Rachel Ma

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EDUCATION

Massachusetts Institute of Technology
Sept 2023 - Present (S.M. completed Feb 2025)

S.M and Ph.D. in Electrical Engineering and Computer Science

- Research: AI (NLP, Vision, Foundation Models, Robotics) to help with better decision making and reasoning for alignment between humans and AI agents/autonomous systems for assisting humans with everyday tasks, or human robot interaction. I am interested in Open-Universe Cooperative Learning and Assistance Games for human preferences..
- Relevant classes: Robotic Manipulation (A), Computer Vision (A), TinyML and Efficient DL (A), Advanced Algorithms (A)
- Activities: Grad Women in Course 6 (GW6) Co-President, Ashdown Events Chair, Grad Women in Robotics, EECS Buddy

Brown University
Sept 2019 - May 2023

B.Sc in Computer Science (Honors), A.B in Music (Honors)

- Honors Theses: "*Skill Generalization With Verbs*" (CS), "*Odyssey*" (Music)
- Relevant Coursework: Artificial Intelligence, Intro to Comp. Systems, Computer Vision, Collaborative Robotics, Theory of Computation, Software Security Exploitation, User Interface & Experience, Deep Learning, Discrete Struc. & Probability, Linear Algebra, Statistics, Multivariable Calculus
- Activities: U/H/M Teaching Assistant, Alpha Chi Omega, Chamber Music, Meiklejohn Peer Advisor

University of Toronto Schools
Sept 2013 - June 2019

Middle and High School Diplomas

- Activities: DECA, CAYPT, Junior +Senior Math Clubs, Twig Tape, Dance Committee, Varsity Badminton, Music ensembles

PUBLICATIONS

Open-Universe Assistance Games: **R.Ma**, J.Qu, A.Bobu, D.Hadfield-Menell. In submission.

Using Rotations and Scaling to Align LLaMA, Mistral, and Gemma: D.Turturean, **R.Ma**, D.Hadfield-Menell. New England Mechanistic Interpretability (NEMI) Workshop 2025.

Learning to Search from Belief-Space Plans: P.JK.Christofferson, R.Ma, D. Hadfield-Menell. Forthcoming.

Learning Human Preferences Through Open-Ended Dialogue: **R. Ma,** D. Hadfield-Menell, in the Generative Modeling meets HRI Workshop at Robotics: Science and Systems (RSS) 2024. Runner Up Best Paper.

Skill Generalization With Verbs: **R. Ma**, L. Lam, B.A. Spiegel, A. Ganeshan, B. Abbatematteo, R. Patel, D. Paulius, S. Tellex, G. Konidaris, in the International Conference for Intelligent Robots and Systems (IROS) 2023.

RESEARCH EXPERIENCES

Research Intern — *MIT-IBM AI Watson Lab*
June 2025 - Late Aug 2025

- Uncertainty Quantification for PRM calibration. Supervisor: Kristjan Greenewald

Graduate Researcher — *Algorithmic Alignment Group*
Sept 2023 - Present

- Advisor: Dylan Hadfield-Menell, Faculty Collaborator: Andreea Bobu
- Open-Universe Assistance Games: proposed extracting natural language goals and method for goal inference and uncertainty quantification, with help from LLMs, from open-ended dialogue between an agent and a human with preferences to assist with tasks. Learning to Search from Belief-Space Plans paper: Drake: Manipulation simulation for Spot robot

Robotics and NLP Researcher — *Intelligent Robot Lab, Humans To Robots Lab*
Jan 2022 - Aug 2023

- Supervisors: George Konidaris and Stefanie Tellex
- Led research in robotics and natural language processing through transferring skills (verb actions) across different objects from ideation to submitted paper (first author).

Choreo-Robotics Researcher — *Humans To Robots Lab*
Jan 2021 - Dec 2021

- Supervisor: Stefanie Tellex
- Led beat detection project to develop reactive dancing robots, worked with Spot and Baxter robots
- Helped with grant writing and designing curriculum for *Choreo-robotics 101.*

Drone and STEM Education Research — *Humans To Robots Lab* March 2020 - Dec 2021

- Robotics Research Assistant, Project Manager, Communications Lead; Supervisor: Stefanie Tellex
- Led meetings, developed curriculum, organized training and outreach, and led tech support for high schools.
- Research with autonomous drones and systems: build drones, used ROS, localization and PID control

TEACHING/MENTORING EXPERIENCES

Mentoring Undergrad UROPS — *MIT EECS* July 2024 - Present

MIT Thriving Stars Buddy, MIT CSAIL Buddy — *MIT EECS* Sept 2024 - Present

Meta Teaching Assistant — *Brown University, Computer Science Dpt.* Oct 2021 - May 2023

- One of two MTAs who coordinated the CS TA program, managed and led 60 HTAs and 400 UTAs each semester
- Communicated between undergrads, technical staff, and CS faculty and represented the CS department at Brown events.

Head Teaching Assistant — *Brown University, Computer Science Dpt.*

- Introduction to Discrete Math and Probability Structures (CS0220) Spring 2022
- Artificial Intelligence (CS1410) Fall 2021
- Administrative duties, course development, auto-grader scripts, trained and led class UTAs, UTA duties

Undergraduate Teaching Assistant — *Brown University, Computer Science Dpt.*

- Cybersecurity and International Relations (CS1800) Spring 2021
- Computing Foundations: Data (CS0111) Fall 2020
- Held TA hours for students, assignment development, led lab sections and discussions, graded assignments and projects.

Undergraduate Lab Teaching Assistant — *Brown University, Music Dpt.*

- Keyboard lab TA for all intro music theory classes (MUSC400A, MUSC400B, MUSC550) Fall 2021

Meiklejohn Peer Advisor — *Brown University* Sept 2020 - May 2022

- Peer advisor to 1st years interesting in Computer Science or Engineering

AWARDS

Real. Strong. Women of Distinction Award (Alpha Chi Omega 1 out 5 recipients nationally) Summer 2025
Best Paper Runner Up for Generative Modeling meets HRI Workshop at Robotics: Science and Systems (RSS) 2024
MIT Presidential Fellowship Sept 2023 - May 2024
Gordon Wu Fellowship, 5 years (Declined) – Princeton Feb 2023
Norman K. Meyrowitz Award May 2023, Brown CS Department
MH. Mann Premium Award May 2023, Brown Music Department
Honorable Mention for Computing Research Association (CRA) Outstanding Undergraduate Researcher Award Dec 2022
Molly and David Wadhwani Foundation Meta UTAship in honor of Andy van Dam Fall 2022, Brown CS department
Norm Meyrowitz '81 Meta-TAship in honor of Ugur Cetintemel Spring 2022, Brown CS department
Margery MacColl Award 2021, Brown Music department
Karen T. Romer Undergraduate Teaching and Research Awards (UTRA) Summer 2021, Brown University
Karen T. Romer Undergraduate Teaching and Research Awards (UTRA) Summer 2020, Brown University

PROGRAMMING LANGUAGES: Python, C/C++, Java, Assembly, LaTeX, CSS/HTML, SQL, Pyret/Racket.

PUBLICITY/ARTICLES:

Opening More Than Doors: Teaching Robots the Art of Generalization – CRA Article
Decoding Computer Science, The Brown Way
Rachel Ma Receives the Norman K. Meyrowitz Award – Brown University, CS Department
Brown CS Student Rachel Ma Receives a CRA Outstanding Undergraduate Researcher Honorable Mention – Brown, CS Dept.

OTHER EXPERIENCES/HOBBIES:

Ashdown Events Officer and Chair — *MIT* Fall 2024 - Current

Graduate Women in Course 6 (GW6) — *Co-President, MIT EECS* Dec 2023 - Dec 2024

Alpha Chi Omega — *Various chair positions, Brown University* Feb 2021 - May 2023

Composition Composed & recorded pieces for a variety of music ensembles (duos, quintet, symphony). 2014 - Present

Piano 2006 - Present

Licentiate Diploma (LRCM), Associate Diploma (ARCT) in Piano Performance from the Royal Conservatory of Music (RCM) 2019, 2016. Active as a piano soloist, chamber musician (duos and piano trio), accompaniment, large ensemble work
Recordings from performances at Brown: https://youtu.be/LjCFzkqYXkY , https://youtu.be/wTzGq1DfR9I, https://youtu.be/IgPQboKMYNI?t=4066