

Michelle Zhao

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RESEARCH INTERESTS

Theory and applications of machine learning for human-robot interaction with a focus on reinforcement learning and interactive, adaptive systems.

EDUCATION

Carnegie Mellon University, Pittsburgh, Pennsylvania, USA

▪ Ph.D. Student in Robotics

Aug 2020 – Current

- Advisors: Henny Admoni and Reid Simmons
- Focus: Human-Robot Collaboration, Imitation Learning, Reinforcement Learning.
- 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

- C7 Pandya, R.*, Zhao, M.*, Liu C., Simmons R., Admoni, H. Multi-Agent Strategy Explanations for Human-Robot Collaboration. Under Review 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 COHUMAIN: 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

- 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

- 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

- 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
- **Uber PhD Fellowship**, Carnegie Mellon University 2021
- **George W. Housner Student Discovery Award**, California Institute of Technology 2019
 Funding for research and scholarly activities.
- **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

- 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, *INGroup, ICRA, HHAI, CORL, TIIS, HRI*

Membership and Involvement

- 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

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

- Nyomi Morris, 2023, *Undergraduate, RISS*
- Narit Trikasemsak, 2023, *Undergraduate, RISS*
- Daphne Chen, 2022-2023, *Master's*
- 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 2023-11-22]