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
- Coursework: Optics & Photonics, Nonlinear Optics, Biomedical Signal & Image Processing, Advances in Computer Vision (Neural Networks), Digital Control Systems, Cardiovascular Pathophysiology, Respiratory Pathophysiology, Immunology, Human Pathology, Genetics

Harvey Mudd College *Sept 2017 – May 2021*
BS in Engineering

- Graduated with High Distinction and Department Honors
- **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*

- Developing optical coherence tomography (OCT) elastography methods for tissue elasticity measurement *in vivo*. Conducting IRB approved pilot study on corneas from healthy human volunteers.
- Designing and manufacturing a novel micromotor optical imaging probe for high-speed coronary artery imaging.
- **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 surrounding water to module center of mass. Implemented controls and stability simulations in MATLAB, validated electrolysis engine via autonomous depth tracking.
- Laspa Fellow for Autonomous Systems
- **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 (NSFGRFP)	2022-25
MIT Presidential Fellowship	2022-23
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
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, Brett E. Bouma, and Néstor Uribe-Patarroyo, "Asynchronous, semi-reverberant elastography," Optica 11, 1285-1294 (2024)
2. Ginger Schmidt, Ryan McAuley, Brett E. Bouma, and Néstor Uribe-Patarroyo, "Asynchronous optical coherence elastography and directional phase gradient analysis," J Biomed Opt. (2025)

Invited Talks

1. New England Symposium for Biomedical Optics (NESBO) 2025
2. Wellman-UTokyo Graduate Student Symposium 2025
3. Drexel University ECE-101 Guest Speaker 2023

Contributed Talks

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

Industry Experience

Johnson & Johnson, Robotics and Digital Surgery *Santa Clara, CA*
Mechanical Engineering & Robotics Intern *August 2020 – May 2021*

- 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.

Raytheon Technologies *El Segundo, CA*
Engineering Intern, Space and Airborne Systems *May 2019 – August 2019*

- 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.

Auris Health *Redwood City, CA*
Mechanical Engineering & Robotics Intern, Advanced Development *May 2018 – January 2019*

- 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.

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

Volunteering

- **Graduate Admissions Student Interviewer:** Interviewed students for admission to the Harvard-MIT Health Sciences & Technology Ph.D. program. 2025
- **MAAP:** MEMP Application Assistance Program. Mentored underrepresented students through their graduate school applications. 2021-2024
- **PEP:** Prison Education Project. President and instructor for computer science, physics, and engineering. 2018-2021

Extracurricular

- **Battlebots:** Season 6 World Championship Winner of Battlebots on Discovery channel. Captain of combat robotics team Tantrum, appearing on Seasons 3-7. 2017-present