Huao Li

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Research Interests

Human-AI Teamwork: Adaptation, Communication, Trust, Theory of Mind;
Multi-agent Systems: Multi-agent Reinforcement Learning, Embodied LLM Agent;
Human-centered AI: Explainable AI, Trustworthy AI, Normative Reasoning

Education

University of Pittsburgh **Pittsburgh, PA**
Ph.D. in Intelligent Systems *Aug. 2019 - Aug 2025*
Thesis: A Computational Framework for Efficient Human-agent Teamwork
Committee members: Michael Lewis, Na Du, Daqing He, Katia Sycara (CMU)

University of Pittsburgh **Pittsburgh, PA**
Master of Science in Information Science *Aug. 2017 – May 2019*
Thesis: A Computational Model of Human Trust in Supervisory Control of Robotic Swarms

Zhejiang University **Hangzhou, China**
Bachelor of Science in Applied Psychology *Sep. 2013 – June 2017*
Thesis: The Influence of Pictorial Realism on the Comprehension of Safety Briefing Cards

Fellowships and Awards

- MIT Postdoctoral Fellowship for Engineering Excellence (6 recipients globally) 2025
- Best Paper Award in GenAI-HRI workshop at Robotics: Science and Systems (Top 1) 2025
- Best Paper Award at AAAI conference on Artificial Intelligence, Ethics, and Society (Top 1%) 2018

Research Experience

Massachusetts Institute of Technology **Cambridge, MA**
Postdoctoral Fellow, Advised by Prof. Chuchu Fan *Sep. 2025 – Current*

- Develop novel reinforcement learning algorithms for agents to learn from social interaction in multi-agent settings.
- Enable natural and adaptive interaction between humans and robots in industrial operational environments based on visual language models (VLMs) and control algorithms.

Carnegie Mellon University **Pittsburgh, PA**
Research Assistant, Advised by Prof. Katia Sycara and Prof. Michael Lewis *Aug. 2017 – Aug. 2025*

- Apply human-centered research methods to facilitate the interaction between humans and artificial agents.
- Researched mutual adaptation in human-agent teams and proposed a computational framework for RL agents to adopt complementary policies in real-time
- Evaluated LLM-based agents' embodied interaction and Theory of Mind (ToM) capabilities in multi-agent collaborations
- Designed visual and natural language explanations to improve the transparency of RL agents' decision making processes

Zhejiang University **Hangzhou, China**
Research Assistant, Advised by Prof. Zaifeng Gao *May 2015 – June 2017*

- Designed and implemented an eye-tracking experiment to confirm the processing priority of social interactive biological motions in working memory
- Researched drivers' cognitive distraction while using ride-sharing apps in the simulated driving environment, by analyzing multimodal data from eye tracking, driving behaviors and surveys
- Improved the intelligibility of airline safety briefing cards by redesigning the pictorial based on user tests

Working Experience

Research Scientist Internship **Ann Arbor, MI**
Honda Research Institute USA *Jan. 2024 – Aug 2024*

- Develop novel techniques to allow multi-agent reinforcement learning (MARL) agents to collaborate and communicate with humans in team tasks based on representation learning and large language models (LLMs).
- Collaborate with a multidisciplinary team of researchers to design and implement cutting-edge solutions.

User Experience Researcher Internship **Hangzhou, China**
International User Experience Design, Alibaba Group *Dec. 2015 – Aug. 2016*

- Collaborated with front-end engineers, interaction designers and product managers to locate user experience issues of AliExpress.com
- Designed user study protocols and assigned in-lab tests/interviews to over 90 users from 14 countries
- Analyzed quantitative and qualitative test data and delivered constructive design suggestions to the team

Signature Publications

Book Chapter

- Lewis, M., **Li, H.**, & Sycara, K., (2021) Deep learning, transparency, and trust in human robot teamwork. In *Trust in Human-Robot Interaction (pp. 321-352).* Academic Press.

Peer Reviewed Journal Papers

- Karten, S., Tucker, M., **Li, H.**, Kailas, S., Lewis, M., & Sycara, K., (2023) Interpretable Learned Emergent Communication for Human-Agent Teams. In *IEEE Transactions on Cognitive and Development Systems* **(IEEE T-CDS)**
- **Li, H.**, Ni, T., Agrawal, S., Jia, F., Raja, S., Gui, Y., Hughes, D., Lewis, M. and Sycara, K., (2021). Individualized Mutual Adaptation in Human-Agent Teams. In *IEEE Transactions on Human Machine Systems* ***(IEEE T-HMS)***.
- Nam, C., Walker, P., **Li, H.**, Lewis, M., & Sycara, K., (2020). Models of Trust in Human Control of Swarms With Varied Levels of Autonomy. In *IEEE Transactions on Human-Machine Systems* ***(IEEE T-HMS)***.
- Fang, T., **Li, H.***, Ma, Z., Peng, Z., Xie, Y., Zhu, C., & Gao, Z.*, (2017). The Influence of Pictorial Realism on the Comprehension of Safety Briefing Cards. *Chinese Journal of Applied Psychology, 23(4): 318-326*. **(Corresponding Author)**

Peer Reviewed Conference Papers

- Li, B., Shi, S., Romeo. L., **Li, H.**, Xie, Y., Kim, W., Nikolaidis, S., Lewis, M., Sycara, K., & Stepputtis, S. (2025). Adaptively Coordinating with Novel Partners via Learned Latent Strategies. *The 39th Conference on Neural Information Processing Systems.****(NeurIPS 2025)***
- Li, B., Shi, S., Romeo. L., **Li, H.**, Xie, Y., Kim, W., Nikolaidis, S., Lewis, M., Sycara, K., & Stepputtis, S. (2025). Modeling Latent Partner Strategies for Adaptive Zero-Shot Human-Agent Collaboration. *In GenAI-HRI workshop at RSS 2025.* ***(Best Paper Award)***
- **Li, H.**, Mahjoub, H. N., Lee, K., Chalaki, B., Tadiparthi, V., Moradi-Pari, E., Lewis, M., & Sycara, K., (2024). Language Grounded Multi-agent Reinforcement Learning with Human-interpretable Communication. *The 38th Conference on Neural Information Processing Systems* ***(NeurIPS 2024)***
- **Li, H.**, Chong, Y., Stepputtis, S., Campbell, J., Hughes D., Lewis, M., Sycara, K., (2023). Theory of Mind for Multi-Agent Collaboration via Large Language Models. *Conference on Empirical Methods in Natural Language Processing* ***(EMNLP 2023)***

- **Li, H.**, Fan, Y., Zheng, K., Lewis, M., Sycara, K., (2023). Personalized Decision Supports based on Theory of Mind Modeling and Explainable Reinforcement Learning. *IEEE International Conference on Systems, Man, and Cybernetics* ***(SMC 2023)***
- **Li, H.**, Oguntola, I., Hughes D., Lewis, M., Sycara, K., (2022). Theory of Mind Modeling in Search and Rescue Teams. *IEEE International Conference on Robot and Human Interactive Communication* ***(RO-MAN 2022)***
- Tucker, M., **Li, H.**, Agrawal, S., Hughes D., Lewis, M., Sycara, K. Shah, J., (2021). Emergent Discrete Communication in Semantic Spaces. *Conference on Neural Information Processing Systems* ***(NeurIPS 2021)***
- **Li, H.**, Le, L., Chis, M., Zheng, K., Hughes D., Lewis, M., Sycara, K., (2021). Sequential Theory of Mind Modeling in Team Search and Rescue Tasks. *AAAI Symposium of Computational Theory of Mind for Human-Machine Teams*
- Deka, A., Luo, W., **Li, H.**, Lewis, M., Sycara, K., (2021). Hiding Leader's Identity in Leader-Follower Navigation through Multi-Agent Reinforcement Learning. In *Proceedings of 2021 IEEE/RSJ International Conference on Intelligent Robots and Systems* ***(IROS 2021)***
- **Li, H.**, Lewis, M., Sycara, K., (2020). A Kalman estimation model of human trust in supervisory control of robotic swarms. In *Proceedings of 64th Annual Meeting of the Human Factors and Ergonomics Society* ***(HFES 2020)***
- **Li, H.**, Hughes D., Lewis, M., Sycara, K., (2020). Individual adaptation in teamwork. In *Abstract proceedings of 42nd Annual Meeting of the Cognitive Science Society* ***(CogSci 2020)***
- **Li, H.**, Milani, S., Krishnamoorthy, V., Lewis, M., & Sycara, K., (2019). Perceptions of Domestic Robots' Normative Behavior Across Cultures. In *AAAI conference on Artificial Intelligence, Ethics, and Society* ***(AIES 2019)***
- **Li, H.**, Bang, J., Nagavalli, S., Nam, C., Lewis, M., & Sycara, K., (2018). Human Interaction Through an Optimal Sequencer to Control Robotic Swarms. *IEEE International Conference on Systems, Man, and Cybernetics* ***(SMC 2018)***
- Iyer, R., Li, Y., **Li, H.**, Lewis, M., Sundar, R., & Sycara, K., (2018). Transparency and Explanation in Deep Reinforcement Learning Neural Networks. *AAAI conference on Artificial Intelligence, Ethics, and Society* ***(AIES 2018)*** **(Best Paper Award)**

Invited Talks

Language Grounded MARL with Human-interpretable Communication — **Cambridge, MA**
MIT LIDS Nexus Postdoc Meeting — *Oct. 2025*

A Computational Framework for Efficient Human-agent Teamwork — **Cambridge, MA**
MIT Realm Lab Meeting — *July. 2025*

Sentiment analysis of Artificial dvisors in Search and Rescue Tasks — **Washington, D.C.**
The 67th International Annual Meeting of Human Factors and Ergonomics Society — *March. 2023*

Personalized Decision Supports based on ToM Modeling and Explainable RL — **Oahu, HI**
2023 IEEE International Conference on Systems, Man, and Cybernetics — *Oct. 2023*

Theory of Mind Modeling in Search and Rescue Teams — **Naples, Italy**
31st IEEE International Conference on Robot & Human Interactive Communication — *Aug. 2023*

Sequential Theory of Mind Modeling in Team Search and Rescue Tasks — **Virtual**
AAAI Symposium of Computational Theory of Mind for Human-Machine Teams — *Nov. 2021*

Human Theory of Mind Inference in Search and Rescue Tasks — **Baltimore, MD**
65th Annual Meeting of the Human Factors and Ergonomics Society — *Oct. 2021*

A Kalman estimation model of human trust in supervisory control of robotic swarms — **Virtual**
64th Annual Meeting of the Human Factors and Ergonomics Society — *Oct. 2020*

Team Synchronization and Individual Contributions in Coop-Space Fortress — **Virtual**
64th Annual Meeting of the Human Factors and Ergonomics Society — *Oct. 2020*

Professional Services

- MIT LIDS Student Conference 2026 — Co-chair
- Fall 2019 Human Robot Interaction, University of Pittsburgh — Teaching Assistant
- Behaviour & Information Technology, Scientific Reports, IJCHI, T-HMS, PLOS One — Journal Reviewer
- ICLR, NeurIPS, AAAI, EMNLP, ICRA, IROS, SMC, HFES — Conference Reviewer

References

- Prof. Chuchu Fan, Massachusetts Institute of Technology — chuchu@mit.edu
- Prof. Michael Lewis, University of Pittsburgh — ml@sis.pitt.edu
- Prof. Katia Sycara, Carnegie Mellon University — sycara@andrew.cmu.edu
- Dr. Hossein Nourkhiz Mahjoub, Honda Research Institute — hossein_nourkhizmahjoub@honda-ri.com