Jiazhen Liu

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Education

Georgia Institute of Technology **Atlanta, GA**
Ph.D. in Robotics, Advisor: Prof. Harish Ravichandar Aug. 2023 - 2028

- GPA: 4.0/4.0
- Robotics Coursework: Mathematical Principles for Planning and Control, Deep Learning for Robotics Research, Computer Vision, Human-Robot Interaction, Human-AI Interaction, Large language Models

University of Pennsylvania **Philadelphia, PA**
M.S. in Computer and Information Science Sept. 2021 - May. 2023

- GPA: 3.95/4.0
- Coursework: Advanced Algorithms, Learning in Robotics, Advanced AI, Software Analysis and Development, Operating System, Functional Programming

The Chinese University of Hong Kong, Shenzhen (CUHKSZ) **Shenzhen, China**
B.E. in Computer Science and Engineering Sept. 2017 - May. 2021

- GPA: 3.79/4.0 (ranking: 5/100+), Graduated with First Class Honors
- Coursework: Linear Algebra, Probability Theory, Statistics, Convex Optimization, Calculus, Discrete Mathematics, Machine Learning, Reinforcement Learning, Operating System, Data Structure, Distributed and Parallel Computing, Database, Data Mining, Signals and Systems

University of California, Berkeley **Berkeley, CA**
Summer Visiting Student June. 2018 - Aug. 2018

- GPA: 4.0/4.0
- Coursework: Introduction to Economics, General Psychology

Research Interests

My research focuses on designing and learning abstractions for efficient robot planning and decision-making. Across multi-robot coordination and manipulation, I study how to capture the capabilities, constraints, and physical interactions essential to task execution while reducing computational and data requirements.

Publications

T-RO G. Shi, S. Liu, E. Novoseller, **J. Liu**, F. Qian and G. Sukhatme. Human-in-the-Loop Multirobot Information Gathering With Inverse Submodular Maximization. In IEEE Transactions on Robotics, vol. 42, pp. 3944-3963, 2026, doi: 10.1109/TRO.2026.3738463.

CoRL 2025 S. Jain, **J. Liu**, S. Kailas, H. Ravichandar (2025, October). JaxRobotarium: Training and Deploying Multi-Robot Policies in 10 Minutes. In Conference on Robot Learning (pp. 1975-1996). PMLR.

IROS 2025 P. Li, Y. Wu, **J. Liu**, G. S. Sukhatme, V. Kumar, L. Zhou (2025, October). Resilient Multi-Robot Target Tracking with Sensing and Communication Danger Zones. In 2025 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) (pp. 3573-3580). IEEE.

ISRR 2024 **J. Liu***, G. Neville*, S. Chernova, H. Ravichandar (2024, December). Q-ITAGS: Quality-Optimized Spatio-Temporal Heterogeneous Task Allocation with a Time Budget. In Springer SPAR series for the International Symposium of Robotics Research.
Selected as a Top Paper

DARS 2024 **J. Liu***, P. Li*, Y. Wu, G. S. Sukhatme, V. Kumar, L. Zhou (2024, October). Multi-robot target tracking with sensing and communication danger zones. In International Symposium on Distributed Autonomous Robotic Systems (pp. 600-615). Cham: Springer Nature Switzerland.
Best Paper Nomination

ACC 2023 R. Zahroof*, **J. Liu***, L. Zhou, V. Kumar (2023, May). Multi-robot localization and target tracking with connectivity maintenance and collision avoidance. In 2023 American Control Conference (ACC) (pp. 1331-1338). IEEE.

DARS 2022 **J. Liu**, L. Zhou, R. Ramachandran, G. S. Sukhatme, V. Kumar (2022, November). Decentralized risk-aware tracking of multiple targets. In International Symposium on Distributed Autonomous Robotic Systems (pp. 408-423). Cham: Springer Nature Switzerland.

ICME 2021 P. Hu, **J. Liu**, T. Cao, R. Huang (2021, July). Reinforcement learning based automatic personal mashup generation. In 2021 IEEE International Conference on Multimedia and Expo (ICME) (pp. 1-6). IEEE.

* Denotes equal contributions

Preprints

Under Review **J. Liu**, G. Neville, J. Park, S. Chernova, and H. Ravichandar (2026). Learning and Optimizing the Efficacy of Spatio-Temporal Task Allocation under Temporal and Resource Constraints.

Workshop Organization & Services

IEEE International Conference on Intelligent Robots and Systems IROS 2026

Workshop Title: Tightly Coupled Physical Interaction and Collaboration in Multi-Robot Systems

- This workshop aims to bring together researchers in control, motion planning, TAMP, and robot learning to shift the focus of multi-robot research from loosely coupled coordination towards physically grounded, tightly coupled collaboration.

IEEE International Conference on Robotics and Automation ICRA 2025

Role: Volunteer Co-Manager:

- Coordinated a team of **200+ volunteers** to provide help to conference attendees. In charge of allocating volunteers to various workshops and handling emergencies.

Work Experience

Graduate Research Assistant **STAR Lab, Georgia Tech**

Advisor: *Harish Ravichandar* Aug. 2023 - Present

- Designed a contact-implicit multi-robot task and motion planner for coordinated non-prehensile manipulation
- Formalized and designed algorithms for quality-optimized black-box multi-robot task allocation (ISRR 2024)
- Investigated the role of realizability when active learning meets multi-robot task allocation (under review)
- Advised the benchmarking of multi-agent reinforcement learning (MARL) algorithms with a sim-to-real transfer perspective on the Robotarium platform (CoRL 2025)
- Shaped the problem formulation and evaluation strategy of a compatibility-aware human-robot teaming algorithm (under review)

Graduate Research Assistant **Kumar Lab, UPenn**

Advisor: *Vijay Kumar* and *Lifeng Zhou* Sept. 2021 - May. 2023

- Designed a chance-constrained multi-robot target tracking algorithm that enables UAVs to track targets under threats of sensing and communication danger zones (DARS 2024)
- Designed a sampling-based algorithm for coordinated self-localization and target tracking (ACC 2023)
- Designed a decentralized multi-robot tracking algorithm to automatically trade off between tracking performance and safety requirements in dangerous environments (DARS 2022)

Graduate Research Assistant **ScalAR Lab, UPenn**

Advisor: *M. Ani Hsieh* Sept. 2022 - May. 2023

- Implemented a controller inspired by the Knowledge-Based Neural Ordinary Differential Equations (KNODE) to achieve 2D flocking using a swarm of Husky unmanned ground vehicles (UGV) in the simulator

Undergraduate research assistant **Computer Vision Lab, CUHKSZ**
Advisor: *Rui Huang* Jan. 2019 - Mar. 2021

- Participated in the design of an automatic human tracking and video editing system (ICME 2021)
- Investigated common techniques for pedestrian re-identification, multi-target multi-camera tracking, and multiple object tracking

Algorithm Software Engineer **Shenzhen, China**
Tencent Technology (Shenzhen) Co., Ltd Mar. 2021 - July. 2021

- Designed post-processing algorithms based on geometric relationships to refine the game character skinning
- Deployed the algorithms into Maya simulator and improved the skinning performance of 50+ game characters

Professional Services and Awards

Reviewer: IROS 2023, ICRA 2024-2026, RSS 2025, CoRL 2025, IROS 2026, DARS 2026, Transactions on Mechatronics, Transactions on Robotics, RA-L.
Georgia Tech Robotics Fellowship: Top Admitted PhD Student, 2023.
Academic Scholarship: CUHKSZ, 2018–2019 (Top 1%).
Dean's List: School of Data Science, CUHKSZ, 2018–2020.

Teaching and Mentoring Experience

Graduate Teaching Assistant **Georgia Tech**
CS 7631 Multi-Robot Systems Spring 2025

- Served as Head TA and was in charge of preparing reading lists and providing guidance to group projects

Undergraduate Teaching Assistant **CUHKSZ**

- TA for General Chemistry in Fall 2019
- Head-TA for C++ Programming in Spring 2020

Mentoring:

- Yu Du, now software engineer at Google (M.S.) 2024-2025
- Shalin Anand Jain, now at NVIDIA (M.S.) 2025
- Clark Abou Rjeily (M.S.) 2025
- Sneha Maheshwari (M.S.) 2024

Technical Skills

Programming Languages: Python, C++, C, SQL, MATLAB, LaTeX, Coq, Javascript
Robotic Platforms: Georgia Tech Robotarium, Turtlebot, Crazyflie
Simulations: Gazebo, Issac Lab, Pybullet, RViz
Tools and Packages: ROS, OMPL, Git, PyTorch, Tensorflow, NumPy, Scipy, Pandas, Maya
Optimization software: Gurobi, cvxpy, Casadi, forcespro, Knitro, IPOPT