Eric Ewing, Ph.D.

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Positions

Visiting Assistant Professor of the Practice — Brown University
July 2024 - June 2025

- Foundations of AI CSCI 410/1411 (Fall/Spring)
- Robots as a Medium CSCI 1952z (Fall)
- Deep Learning CSCI 1470 (Spring)

Education

Brown University — Providence, RI
Ph.D. in Computer Science — *September 2022 – October 2024*

University of Southern California — Los Angeles, CA
Computer Science Ph.D. Program (Transferred to Brown) — *September 2018 – August 2022*

Carleton College — Northfield, MN
B.A. Computer Science, B.A. Classical Studies — *September 2012-July 2016*

Publications

Dissertation

Advancements in Portfolio Methods for Optimal Multi-Agent Path Finding

Multi-Agent Pathfinding

- **Ewing, E.** Ren, J., Ayanian, N. "Instance Decomposition for Fast Multi-Agent Pathfinding" in preparation for *ICAPS* 2025
- Ren, J., **Ewing, E.**, Ayanian, N. "Map Connectivity and Empirical Hardness of Grid-based Multi-Agent Pathfinding Problem," in *ICAPS* 2024.
- **Ewing, E.**, Ren, J., Kansara, D., Sathiyanarayanan, V., Ayanian, N. "Betweenness Centrality in Multi-Agent Pathfinding," in *AAMAS* 2022.
- Ren J, Sathiyanarayanan V, **Ewing E**, Senbaslar B, Ayanian N., "MAPFAST: A Deep Algorithm Selector for Multi Agent Path Finding using Shortest Path Embeddings," in *AAMAS* 2021.

Robotics Accessibility

- **Ewing, E.**, Ayanian N. "RobArt: An Online Programming Environment for Accessible Multi-Robot Programming" in preparation for *RSS* 2025.

Decision Focused Learning

- Perrault, A., Wilder, B., **Ewing, E.**, Mate, A., Dilkina, B., & Tambe, M. "Decision-Focused Learning of Adversary Behavior in Security Games," in *AAAI 2020*.
- Wilder, B., **Ewing, E.**, Dilkina, B., & Tambe, M. "End to End Learning and Optimization on Graphs," in *NeurIPS 2019*.

Awards and Grants

NSF FRR–2330942: Expediting Solutions to Hard Multi-Robot Path Finding Instances — Fall 2023
Total Awarded: $600,000 — *Award Page*

- Grant to develop new MAPF algorithms that improve performance on hard MAPF instances.
- Co-developed and wrote the grant with PI Nora Ayanian and fellow PhD student Jingyao Ren.

NSF GRFP Honorable Mention — Fall 2019

- Proposal on improving robot teams by increasing diversity within policies.
- Focused on using Quality-Diversity algorithms to train robot policies robust to environmental perturbations and other distributional shifts between train and test time.

Senior Thesis Distinction in Computer Science — Spring 2016
Carleton College — *Northfield, MN*

- Highest award for senior thesis. Thesis was on pitch modulation of human voice (Auto-tuner).

Teaching

Robots as a Medium Fall 2024
CSCI 1952z *Brown University*

- Project based course on creating art with robotics. Course covers an introduction to robotics and art. Readings and exercises focus on the importance of intentional group work, diversity of thought, and fail-fast iteration.

Foundations of AI (Co-Instructor) Fall 2024
CSCI 410/1411 *Brown University*

- Completely redesigned course for Fall 2024. 410 is a course for second year students in the foundations of Artificial Intelligence. Course consists of eleven homework assignments, discussion sections, and a Final project.

Robots as a Medium (Co-Instructor, Teaching Fellow) Spring 2024
CSCI 1952z *Brown University*

- **Overall I rate this instructor as effective**: 5.0/5.0
- Selected student review: Eric is always able to help students solve problems in the lab, even in face of significant time stress. He is goes beyond reasonable expectations to accommodate students and make himself available. This course would not be possible without Eric.
- Selected student review: Eric genuinely taught me so much this semester. Getting to work on a project with him, see how he problem solves, debugs, and designs in code. His willingness to be available at many hours to help students operate the lab software and debug more efficiently is the only reason we were able to get running what we did.

Summer@Brown Course: Taking Art to the Skies Summer 2023
Summer@Brown Course *Brown University*

- **Overall Course Score 4.83/5**, average for Summer@Brown was 4.56/5.
- **Instructor Score 4.97/5**, average for Summer@Brown was 4.53/5.
- Selected student review: "This course was F-A-N-T-A-S-T-I-C! Dr. Ewing was wonderful. He was engaging, prepared, helpful, and knowledgeable–truly a dream instructor. I hope he will teach this course again because he is absolutely amazing. He made this course my favorite one."

Sheridan Center Teaching Certificate I Fall 2022
Brown University *Providence, RI*

Summer Highschool Intensive program for Next-generation Engineers (SHINE) Summer 20, 21
University of Southern California *Los Angeles, CA*

- SHINE is an intensive STEM Summer program for high school students that matches high school students with PhD mentors. I mentored two high school students in computer science research for 20 hours a week for 7 weeks. We completed research projects on reinforcement learning for multi-agent path finding, multi-agent trajectory planning, and vision and planning for an autonomous snow plow.

Teaching Assistant Summer 2019
University of Southern California *Los Angeles, CA*

- Teaching assistant for CS 104 on Object Oriented Programming and Data Structures under Professor Mark Redekopp. I led lab sessions, held office hours, and wrote grading scripts for a class of 40 students. No student reviews are available.

Schuler Scholar Program STEM Coach Summer 2016 – 2018
Highland Park High School *Highland Park, IL*

- Mentored and taught 38 high achieving underrepresented minority high school students in science and mathematics. I worked with individual students daily on their reading, writing, math, and science skills. I planned and facilitated after school programming once or twice a week designed to give students a STEM positive mindset, including 4 week lessons for each of data analysis, graph theory, and pattern thinking. I tracked student grades and adjusted programming to their needs. I led programming over the summer for three weeks to teach Scholars coding skills. I planned and executed a week long field trip to Seattle to study environmental change for rising seniors. I planned led another trip to Boulder in June of 2018 to study climate change and psychology.

English Language Teacher Summer 2015
WorldTeach *Quito, Ecuador*

Teaching Assistant: Robotics Summer 2014
Carleton Summer Computer Science Institute *Northfield MN*

- Mentored high school juniors and seniors in guided research sessions working with Lego robots. Led evening discussions on the technical details of current events in the world of computer science. My contributions to the program were acknowledged in a paper presented at AAAI in 2017. Musicant, D. R., Laddha, A., & Choi, T. (2017). Open-Ended Robotics Exploration Projects for Budding Researchers. In AAAI (pp. 4792-4797).

Mentoring

All mentees listed met with me for *at least* one hour a week working on research projects or lab tasks. Other students, with whom I met less frequently, are not included in this list.

Mentee	**Status While Mentored**	**Duration**	**Next Steps**
Ella Blanco	High School Student	2023-present	—
Saanvi Chugh	High School Student	2023-present	—
Narek Harutyunyan	Undergraduate at Brown	2022-present	—
Heidi Schaefer	Undergraduate at Brown	2023-present	—
Kofi Young	Undergraduate at Brown	2023-present	—
Grace Mugo	Undergraduate at Brown	Summer 2023	—
Natalie Abreu	Undergraduate at USC	2019-2022	PhD Student at Harvard University
Pilar Luiz	Undergraduate at USC	2019-2022	Engineer at Applied Invention
Dhvani Kansara	Masters at USC	2019-2021	Software Engineer at WePay
Vikraman Sathiyanarayanan	Masters at USC	2019	Software Engineer at Apple
Anthony Flores-Alvarez	SHINE Mentee	2020	Undergraduate student at Columbia
Vrinda Bansal	SHINE Mentee	2020, 2021	Undergraduate student at UC Davis
Ashna Khemani	SHINE Mentee	2021	Undergraduate student at UPenn

Invited Lectures

Howard University Drone Academy July, 2024
Creating Art With Drones: Why Your Next Steps Should be Art

SHINE Summer Program July, 2023
Introduction to Machine Learning: A Practical Approach

Media

Vicon Motion Capture Feature October, 2024
Video and article forthcoming for Vicon Motion Capture.

Swarms@SXSW April, 2024
Video we made used to open the Swarms@SXSW panel: Swarms@SXSW.

Brown Engineering Article February, 2024
Article featuring the work done for our Art and Robotics Course:
Eric Ewing: Helping multi-robot research lift off at Brown and beyond.

Outreach

Splash @ Brown November, 2023

Girls Get Math July, 2023

Lab Tours and Demos

- Countless lab tours and demos to visiting school groups, Brown University Donors, and other visitors to the university.

Service

I have reviewed over 15 papers for *AAAI, AAMAS, ICAPS, SOCS, T-RO, RAL* and other AI venues.