Michelle Zhao

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RESEARCH INTERESTS

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 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

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

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
- Lecture in Undergraduate Human-Robot Interaction course at CMU.

T7 "Intent, Theory of Mind, and Implicit Communication in HRI" Mar 2024
- Presentation at Intent+LeCar lab meeting.

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
- **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 AAAI 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

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 2024-10-30*]