

# Ginger Schmidt

✉ gingers@mit.edu    📧 gingerschmidt    📞 (650)-823-3783

## Education

### Harvard-MIT Health Sciences and Technology

Sept 2021 – present

*PhD in Medical Engineering and Medical Physics*

- Electrical engineering concentration
- **MIT Coursework:** Optics & Photonics, Nonlinear Optics, Biomedical Signal & Image Processing, Advances in Computer Vision (Neural Networks), Digital Control Systems
- **Harvard Medical School Coursework:** Cardiovascular Pathophysiology, Respiratory Pathophysiology, Genetics, Immunology, Human Pathology

### Harvey Mudd College

Sept 2017 – May 2021

*BS in Engineering*

- **Coursework:** Advanced Systems & Signal Engineering, Dynamics of Elastic Systems, Differential Equations, Linear Algebra, Data Structures (C++), Digital & Analog Electronics, Robotics State Estimation, Robotics Motion Planning

## Research

### Bouma Lab, Wellman Center for Photomedicine

Cambridge, MA

*Massachusetts General Hospital, Harvard Medical School*

June 2021 – present

- Thesis Title: High-speed, motion-robust, asynchronous optical coherence elastography (AsyncOCE) for ophthalmic and intravascular applications.
- **Advisors:** Prof. Néstor Uribe-Patarroyo, Prof. Brett Bouma

### Lab for Autonomous and Intelligent Robotics (LAIR)

Claremont, CA

*Harvey Mudd College*

June 2019 – May 2021

- Designed centimeter-scale autonomous underwater glider that conducts electrolysis of water to modulate center of mass, performed controls and stability simulations, and validated electrolysis engine via autonomous depth tracking.
- **Advisors:** Prof. Christopher Clark, Prof. Matthew Spencer

## Fellowships

MIT Health and Life Sciences Collaborative Graduate Fellowship (HEALS)	2025-26
National Science Foundation Graduate Research Fellowship (NSF-GRFP)	2022-25
MIT Presidential Fellowship	2022-23
Jude and Eileen Laspa Fellowship in Autonomous Systems	2019-21
Harvey S. Mudd Merit Scholarship	2017-21
National Merit Scholarship	2017

## Awards

Best Presentation (International Tissue Elasticity Conference)	2025
Best Poster Award (SPIE Photonics West, Elastography & Tissue Mechanics)	2025
Best Poster Award (Gordon Research Conference, Optics in Medicine)	2024
Best Poster Award (Biophotonics Summer School)	2023
50 Women in Robotics You Need to Know About (Robohub)	2022
Engineering Department Honors (Harvey Mudd College)	2021
Johnson Excellence in Engineering Award (Harvey Mudd College)	2021
Alford-Gilkeson Award (Harvey Mudd College)	2020

## Publications

1. Ginger Schmidt, Ryan McAuley, Brett E. Bouma, and Néstor Uribe-Patarroyo, “Asynchronous optical coherence elastography and directional phase gradient analysis,” J Biomed Opt. (2025)
2. Manisha Singh, Julia Situ, Carly Long, Diego Quevedo-Moreno, Ginger Schmidt, Néstor Uribe-Patarroyo and Ellen T. Roche, “Coronary Artery Flow Modeling in an Ex-vivo Biorobotic Heart,” 2025 IEEE 8th International Conference on Soft Robotics (2025)
3. Ginger Schmidt, Brett E. Bouma, and Néstor Uribe-Patarroyo, “Asynchronous, semi-reverberant elastography,” Optica 11, 1285-1294 (2024)

## Invited Talks

- |                                                              |      |
|--------------------------------------------------------------|------|
| 1. New England Symposium for Biomedical Optics (NESBO)       | 2025 |
| 2. Wellman-UTokyo Graduate Student Symposium in Tokyo, Japan | 2025 |
| 3. Drexel University ECE-101 Guest Lecturer                  | 2023 |

## Conference Presentations

1. International Tissue Elasticity Conference: “Elasticity measurement of the human cornea in vivo with 3D asynchronous optical coherence elastography.” (2025)
2. International Tissue Elasticity Conference: “Asynchronous semi-reverberant elastography.” (2024)
3. SPIE Photonics West: “Overcoming the spatial and temporal coherence limitations of reverberant elastography in raster-scanned OCT systems.” (2023)
4. SPIE Photonics West: “Enabling quantitative shear wave elastography in conventional optical coherence tomography *in vivo*.” (2023)

## Teaching

HMC E206: Robotics State Estimation, TA	Spring 2021
HMC E102: Advanced Signals & System Engineering 2, Head Grader and Tutor	Spring 2021
HMC E205: Robotics State Estimation, TA	Fall 2020
HMC E101: Advanced Signals & System Engineering 2, Head Grader and Tutor	Fall 2020
HMC E79: Introduction to Systems Engineering, TA	Fall 2020
HMC E80: Experimental Engineering, Lab Proctor	Spring 2020
HMC E79: Introduction to Systems Engineering, TA	Fall 2019

## Industry Positions

<b>Johnson &amp; Johnson, Robotics and Digital Surgery</b>	<i>Santa Clara, CA</i>
<i>Mechanical Engineering &amp; Robotics Intern</i>	<i>August 2020 – May 2021</i>

- Performed tests and data analysis to characterize magnetic crosstalk interference in neighboring encoders.
- Brought up 6-axis motor fixture with torque sensors and encoders for surgical instrument manipulator verification & validation testing. Selected electrical and control system components for the fixture.

<b>Raytheon Technologies</b>	<i>El Segundo, CA</i>
<i>Engineering Intern, Space and Airborne Systems</i>	<i>May 2019 – August 2019</i>

- Wrote product specifications for thermal vacuum chamber for level 5 space hardware testing.
- Designed test fixture and test procedure for wire marking durability analysis, performed FEA in CREO.

<b>Auris Health</b>	<i>Redwood City, CA</i>
<i>Mechanical Engineering &amp; Robotics Intern, Advanced Development</i>	<i>May 2018 – January 2019</i>

- Designed electro-mechanical packaging solution for a surgical instrument manipulator to fit torque sensors in a constrained volume while improving DFM and DFA. Performed complex mechanical and electrical assemblies of surgical robotic arms with brushless motors, sensors, slip rings, and harmonic drives.

## Service

- |                                                                                                                                                                         |           |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| ◦ <b>Graduate Student Advisory Group for Engineering (GradSAGE):</b> Selected as an advisor to the MIT School of Engineering, contributing to grad student initiatives. | 2025-2026 |
| ◦ <b>Graduate Admissions Student Interviewer:</b> Interviewed students for admission to the Harvard-MIT Health Sciences & Technology Ph.D. program.                     | 2025      |
| ◦ <b>MIT Application Assistance Program:</b> Mentored underrepresented students through graduate school applications.                                                   | 2021-2024 |
| ◦ <b>Prison Education Project:</b> President and instructor, computer science and physics.                                                                              | 2018-2021 |

## Additional Activities

- |                                                                                                                                                                |              |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| ◦ <b>Battlebots:</b> Season 6 World Championship Winner of Battlebots on Discovery channel. Captain of combat robotics team Tantrum, appearing on Seasons 3-7. | 2017-present |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|