Andrew P. Sabelhaus

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APPOINTMENTS

Assistant Professor Boston University
  Department of Mechanical Engineering 2022 - Present
  Division of Systems Engineering 2022 - Present
  Center for Information Systems and Engineering 2022 - Present

Postdoctoral Research Fellow Carnegie Mellon University
  Deptartment of Mechanical Engineering 2019 - 2021

Visiting Technologist NASA Ames Research Center
  Intelligent Systems Division 2015 - 2019

Graduate Research Fellow University of California, Berkeley
  Department of Mechanical Engineering 2012-2019

EDUCATION

Ph.D. Mechanical Engineering University of California, Berkeley
Dissertation title: *Tensegrity Spines for Quadruped Robots* August 2019
Dissertation Committee: *Alice M. Agogino (Chair), Andrew Packard, Claire Tomlin, Murat Arcak*

M.S. Mechanical Engineering University of California, Berkeley
Thesis: *Mechanism and Sensor Design for SUPERball, a Cable-Driven Tensegrity Robot* Dec. 2014
Thesis Committee: *Alice M. Agogino, Dennis Lieu*

B.S. Mechanical Engineering University of Maryland, College Park
Minor in Computer Science May 2012

AWARDS

At Boston University

10. **NSF Faculty Early Career Development Program (CAREER) Award.** National Science Foundation. Title: *Safe Autonomy for Soft Robots.* 2024.

9. **Outstanding Associate Editor.** *IEEE International Conference on Robotics and Automation,* 2023.

Before Joining Boston University

8. **Intelligence Community Postdoctoral Research Fellowship.** Office of the Director of National Intelligence. Title: *Rapid Deployment of Hard-to-Control Robots with Optimality Tradeoffs.* 2020-2022.

7. **Outstanding Graduate Student Instructor Award.** University of California, Berkeley. 2018.

6. **NASA Space Technology Research Fellowship.** National Aeronautics and Space Administration. Title: *Trajectory Tracking in Nonlinear, High-Order, Underactuated Robotic Systems.* 2015-2019.

5. **Markowski-Leach Foundation Award.** *Awarded to LGBTQ individuals at San Francisco Bay Area institutions who "are likely to make a substantial contribution to society."* 2013-2014, re-awarded 2016-2018.

4. **NSF Graduate Research Fellowship.** National Science Foundation. 2012-2015.

3. **University Leadership Award.** University of Maryland, College Park. 2012.

2. **Office of LGBTQ Equity Award.** University of Maryland, College Park. 2011.

1. **President's Scholarship.** University of Maryland, College Park. 2008.

RESEARCH OUTPUT SNAPSHOT

Peer-Reviewed Publication Count:				Total Citations:	h-index:
	Conference:	Journal:	Total:		
1st-Author or PI:	9	5	14	1118^* $(500^\dagger)$	15^* $(10^\dagger)$
All:	14	12	26		

Via Google Scholar, https://scholar.google.com/citations?user=ze69yEMAAAAJ&hl=en.
†*Via Web of Science, https://www.webofscience.com/wos/author/record/1791313.*

JOURNAL PUBLICATIONS

12. A. Choi, R. Jing, <u>A.P. Sabelhaus</u>, M.K. Jawed, ``DisMech: A Discrete Differential Geometry-Based Physical Simulator for Soft Robots and Structures,'' *IEEE Robotics and Automation Letters*, Accepted for Publication, 2024.

11. <u>A.P. Sabelhaus</u>, Z. Patterson, A. Wertz, C. Majidi, ``Safe Supervisory Control of Soft Robot Actuators,'' *Soft Robotics*, ahead of print, 2024. doi:10.1089/soro.2022.0131

10. X. Huang, Z.J. Patterson, <u>A.P. Sabelhaus</u>, W. Huang, K. Chin, Z. Ren, M.K. Jawed, C. Majidi, ``Design and Closed Loop Motion Planning of an Untethered Swimming Soft Robot using 2D Discrete Elastic Rods Simulations,'' *Advanced Intelligent Systems*, 2200163, 2022. doi:10.1002/aisy.202200163

9. X. Huang, <u>A.P. Sabelhaus</u>, M. K. Jawed, L. Jin, J. Zou, Y. Chen,``Materials, design, modeling and control of soft robotic artificial muscles,'' *Frontiers in Robotics and AI*, Vol. 30, Nov 2022. doi:10.3389/frobt.2022.1074549

8. <u>A.P. Sabelhaus</u>, R.K. Mehta, A. Wertz, C. Majidi, ``In-Situ Sensing and Dynamics Predictions for Electrothermally-Actuated Soft Robot Limbs,'' *Frontiers in Robotics and AI*, Vol. 9, May 2022. doi:10.3389/frobt.2022.888261

7. M. Zadan, D.K. Patel, <u>A.P. Sabelhaus</u>, J.Liao, A. Wertz, L. Yao, C. Majidi, ``Liquid Crystal Elastomer with Integrated Soft Thermoelectrics for Shape Memory Actuation and Energy Harvesting,'' *Advanced Materials*, April 2022. doi:10.1002/adma.202200857

6. Z.J. Patterson, <u>A.P. Sabelhaus</u>, C. Majidi, ``Robust Control of a Multi-Axis Shape Memory Alloy-Driven Soft Manipulator,'' *IEEE Robotics and Automatics Letters*, April 2022. doi:10.1109/LRA.2022.3143256

5. <u>A.P. Sabelhaus</u>, K. Zampaglione, E. Tang, L.H. Chen, A.K. Agogino, A.M. Agogino, ``Double-Helix Linear Actuators.'' *Journal of Mechanical Design (ASME)*, Vol. 143, Issue 10, Oct. 2021. doi:10.1115/1.4050739

4. Z. Ren, X. Huang, M. Zarepoor, <u>A.P. Sabelhaus</u>, C. Majidi, ``Shape Memory Alloy (SMA) Actuator with Embedded Liquid Metal Curvature Sensor for Closed-Loop Control.'' *Frontiers in Robotics and AI*, Vol. 8, Mar. 2021. doi:10.3389/frobt.2021.599650

3. <u>A.P. Sabelhaus</u>, H. Zhao, E. Zhu, A.K. Agogino, A.M. Agogino, ``Model-Predictive Control with Inverse Statics Optimization for Tensegrity Spine Robots.'' *IEEE Transactions on Control System Technology*, Vol. 29, Issue 1, Jan. 2021. doi:10.1109/TCST.2020.2975138

2. <u>A.P. Sabelhaus</u>, A.H. Li, K.A. Sover, J. Madden, A. Barkan, A.K. Agogino, A.M. Agogino, ``Inverse Statics Optimization for Compound Tensegrity Robots.'' *IEEE Robotics and Automation Letters*, July 2020. doi:10.1109/LRA.2020.2983699

1. K. Caluwaerts, J. Despraz, A. Iscen, <u>A.P. Sabelhaus</u>, J. Bruce, B. Schrauwen, V. SunSpiral, ``Design and Control of Compliant Tensegrity Robots through Simulation and Hardware Validation.'' *Journal of the Royal Society Interface*, Sept. 2014. doi:10.1098/rsif.2014.0520

CONFERENCE PUBLICATIONS

14. M.L. Anderson, R. Jing, J.C. Pacheco Garcia, I. Yang, S. Alizadeh-Shabdiz, C. DeLorey, <u>A.P. Sabelhaus</u>, ``Maximizing Consistent Force Output for Shape Memory Alloy Artificial Muscles in Soft Robots,'' *IEEE International Conference on Soft Robotics (RoboSoft)*, Accepted for Publication, 2024.

13. J.C. Pacheco Garcia, R. Jing, M.L. Anderson, M. Ianus-Valdivia, <u>A.P. Sabelhaus</u>, ``A Comparison of Mechanics Simplifications in Pose Estinmation for Thermally-Actuated Soft Robot Limbs.'' *ASME 2023 Conference on Smart Materials, Adaptive Structures, and Intelligent Systems (SMASIS)*, Sept. 2023. doi:10.1115/SMASIS2023-110774

12. A. Wertz*, <u>A.P. Sabelhaus</u>*, C. Majidi, ``Trajectory Optimization for Thermally-Actuated Soft Planar Robot Limbs,'' *IEEE International Conference on Soft Robotics (RoboSoft)*, April 2022. *Equal Contribution. doi:10.1109/RoboSoft54090.2022.9762226

11. <u>A.P. Sabelhaus</u>, C.Majidi, ``Gaussian Process Dynamics Models for Soft Robots with Shape Memory Actuators.'' *IEEE International Conference on Soft Robotics (RoboSoft)*, April 2021. doi:10.1109/RoboSoft51838.2021.9479294

10. Z. Patterson, <u>A.P. Sabelhaus</u>, K. Chin, T. Hellebrekers, C. Majidi, ``An Untethered Brittle Star Robot for Closed-Loop Underwater Locomotion.'' *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Oct. 2020. doi:10.1109/IROS45743.2020.9341008

9. L.H. Chen, M.C. Daly, <u>A.P. Sabelhaus</u>, L.A. Janse van Vuuren, H.J. Garnier, M.I. Verdugo, E. Tang, C.U. Spangenberg, F. Ghahani, A.K. Agogino, A.M. Agogino, ``Modular Elastic Lattice Platform for Rapid Prototyping of Tensegrity Robots.'' *ASME International Design Engineering Technical Conferences (IDETC) / 41st Mechanisms and Robotics Conference*, Aug 2017. doi:10.1115/DETC2017-68264

8. <u>A.P. Sabelhaus</u>, A.K. Akella, Z.A. Ahmad, V. SunSpiral, ``Model-Predictive Control of a Flexible Spine Robot.'' *American Control Conference (ACC)*, IEEE, May 2017. doi:10.23919/ACC.2017.7963738

7. K. Zampaglione, <u>A.P. Sabelhaus</u>, L.H. Chen, A.M. Agogino, A.K. Agogino, ``DNA-Structured Linear Actuators.'' *ASME International Design Engineering Technical Conferences (IDETC) / 40th Mechanisms and Robotics Conference*, Aug 2016. doi:10.1115/DETC2016-60291

6. <u>A.P. Sabelhaus</u>, H. Ji, P. Hylton, Y. Madaan, C. Yang, J. Friesen, V. SunSpiral, A.M. Agogino, ``Mechanism Design and Simulation of the ULTRA Spine, a Tensegrity Robot.'' *ASME International Design Engineering Technical Conferences (IDETC) / 39th Mechanisms and Robotics Conference*, Aug 2015. doi:10.1115/DETC2015-47583

5. <u>A.P. Sabelhaus</u>, J. Bruce, K. Caluwaerts, P. Manovi, R.F. Firoozi, S. Dobi, A.M. Agogino, V. SunSpiral, ``System Design and Locomotion of SUPERball, an Untethered Tensegrity Robot.'' *IEEE International Conference on Robotics and Automation (ICRA)*, May 2015. doi:10.1109/ICRA.2015.7139590

4. <u>A.P. Sabelhaus</u>; J. Bruce, K. Caluwaerts, Y. Chen, D. Lu, Y. Liu, A.K. Agogino, V. SunSpiral, A.M. Agogino, ``Hardware Design and Testing of SUPERball, a Modular Tensegrity Robot.'' *The 6th World Conference on Structural Control and Monitoring (6WCSCM)*, July 2014.

3. J. Bruce, <u>A.P. Sabelhaus</u>, Y. Chen, D.Lu, K. Morse, S. Milam, K. Caluwaerts, A.M. Agogino, V. SunSpiral, ``SUPERball: Exploring Tensegrities for Planetary Probes.'' *12th International Symposium on Artificial Intelligence, Robotics, and Automation in Space (i-SAIRAS)*, June 2014.

2. J. Bruce, K. Caluwaerts, A. Iscen, <u>A.P. Sabelhaus</u>, V. SunSpiral, ``Design and Evolution of a Modular Tensegrity Robot Platform.'' *IEEE International Conference on Robotics and Automation (ICRA)*, May 2014. doi:10.1109/ICRA.2014.6907361

1. <u>A.P. Sabelhaus</u>, D. Mirsky, L.M. Hill, S. Bergbreiter, ``TinyTeRP: A Tiny Terrestrial Robotic Platform with Modular Sensing.'' *IEEE International Conference on Robotics and Automation (ICRA)*, May 2013. doi: 10.1109/ICRA.2013.6630933

EDITORIALS

1. X. Huang, <u>A.P. Sabelhaus</u>, M.K. Jawed, L. Jin, J. Zou, Y. Chen. ``Editorial: Materials, design, modeling and control of soft robotic artificial muscles.'' *Frontiers in Robotics and AI*, Nov. 2021. doi:10.3389/frobt.2022.1074549

UNDER REVIEW + PRE-PRINTS

2. R. Jing, M. Anderson, M. Ianus-Valdivia, A. Akber, C. Majidi, <u>A.P. Sabelhaus</u>, ``Safe Balancing Control of a Soft Legged Robot.'' *Preprint Only.* arXiv:2209.13715

1. <u>A.P. Sabelhaus</u>, L.A. Janse van Vuuren, A. Joshi, E. Zhu, H.J. Garnier, K.A. Sover, J. Navarro, A.K. Agogino, V. SunSpiral, A.M. Agogino, ``Design, Simulation, and Testing of a Flexible Actuated Spine for Quadruped Robots.'' *Preprint Only.* arXiv:1804.06527

IN-PREPARATION

3. M.L. Anderson, J.C. Pacheco Garcia, C. DeLorey, R. Jing, S. Alizadeh-Shabdiz, Z. Patterson, <u>A.P. Sabelhaus</u>, ``Safe Autonomous Environmental Contact for Soft Robots using Control Barrier Functions.''

2. <u>A.P. Sabelhaus</u>, L.A. Janse van Vuuren, D. Macri, A. Joshi, K.A. Sover, Z. Rodriquez, J. Navarro, A. Bronars, A.H. Li, A. Barkan, A. Zhang, A.K. Agogino, A.M. Agogino, ``Tensegrity Spines for Quadruped Robots.''

1. <u>A.P. Sabelhaus</u>, ``Stability and Control Design for Lagrangian Systems with Statically-Conservative Forces.''

PATENTS

2. A. Agogino, K. Zampaglione, L.-H. Chen, <u>A.P. Sabelhaus</u>, ``DNA Structured Linear Actuator.'' *US Patent No. 10,630,208, issued April 21, 2020.*

1. L.-H. Chen, A. Agogino, M. Daly, <u>A.P. Sabelhaus</u>, A.K. Agogino, ``Elastic Lattices for Design of Tensegrity Structures and Robots.'' *Under review, US Patent Application No. US20190382995A1.*

TALKS + PRESENTATIONS + POSTERS

27. <u>A.P. Sabelhaus</u>, ``Challenges in Control Across Stiffness Scales: from Tensegrity to Softness.'' *IEEE Intelligent Robots and Systems (IROS) Tensegrity Robotics Workshop*, 2023.

26. R. Jing, M.L. Anderson, M. Ianus-Valdivia, A. Akber Ali, C. Majidi, <u>A.P. Sabelhaus</u>, ``Safe Balancing Control of a Soft Legged Robot.'' *Late Breaking Results, IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2023

25. M.L. Anderson, R. Jing, J.C. Pacheco Garcia, I. Yang, S. Alizadeh-Shabdiz, <u>A.P. Sabelhaus</u>, ``Networks of Shape Memory Alloy Artificial Muscles Increase Force Output in Soft Robot Limbs.'' *Late Breaking Results, IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2023

24. <u>A.P. Sabelhaus</u>, ``Challenges in Control and Autonomy for Soft Robots: Safety, Robustness, and Scalability.'' *ASME International Design Engineering Technical Conferences (IDETC) Mechanisms and Robotics Special Early Career Session (SEC-sess)*, 2023.

23. <u>A.P. Sabelhaus</u>, ``Challenges in Control and Autonomy for Soft Robots: Robustness, Scalability, and Safety.'' *Embodied Intelligence Conference*, 2023

22. <u>A.P. Sabelhaus</u>, ``Controlling Soft Robots: Not as Hard as You'd Think.'' *University of Massachusetts Amherst, Department of Mechanical Engineering Seminar*, 2022

21. R. Jing, M.L. Anderson, M. Ianus-Valdivia, <u>A.P. Sabelhaus</u>, ``Safe Balancing Control of a Soft Legged Robot.'' *Northeast Regional Robotics Colloquium*, 2022

20. <u>A.P. Sabelhaus</u>, ``Safe Supervisory Control of Soft Robot Actuators.'' *Northeast Regional Robotics Colloquium*, 2022

19. <u>A.P. Sabelhaus</u>, ``Controlling Soft Robots: Not as Hard as You'd Think.'' *Applied Materials, Inc. Research Seminar Series*, 2022

18. <u>A.P. Sabelhaus</u>, ``Safe Supervisory Control of Soft Robot Actuators.'' *Robotics: Science and Systems, Workshop: The Science of Bumping Into Things, Towards Robots that Aren't Afraid of Contact*, 2022

17. <u>A.P. Sabelhaus</u>, ``Close Enough is Good Enough: Approximations in Soft Robot Control.'' *Embodied Intelligence Conference*, 2022

16. <u>A.P. Sabelhaus</u>, ``Double-Helix Linear Actuators.'' *4th ASME Journal of Mechanical Design Webinar*, American Society of Mechanical Engineers, Dec. 2021

15. <u>A.P. Sabelhaus</u>, ``Soft Robot Locomotion: Not as Hard as You Might Think.'' *Intelligence Community Academic Research Syposium*, United States Office of the Director of National Intelligence, Sept. 2021.

14. <u>A.P. Sabelhaus</u>, ``Controlling Soft Robots: Not as Hard as You Might Think.'' *NGA IC Postdoc Speaker Series*, National Geospatial Intelligence Agency (Online), June 2021.

13. <u>A.P. Sabelhaus</u>, ``Towards Rich Locomotion Gaits for Soft Robots.'' *CMU Locomotion Seminar*, Carnegie Mellon University, Nov. 2020.

12. <u>A.P. Sabelhaus</u>, C. Majidi, ``Gaussian Process Models for Soft Robot Locomotion.'' *Workshop on Application-Oriented Modeling and Control of Soft Robots, IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Oct. 2020.

11. <u>A.P. Sabelhaus</u>, ``Tensegrity Spines for Quadruped Robots.'' *Workshop on Tensegrity Robotics, IEEE International Conference on Robotics and Automation (ICRA)*, May 2019.

10. <u>A.P. Sabelhaus</u>, ``Tensegrity Spines for Quadruped Robots.'' *CMU Locomotion Seminar*, Carnegie Mellon University, Feb. 2019.

9. <u>A.P. Sabelhaus</u>, ``Laika and Belka: Walking Robots with Flexible Spines.'' *Workshop on Autonomy for Future NASA Science Missions*, National Aeronautics and Space Administration, Oct. 2018.

8. <u>A.P. Sabelhaus</u>, A.K. Agogino, ``Inverse Kinematics for Tensegrity Soft Robot Control: Existence and Optimality.'' *Soft Robotics Modeling and Control Workshop, IEEE/RSJ International Conference on Intelligent Robots and Systems*, Oct. 2018.

7. <u>A.P. Sabelhaus</u>, ``Laika, The Four-Legged Robot with a Flexible Spine.'' *NASA Space Technology Day-On-The-Hill*, United States Congress / House of Representatives, Nov. 2017.

6. <u>A.P. Sabelhaus</u>, ``Laika, The Quadruped Robot with a Flexible Spine.'' *Bay Area Robotics Symposium (BARS)*, Oct. 2017.

5. <u>A.P. Sabelhaus</u>, ``Trajectory Tracking Control of a Flexible Spine Robot.'' *Workshop on Structurally Adaptive Tensegrity Robotics, 13th NASA/ESA Conference on Adaptive Hardware and Systems*, July 2017.

4. <u>A.P. Sabelhaus</u>, ``UC Berkeley Robotics for Disaster Relief.'' *Field Innovation Team Bootcamp 5.0*, Mar. 2017.

3. <u>A.P. Sabelhaus</u>, ``DNA-Structured Linear Actuators.'' *SKTA Innopartners IP Redux*, Apr. 2016.

2. <u>A.P. Sabelhaus</u>, ``The ULTRA Spine Project.'' *Bay Area Robotics Symposium (BARS)*, Oct. 2015.

1. <u>A.P. Sabelhaus</u>, ``Robotics, Mechatronics, and Intelligent Systems.'' *Osher Lifelong Learning Institute*, Feb. 2014.

PROFESSIONAL ACTIVITIES

- **Editorial Work: Associate Editor**
  - *IEEE International Conference on Robotics and Automation (ICRA)*: Humanoids and Animaloids topic area. 2023
  - Outstanding Associate Editor Award, *IEEE ICRA 2023*
- **Editorial Work: Guest Editor**
  - *Frontiers in Robotics and AI*: Special Topic on Materials, Design, Modeling and Control of Soft Robotic Artificial Muscles. 2022
- **Peer Review: Grants and Funding**
  - National Science Foundation (NSF), *Panel Reviewer, 2023, 2024*
- **Peer Review: Journals and Conferences**
  - **Journals**: *Soft Robotics, IEEE Robotics and Automation Letters (RA-L), International Journal of Robotics Research (IJRR), Science Robotics, Mechanism and Machine Theory, Acta Astronautica, IEEE Transactions on Control System Technology (T-CST), IEEE Transactions on Robotics (T-RO), Journal of Open-Source Software (JOSS), Frontiers in Robotics and AI, IEEE Robotics and Automation Magazine, International Journal of Space Structures (IJSS).*
  - **Conferences**: *IEEE International Conference on Robotics and Automation (ICRA), IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), American Control Conference (ACC), IEEE Conference on Decision and Control (CDC), IEEE International Conference on Soft Robotics (RoboSoft), IEEE RAS/EMBS International Conference on Biomedical Robotics & Biomechatronics (BioRob), ASME International Design Engineering Technical Conference (IDETC), IEEE Conference on Control Technology and Applications (CCTA), IEEE/ASME Advanced Intelligent Mechatronics (AIM).*

TEACHING + MENTORING

- **Mentorship of PhD students.** 4 students. Diversity: 3/4 identify as minority or under-represented, 75%.

- **Mentorship of master's students.** 18 students. Diversity: 11/18 identify as minority or under-represented, 61%.

- **Mentorship of undergraduate students.** 22 students. Diversity: 14/22 identify as minority or under-represented, 64%.

- **Instructor / Assistant Professor.** Boston University.

  - Spring 2024 | Eng. 103, Computational Linear Algebra | Overall rating: --
  - Fall 2023 | Eng. 121, Introduction to Programming | Overall rating: 3.26/5
  - Spring 2023 | Eng. 103, Computational Linear Algebra | Overall rating: 4.63/5
  - Spring 2022 | Eng. 103, Computational Linear Algebra | Overall rating: 4.54/5

- Graduate Student Instructor (GSI). University of California, Berkeley.
  - Spring 2018 | Mech. Eng. 135/235, Design of Microprocessor-Based Mechanical Systems
- Outstanding Graduate Student Instructor (GSI) Award. University of California, Berkeley, 2019

SERVICE + OUTREACH

- Service to the Mechanical Engineering Department at Boston University:
  - Policies Task Force for Fostering Inclusive Environments, 2023
  - PhD Fellowships Writing Group (Organizer), 2022-2023
- Service to the Systems Engineering Division at Boston University:
  - Graduate Admissions Committee, 2022-2024
- Faculty Advisor. Out in Science, Technology, Engineering, and Mathematics (oSTEM)[†] at Boston University, 2022 - present
- Faculty/Staff Advisor. Out in Science, Technology, Engineering, and Mathematics (oSTEM)[†] at Carnegie Mellon University, 2020 - 2022.
- ASME Diversity and Inclusion Strategic Commitee (DISC), Advisor. American Society of Mechanical Engineers (ASME). Revised ASME policy P-15.11, PS16-02, and Statement on Diversity and Inclusion to include protections for transgender ASME members. June 2016 - 2018.
- ASEE LGBTQ Virtual Community of Practice, Member. American Society for Engineering Education. 2018 - 2020.
- Service to the Mechanical Engineering Department at UC Berkeley:
  - Graduate Student Committee for Faculty Searches, 2017 - 2018.
  - Graduate Peer Advisor for Equity, Diversity, and Inclusion Initiative, 2014 - 2015.
- Coordinator, Chapter Leadership Programs. Out in Science, Technology, Engineering, and Mathematics[†] Incoporated. 2012 - 2013.
- Single Outreach Events (Selected):
  - NASA Downlink Day with The Calculus Project, Boston University, 2022 and 2023: Demo and Lab Tour
  - LGBTQ Professionals in STEM Panel, Boston University, 2022: Panelist
  - NASA High School Camp at Carnegie Mellon University, 2021: Guest lecture
  - Carnegie Science Center Day, 2020: Organized table presentation
  - Cal Day, UC Berkeley, 2015-2019: Organized lab tours
  - Robot Block Party, Silicon Valley Robotics, 2015, 2017: Organized table presentation

[†]Out in Science, Technology, Engineering, and Mathematics (oSTEM) is a national organization for LGBTQ science and engineering students, www.ostem.org

PROFESSIONAL DEVELOPMENT

- Essentials of Effective Instruction. American Society for Engineering Education (ASEE). Intensive course on active learning and theory of teaching and learning for new instructors. Sept. 2021.
- Summer Institute for Preparing Future Faculty. A professional development program to prepare students for academic careers. University of California, Berkeley. Completed / certified in June 2018.
- Question, Persuade, Refer: Gatekeeper. Trained for response to mental health crises in students. University of California Berkeley Health Center, March 2018.
- Teaching of Mechanical Engineering at the University Level. UC Berkeley Mechanical Engineering Department. Course on teaching pedagogy in engineering. Spring 2018.
- Workshops on Teaching and Learning. UC Berkeley GSI Teaching and Resource Center / Academic Innovation Studio. Attended workshops on teaching pedagogy, including `How Students Learn' and `Teaming With Diversity.' Fall 2017 - Spring 2018.

- **Teaching Conference for Graduate Student Instructors**. UC Berkeley GSI Teaching and Resource Center. Introductory pedagogy for first-time Graduate Student Instructors. Attended in Jan. 2018.