Boulder. 6 Nov 2014
 13. **J.Y. Tsai**, D.A. Kotys-Schwartz, D.W. Knight, “Actor-Networks in Sophomore Engineering,” Discipline-Based Educational Research Seminar Series, University of Colorado Boulder. 8 Oct 2014
 14. **J.Y. Tsai**, S. Black, L. Giangola (facilitator), “A conversation on ‘Achieving Parity of the Sexes at the Undergraduate Level: A Study of Success’,” Center for the Integration of Research, Teaching, and Learning (CIRTL) Reads Series, online. 5 Mar 2014
 15. **J.Y. Tsai**, “Test-Taking Workshop,” Department of Mechanical Engineering, Undergraduate Program, University of Colorado Boulder. 4 Feb 2014
 16. **J.Y. Tsai**, “Update: Current Trends in Engineering Education,” College of Engineering and Applied Science Graduate STEMinar Series, University of Colorado Boulder. 31 Oct 2013
 17. **J.Y. Tsai**, “Current Trends in Engineering Education,” Department of Aerospace Engineering, Graduate Seminar Series, University of Colorado Boulder. 27 Feb 2013
 18. **J.Y. Tsai**, D.A. Kotys-Schwartz, B. Louie, V.L. Ferguson, A. Berg, “Comparing Mentor and Mentee Perspectives in a Research-Based Undergraduate Mentoring Program,” Engineering Education Research Group, University of Colorado Boulder. 22 Jan 2013
 19. **J.Y. Tsai**, D.A. Kotys-Schwartz, B. Louie, V.L. Ferguson, A. Berg, “Comparing Mentor and Mentee Perspectives in a Research-Based Undergraduate Mentoring Program,” Discipline-Based Educational Research Seminar Series, University of Colorado Boulder. 4 Dec 2012
 20. **J.Y. Tsai** and J. Garland, “Grading Problems in STEM Disciplines,” Graduate Teacher Program Fall Intensive Conference, University of Colorado Boulder. 23 Aug 2012
 21. **J.Y. Tsai**, “Guidelines to Address Gender in Engineering Classrooms and Beyond.” Graduate Teacher Program Monday Workshop Series, University of Colorado Boulder. 27 Feb 2012

Oral Conference Presentations (presenter in bold)

22. **J. Erickson, S. Claussen**, J. A. Leydens, K. Johnson, and **J. Y. Tsai**, “Real-world Examples and Sociotechnical Integration: What’s the Connection?,” presented at the 2020 ASEE Virtual Annual Conference Content Access, Virtual On line, Jun. 2020. 22 June 2020

23. **J. Y. Tsai**, B. A. Myers, J. Sullivan, and K. Anderson, “Intended & Unintended Consequences of Rapidly Expanding an Engineering Mathematics Intervention for Incoming First-Year Students,” presented at the American Society for Engineering Education Annual Conference and Exposition Tampa, FL. 15 June 2019
24. **J. Y. Tsai** and B. A. Myers, “Mandatory but not Required: Examining Change in the Year Two Implementation of a Novel Engineering Mathematics Course,” presented at the American Society for Engineering Education Annual Conference and Exposition Tampa, FL. 16 June 2019
25. M. Keogh, M. S. Zarske, and **J. Y. Tsai**, “Examining How Skill-building Workshops Affect Women’s Confidence over Time,” presented at the American Society for Engineering Education Annual Conference and Exposition, Tampa, FL. 15 June 2019
26. **Tsai, J. Y.**, K. O’Connor, K., B. A. Myers, J. Sullivan, D. Reamon, & K. Anderson, “Examining the Replication – or Mutation – Processes of Implementing a National Model for Engineering Mathematics Education at a New Site,” presented at the American Society for Engineering Education Annual Conference and Exposition, Salt Lake City, UT. 27 June 2018
27. K. Waugaman, **J. Y. Tsai**, & M. Zarske, “Connecting with First-year Engineering Students’ Interest in Social Justice Issues through Ethics Lessons to Sustain Student Retention in Engineering,” presented at the American Society for Engineering Education Annual Conference and Exposition, Salt Lake City, UT. 26 June 2018
28. **J. Y. Tsai**, K. O’Connor, B. A. Myers, J. Sullivan, D. Reamon, & K. Anderson, “Scaling Up or Scale-making? Examining Sociocultural Factors in a New Model for Engineering Mathematics Education,” presented at the American Society for Engineering Education Annual Conference and Exposition, Salt Lake City, UT. 26 June 2018
29. J. L. Segil, **J.F. Sullivan**, J.Y. Tsai, D.T. Reamon, & M.H. Forbes, “Investigation of spatial visualization skills across world regions,” presented at the 2017 IEEE Frontiers in Education Conference (FIE), Indianapolis, IN. 20 Oct 2017
30. **B. Louie, T.D. Ennis**, J.Y. Tsai, B.A. Myers, & J. Sullivan, “Fostering an Asset Mindset to Broaden Participation through the Transformation of an Engineering Diversity Program,” presented at the American Society for Engineering Education Annual Conference and Exposition, Columbus, OH. 27 June 2017
31. **J.Y. Tsai**, B.A. Myers, J. Sullivan, J., & B. Louie, “Maintaining the Individual within a Climate of Indifference: Specialization vs. Standardization in the Factory Model of Engineering Education,” presented at the American Society for Engineering Education Annual Conference and Exposition, Columbus, OH. 26 June 2017
32. **M. Zarske**, J.Y. Tsai, J. Sullivan, & D. Carlson, “Seeking Engineering Undergraduates for K-12 STEM Teacher Licensure: Fuels the Soul or Too Many Barriers? (Research to Practice),” presented at the 26 June 2017

- American Society for Engineering Education Annual Conference and Exposition, Columbus, OH.
33. **J.Y. Tsai**, D. Kotys-Schwartz, and D.W. Knight, "Introducing Actor-Network Theory via the Engineering Sophomore Year," presented at the American Society for Engineering Education Annual Conference and Exposition, Seattle WA. 17 June 2015
 34. J.Y. Tsai, D. Kotys-Schwartz, and **D.W. Knight**, "What's fair in sophomore engineering mathematics courses? Investigating exams from an actor-network perspective," presented at the *First Annual Mid Years Engineering Experience (MYEEC) Conference*, College Station, TX. 24 Mar 2015
 35. **J.Y. Tsai**, D. Kotys-Schwartz, and D.W. Knight, "The Powerful Construction of Norms Within Sophomore Engineering," presented at the IEEE Frontiers in Education Conference, Madrid, Spain. 23 Oct 2014
 36. **J.Y. Tsai**, D. Kotys-Schwartz, and D.W. Knight, "New Perspectives to Investigate the Politics of Education in Engineering Cultures," presented at the American Society for Engineering Education Rocky Mountain Section Annual Conference, Denver, CO. 10 Apr 2014
 37. **J. Y. Tsai**, D. Kotys-Schwartz, B. Louie, V. L. Ferguson, and A. N. Berg, "Am I a Boss or a Coach? Graduate Students Mentoring Undergraduates in Research," presented at the American Society for Engineering Education Annual Conference and Exposition, Atlanta, GA. 25 Jun 2013
 38. **J. Y. Tsai**, D. Kotys-Schwartz, and M. Hannigan, "Learning Statics by Feeling: Effects of Everyday Examples on Confidence and Identity Development," presented at the American Society for Engineering Education Annual Conference and Exposition, Atlanta, GA. 24 Jun 2013
 39. **J.Y. Tsai** and D.A. Kotys-Schwartz, "Status and the Roles of Students in Engineering: A Justification for Studying the Creation of Status Assignment in Freshman and Sophomore Year," presented at the American Society for Engineering Education Rocky Mountain Section Annual Conference, Pueblo, CO. 28 Mar 2013
 40. J. Y. Tsai, **D. A. Kotys-Schwartz**, and M. Hannigan, "A Body-based Approach to Teaching and Learning Engineering Statics," presented at the ASME 2012 International Mechanical Engineering Congress & Exposition, Houston, TX. 13 Nov 2012
 41. J. Y. Tsai, **D. A. Kotys-Schwartz**, B. Louie, V. L. Ferguson, and A. N. Berg, "Comparing Mentor and Mentee Perspectives in a Research-Based Undergraduate Mentoring Program," presented at the ASME 2012 International Mechanical Engineering Congress & Exposition, Houston, TX. 13 Nov 2012
 42. **A. N. Berg**, J.Y. Tsai, B. Louie, V.L. Ferguson, "The importance of trust in a research-based undergraduate mentoring program," presented at the University of New Mexico Mentoring Institute Conference, Albuquerque, NM. 24 Oct 2012
 43. **J. Y. Tsai**, D. A. Kotys-Schwartz, B. Louie, V. L. Ferguson, and A. N. Berg, "Graduate Students Mentoring Undergraduates in Research: Attitudes and Reflections about these Experiences," presented at the

American Society for Engineering Education Annual Conference and Exposition, San Antonio, TX.

44. **J.Y. Tsai**, D.A. Kotys-Schwartz, M. Hannigan, "A Body-Based Approach to Teaching and Learning Engineering Statics," presented at the Graduate Engineering Annual Research and Recruitment Symposium (GEAR2S), Boulder, CO. 8 Mar 2012
45. **J. Y. Tsai**, D. A. Kotys-Schwartz, V. L. Ferguson, and B. Louie, "Assessing Efficacy of a New Research-Oriented Peer Mentoring Program: YOU'RE@CU," presented at the ASME 2011 International Mechanical Congress & Exposition, Denver, CO. 17 Nov 2011
46. **J. Y. Tsai**, "Perspectives on FIRST Robotics," presented at the Rocky Mountain Section Mini-Conference, Society of Women Engineers, Boulder, CO. Mar 2010

Conference Poster Presentations (presenter in bold)

47. **J.Y. Tsai**, B.A. Myers, J. Sullivan, D. Godrick, A. Bielefeldt, K. Anderson, "Implementing Engineering Mathematics in the CEAS," Center for STEM Learning 11th Annual Symposium. 23 September 2019
48. **J. Y. Tsai**, D.A. Kotys-Schwartz, D. W. Knight, "Actor-Networks of Engineering Sophomore Year," Science Education Initiative/Center for STEM Learning 6th Annual Symposium. 29 September 2014
49. **J.Y. Tsai**, D. Kotys-Schwartz, D.W. Knight, "The Power of Networks as an Engineering Sophomore," 11th International Conference of the Learning Sciences (ICLS), Boulder, CO, USA. 26 June 2014
50. **J.Y. Tsai**, D. Kotys-Schwartz, D.W. Knight, "What's 'Proper' in Engineering? Exploring Cultural Norms in the Sophomore Engineering Curriculum," Graduate Engineering Annual Research and Recruitment Symposium (GEARRS), Department of Mechanical Engineering, University of Colorado Boulder. 6 March 2014
51. A. Berg, J.Y. Tsai, V.L. Ferguson, **B.Louie**, "What's trust got to do with it? Assessing a research-based mentoring program for novice engineers," American Society for Engineering Education Annual Conference and Exposition, T442 First Year Programs Poster Session. 25 June 2013
52. **J. Y. Tsai**, D.A. Kotys-Schwartz, M. Hannigan, "Learning Statics by Feeling: Effects of Everyday Examples on Confidence and Identity Development," Science Education Initiative/Center for STEM Learning End-of-Year Event. 7 May 2013
53. **E.A. Hogan**, K. Kyburz, A.D. Montebianco, C. Szczepanski, J.Y. Tsai, "Active Learning at the University of Colorado Boulder," Graduate Teacher Program Lead Capstone Event. 5 April 2013
54. **J. Y. Tsai**, A. Berg, V.L. Ferguson, B. Louie, D.A. Kotys-Schwartz, "Assessing and Understanding the Your Own Undergraduate Research Experience at CU (YOU'RE@CU) Program," Graduate Engineering Annual Research and Recruitment Symposium. 14 March 2013

55. **J. Y. Tsai**, A. Berg, V.L. Ferguson, B. Louie, D.A. Kotys-Schwartz, "YOU'RE@CU: Your Own Undergraduate Research Experience," Center for STEM Learning Launch, University of Colorado Boulder. 30 Sep 2012
56. **J. Y. Tsai**, A. Berg, V.L. Ferguson, B. Louie, D.A. Kotys-Schwartz, "An Introduction to YOU'RE@CU: Your Own Undergraduate Research Experience," Science Education Initiative/Center for STEM Learning End-of-Year Event. 9 May 2012
57. **S. Pang**, J.Y. Tsai, N. Wakefield, S. Waggy, A. Wong, "Retention of Women and Minorities in Science, Technology, Engineering, and Mathematics (STEM) @CU," Graduate Teacher Program Lead Capstone Event. 6 April 2012

Service Activities

- Founding Member, Diversity, Equity, and Inclusion (DEI) Working Group, Paul M. Rady Department of Mechanical Engineering 2020-present
- Faculty Mentor, Engineering GoldShirt Program, BOLD Center CU Boulder 2020-present
- Faculty Director, American Society of Mechanical Engineers, CU Boulder Chapter 2019-present
- Member, Department of Mechanical Engineering Undergraduate Committee 2019-present
- Member, American Society for Engineering Education (ASEE) Projects Board 2017-present
- Representative of the Class of 2006 to the Olin Alumni Council (OAC) 2016-2020
- Panelist for annual Mechanical Engineering Ladies Social event, discussing experiences and lessons learned applicable to women in mechanical engineering graduating to industry 2015-present
- Coordinator, Gender and Engineering Seminar at the University of Colorado Boulder, College of Engineering and Applied Science 2011
- Founding Member, Bitch Magazine Leadership Council 2010-11

Advising

Undergraduate Honors Thesis

- Megan Walters, B.S. in Physics, May 2020. Committee Chair Noah Finkelstein.

Professional Review – Peer Reviewed Publications

- Journal of Engineering Education
- Advances in Engineering Education
- Journal of Humanitarian Engineering
- American Society for Engineering Education Annual Conference and Exposition
 - Liberal Education/Engineering & Society Division
 - Mechanics Division
 - Women in Engineering Division
 - Educational Research and Methods Division

- Frontiers in Engineering Education Conference
- Collaborative Network for Engineering and Computing Diversity (CoNECD)

Affiliations/Memberships

- | | |
|-----------------------------------------------------|-----------------|
| • American Society for Engineering Education (ASEE) | 2011-present |
| • American Society of Mechanical Engineers (ASME) | 2011-present |
| • Society of Women Engineers (SWE) | 2002-2006, 2016 |
| • Women in Engineering ProActive Network (WEPAN) | 2015-16 |
| • Society of Asian Scientists and Engineers (SASE) | 2016 |

Relevant Press

- “Keeping the Hope Alive as a Woman in Engineering”, Engineer Girl Website, National Science Foundation Fall 2013
<<http://www.engineergirl.org/GetThere/HowtoGetThere/16862.aspx>>