Eyassu Shimelis

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Cambridge, MA

EDUCATION

Harvey Mudd College Aug 2014 - May 2018
B.S. in Engineering, Departmental Honors *Claremont, CA*
Relevant Coursework: Autonomous Robot Navigation, Artificial Intelligence, Communications & Information Theory, Data Structures and Program Development, Microprocessor Systems, Advanced Systems Engineering, Multi-variable Calculus, Differential Equations, and Linear Algebra

Massachusetts Institute of Technology Feb 2020 - May 2020
Advanced Studies Program, Non-Degree *Cambridge, MA*
Graduate Coursework: 16.32 - Principles of Optimal Control & Estimation

WORK EXPERIENCE

MIT Lincoln Laboratory May 2018 - Present
Assistant Technical Staff in the Advanced Concepts and Technologies Group *Lexington, MA*

- Joined as an intern, working on a cooperative localization system
- Developing performant algorithms for real-time, distributed inference on low-cost sensors and computing devices, using the Julia programming language
- Implementing and evaluating methods for information-seeking control in multi-agent networks, with emphasis on aerial and ground vehicles
- Wrote a software library, using Julia, for recursive Bayesian inference, with support for linear and nonlinear models using Kalman, Extended Kalman, and Unscented Kalman filters
- Created a language-agnostic pub/sub messaging system for real-time data routing, using Google Protobuf and ZeroMQ
- Implemented a custom, web-based visualizer using ThreeJS (a 3D JavaScript library)

SKILLS

Programming: Python, Julia, MATLAB, C/C++/C#, HTML/CSS, Javascript
Technical: Linux, Git, ROS, CAD, LaTeX, Machining, 3D Printing, Soldering, Electronic Lab Equipment, FPGA
Recreational Activities: Running, Rock Climbing, Sailing, Photography, Cooking

RESEARCH & PROJECTS

Lab for Autonomous and Intelligent Robotics (LAIR) Sep 2017 - May 2018
Undergraduate Research Assistant *Claremont, CA*

- Developed methods to autonomously track sharks with multiple underwater vehicles (AUVs)
- Simulated and tested control-based trackers in MATLAB, later re-written in C#, and validated in hardware
- Wrote an AUV simulation library in MATLAB to test graph-based planning methods for multi-agent coordination

Systron Donner Inertial Aug 2017 - May 2018
Senior Capstone Project *Claremont, CA*

- Developed a compensation method for highly nonlinear IMU errors using neural network regression
- Validated approach to existing method and presented results in two presentations plus a written report

Autonomous Robot Navigation (ENGR160) Jan 2018 - May 2018
HMC Senior-level Robotics Course *Claremont, CA*

- Implemented control, sensing, estimation, localization, and mapping algorithms on a mobile robotic system
- Simulated, tested, and deployed an online particle filter (PF) for localization
- Implemented an Unscented Kalman Filter (UKF) and compared its performance to a PF

Amazon Lab126 Jan 2017 - May 2017
Junior Capstone Project *Claremont, CA*

- Developed a configurable microphone array harness for product testing
- Developed a high-bandwidth, multi-channel audio harness for automated testing of Alexa devices
- Wrote a Python audio library to handle up to 32 channels of audio throughput

LEADERSHIP & TEACHING EXPERIENCE

The Partnership Inc Feb 2021 - Present
Associates Program Fellow *Cambridge, MA*
- Nominated by MIT Lincoln Laboratory to participate in a year-long professional development program
- Learning about the principles of organization, effective leadership, efficacy, and many other important professional skills

MIT Beaver Works Mar 2019 - Aug 2020
RACECAR Course Instructor & Outreach Coordinator *Cambridge, MA*
- Lead a four-week summer course for 50+ high school students interested in vehicle autonomy, $200K budget
- Developed lectures and labs for the MIT RACECAR platform: a research-grade, tenth-scale autonomous vehicle

MIT Course 16.633 Aug 2019 - Dec 2019
Co-instructor, Autonomous Machines Seminar *Cambridge, MA*
- Instructed a 20-person junior robotics course, led by Professors Sertac Karaman and Jonathan How (AeroAstro)
- Developed and taught weekly lectures & labs, focused on understanding the principles of autonomous vehicles and applications of imitation learning

HMC Engineering Department Aug 2016 - May 2017
Academic Excellence Tutor *Claremont, CA*
- Held exam reviews and weekly tutoring sessions for a 240-student course
- Worked closely with Professors to provide student feedback on course materials

Signals and Systems (ENG079) Course Development Team May 2016 - Jan 2018
Undergraduate Course Assistant *Claremont, CA*
- Assisted in the development of a 240-student course, focused on underwater vehicles
- Edited class video lectures and material
- Designed and tested pressure and temperature sensing circuitry

Data Structures and Program Development (CS70) Teaching Team Jan 2016 - May 2017
Grader and tutor (Grutor) *Claremont, CA*
- Tutored 30-40 computer science students during lab sessions
- Graded weekly C++ homework assignments, and provided feedback via code reviews

AWARDS & HONORS

2016-18	Laspa Fellow in Autonomous Systems, HMC
2017	Ford Men of Courage Fund
2016	Davies Engineering Prize, HMC

PUBLICATIONS & APPEARANCES

Chen, S., Fishberg, A., **Shimelis, E.**, Grimm, J., van Broekhoven, S., Shin, R., & Karaman, S. "A Hands-on Middle-School Robotics Software Program at MIT," 2020 IEEE Integrated STEM Education Conference (ISEC), 2020

Shi, J., Ma, T., Lee, C.Y., **Shimelis, E.**, Van Eijk, C., Clark, C.M., & Lowe, C.G. "Acoustic Tag State Estimation with Unsynchronized Hydrophones on AUVs," 2018 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2018

MIT News - Lincoln Laboratory staff use race cars as a vehicle to teach coding, 6/1/2019

MIT News - Boston-area girls discover a passion for coding, 12/13/2019

MIT Lincoln Laboratory Staff Profile

LINKS

Website: **eyassu.com** | LinkedIn: **eshimelis** | Undergraduate Research: **LAIR Homepage**