

CARLYE LAUFF

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Carlye is a human-centered innovation strategy consultant. Carlye most recently served as a Design Innovation Fellow within the SUTD-MIT International Design Centre (IDC) in Singapore from 2018-2019. She received her PhD from the Department of Mechanical Engineering at the University of Colorado Boulder, where she was an National Science Foundation (NSF) Graduate Research Fellow and an NSF Global Research Fellow. Carlye's research is in the field of Design Theory and Methodology, and she develops tools and methods to support designers and engineers. She has worked with more than 25 global companies to improve their product design and development processes, ranging in industries from medical devices to consumer electronics to transportation systems. Some of her recent research led to the creation of the Prototyping Canvas, a tool to guide strategic prototyping efforts, and to the validation of the Additive Manufacturing (AM) Design Principle Cards, which were recently awarded the 2019 Singapore Good Design Mark award.

Carlye's research interests are in design methods and tools, design education, product design and development, innovation strategy, entrepreneurship, design communication, prototyping, and front-end design activities.

EDUCATION

- 2013-2018 **Ph.D. Mechanical Engineering**
Focus in Design Theory and Methodology
University of Colorado Boulder, College of Engineering and Applied Science
Boulder, CO, USA – GPA: 3.86
Dissertation – Prototyping in the Wild: The Role of Prototypes in Companies
- 2013-2015 **M.S. Mechanical Engineering**
Focus in Product Design Engineering
University of Colorado Boulder, College of Engineering and Applied Science
Boulder, CO, USA – GPA: 3.75
Capstone Project – Novel Laparoscopic Surgical Device with Medtronic
- 2009-2013 **B.S. Mechanical Engineering**
Minor in Engineering Leadership Development (ELDM)
Certificate in Humanitarian Engineering and Social Entrepreneurship (HESE)
The Pennsylvania State University, College of Engineering
University Park, PA, USA – GPA: 3.62

RESEARCH EXPERIENCE

- 2018-2019 **Postdoctoral Design Innovation Research Fellow**
SUTD-MIT International Design Centre, www.idc.sutd.edu.sg / www.idc.mit.edu
Mentor: Prof. Kristin L. Wood
- Conduct research on design tools and methods, such as developing the Prototyping Canvas [C14], Additive Manufacturing (AM) Principle cards [C15-C17, J6], which were awarded the 2019 SG Good Design Mark, and Design Signatures to map design innovation processes [J7]
 - Senior Program Manager and design researcher for consulting, guidance, and co-creation company projects, such as current projects with the Land Transport Authority (LTA) of Singapore and ST Engineering, where I manage 30 people and \$750k project budgets
 - Lead instructor for Design Innovation trainings (1-5 days) for c-suite executives and upper management in diverse organizations [J8], such as Singtel, Republic of Singapore Navy (RSN), Urban Redevelopment Authority (URA), and the Development Bank of Singapore (DBS)

2015-2018

NSF Graduate Research Fellow

*University of Colorado Boulder, Design Center Colorado, www.designcenter.colorado.edu
Co-Advisors: Dr. Mark Rentschler and Dr. Daria Kotys-Schwartz*

- Awarded the NSF Graduate Research Fellowship (GRFP) to understand the role and impact of prototypes during new product development within three diverse companies (footwear, medical, consumer electronics), resulting in 10 conference papers and 3 journal articles
- Conducted a pilot study comparing the perceptions of prototypes between mechanical engineering students and design professionals [C11]
- Used applied ethnographic methods to collect data from three companies, and inductively analyzed data to uncover three roles of prototypes, as tools for communication, learning, and decision making; resulting in a newly refined definition of a prototype [C12], [J2]
- Uncovered the changing role of prototypes as communication tools between stakeholder [J4]
- Mapped the methods used during early-stage design for evolutionary product design [C13]

2017

NSF Global Design Research Fellow

*Swinburne University, Centre for Design Innovation (CDI), www.cdiengage.com.au
Mentor/Advisor: Prof. Blair Kuys*

- Awarded the NSF Global Research Opportunities Worldwide (GROW) Fellowship to collaborate with Swinburne University's Centre for Design Innovation (CDI)
- Collaborated with an interdisciplinary team of industrial designers, product design engineers, and design researchers on 6 company sponsored projects
- Co-authored a manuscript discussing CDI's unique platform of university engagement with Australian companies to enhance product diversification in the private sector [J5]
- Lead design researcher; developed studies including ethnographic observations, interviews, eye tracking protocols, market research, and finite element analysis for the design projects
- Studied the impact of sequential versus parallel prototyping for consumer products
- Compared the use of five 3D printer's ability to convey the prototype's intent to end users

2013-2015

Graduate Research Assistant

*University of Colorado Boulder, Design Center Colorado, www.designcenter.colorado.edu
Co-Advisors: Dr. Mark Rentschler and Dr. Daria Kotys-Schwartz*

- Primary researcher on the Cognitive Ethnographies in Engineering Design project, which was funded by the National Science Foundation CMMI Grant No. 1355599
- Collaborative research between mechanical engineers, psychologists, and learning scientists
- Field-based study comparing the design practices of professional engineers and university engineering students [C2], [C8]
- Used the theoretical framework of heterogeneous engineering from Actor-Network Theory to uncover the critical social practices that underpin the technical elements of design [C3], [C6]
- In-depth case studies of two companies, looking at the role of space and time [C5], [C7]
- Comparative case study of two student design teams using the theoretical framework of intermediary objects to uncover the importance of prototypes in mediating skills [J3]

2012-2013

Undergraduate Research Assistant

*Pennsylvania State University, Engineering Design & Optimization Group, sites.psu.edu/edog
Co-Advisors: Prof. Tim Simpson and Prof. Mary Frecker*

- Primary undergraduate researcher on the Multi-Field Responsive Origami Structures project, which was funded by National Science Foundation EFRI Grant No. 1240459
- Developed artistically inspired multi-field origami structures that actively fold and unfold from an initially flat sheet into complex 3D shapes in response to different fields, specifically electromagnetic and thermal activation [C1]
- Conducted an extensive literature review to define the difference between bending and folding for origami-inspired materials of thickness [C4]
- Developed a summer camp outreach curriculum to promote engineering and art for children

PUBLICATIONS – PEER-REVIEWED JOURNAL ARTICLES

- [J8] Camburn, B.A., **Lauff, C.A.**, Wood, K.L., “Design Innovation: A Study of Integrated Practice”, *She Ji: The Journal of Design, Economics, and Innovation*, in final prep.
- [J7] **Lauff, C.A.**, Seow, O., Tiong, E., Teo, K., Silva, A., Wood, K.L., Jensen, D.D. and Yang, M.C., “Design Signatures: Mapping Design Innovation Processes,” *Design Studies*, in final prep.
- [J6] Hwang, D., **Lauff, C.A.**, Camburn, B.A., Wood, K.L., “Design Principle Cards: Toolset to Support Innovations with Additive Manufacturing”, *Journal of Mechanical Design*, in review.
- [J5] Kuys, B., **Lauff, C.A.**, Kotlarewski, N., “Maintaining Companies’ Competitive Advantage: Exploring Three Cases of Engaging with Design as a Strategic Tool,” *Journal of Product Innovation Management*, in review.
- [J4] **Lauff, C.A.**, Knight, D., Kotys-Schwartz, D., Rentschler, M.E., 2020, “The role of prototypes in communication between stakeholders,” *Design Studies*, in press in January.
- [J3] **Lauff, C.A.**, Weidler-Lewis, J., Kotys-Schwartz, D., and Rentschler, M.E., 2018, “Prototypes as Intermediary Objects for Design Coordination in First-Year Design Courses,” *International Journal of Engineering Education*, 34(3), 1085-1103.
- [J2] **Lauff, C.A.**, Kotys-Schwartz, D., Rentschler, M.E., 2018, “What is a prototype? What are the roles of prototypes in companies?” *Journal of Mechanical Design*, 140(6), p.061102.
- [J1] Stokes, E., **Lauff, C.A.**, Eldridge, E., Ortbal, K., Nassar, A., and Mehta, K., 2015, “Income Generating Activities of Rural Kenyan Women,” *Journal of Sustainable Development*, 8(8), p42.

PUBLICATIONS – PEER-REVIEWED CONFERENCE ARTICLES

- [C17] **Lauff, C. A.**, Perez, K. B., Camburn, B., Wood, K. L., 2019, “Design Principle Cards: Toolset to Support Innovations with Additive Manufacturing,” *Proceedings of the ASME 2019 IDETC/CIE – Design Theory and Methodology Conference*, Anaheim, CA. August 18-21. DETC-2019-97231.
- [C16] Perez, K. B., **Lauff, C. A.**, Camburn, B., Wood, K. L., 2019, “Design Innovation with Additive Manufacturing (DIwAM): A Methodology,” *Proceedings of the ASME 2019 IDETC/CIE – Design Theory and Methodology Conference*, Anaheim, CA. August 18-21. DETC-2019-97400.
- [C15] Camburn, B., Ismail, E., Perez, K. B., **Lauff, C. A.**, Wood, K. L., 2019, “Additive Manufacturing of Fibre-Reinforced Structures: Design Process and Principles,” *Proceedings of the ASME 2019 IDETC/CIE – Design Theory and Methodology Conference*, Anaheim, CA. August 18-21. DETC-2019-97398.
- [C14] **Lauff, C. A.**, Menold, J., Wood, K. L., 2019, “Prototyping Canvas: Design Tool for Planning for Purposeful Prototypes,” *International Conference on Engineering Design (ICED)*. August 4-8. Delft, Netherlands.
- [C13] **Lauff, C.A.**, Kotys-Schwartz, D., Rentschler, M.E., 2018, “Company Case Study: Design Methods used during Early Stages of Evolutionary Product Development,” *Proceedings of the ASME 2018 IDETC/CIE – Design Theory and Methodology Conference*, Quebec City, Quebec, CA, August 26-29. DETC-2018-85406.
- [C12] **Lauff, C.A.**, Kotys-Schwartz, D., Rentschler, M.E., 2017, “What is a Prototype? Emergent Roles of Prototype from Empirical Work in Three Diverse Companies,” *Proceedings of the ASME 2017*

IDETC/CIE – Design Theory and Methodology Conference, Cleveland, OH, August 6-9, DETC2017-67173.

- [C11] **Lauff, C.A.**, Kotys-Schwartz, D., Rentschler, M.E., 2017, “Perceptions of Prototypes: Pilot Study Comparing Students and Professionals,” *Proceedings of the ASME 2017 IDETC/CIE – Design Education Conference*, Cleveland, OH, August 6-9, DETC2017-68117.
- [C10] Stangl, A., Weidler-Lewis, J., **Lauff, C.A.**, Price, E., and Fauble, E., 2017, “The SEL Transition Wheel: Designing for Early Childhood Social Emotional Learning,” *Proceedings of the 2017 Conference on Interaction Design and Children*, Stanford, CA, June 27-30, pp. 334-339, ACM.
- [C9] **Lauff, C.A.**, Menold, J., Small, M., 2016, “Two Design Cases Exploring Development of Social Emotional Learning Solutions,” *Proceedings of the 10th International Conference on Design and Emotion*, Amsterdam, Netherlands, September 27-30.
- [C8] O’Connor, K., **Lauff, C.A.**, Kotys-Schwartz, D., and Rentschler, M.E., 2015, “Learning and Identity at the Nexus of Practice: Mediated Discourse Analysis as a Methodology for Engineering Education Research,” *Proceedings of the ASEE Annual Conference and Exposition*, Seattle, WA, June 14-17.
- [C7] **Lauff, C.**, O’Connor, K., Kotys-Schwartz, D., and Rentschler, M.E., 2015, “Comparing Organizational Structures: Two Case Studies of Engineering Companies,” *Proceedings of the ASEE Annual Conference and Exposition*, Seattle, WA, June 14-17.
- [C6] **Lauff, C.**, O’Connor, K., Kotys-Schwartz, D., and Rentschler, M.E., 2015, “Engineering Design Process: More than the ‘Standardized Loop’,” *Proceedings of the ASEE Rocky Mountain Section Conference*, Denver, CO, April 10-11.
- [C5] **Lauff, C.**, O’Connor, K., Kotys-Schwartz, D., and Rentschler, M.E., 2014, “How is Design Organized? A Preliminary Study of Spatiotemporal Organization in Engineering Design,” *Proceedings of the IEEE Frontiers in Education Conference*, Madrid, Spain, October 22-25.
- [C4] **Lauff, C.**, T. Simpson, M. Frecker, Z. Ounaies, S. Ahmed, P. von Lockette, R. Strzelec, and R. Sheridan, 2014, “Differentiating Folding from Bending in Origami Engineering using Active Materials,” *Proceedings of the ASME 2014 IDETC/CIE Mechanisms and Robotic Conference*, Buffalo, NY, August 17-20, DETC2014-34702.
- [C3] **Lauff, C.**, Weidler-Lewis, J., O’Connor, K., Kotys-Schwartz, D., and Rentschler, M., 2014, “Cognitive Ethnographies of Heterogeneous Engineering Design,” *Proceedings of the International Conference of the Learning Sciences*, Boulder, CO, June 2014.
- [C2] **Lauff, C.**, Weidler-Lewis, J., O’Connor, K., Kotys-Schwartz, D., and Rentschler, M.E., 2014, “Undergraduate to Professional Engineering Design: A Disconnected Trajectory?” *Proceedings of the ASEE Zone IV Conference*, Long Beach, CA, April 24-26.
- [C1] Ahmed, S., **Lauff, C.**, Crivaro, A., McGough, K., Sheridan, R., Frecker, M., von Lockette, P., Ounaies, Z., Simpson, T., Lien, Jyh-Ming, L., and Strzelec, R., 2013, “Multi-field responsive origami structures: Preliminary modeling and experiments,” *Proceedings of the ASME 2013 IDETC/CIE Mechanisms and Robotic Conference*, Portland, OR, August 4-7, DETC2013-12405.

PRESENTATIONS, PANELS & WORKSHOPS

- 2019 Additive Manufacturing (AM) Principle Cards IDETC Design Tool Showcase. ASME IDETC2019-98262. Anaheim, CA, USA. August 20, 2019.
- 2019 Prototyping Canvas: Tool for Intentional Prototyping Practice. IDETC Design Tool Showcase. ASME IDETC2019-98264. Anaheim, CA, USA. August 20, 2019.
- 2019 Prototyping Canvas: Design Tool for Planning Purposeful Prototypes. ICED Marketplace. Delft, Netherlands. August 6, 2019.
- 2019 Invited Presentation – Additive Manufacturing (AM) Design Principle Cards Singapore Good Design Award. National Design Centre, Singapore. March 25, 2019. Details on award: <https://www.sgmark.org/project-description/?id=59>
- 2019 Invited Presentation – Improving the Design Innovation (DI) Process, Methods, and Principles. SUTD Research Fest. Singapore University of Technology and Design (SUTD), Postdoc Society. Singapore. January 17, 2019. Details: <https://postdocs.sutd.edu.sg/research-fest-2019/>
- 2018 Workshop – Applying Design Innovation to Education. Design Education Summit (DEST). DesignSingapore Council. Singapore. November 1-2, 2018. Details: <https://www.designsingapore.org/modules/events/design-education-summit-2018>
- 2018 Workshop at the 125th Annual American Society of Engineering Education Conference on “*Teaching Prototyping: Translating Best Practices from Industry to Design Courses*”. June 24, 2018 in Salt Lake City, UT, USA with Jessica Menold and support from Daria Kotys-Schwartz.
- 2018 Invited Seminar – Prototyping in the Wild: The Role of Prototypes in Companies. Massachusetts Institute of Technology (MIT). Department of Mechanical Engineering. Cambridge, MA, USA. April 3, 2018.
- 2018 Invited Seminar – Prototyping in the Wild: The Role of Prototypes in Companies. University of California, Berkeley. Jacob’s Institute for Design Innovation. Berkeley, CA, USA. March 1, 2018.
- 2018 Invited Seminar – Prototyping in the Wild: The Role of Prototypes in Companies. Oregon State University. Department of Mechanical, Industrial, and Manufacturing Engineering. Corvallis, OR, USA. February 20, 2018.
- 2018 Invited Seminar – Prototyping in the Wild: The Role of Prototypes in Companies. California Polytechnic State University. Department of Mechanical Engineering. San Luis Obispo, CA, USA. February 1, 2018.
- 2018 Invited Workshop – Demystifying Prototyping. Event sponsored by the CU Boulder College of Engineering, Idea Forge, and the Leeds School of Business. January 25, 2018. Boulder, Co, USA. Details: <https://www.eventbrite.com/e/demystifying-prototyping-tickets-42022617781>
- 2017 Invited Presentation – Prototyping in the Wild. ATLAS Institute Research Showcase. October 30, 2017. Boulder, CO, USA. Details: <https://www.colorado.edu/atlas/research-showcase>
- 2017 Invited Panelist – The Limitations of 3D Modeling & Simulations. Denver Startup Week Maker Session. IRL: Physical Product Showcase. September 26, 2017. Denver, CO, USA. Details: <https://www.denverstartupweek.org/schedule/3835-the-limitations-of-3d-modeling-simulations-irl-physical-product-showcase>
- 2016 Invited Workshop – Prototyping for Social Impact. Design for America in collaboration with the James Dyson Foundation. November 9, 2016. Boulder, CO, USA.

- 2016 Invited Presentation – The Impact of Prototyping in the Design Process. Mechanical Engineering Strategic Advisory Board (MESAB) Annual Meeting. April 16, 2016. Boulder, CO, USA.
- 2015 Invited Workshop – Using Design Thinking for Improving Social Emotional Competencies in Young Children, with Jessica Menold and Meg Small. Robert Wood Johnson Foundation and the Hope Street Group. December 8-10, 2015. Buffet Early Childhood Institute. Omaha, NE, USA.
- 2015 Invited Workshop – Focus Your Passion to Solve Problems and Make an Impact, with Jessica Menold. Under 30 Changemaker Summit. August 7-10, 2015. San Francisco, CA, USA. Details: <https://changemakersummit.splashthat.com>
- 2015 Invited Presentation – Engineering Design Process: More than the “Standardized Loop”. University of Colorado Boulder. Graduate Engineering Recruitment and Research Symposium. March 5, 2015. Boulder, CO, USA.
- 2013 Invited Presentation – Folding it Together: Art and Engineering-based Active Origami, with Mary Frecker and Rebecca Strzelec. February 20, 2013. Penn State Greater Valley – Malvern, PA, USA. Details: <http://news.psu.edu/story/265034/2013/02/20/research/penn-state-investigatorsdiscuss-how-origami-unites-art-and>
- 2012 Invited Presentation – The Penn State Engineering Ambassadors, November 9-15, 2012. ASME IMECE. Houston, Texas, USA.

FUNDING

As a graduate student, I secured research funding for three years through the National Science Foundation estimated at \$230,000. As the founder of Design for America at CU Boulder and CurioSpace, secured \$25,000 to develop both organizations.

2015-2018

National Science Foundation Graduate Research Fellowship

- 3 years of graduate school tuition: \$20,000 per year
- 3 years of living stipends: \$50,000 per year including ICR
- Estimated total: \$210,000

2015-2018

Design for America – CU Boulder Studio Grants

- Jumpstart! Boulder SEED grant funding: \$5,000
- Engineering Excellence Funding: \$2,500
- Centre for Student Involvement, Student Organization Allocation Committee: \$1,500
- James Dyson Funding: \$1,500

2016-2017

National Science Foundation Global Research Opportunities Worldwide Fellowship

- Travel: \$5,000
- International support: \$15,000

2016-2017

CurioSpace

- Summer Founder's Program: \$10,000
- Robert Wood Johnson Foundation: \$5,000

2014-2017

Conference Travel

- Mechanical Engineering Department: \$2,250
- CU Graduate School: \$1,500
- United Government of Graduate Students: \$1,500

AWARDS AND RECOGNITION

2019 Singapore Good Design Mark Award – Additive Manufacturing Design Principle Cards (May)
2018 SUTD-MIT International Design Centre (IDC) Design Research Fellowship (September)
2018 Three-Minute Thesis (3MT) Finalist at University of Colorado Boulder (February)
2018 CU Boulder Mechanical Engineering Spotlight on Research (January)
2016 National Science Foundation Global Research Opportunities Worldwide Fellowship (January)
2017 CU Boulder Design for America studio Diversity Award for Excellence (April)
2016 James Dyson with Design for America – Design Leader Award (July)
2016 LaunchBox Accelerator Cohort for CurioSpace (May)
2016 Summer Founder’s Program Grant Recipient for CurioSpace (March)
2015 CU Boulder Mechanical Engineering Graduate Fellowship (May)
2015 National Science Foundation Graduate Research Fellowship (May)
2014 Department of Mechanical Engineering Graduate Student of the Month (July)
2012 J&J Medal by ASME, accepted on behalf of the Engineering Ambassador Program (November)
2012 Engineer in Training: Passed Fundamentals of Engineering Exam (October)
2012 Penn State’s Nadine Barrie Smith Outstanding Mentor Award (May)
2012 1st Place Penn State Junior-Level Mechanical Design Competition for ME 340 (April)
2010 Society of Women Engineers (SWE), Region G Future Leader Award (August)
2010 Penn State Royal P. Fisher Academic Scholar (January)
2009 Penn State Weiss Breakthrough Academic Scholar (May)

TEACHING, LEADERSHIP & OUTREACH

- 2018-present **Design Innovation Trainings – Professional Continuing Education**
SUTD Academy & SUTD-MIT International Design Centre
- Lead instructor for Design Innovation trainings (1-5 days) for c-suite executives and upper management in diverse organizations, such as Singtel, Republic of Singapore Navy (RSN), Urban Redevelopment Authority (URA), and the Development Bank of Singapore (DBS)
 - More details under “Entrepreneurship” courses:
<https://sutd.edu.sg/Education/Academy/Our-Offerings/SkillsFuture-Series-Courses/>
- 2017-present **Teaching Assistant for Communicating Scientific Research Course**
Simula and the University of Oslo, Norway
- Teaching Assistant for 5-credit Ph.D. course for one-week each year in April 2017 and May 2019
 - Developed curricula to teach effective technical presentations, academic writing, and scientific posters to 30 graduate students in science and engineering
 - Collaborated with Michael Alley, author of *The Craft of Scientific Presentations & Writing*, and Christine Haas, technical communication consultant
 - Details: www.simula.no/education/courses/communicating-scientific-research-2017,
<https://www.simula.no/education/courses/communicating-scientific-research-2019>
- 2017-2018 **Design Instructor**
Till Summer Institute: www.tillschool.com
- Worked with Erin Huizinger, founder of the Till School, to implement the Till Summer Institute from Chicago, IL to Boulder, CO
 - Till helps student solve real problems with a community partner using lessons on research, strategy, design thinking, leadership, and storytelling. They discover their passions, learn new design skills, and create a portfolio piece.
- 2015-2018 **Design for America (DFA)**
Founder of the CU Boulder DFA Studio – www.colorado.edu/designforamerica
- DFA’s mission is to solve local real-world problems with community partners, using human-centered design principles on interdisciplinary student design teams
 - Built the studio from the ground-up to be a university-recognized organization that is self-sustaining with over 50 students involved from 15 different disciplines
 - Raised \$10,500 in funding to support the studio and design projects
 - Recent successes include one project with a patent-pending design, winning a national mobility challenge, and community collaborations with Dyson, Medline, and Chrysler
- 2015-2018 **Prototyping Lecture Series**
University of Colorado Boulder, Department of Mechanical Engineering
- Created a lecture series teaching students the importance of prototyping in the design process
 - Developed a hands-on workshop and ‘preto-typing’ assignment to accompany the lectures to get students into the ‘build to think’ mindset on their design teams
 - Invited to teach these lectures in four mechanical engineering courses for over 500 students: MCEN 3025 Component Design, MCEN 4045/4085 Senior Design Capstone, MCEN 5055 Advanced Product Design, and MCEN 5065/5075 Graduate Design I/II
- 2015-2018 **Human-Centered Design Workshops**
University of Colorado Boulder
- Developed curriculum to lead design thinking workshops either for 2-hours, 1-day, or over 3-weeks to undergraduate students, graduate students, community members, and professionals
 - Invited to teach these workshops to student organization like Design for America, university groups like New Venture Challenge, outreach efforts like CU Science Discovery, and academic courses including mechanical engineering senior design and graduate design

- 2014-2015 **Program Assistant for Mechanical Engineering Senior Design** (MCEN 4045/4085)
University of Colorado Boulder, Department of Mechanical Engineering
- Aided in teaching over 180 seniors on 30 design teams for one academic year
 - Developed materials to teach 8 workshops on design, prototyping, and manufacturing
 - Implemented new tools for concept generation, expert workshops, and design critiques
 - Organized the final Design Exposition for 250 students, all of the industry partners, and community members and expert judges
- 2014 **Course Development & Instruction for Biomechanics of Rock Climbing**
X-perience STEM Conference, Denver, CO - www.xsci.org/work/x-stem
- Developed course material for the Biomechanics of Rock Climbing from January to June
 - Used Experiential Learning Theory to guide the lessons of physics, mechanics, and geography
 - Taught 3 classes over 3 days in July to 60 professionals and teachers
- 2013 **Teaching Intern for Engineering Design Methodology Course** (ME 340)
The Pennsylvania State University, Department of Mechanical Engineering
- Completed semester educational coursework to prepare to teach several classes in ME 340
 - Worked with Prof. Thomas Litzinger as a teaching assistant for one section of ME 340
 - Taught lectures on reverse engineering, project management, and concept selection to junior-level mechanical engineering students working on a wind turbine design project
- 2012 **Design Lead, Women in Engineering Program Orientation**
Pennsylvania State University, College of Engineering - www.engr.psu.edu/wep/wepo
- Collaborated with 4 other leadership team members to coordinate a 3-day orientation program involving 300 female engineering students
 - Taught introductory design process workshops to first-year engineering students
- 2011-2013 **Teaching Assistant**
Pennsylvania State University
- ME 340 – Mechanical Engineering Design Methodology
 - ENGR 493 – Leadership Experience Project for Engineering Leadership Development Minor
 - ENGR 397 – Advanced Engineering Communication
 - CAS 100A – Effective Speech for Engineers
- 2011-2013 **Engineering Ambassador (EA) Network**
Pennsylvania State University, College of Engineering - www.engineeringambassadors.com
- Early member of the inaugural Engineering Ambassadors program, whose mission is to empower the next generation of engineers through enhanced technical communication and leadership
 - Designed and organized the first workshop and conference in 2012
 - Helped grow the network to over 30 schools across 3 continents

PROFESSIONAL EXPERIENCES

- 2013-present **Carlye Lauff Consulting LLC**
Design Innovation and Strategy, Human-Centered Design, Design Methodology
- Customize and deliver human-centered design and design innovation workshops, mentoring programs, and project guidance for diverse clients ranging from universities to non-profit organizations
 - One exemplar client is the Robert Wood Johnson Foundation (RWJF), where I led an interdisciplinary Colorado team of 8 people through a 6-month project around the opportunity of increasing social-emotional competencies in children. This project was in collaboration with Dr. Meg Small (PSU, HHD) and Dr. Jessica Menold (PSU, SEDTAPP/ME)
 - Another exemplar client is PSU World Campus where I co-led design thinking guidance workshops with Dr. Jessica Menold over 4-months for 25 employees, solving the challenge of enhancing team member interactions for digital and remote projects
- 2018-2019 **Senior Program Manager and Lead Instructor**
As part of my Postdoctoral Design Innovation Research Fellowship at SUTD-MIT IDC
- Senior Program Manager and design researcher for consulting, guidance, and co-creation company projects, such as current projects with the Land Transport Authority (LTA) of Singapore and ST Engineering, where I manage 30 people and \$750k project budgets
 - Lead instructor for Design Innovation trainings (1-5 days) for c-suite executives and upper management in diverse organizations [J8], such as Singtel, Republic of Singapore Navy (RSN), Urban Redevelopment Authority (URA), and the Development Bank of Singapore (DBS)
- 2017-2019 **Design Research & Strategy Consultant**
Borough + Block
- Design research consultant, conducting qualitative design research for projects with the Till School, Idea Forge, TechStars, and Dell Scholars
 - Led the design thinking integration for the Michael & Susan Dell Foundation scholars' program
 - Developed relationships and materials for launching Till School in Colorado
 - Facilitated deep-dive prototyping workshops for the University of Colorado's finance, technology, and human resource teams
- 2018 **User Experience Design Strategist**
Innovation & Entrepreneurship at University of Colorado Boulder – colorado.edu/innovate
- Ran Design Thinking, Empathy, and Prototyping workshops for faculty/staff at CU Boulder
 - Organized cross-campus entrepreneurship initiative, including the faculty and staff bi-annual summer retreat, and I&E student retreat, and programming for Boulder Startup Week 2018
 - Made upgrades to the I&E website, specifically in the organization and details of "Programs"
 - Worked with a team to re-imagine students' journeys, and then plan 'on-ramps' and 'off-ramps' for the different student experiences
 - Worked with a team to improve the mentor data collection and organization
 - Organized historical New Venture Challenge (NVC) team winners data
- 2016-2018 **Co-Founder and Design Researcher**
CurioSpace, LLC
- Our mission is to increase children's positive social interactions, curiosity, and creativity during group play through our guided building activities and stories
 - Our curated kits include purposefully designed stories and building materials for children to experience the design process through building out play-spaces
 - Patented bracket design that aids in building cardboard designs

- 2017 **Design Researcher & Product Designer**
Centre for Design Innovation (CDI) at Swinburne University, www.cdiengage.com.au
- Collaborated with an interdisciplinary team of industrial designers, product design engineers, and design researchers on 6 company sponsored projects
 - Lead design researcher; developed studies including ethnographic observations, interviews, eye tracking protocols, market research, and finite element analysis for the design projects
 - Studied the impact of sequential versus parallel prototyping for consumer products
- 2015 **Project Lead: Disruptive Innovation in Early Learning Opportunities**
*Collaboration between Pennsylvania State University & University of Colorado Boulder
 Robert Wood Johnson Foundation*
- Led a team of 8 people from Colorado with backgrounds in interaction design, mechanical engineering, psychology, learning sciences, and early childhood education
 - This project was in collaboration with Dr. Meg Small (PSU, HHD) and Dr. Jessica Menold (PSU, SEDTAPP/ME) who led a Pennsylvania team
 - This project was sponsored by the Robert Wood Johnson Foundation (RWJF), and we presented our insights at a workshop to RWJF and the Hope Street Group in Omaha, NE
 - This project used design thinking to generate and test new solutions for increasing social and emotional learning in young children [C9]
 - Gained insights about children's critical transitions throughout the day, and designed a children's toy to increase emotional awareness in young children during those transitions [C10] More details here: www.innovationinsed.com
- 2014-2015 **Project Lead & Product Designer: Tissue Extraction Laproscopic Surgical Device**
University of Colorado Boulder, Department of Mechanical Engineering
- This project was part of the year-long capstone for the graduate design program and was sponsored by Covidien/Medtronic
 - Developed a patent-pending laparoscopic surgical device that allows for safe tissue extraction, such as for removal of uterine fibroids, collagenous tissue and soft organs
- 2012-2013 **Project Lead & Product Designer: Mashavu Networked Health Solutions**
Pennsylvania State University, School of Engineering Design, Technology, & Professional Programs (SEDTAPP) – Humanitarian Engineering & Social Entrepreneurship
- Mashavu (*chubby cheeks* in Swahili) strives to provide accessible healthcare in developing nations by working with international partners to confront provider shortages and reduce barriers to health care through pre-primary screenings in rural towns
 - Used principles from systems engineering to confront many of the systematic problems in our pilot location in Nyeri, Kenya – specifically understanding income-generating activities of women [J1] More details here: www.mashavukenya.wordpress.com
- 2012 **Materials & Process Engineering Intern**
Ball Aerospace & Technologies Corporation, Boulder, CO, USA
- Designed a bearing test for analyzing space grade lubrications, and published a Services Engineering Report (SER) for the testing and analysis of space lubrications at cold viscosities
 - Conducted a root cause analysis for circular connector failures
- 2011 **Mechanical Design Intern**
The Boeing Company, Everett, WA, USA
- Worked within the interior design group to design all interior elements for the 787
 - Improved the process for the installation of stow-bin kits for the 787
- 2010 **Service Productivity Analysis Intern**
General Electric Transportation Division, Erie, PA, USA
- Project lead for the DC locomotive 43" wheel initiative for reducing air brake failures
 - Led the project through their 8-step tollgate approval process

SERVICE

2018-present Journal paper peer reviewer for JMD, Design Studies, She Ji, Design Science
2014-present Conference paper peer reviewer for ASME IDETC, ICED, ASEE, and IEEE FIE
2013-present Mentor, Penn State Mechanical Engineering Alumni Society (PSMES)
2016-2018 Mentor, Design for America (DFA) CU Boulder studio
2014-2015 Undergraduate research mentor through the SMART Diversity Initiative Program
2015 Volunteer design workshop instructor for CU Science Discovery
2013-2015 Volunteer for TEDxBoulder and TEDxCUBoulder
2013-2015 Calculus tutor for Longmont, Colorado High School District
2014 International Conference of Learning Sciences Conference Volunteer
2014 Workshop instructor for the X-perience STEM Conference
2013-2015 Secretary for Engineering Ambassador Alumni Network
2011-2013 STEAM Outreach through Engineering Ambassador (EA) Program at Penn State
2010-2013 Lead, Mentor, and Rover for Women in Engineering Program (WEP), Penn State

NEWS & PRESS

2018 Three-Minute Thesis (3MT) Finalist Promotion Video from CU Boulder on my Dissertation Research: <https://www.youtube.com/watch?v=NtaADvkQIYM&feature=youtu.be>

2018 Research Spotlight – CU Boulder Mechanical Engineering:
<https://www.colorado.edu/mechanical/2018/01/03/carlye-lauff-design-theory-and-methodology>

2018 CU Boulder Design for America featured in the winter 2017/18 edition of the Colorado Engineer magazine: “Design with Determination”- <http://cem.colorado.edu/design-for-america/>

2017 Research Spotlight through NSF GROW:
<http://www.colorado.edu/mechanical/2017/01/18/fellowship-win-designing-down-under>

2017 Design for America – James Dyson Fellow:
<http://designforamerica.com/2017/03/30/the-james-dyson-award-is-now-open/>

2017 CurioSpace: <http://news.psu.edu/story/472258/2017/06/20/research/prepare-launch>

2016 Design for America – CU Boulder Studio Launch: <http://designforamerica.com/2016/05/23/dfa-welcomes-extraordinary-group-of-new-studios-to-the-network>

2016 CurioSpace in Summer Founder’s Program:
<http://news.psu.edu/story/425164/2016/09/12/summer-founders-program-helps-engineering-students-enhance-startups>

2013 Penn State Engineering Origami Outreach:
<http://www.centredaily.com/news/article42824277.html>;
http://www.fultoncountynews.com/news/2013-08-08/Local_%28and%29_State/PSU_Students_Using_Origami_To_Teach_Engineering.html

2012 Penn State Engineering Ambassadors – J&J Medal through ASME, accepted on behalf
<http://news.psu.edu/story/148966/2012/05/10/engineering-ambassadors-win-johnson-johnson-medal>

REFERENCES

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Prior Managing Director, CatalyzeCU
University of Colorado Boulder