

Ethan Fahnestock

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Education

Ph.D. Electrical Engineering and Computer Science Sept 2021 – Present
M.S. Electrical Engineering and Computer Science Sept 2021 – Sept 2024
Massachusetts Institute of Technology & Woods Hole Oceanographic Institution
Advisor: Prof. Nicholas Roy
M.S. Thesis: *Guiding Navigation of Unknown Environments with Distant Visual Cues*
B.S. Interdepartmental Engineering (Robotics Focus) Magna Cum Laude Sept 2017 – May 2021
B.S. Physics and Astronomy Magna Cum Laude
University of Rochester

Select Experience

Graduate Researcher, Computer Science and Artificial Intelligence Lab Sept 2021 – Present

- Developed and tested robust approach to cross-view localization matching VLM-extracted landmarks to OpenStreetMap [1]
- Built self-supervised data pipelines and DINOv2-based far-field cost models with ensemble uncertainty estimates. Evaluated navigation in simulation and real-world deployments [2]
- Trained diffusion models with PyTorch to infer costmaps conditioned on partial observations [3]

Software Engineering Intern, Perception and Planning teams at [Aurora Innovation](#) June 2025 – Aug 2025

- Connected perception and planning learning pipelines, combining datasets, training, and evaluation workflows.
- Demonstrated richer perception features improved trajectory ranking in driving scenarios involving motorcycles, pedestrians, and unidentified road objects.

Robotics Institute Summer Scholar, Carnegie Mellon June 2020 – Sept 2020

- Deployed A* with compliant task-space motion primitives for contact-rich assembly in the Search-Based Planning Lab, mentored by Shivam Vats and Prof. Maxim Likhachev
- Evaluated sensitivity to noise using NVIDIA's Isaac Gym and the search-based planning library ([report](#), [video](#))

Autonomous Vehicle Team Lead, University of Rochester Baja SAE May 2020 – May 2021
Data Acquisition Team Lead, University of Rochester Baja SAE May 2018 – May 2020

- Led a team of 1-4 people building drive-by-wire and data acquisition for a student-built off-road vehicle. Placed 6th of 100 in design at the 2019 California competition, with special recognition for data acquisition.
- Used RTK GPS, IMU, strain gauge, Hall effect, and lidar data to improve and verify design ([test summaries](#))

Select Publications

[1] **E. Fahnestock***, E. Fuentes*, P. R. Osteen, N. Roy, "Leveraging Semantic Maps for City-Scale Cross-View Localization." In submission to *IEEE Transactions on Field Robotics (T-FR)*, 2026. [paper](#) [project](#)

[2] **E. Fahnestock**, E. Fuentes, S. Prentice, V. Vasilopoulos, P. R. Osteen, T. Howard, N. Roy, "Far-Field Image-Based Traversability Mapping for A Priori Unknown Natural Environments," *IEEE Robotics and Automation Letters*, 10(6):6039–6046, 2025. [code](#) [paper](#)

[3] **E. Fahnestock**, E. Fuentes, P. R. Osteen, S. Ancha, N. Roy, "Learning semantic traversability priors using diffusion models for uncertainty-aware global path planning," *ICRA Workshop on Resilient Off-road Autonomy*, 2024. [paper](#)

[4] S. Patki, **E. Fahnestock**, T. Howard, M. Walter, "Language-guided Semantic Mapping and Mobile Manipulation in Partially Observable Environments," *Conference on Robot Learning*, 2019. [paper](#)

Skills and Recognition

Experienced: PyTorch/Torchvision, Python, ROS1, Git, NumPy, Matplotlib
Proficient: C++, OpenCV, Docker, (Py)Bullet, Raspberry Pi
Awards: NSF-GRFP (2021), NDSEG (2021), Goldwater Scholarship (2020), Charles L. Newton Prize (2021)