

# Andrew P. Sabelhaus

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## APPOINTMENTS

### **Assistant Professor**

Department of Mechanical Engineering  
Division of Systems Engineering  
Center for Information Systems and Engineering

**Boston University**

2022 - Present

2022 - Present

2022 - Present

### **Postdoctoral Research Fellow**

Department of Mechanical Engineering

**Carnegie Mellon University**

2019 - 2021

### **Visiting Technologist**

Intelligent Systems Division

**NASA Ames Research Center**

2015 - 2019

### **Graduate Research Fellow**

Department of Mechanical Engineering

**University of California, Berkeley**

2012-2019

## EDUCATION

### **Ph.D. Mechanical Engineering**

Dissertation title: *Tensegrity Spines for Quadruped Robots*

Dissertation Committee: Alice M. Agogino (Chair), Andrew Packard, Claire Tomlin, Murat Arcak

**University of California, Berkeley**

August 2019

### **M.S. Mechanical Engineering**

Thesis: *Mechanism and Sensor Design for SUPERball, a Cable-Driven Tensegrity Robot*

Thesis Committee: Alice M. Agogino, Dennis Lieu

**University of California, Berkeley**

Dec. 2014

### **B.S. Mechanical Engineering**

Minor in Computer Science

**University of Maryland, College Park**

May 2012

## AWARDS

### **At Boston University**

10. NSF Faculty Early Career Development Program (CAREER) Award. National Science Foundation. 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.

## FUNDING

Total amount of funding at Boston University: \$1,835,205

Personal share of funding at Boston University: \$1,345,242

### At Boston University - PI

5. NSF Foundational Research in Robotics (FRR). CAREER: *Safe Autonomy for Soft Robots*. 2024-2029. (\$600,000.)
4. Office of Naval Research (ONR). *Lightweight Soft Robotic Vehicles with Inflation-Based Locomotion*. 2024-2025. (\$68,300.) PI: Sabelhaus, Co-PI: Xiaonan Huang, University of Michigan Ann Arbor.
3. National Reconnaissance Office (NRO) Architecture After Next. *Soft Robot Proprioception with Space-Compatible Artificial Muscles*. 2023-2024. (\$210,459.)

### At Boston University - Co-PI

2. NSF Dynamics, Control, and System Diagnostics (DCSD). *Koopman in the Field: Feedback, Teaching, and Adaptation for Real-World Mechanical Systems*. 2025-2027. (\$522,592, personal share \$261,296.) PI: Roberto Tron (BU MechE), co-PI: Sabelhaus.
1. NSF Cyberinfrastructure for Sustained Scientific Innovation (CSSI). *Collaborative Research: Elements: Discrete Simulation of Flexible Structures and Soft Robots*. 2022-2025. (\$169,987 with \$35,200 REU Supplement Awards.) PI: M. Khalid Jawed (University of California Los Angeles), co-PIs: Sabelhaus, Carmel Majidi (Carnegie Mellon University).

## PUBLICATIONS

Peer-Reviewed Publication Count:				Total Citations:	h-index:
	Conference:	Journal:	Total:		
1st-Author or PI:	10	5	15	1364* (650 <sup>†</sup> )	16* (11 <sup>†</sup> )
All:	15	11	26		

\*Via Google Scholar, <https://scholar.google.com/citations?user=ze69yEMAAAAJ&hl=en>.

<sup>†</sup>Via Web of Science, <https://www.webofscience.com/wos/author/record/1791313>.

### Journal Publications

Names of advised students/postdocs are underlined>.

11. A. Choi, R. Jing, **A.P. Sabelhaus**, M.K. Jawed, "DisMech: A Discrete Differential Geometry-Based Physical Simulator for Soft Robots and Structures," *IEEE Robotics and Automation Letters*, Vol. 9, No. 4., Apr 2024. doi:10.1109/LRA.2024.3365292
10. **A.P. Sabelhaus**, Z. Patterson, A. Wertz, C. Majidi, "Safe Supervisory Control of Soft Robot Actuators," *Soft Robotics*, Vol. 11, No. 4, Aug 2024. doi:10.1089/soro.2022.0131
9. X. Huang, Z.J. Patterson, **A.P. Sabelhaus**, 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, Sept 2022. doi:10.1002/aisy.202200163
8. **A.P. Sabelhaus**, 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, **A.P. Sabelhaus**, J. Liao, A. Wertz, L. Yao, C. Majidi, "Liquid Crystal Elastomer with Integrated Soft Thermoelectrics for Shape Memory Actuation and Energy Harvesting," *Advanced Materials*, Vol. 34, No. 23, April 2022. doi:10.1002/adma.202200857
6. Z.J. Patterson, **A.P. Sabelhaus**, C. Majidi, "Robust Control of a Multi-Axis Shape Memory Alloy-Driven Soft Manipulator," *IEEE Robotics and Automation Letters*, Vol. 7, No. 2, April 2022. doi:10.1109/LRA.2022.3143256

5. **A.P. Sabelhaus**, K. Zampaglione, E. Tang, L.H. Chen, A.K. Agogino, A.M. Agogino, "Double-Helix Linear Actuators." *Journal of Mechanical Design (ASME)*, Vol. 143, No. 10, Oct. 2021. doi:10.1115/1.4050739
4. Z. Ren, X. Huang, M. Zarepoor, **A.P. Sabelhaus**, 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. **A.P. Sabelhaus**, 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, No. 1, Jan. 2021. doi:10.1109/TCST.2020.2975138
2. **A.P. Sabelhaus**, 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*, Vol. 5, No. 3, July 2020. doi:10.1109/LRA.2020.2983699
1. K. Caluwaerts, J. Despraz, A. Iscen, **A.P. Sabelhaus**, J. Bruce, B. Schrauwen, V. SunSpiral, "Design and Control of Compliant Tensegrity Robots through Simulation and Hardware Validation." *Journal of the Royal Society Interface*, Vol. 11, No. 98, Sept. 2014. doi:10.1098/rsif.2014.0520

## Conference Publications

Names of advised students/postdocs are underlined.

15. A. Dickson, J.C. Pacheco Garcia, R. Jing, M.L. Anderson, **A.P. Sabelhaus**, "Real-Time Trajectory Generation for Soft Robot Manipulators Using Differential Flatness," *IEEE International Conference on Soft Robotics (RoboSoft)*, Accepted for Publication, 2025. doi:10.48550/arXiv.2412.08568
14. M.L. Anderson, R. Jing, J.C. Pacheco Garcia, I. Yang, S. Alizadeh-Shabdiz, C. DeLorey, **A.P. Sabelhaus**, "Maximizing Consistent Force Output for Shape Memory Alloy Artificial Muscles in Soft Robots," *IEEE International Conference on Soft Robotics (RoboSoft)*, Apr. 2024. doi:10.1109/RoboSoft60065.2024.10521983
13. J.C. Pacheco Garcia, R. Jing, M.L. Anderson, M. Ianus-Valdivia, **A.P. Sabelhaus**, "A Comparison of Mechanics Simplifications in Pose Estimation 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\*, **A.P. Sabelhaus\***, 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. **A.P. Sabelhaus**, 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, **A.P. Sabelhaus**, 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, **A.P. Sabelhaus**, 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. **A.P. Sabelhaus**, 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, **A.P. Sabelhaus**, 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. **A.P. Sabelhaus**, 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. **A.P. Sabelhaus**, 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. **A.P. Sabelhaus**, 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, **A.P. Sabelhaus**, 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, **A.P. Sabelhaus**, 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. **A.P. Sabelhaus**, 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, **A.P. Sabelhaus**, 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

## Pre-prints and Under Review

3. R. Jing, M.L. Anderson, J.C. Pacheco Garcia, **A.P. Sabelhaus**, "Self-Sensing for Proprioception and Contact Detection in Soft Robots Using Shape Memory Alloy Artificial Muscles." *Preprint*. arXiv:2409.17111
2. R. Jing, M.L. Anderson, M. Ianus-Valdivia, A. Akber, C. Majidi, **A.P. Sabelhaus**, "Safe Balancing Control of a Soft Legged Robot." *Preprint*. arXiv:2209.13715
1. **A.P. Sabelhaus**, 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

## Patents

1. A. Agogino, K. Zampaglione, L.-H. Chen, **A.P. Sabelhaus**, "DNA Structured Linear Actuator." *US Patent No. 10,630,208*, issued April 21, 2020.

## TALKS + PRESENTATIONS + POSTERS

27. **A.P. Sabelhaus**, "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, **A.P. Sabelhaus**, "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, **A.P. Sabelhaus**, "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. **A.P. Sabelhaus**, "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. **A.P. Sabelhaus**, "Challenges in Control and Autonomy for Soft Robots: Robustness, Scalability, and Safety." *Embodied Intelligence Conference*, 2023
22. **A.P. Sabelhaus**, "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, **A.P. Sabelhaus**, "Safe Balancing Control of a Soft Legged Robot." *Northeast Regional Robotics Colloquium*, 2022
20. **A.P. Sabelhaus**, "Safe Supervisory Control of Soft Robot Actuators." *Northeast Regional Robotics Colloquium*, 2022

19. A.P. Sabelhaus, "Controlling Soft Robots: Not as Hard as You'd Think." *Applied Materials, Inc. Research Seminar Series*, 2022
18. A.P. Sabelhaus, "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. A.P. Sabelhaus, "Close Enough is Good Enough: Approximations in Soft Robot Control." *Embodied Intelligence Conference*, 2022
16. A.P. Sabelhaus, "Double-Helix Linear Actuators." *4th ASME Journal of Mechanical Design Webinar*, American Society of Mechanical Engineers, Dec. 2021
15. A.P. Sabelhaus, "Soft Robot Locomotion: Not as Hard as You Might Think." *Intelligence Community Academic Research Symposium*, United States Office of the Director of National Intelligence, Sept. 2021.
14. A.P. Sabelhaus, "Controlling Soft Robots: Not as Hard as You Might Think." *NGA IC Postdoc Speaker Series*, National Geospatial Intelligence Agency (Online), June 2021.
13. A.P. Sabelhaus, "Towards Rich Locomotion Gaits for Soft Robots." *CMU Locomotion Seminar*, Carnegie Mellon University, Nov. 2020.
12. A.P. Sabelhaus, 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. A.P. Sabelhaus, "Tensegrity Spines for Quadruped Robots." *Workshop on Tensegrity Robotics, IEEE International Conference on Robotics and Automation (ICRA)*, May 2019.
10. A.P. Sabelhaus, "Tensegrity Spines for Quadruped Robots." *CMU Locomotion Seminar*, Carnegie Mellon University, Feb. 2019.
9. A.P. Sabelhaus, "Laika and Belka: Walking Robots with Flexible Spines." *Workshop on Autonomy for Future NASA Science Missions*, National Aeronautics and Space Administration, Oct. 2018.
8. A.P. Sabelhaus, 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. A.P. Sabelhaus, "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. A.P. Sabelhaus, "Laika, The Quadruped Robot with a Flexible Spine." *Bay Area Robotics Symposium (BARS)*, Oct. 2017.
5. A.P. Sabelhaus, "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. A.P. Sabelhaus, "UC Berkeley Robotics for Disaster Relief." *Field Innovation Team Bootcamp 5.0*, Mar. 2017.
3. A.P. Sabelhaus, "DNA-Structured Linear Actuators." *SKTA Innopartners IP Redux*, Apr. 2016.
2. A.P. Sabelhaus, "The ULTRA Spine Project." *Bay Area Robotics Symposium (BARS)*, Oct. 2015.
1. A.P. Sabelhaus, "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 & Biomechanics (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)<sup>†</sup> at Boston University, 2022 - present
- **Faculty/Staff Advisor.** Out in Science, Technology, Engineering, and Mathematics (oSTEM)<sup>†</sup> at Carnegie Mellon University, 2020 - 2022.
- **ASME Diversity and Inclusion Strategic Committee (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<sup>†</sup> Incorporated. 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

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