

# Michelle Zhao

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**RESEARCH** Human-robot interaction with a focus on active learning from feedback and uncertainty quantification.

**EDUCATION** **Carnegie Mellon University**, Pittsburgh, Pennsylvania, USA

- Ph.D. Student in Robotics Aug 2020 – Current
  - Advisors: Henny Admoni and Reid Simmons
  - Focus: Uncertainty Quantification, Learning from Human Feedback, Human-Robot Collaboration
  - GPA: 3.92 / 4.00

**California Institute of Technology**, Pasadena, California, USA

- B.S. in Computer Science Sep 2016 – Jun 2020
  - Minor: Information and Data Science
  - GPA: 3.82 / 4.00

## PUBLICATIONS

### CONFERENCES

- C10 [Zhao, M.](#), [Admoni, H.](#), [Simmons R.](#), [Ramdas, A.\\*](#), [Bajcsy, A.\\*](#) Conformalized Interactive Imitation Learning: Handling Expert Shift and Intermittent Feedback. Under review at ICLR 2025.
- C9 [Tecson, M.](#), [Chen, D.](#), [Zhao, M.](#), [Simmons R.](#), [Erikson, Z.](#) Leveraging Large Language Models for Preference-Based Sequence Prediction. Under review at ICAART 2025.
- C8 [Zhao, M.](#), [Simmons R.](#), [Admoni, H.](#), [Bajcsy, A.](#) Conformalized Teleoperation: Confidently Mapping Human Inputs to High-Dimensional Robot Actions. RSS 2024.
- C7 [Pandya, R.\\*](#), [Zhao, M.\\*](#), [Liu C.](#), [Simmons R.](#), [Admoni, H.](#) Multi-Agent Strategy Explanations for Human-Robot Collaboration. ICRA 2024.
- C6 [Zhao, M.](#), [Simmons R.](#), [Admoni, H.](#) (June 2023). Learning Human Contribution Preferences in Collaborative Human-Robot Tasks. CORL 2023.
- C5 [Zhao, M.](#), [Simmons R.](#), [Admoni, H.](#) (October 2022). Coordination with Humans via Strategy Matching. IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) 2022.
- C4 [Eadeh, F. R.](#), [Zhao, M.](#), [Nguyen, T.N.](#), [Gupta, P.](#), [Gonzalez, C.](#), [Admoni, H.](#), [Woolley, A.W.](#) (October 2022). Good for me, but bad for we: How anger can motivate individual performance but inhibit teamwork. ACM Collective Intelligence Conference 2022.
- C3 [Zhao, M.\\*](#), [Eadeh F.\\*](#), [Admoni, H.](#) (September 2022). Evaluating and Predicting Collective Intelligence as a Latent Variable via Hidden Markov Models. 15th International Conference on Social Computing, Behavioral-Cultural Modeling & Prediction and Behavior Representation in Modeling and Simulation (SBP-BRiMS). 2022.
- C2 [Eadeh, F. R.](#), [Zhao, M.](#), [Nguyen, T.N.](#), [Gupta, P.](#), [Gonzalez, C.](#), [Admoni, H.](#), [Woolley, A.W.](#) (June 2021). Does anger help or hurt individual and team performance? ACM Collective Intelligence Conference 2021.
- C1 [Foust, R.](#), [Zhao, M.](#), [Oliver, S.](#), [Chung, S.](#), [Hadaegh, F.](#) (2017) Distributed Control Of An Evolving Satellite Assembly During In-Orbit Construction. In 68th International Astronautical Congress, 25-29 September 2017, Adelaide, Australia.

### PEER-REVIEWED JOURNAL ARTICLES

- J2 [Zhao, M.](#), [Simmons, R.](#), [Admoni, H.](#) (2022) The Role of Adaptation in Human-AI Teaming. Topics in Cognitive Science (topiCS), Special Issue on Building the Socio-Cognitive Architecture of COHUMAN: Collective Human-Machine Intelligence.
- J1 [Zhao, M.\\*](#), [Eadeh F.\\*](#), [Admoni, H.](#) (2022). Teaching Agents to Understand Teamwork: Evaluating and Predicting Collective Intelligence as a Latent Variable via Hidden Markov Models. Computers in Human Behavior.

### PEER-REVIEWED WORKSHOP PAPERS

- W5 [Zhao, M.](#), [Zhu, H.](#), [Simmons, R.](#), [Bisk, Y.](#), [Admoni, H.](#) Large Language Models as Proxies for Evaluating Collaborative Norms; HRI Workshop on Scarecrows in Oz: Large Language Models; HRI, March 2024.

- W4 Morris, N., Zhao, M., Simmons, R., Admoni, H. Machine Teaching of Collaborative Policies for Human Inverse Reinforcement Learning, In RL-CONFORM Workshop: RL Meets HRI, Control, and Formal Methods; IROS, October 2023. **Best Poster Presentation Award**
- W3 Chen, D., Zhao, M., Simmons, R. Learning Human Preferences for Personalized Assistance in Household Tasks, In AAAI Workshop on User-Centric Artificial Intelligence for Assistance in At-Home Tasks; AAAI, February 2023.
- W2 Zhao, M., Simmons, R., Admoni, H. Adapting Language Complexity for AI-Based Assistance, In Workshop Your Study Design Workshop; International Conference on Human-Robot Interaction, March 2021.
- W1 Zhao, M., Simmons, R., Admoni, H. Adapting Language Complexity for AI-Based Assistance, In Workshop on Lifelong Learning and Personalization in Long-Term Human-Robot Interaction; International Conference on Human-Robot Interaction, March 2021.

#### POSTER PRESENTATIONS

- P7 Zhao, M., Simmons R., Admoni, H., Bajcsy, A. Conformalized Teleoperation: Confidently Mapping Human Inputs to High-Dimensional Robot Actions. Poster presentation at RSS 2024.
- P6 Zhao, M., Simmons R., Admoni, H. (August 2023). Learning Human Contribution Preferences in Collaborative Human-Robot Tasks. Poster presentation at the 2nd Annual NSF AI-CARING Annual Review Meeting.
- P5 Zhao, M., Simmons R., Admoni, H. (March 2023). Learning Human Contribution Preferences in Collaborative Human-Robot Tasks. Poster presentation at the 2nd Annual NSF AI-CARING Student Symposium.
- P4 Zhao, M., Simmons R., Admoni, H. (August 2022) Coordination via Strategy Matching. Poster presentation at the 1st NSF AI-CARING Annual Review Meeting.
- P3 Zhao, M., Simmons R., Admoni, H. (April 2022) Coordination via Strategy Matching. Poster presentation at the 1st NSF AI-CARING Student Symposium.
- P2 Eadeh, F. R., Zhao, M., Nguyen, T.N., Gupta, P., Gonzalez, C., Admoni, H., Woolley, A.W. (October 2021). Can't Get You Off of My Mind: The Detrimental Effects of Anger and Rumination for Team Performance. Poster presentation at the 16th annual INGroup conference, Virtual Presentation.
- P1 Eadeh, F. R., Zhao, M., Nguyen, T.N., Gupta, P., Gonzalez, C., Admoni, H., Woolley, A.W. (June 2021). Does anger help or hurt individual and team performance? Poster presentation at the 16th annual INGroup conference, Virtual Presentation.

#### TALKS

- T12 "Conformalized Teleoperation: Uncertainty Quantification in Shared Autonomy" Nov 2024  
 • Talk at ROB 498/599: Computational HRI (Graduate) Course at University of Michigan, taught by Christoforos Mavrogiannis.
- T11 "Alignment and Active Learning in HRI" Oct 2024  
 • Talk at Graduate HRI Course at CMU 2024, taught by Andrea Bajcsy.
- T10 "Conformalized Teleoperation: Confidently Mapping Human Inputs to High-Dimensional Robot Actions" Jul 2024  
 • Talk at RSS 2024.
- T9 "How to organize a workshop, and Highlights from our HRI 2024 workshop on HRI for Aging in Place" Apr 2024  
 • Talk at AI-CARING Student Symposium 2024.
- T8 "Conformalized Assistive Teleoperation: Confidently Mapping Human Inputs to High-Dimensional Robot Actions" Mar 2024  
 • Presentation at Intent+LeCar lab meeting.
- T7 "Intent, Theory of Mind, and Implicit Communication in HRI" Mar 2024  
 • Lecture in Undergraduate Human-Robot Interaction course at CMU.
- T6 "Towards Proactive, Collaborative Robots" Feb 2024  
 • Presentation at CMU Robotic Caregiving and Human Interaction (RCHI) Lab.
- T6 "Examining the Role of Adaptation in Human-Robot Collaboration" Mar 2023  
 • In-person oral presentation at CMU - Speaking Qualifier

- T5 “Examining the Role of Adaptation in Human-Robot Collaboration” Mar 2023
  - Virtual presentation at MITRE Human-Machine Teaming Community of Interest Discussion Session
- T4 “Coordination with Humans via Strategy Matching” Oct 2022
  - Oral presentation at the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) 2022
- T3 “Implicit Communication” Sep 2022
  - Lecture in Graduate Human-Robot Interaction course at CMU.
- T2 “Evaluating and Predicting Collective Intelligence as a Latent Variable via Hidden Markov Models.” Sep 2022
  - Oral presentation at the 15th International Conference on Social Computing, Behavioral-Cultural Modeling & Prediction and Behavior Representation in Modeling and Simulation (SBP-BRIMS)
- T1 “Adapting Language Complexity for AI-Based Assistance” Mar 2021
  - In Workshop on Lifelong Learning and Personalization in Long-Term Human-Robot Interaction; International Conference on Human-Robot Interaction
  - In Workshop Your Study Design; International Conference on Human-Robot Interaction

**FELLOWSHIPS & AWARDS**

- **DoD NDSEG Fellowship**, Carnegie Mellon University 2022
- **NCWIT Collegiate Award, Finalist** 2022
- **Uber PhD Fellowship**, Carnegie Mellon University 2021
- **George W. Housner Student Discovery Award**, California Institute of Technology 2019
- **Beckman Coulter Scholarship** 2016  
Scholarship for STEM-focused study and research.
- **Intuit Scott Cook Award** 2016
- **Dollars for Scholars Scholarship** 2016  
Undergraduate scholarship

**ACADEMIC SERVICE**

**Workshop and Conference Organization**

- Co-Organizer, *LEAP-HRI Workshop, under review for HRI 2025*
- Co-Organizer, *Fall AAI Symposium on AI for Aging in Place, November 2024, Washington D.C.*
- Co-Organizer, *AI-CARING Student Symposium 2024, University of Massachusetts at Lowell, 2024*
- Co-Organizer, *Workshop on HRI for Aging in Place, ACM/IEEE International Conference on Human-Robot Interaction, 2024*
- Program Committee, *MULTITRUST2: International Workshop on Multidisciplinary Perspectives on Human-AI Team Trust, HHAI conference, 2024*
- Program Committee, *MULTITRUST: International Workshop on Multidisciplinary Perspectives on Human-AI Team Trust, HHAI conference, 2023*
- Organizer, *AI-CARING Student Symposium 2023, CMU, 2023*
- Reviewer, *ICRA, IROS, HHAI, CORL, TIIS, HRI, ICLR, INGroup, THRI, ISRR, IEEE RA-L*

**Membership and Involvement**

- CMU RI Graduate Student Orientation, *Volunteer*
- CMU HRI Summer Picnic, *Organizer*
- RI Women and Non-binary Lunches Group, *Co-organizer*
- CMU RI Climate Committee, *Member*
- CMU AI/ML Mentoring Program, *Graduate student mentor*
- CMU SCS Dean’s PhD Student Advisory Committee Anti-Racism Working Group, *Student member*
- CMU Human-Robot Interaction Reading Group, *Co-organizer*

**TEACHING**

*Co-Instructor*

- Human Robot Interaction (Undergraduate), Spring 2025. Co-Instructor: Zackory Erikson
- Eberly Future Faculty Program (Completed, Spring 2024.)*

*Graduate Teaching Assistant*

- Human Robot Interaction (Graduate), Fall 2022. Instructor: Henny Admoni
- Human Robot Interaction (Undergraduate), Spring 2022. Instructor: Henny Admoni

*Undergraduate Teaching Assistant*

- Networks: Structure and Economics, Winter 2020. Instructor: Adam Wierman
- Machine Learning and Data Mining, Winter 2019. Instructor: Yisong Yue

- Machine Learning Systems, Fall 2018. Instructor: Yaser Abu-Mostafa
- Java Computer Programming Lab, Fall 2017. Instructor: Donnie Pinkston

## MENTORING

- Ethan Villalovoz, 2024, *Undergraduate, RISS*
- Michaela Tecson, 2023-2024, *MS in Robotics*
- Nyomi Morris, 2023, *Undergraduate, RISS*, PhD student at Colorado School of Mines
- Narit Trikasemsak, 2023, *Undergraduate, RISS*
- Daphne Chen, 2022-2023, *MS in Robotics*, PhD student at University of Washington
- Yize (Sean) Shen, 2022, *Undergraduate*
- Thomas Cantalapiedra, 2022, *Undergraduate*
- Yitong (David) Chen, 2022, *Undergraduate*
- Timothy Hyun, 2022, *Undergraduate*

## GRADUATE COURSEWORK

Optimal Control and Reinforcement Learning, Spring 2022. Instructor: Zachary Manchester  
 Statistical Techniques in Robotics, Spring 2022. Instructor: Kris Kitani  
 Human Robot Interaction (Graduate), Fall 2021. Instructor: Henny Admoni  
 Probabilistic Graphical Models, Fall 2021. Instructor: Pradeep Ravikumar  
 Kinematics, Dynamics, and Control, Spring 2021. Instructor: Harmut Geyer  
 Computer Vision, Spring 2021. Instructor: Deva Ramanan  
 Introduction to Machine Learning (PhD), Fall 2020. Instructor: Ziv Bar-Joseph, Eric Xing  
 Math Fundamentals for Robotics, Fall 2020. Instructor: Michael Erdmann

## OTHER WORK EXPERIENCE

**Virtualitics**, Los Angeles, California, USA

Machine Learning Intern

Jun 2020 – Sep 2020

- Developed a named entity recognition pipeline for processing natural language datasets
- Built an outlier and error detection system using a voting-based model of several anomaly detection techniques.
- Developed a classifier for breast cancer tumor detection.
- Analyzed runtimes and capabilities of six graph visualization software (whitepaper).

**Goldman Sachs**, New York, New York, USA

Summer Analyst

May 2019 – Aug 2019

- Predicted intraday trade volume and distribution using spline regression and autoregressive techniques.
- Analyzed usage of internal applications in order to propose directions for the upcoming update.

**Vectra Networks**, San Jose, California, USA

Data Science Intern

Jun 2018 – Sep 2018

- Developed machine-learning based algorithms to predict normal, recurrent behavior in network traffic anomaly patterns, using random forests and logistic regression models.
- Engineered predictive models for detecting anomalies in the timing of network authentication requests.

**Caltech Aerospace Robotics and Control Lab**, Pasadena, California, USA

Undergraduate Research Fellow

May 2017 – Oct 2017

- Designed a computer-vision based approach to aerial navigation in GPS-denied environments using road extraction and designed a novel docking mechanism for multi-agent robot formations.
- Programmed a multi-agent swarm robot system and with an offline distributed control algorithm.

[CV compiled on 2024-11-21]