Andrew P. Sabelhaus

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EDUCATION

PH.D. MECHANICAL ENGINEERING — University of California, Berkeley
Disseration title: *Quadruped Robots with Tensegrity Spines* — August 2019
Disseration 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.; Sabelhaus, A.P.; 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. Sabelhaus, A.P.; 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. Sabelhaus, A.P.; 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.; Sabelhaus, A.P.; 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. Sabelhaus, A.P.; 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.; Sabelhaus, A.P.; 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.; Sabelhaus, A.P.; SunSpiral, V.; *IEEE International Conference on Robotics and Automation (ICRA)*, May 2014
1. TinyTeRP: A Tiny Terrestrial Robotic Platform with Modular Sensing. Sabelhaus, A.P.; 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. Sabelhaus, A.P.; 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. Sabelhaus, A.P.; 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.; Sabelhaus, A.P.; Chin, K.; Majidi, C.
1. Twisted Helix Linear Actuators. Sabelhaus, A.P.; Tang, E.; Zampaglione, K.; Chen, L-H.; Agogino, A.M.

PATENTS

2. DNA Structured Linear Actuator. Agogino, A.; Zampaglione, K.; Chen, L-H.; Sabelhaus, A.; 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.; Sabelhaus, A.P.; 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.