

Aaron Ray

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Education

Massachusetts Institute of Technology, Cambridge, MA 2021 – Present
Doctoral Student, Electrical Engineering and Computer Science
Thesis: Symbolic Representations for Generalizable Robot Autonomy
Advisor: Luca Carlone

Massachusetts Institute of Technology, Cambridge, MA 2019 – 2021
MS, Electrical Engineering and Computer Science
Thesis: Viewpoint-Aware Task Planning and MPC for Applications in Videography and Multi-Target Tracking
Advisor: Daniela Rus

Brown University, Providence, RI 2015 – 2019
Sc.B, Computer Engineering with Honors, *magna cum laude*
Thesis: State Estimation for Dynamic Relative Localization Systems
Advisors: Stefanie Tellex & Christopher Rose

Research

SPARK Lab, MIT, Cambridge, MA 2021 – June 2026
Graduate research assistant
Symbol grounding, planning, and control for robots through hierarchical scene understanding under Professor Luca Carlone.

Distributed Robotics Laboratory, MIT, Cambridge, MA 2019 – 2021
Graduate research assistant
Multi-robot task assignment and model-based control for videography and persistent monitoring under Professor Daniela Rus.

Monterey Bay Aquarium Research Institute (MBARI) Summer 2019
Moss Landing, CA. Summer Intern, Bioinspiration Lab
Development of a precise camera tracking system for studying mid-water invertebrates under Dr. Kakani Katija

Brown University, Providence, RI 2017–2018
Research with Professor Chris Rose, School of Engineering
Designing perceptron classification with chemical reactions

NASA Jet Propulsion Laboratory, Pasadena, CA Summer 2017
Summer Intern, Group 347-E
Developing Autonomous Behaviors for Unmanned Surface Vehicles, under Dr. Jean Pierre de la Croix and Dr. Michael Wolf

Naval Postgraduate School, Monterey, CA

Center for Autonomous Vehicles Research, NREIP Intern Summer 2016

Implementation of a SLAM system for Unmanned Underwater Vehicles, under Professors Noel du Toit and Doug Horner

Advanced Robotics Systems Engineering Lab, SEAP Intern Summer 2015

Design and implementation of a software library for analyzing drone swarm data, under Professor Timothy Chung

Department of Oceanography, SEAP Intern Summer 2014

Assembly and programming of sensor package for investigating Arctic sea-ice morphology, under Professor Timothy Stanton

Department of Physics, SEAP Intern Summer 2013

Measurement of bandgaps in Thallium Bromide with cathodoluminescence spectroscopy, under Professor Nancy Haegel

Peer-Reviewed Conferences

Jared Strader, Aaron Ray, Jacob Arkin, Mason B. Peterson, Yun Chang, Nathan Hughes, Christopher Bradley et al. "Language-Grounded Hierarchical Planning and Execution with Multi-Robot 3D Scene Graphs." ISER 2025.

Aaron Ray, Christopher Bradley, Luca Carlone, and Nicholas Roy. "Task and motion planning in hierarchical 3D scene graphs." ISRR 2024.

Yun Chang, Nathan Hughes, Aaron Ray, Luca Carlone, "Hydra-Multi: Collaborative Online Construction of 3D Scene Graphs with Multi-Robot Teams." *2023 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, October 2023.

Aaron Ray, Alyssa Pierson and Daniela Rus, "Free-Space Ellipsoid Graphs for Multi-Agent Target Monitoring," 2022 International Conference on Robotics and Automation (ICRA). 2022.

Aaron Ray, Alyssa Pierson, Hai Zhu, Javier Alonso-Mora, and Daniela Rus. "Multi-robot task assignment for aerial tracking with viewpoint constraints." *2021 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, pp. 1515-1522. IEEE, 2021.

Isaiah Brand, Josh Roy, Aaron Ray, John Oberlin, and Stefanie Tellex. "Pidrone: An Autonomous Educational Drone using Raspberry Pi and Python." *2018 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, October 2018.

Journal Publications

Samuel Ubellacker, Aaron Ray, James Bern, Jared Strader, and Luca Carlone. "High-speed aerial grasping using a soft drone with onboard perception." *npj Robotics* 2, no. 1 (2024)

Makram Chahine*, Ramin Hasani*, Patrick Kao*, Aaron Ray*, Ryan Shubert, Mathias Lechner, Alexander Amini, and Daniela Rus. "Robust flight navigation out of distribution with liquid neural networks." *Science Robotics* 8, no. 77 (2023): eadc8892.

Ramin Hasani, Mathias Lechner, Alexander Amini, Lucas Liebenwein, Aaron Ray, Max Tschaikowski, Gerald Teschl, and Daniela Rus. "Closed-form continuous-time neural networks." *Nature Machine Intelligence* 4, no. 11 (2022): 992-1003.

Aaron Ray, Holland Smith, and Nancy Haegel. “Temperature dependence of the indirect bandgap in thallium bromide from cathodoluminescence spectroscopy.” *Journal of Applied Physics* 115, no. 16 (2014).

Theses

Aaron Ray, “Viewpoint-Aware Task Planning and Model Predictive Control for Applications in Videography and Multi-Target Tracking” (2021). *Masters Thesis*. MIT Libraries <https://hdl.handle.net/1721.1/139901>

Aaron Ray, “State Estimation for Dynamic Relative Localization Systems” (2019). *Undergraduate Thesis*. Brown Digital Repository. Brown University Library. <https://doi.org/10.26300/5m40-pg55>

Industry

Arcadia Tractor Corp. , San Jose, CA	Sep 21 - Dec 23
Head of Software and Robot Autonomy	Part Time
<i>Led software development for a mobile robot for autonomous collection of golf balls on driving ranges.</i>	

Kitty Hawk Corporation , Mountain View, CA	Summer 2018
Summer Intern, Heaviside Project	
<i>Test engineering and software development for electric VTOL aircraft.</i>	

Teaching

Teaching Assistant, Visual Navigation for Autonomous Vehicles	Fall 2024
TA responsible for running 16.485, Visual Navigation for Autonomous Vehicles. Ran office hours, lab hours, graded, upgraded all labs to ROS2, etc.	

Brown Design Workshop	2017–2018
Workshop Monitor—Teach instruction modules, assist use of tools	

Introduction to Robotics , Brown Computer Science	2017
Teaching Assistant and course development for Prof. Stefanie Tellex	

Introduction to Engineering , Brown Engineering	2016
Workshop mentor—Mentor underclassmen in the wood/metal shop	

Awards

National Defense Science and Engineering Graduate Fellowship (NDSEG)	2022
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Jacobs Presidential Fellowship	2019
MIT fellowship to “recruit the most outstanding students worldwide to pursue graduate studies at the Institute”	

Hack @ Brown Most Innovative Project <i>ascii-chat, an in-terminal videochat solution rendered in ascii</i> https://github.com/npolshakova/ascii-chat	2019
Tau Beta Pi Junior Inductee	2017
Hack the Machine , U.S. Navy Hackathon Invited Participant	2017
Hack the Sky , U.S. Navy Hackathon Team First Place	2016
Eagle Scout Boy Scouts of America, Monterey, CA	2012

Extracurricular Activities

MIT Solve Solution Reviewer <i>Review solutions for MIT Solve, an incubator for tech-based social entrepreneurship, during the initial project scoring phase and second-round technical feasibility assessment.</i>	2021 – Present
MIT Driverless <i>Advisor for planning and control subsystems</i>	2019 – 2021
MIT Graduate Student Leadership Initiative (GSLI) <i>Peer-led collaboration across all MIT graduate schools to further develop the leadership skills, experience, and network of outstanding MIT graduate students who have already exhibited strong leadership capacity and a commitment to social impact</i>	2019 – 2020
Brown Formula Racing <i>Mechanical and Electrical design and manufacture of an open-wheel formula-style racecar</i> Data Telemetry Lead —Design/implement realtime telemetry system Shifting Lead —Implement Electropneumatic Paddle-shifting system	2015–2018