Antonia Bronars

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Education

Massachusetts Institute of Technology — Cambridge, MA
PhD Mechanical Engineering, GPA: 4.90/5.00 — 2020–Present

- Advisors: Prof. Pulkit Agrawal, Prof. Alberto Rodriguez
- Master's Thesis: "Estimating Global Object Pose from Tactile Images"

University of California, Berkeley — Berkeley, CA
B.S. Mechanical Engineering, GPA: 3.89/4.00 — 2015–2019

Research Experience

Improbable AI Lab @ MIT — Cambridge, MA
Graduate Research Assistant — September 2023–Present

- Advisor: Prof. Pulkit Agrawal
- My ongoing research is developing a framework for sim-to-real transfer of policies for high-precision tasks (ex. screwdriving) using visual and tactile feedback. I am also advising a Masters student (Shreya Karpoor), who is working on outfitting a bimanual teleoperation system with haptic feedback and tactile sensors, and evaluating the impact of such interventions on policies learned from demonstration.

Mitsubishi Electric Research Laboratory — Cambridge, MA
Graduate Research Assistant — June 2023–Present

- Advisors: Dr. Radu Corcodel, Dr. Devesh Jha
- My summer internship at MERL focused on high-accuracy tactile pose estimation applied to industrial-grade electronic connector insertion. We submitted our findings to ICRA 2024. My part-time internship this fall focuses on dynamic in-hand manipulation of objects, leveraging tactile perception.

MCube Lab @ MIT — Cambridge, MA
Graduate Research Assistant — 2020–2023

- Advisor: Prof. Alberto Rodriguez
- Developed algorithms for model-based tactile perception and control for robotic manipulation. Work is under review at ICRA 24 and Science Robotics (2023), and published in IJRR (2022).

Dynamics @ Berkeley — Berkeley, CA
Undergraduate Research Assistant — 2019

- Advisor: Prof. Oliver O'Reilly
- Derived equations of motion and developed Matlab simulations to understand spontaneous jumping phenomena and unusual gliding behavior of a weighted hoop. Published findings in the Royal Society: Proceedings A (Fall 2019).

Berkeley Emergent Space Tensegrities (BEST) Lab — Berkeley, CA
Undergraduate Research Assistant — 2016–2019

- Advisor: Prof. Alice Agogino
- Formed and led a team of four undergraduates to design a tensegrity robot that uses inertial mechanisms, rather than cable actuation, for locomotion. Presented findings at 2019 SURF conference.

Publications

1. **A. Bronars***, S. Kim*, and A. Rodriguez, "Simultaneous Tactile Estimation and Control for In-Hand Object Manipulation", *submitted to ICRA 2024.*

2. **A. Bronars**, D. Jha, and R. Corcodel, "High-Accuracy Tactile Pose Estimation for Electronic Connector Assembly", *submitted to ICRA 2024.*

3. M. Bauza, **A. Bronars**, Y. Hou, N. Chavan-Dafle, and A. Rodriguez, "simPLE: a Method Learned in Simulation to Precisely Pick, Localize, and Place Objects without Prior Interaction", *Science Robotics 2023 (under review).*

4. **A. Bronars***, M. Bauza*, and A. Rodriguez, "Tac2Pose: Tactile Object Pose Estimation from the First Touch", *IJRR 2022.*

5. **A. Bronars** and O. O'Reilly, "Gliding Motions of a Rigid Body: The Curious Dynamics of Littlewood's Rolling Hoop", *Proceedings of the Royal Society of London A: Mathematical, Physical and Engineering Sciences, 2019.*

6. L.-H. Chen, B. Cera, E.L. Zhu, R. Edmunds, F. Rice, **A. Bronars**, E. Tang, S.R. Malekshahi, O. Romero, A.K. Agogino, and A.M. Agogino, "Inclined surface locomotion strategies for spherical tensegrity robots", *IROS 2017.*

Fellowships and Awards

- **Steidel Award** for Undergraduate Research 2019
  - Awarded to one graduating senior in the UC Berkeley department of Mechanical Engineering for commitment and ingenuity in undergraduate research.
- **Drake Scholarship** for Mechanical Engineering 2015–2019
  - Four-year full-ride academic scholarship for top 10 incoming UC Berkeley ME students.
- **SURF Rose Hills Independent Undergraduate Research Fellowship** 2019
  - Summer research fellowship awarded for original undergraduate research in STEM.

Work Experience

Apple Cupertino, CA
Mac Product Design Internship Summer 2018
- Designed computer parts and mechanisms for the next generation of Mac products
- Intern project selected as best-in-cohort, escalated to Senior VP of Hardware Engineering

Apple Cupertino, CA
Global Commodity Management Intern Summer 2017
- Manufacturing and supply chain analysis for metal component parts
- Intern project selected as best-in-cohort, escalated to VP of AppleCare

UC Berkeley Mechanical Engineering Department Berkeley, CA
Course Reader, Lagrangian Dynamics Fall 2019
- Wrote solutions for problem sets, and graded problem sets and exams.

Mentorship

- **Masters Students**
  - Shreya Karpoor - Haptic teleoperation, behavior cloning with tactile feedback (2023)
- **Undergraduate Students**

- Shreya Karpoor - Nonparametric filtering techniques for tactile perception (2022)
- Claudia Lozano-Perez - Machine learning methods for tactile perception (2021)
- Ying Ying Chen - Mechatronic design for tensegrity robot hardware (2019)
- Hadar Gamliel - Software development and control system design for tensegrity robot (2019)
- Felipe Cuellar - Mechanism design and failure analysis for tensegrity robot hardware (2019)

- **Winsor High School Robotics** September 2023–Present
  - I coach a gender-minority First Tech Challenge (FTC) high school robotics team, consisting of approximately 60 high school students.

- **Women's Technology Program** at MIT 2021, 2022
  - Mentored week-long project on prosthetic device development for high school students