Andrew P. Sabelhaus

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EDUCATION

PH.D. MECHANICAL ENGINEERING   University of California, Berkeley
Dissertation title: *Quadruped Robots with Tensegrity Spines*   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

B.S. MECHANICAL ENGINEERING   University of Maryland, College Park
Minor in Computer Science   May 2012

PROFESSIONAL EXPERIENCE

Carnegie Mellon University   Postdoctoral Research Associate
   Dept. of Mechanical Engineering   2019 - Present
   Soft Machines Lab (*PI: Carmel Majidi*)   Pittsburgh, PA

NASA Ames Research Center   Visiting Technologist
   Intelligent Systems Division   2015 - 2019
   Intelligent Robotics Group and Robust Software Engineering   Moffet Field, CA

University of California, Berkeley   Graduate Student Researcher
   Dept. of Mechanical Engineering   2012-2019
   Berkeley Emergent Space Tensegrities Lab (*PI: Alice Agogino*)   Berkeley, CA

GRANTS + FUNDING

4. **NASA Space Technology Research Fellowship.** 4 years. Title: *Trajectory Tracking in Nonlinear, High-Order, Underactuated Robotic Systems.* 2015-2019.

3. **CITRIS Tech for Social Good Development Grant.** Block grant. Title: *Laika, The Robot Transport for Disaster Relief.* University of California Center for Information Technology Research in the Interest of Society (CITRIS), 2018.

2. **Markowski-Leach Scholarship Award.** 4 years (re-awarded after two.) *Awarded to LGBTQ individuals at San Francisco Bay Area institutions who "are likely to make a substantial contribution to society."* 2013-2014, 2016-2018. Currently the only repeated awardee on record.

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

PUBLICATIONS

11. **Model-Predictive Control with Inverse Statics Optimization for Tensegrity Spine Robots.**
Sabelhaus, A.P.; Zhao, H.; Zhu, E.; Agogino, A.K.; Agogino, A.M.; *IEEE Transactions on Control System Technology*, To Appear, 2020. Preprint available, arXiv:1806.08868

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

9. **Model-Predictive Control of a Flexible Spine Robot.** Sabelhaus, A.P.; Akella, A.K.; Ahmad, Z.A.; SunSpiral, V.; *American Control Conference (ACC)*, IEEE, May 2017.

8. **DNA-Structured Linear Actuators.** Zampaglione, K.; <u>Sabelhaus, A.P.</u>; Chen, L.; Agogino, A.M.; Agogino, A.K.; *ASME International Design Engineering Technical Conferences (IDETC) / 40th Mechanisms and Robotics Conference*, Aug 2016.

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

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

5. **Design and Control of Compliant Tensegrity Robots through Simulation and Hardware Validation.** Caluwaerts, K.; Despraz, J.; Iscen, A.; <u>Sabelhaus, A.P.</u>; Bruce, J.; Schrauwen, B.; SunSpiral, V.; *Journal of the Royal Society Interface*, Sept. 2014.

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

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

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

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

PRE-PRINTS + PUBLICATIONS UNDER REVIEW

2. **Inverse Statics Optimization for Compound Tensegrity Robots.** <u>Sabelhaus, A.P.</u>; Li, A.H.; Sover, K.A.; Madden, J.; Barkan, A.; Agogino, A.K.; Agogino, A.M.; *Under Review (Journal.)* Preprint available, arXiv:1808.08252

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

IN-PREPARATION PUBLICATIONS

2. **An Autonomous, Untethered, Underwater Soft Robot Inspired by the Brittle Star.** Patterson, Z.; <u>Sabelhaus, A.P.</u>; Chin, K.; Majidi, C.

1. **Twisted Helix Linear Actuators.** <u>Sabelhaus, A.P.</u>; Tang, E.; Zampaglione, K.; Chen, L-H.; Agogino, A.M.

PATENTS

2. **DNA Structured Linear Actuator.** Agogino, A.; Zampaglione, K.; Chen, L-H.; <u>Sabelhaus, A.</u>; US Patent Application Number: PCT/US2016/032899. Under Review.

1. **Elastic Lattices for Design of Tensegrity Structures and Robots.** Chen, L-H.; Agogino, A.; Daly, M.; <u>Sabelhaus, A.P.</u>; Agogino, A.K.; US Patent Application Number forthcoming, WIPO Publication Number: WO 2018/161089. Under Review.

TEACHING + OUTREACH + SERVICE

- **Selected Teaching Work:** Graduate Student Instructor (GSI), University of California, Berkeley, 2019. Outstanding GSI Award, 2019. Student Evaluations: 4.88/5.0 (for ``Total Effectiveness of Instructor.")

- **Selected Diversity Work:** Staff Advisor, oSTEM at CMU (Out in Science, Technology, Engineering, and Mathematics), 2019-Present. ASME Diversity and Inclusion Strategic Committee (DISC), Advisor, 2016-2018.