

# Peihong Yu

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## Research Interests

I currently work in the field of **Reinforcement Learning**, with a focus on **Multi-Agent RL**. My research aims to improve **training efficiency** and **generalizability**, enabling autonomous agents to learn effectively and perform robustly across diverse scenarios. I also work on **VLMs** and **VLAs** for robust robotic manipulation and grounding in real-world environments. In addition, I explore **RLHF**, particularly in learning from multi-dimensional preferences to balance multi-faceted criteria in decision-making. My experience extends to **3D Reconstruction** and Simultaneous Localization and Mapping (**SLAM**).

## Education

- 2019–Present **University of Maryland, College Park, Maryland, United States**  
PhD Student in Computer Science.  
Advisor: [Pratap Tokekar](#)
- 2016–2020 **University of Chinese Academy of Sciences, Shanghai, China**  
(Associated program with **ShanghaiTech University**)  
Master of Science in Engineering, Communication and Information Systems.  
Advisors: [Jingyi Yu](#), [Laurent Kneip](#)
- 2012–2016 **Shanghai University, Shanghai, China**  
Bachelor of Engineering, Computer Science and Technology  
Ranking: 10/285

## Employments

- Summer 2023 **Research Intern, Multi-Agent Reinforcement Learning** at *SRI International, CVT*.  
Advised by [Aswin Raghavan](#).
- Developed a robust multi-agent coordination framework by integrating historical observations and communications into a unified Common Operating Picture (COP), demonstrating significant improvements in policy robustness to out-of-distribution scenarios ([Published](#) in CoRL OOD Workshop 2023)
- Summer 2022 **Research Intern, 3D Computer Vision/Machine Learning (PhD)** at *Meta Reality Lab*.  
Advised by [True Price](#).
- Developed a novel permutation-equivariant network architecture for robust pose graph optimization and achieved reliable convergence with poor initializations, addressing critical challenges in large-scale 3D reconstruction and mapping).

## Publications

\* denotes equal contribution.

- RSS 2025 **Sketch-to-Skill: Bootstrapping Robot Learning with Human Drawn Trajectory Sketches.**  
[Peihong Yu\\*](#), [Amisha Bhaskar\\*](#), [Anukriti Singh](#), [Zahiruddin Mahammad](#), and [Pratap Tokekar](#).  
*Robotics: Science and Systems*, 2025. [[Paper Link](#)]

- DC @ AAMAS'25 **Learning with Less Effort: Efficient Training and Generalization in (Multi-)Robot Systems**  
Peihong Yu.  
*Doctoral Consortium at International Conference on Autonomous Agents and Multi-Agent Systems, 2025*
- AAMAS'25 **TACTIC: Task-Agnostic Contrastive pre-Training for Inter-Agent Communication.**  
Peihong Yu, Manav Mishra, Syed Zaidi, and Pratap Tokekar.  
*International Conference on Autonomous Agents and Multi-Agent Systems, 2025* [\[Paper Link\]](#)
- TMLR'25 **Beyond Joint Demonstrations: Personalized Expert Guidance for Efficient Multi-Agent Reinforcement Learning.**  
Peihong Yu, Manav Mishra, Alec Koppel, Carl Busart, Priya Narayan, Dinesh Manocha, Amrit Singh Bedi, and Pratap Tokekar.  
*Transactions on Machine Learning Research, 2025.* [\[Paper Link\]](#)
- OOD @ CoRL'23 **Enhancing Multi-Agent Coordination through Common Operating Picture Integration.**  
Peihong Yu, Bhoram Lee, Aswin Raghavan, Supun Samarasekara, Pratap Tokekar, James Zachary Hare.  
*First Workshop on Out-of-Distribution Generalization in Robotics at CoRL 2023.* [\[Paper Link\]](#)
- IEEE Access'20 **Accurate Line-Based Relative Pose Estimation with Camera Matrices.**  
Peihong Yu, Cen Wang, Zhirui Wang, Jingyi Yu, and Laurent Kneip.  
*IEEE Access, 2020.* [\[Paper Link\]](#)
- ICCV'17 **Ray Space Features for Plenoptic Structure-from-Motion.**  
Yingliang Zhang, Peihong Yu, Wei Yang, Yuanxi Ma, and Jingyi Yu.  
*IEEE International Conference on Computer Vision, 2017.* [\[Paper Link\]](#)
- ICCP'17 **The Light Field 3d Scanner.**  
Yingliang Zhang, Zhong Li, Wei Yang, Peihong Yu, Haiting Lin, and Jingyi Yu.  
*IEEE International Conference on Computational Photography, 2017.* [\[Paper Link\]](#)

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## Preprints

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- In Submission **VARP: Reinforcement Learning from Vision-Language Feedback with Agent Regularized Preferences**  
Amisha Bhaskar, Anukriti Singh, Peihong Yu, Souradip Chakraborty, Ruthwik Dasyam, Amrit Singh Bedi, and Pratap Tokekar.  
*Arxiv, 2025.* [\[Paper Link\]](#)
- In Submission **Equitable Optimization Across Preferences: A Maximinimalist Approach to Persistent Monitoring with Preference-based Reinforcement Learning.**  
Manav Mishra, Peihong Yu, Sujit PB, Pratap Tokekar.
- In Submission **On the Sample Complexity of a Policy Gradient Algorithm with Occupancy Approximation for General Utility Reinforcement Learning.**  
Anas Barakat, Souradip Chakraborty, Peihong Yu, Pratap Tokekar, Amrit Singh Bedi.  
*Arxiv, 2024.* [\[Paper Link\]](#)

Preprint **Insta-RS: Instance-wise Randomized Smoothing for Improved Robustness and Accuracy.**

Chen Chen, Kezhi Kong, [Peihong Yu](#), Juan Luque, Tom Goldstein, Furong Huang.  
*Arxiv*, 2021. [[Paper Link](#)]

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## Professional Services

Reviewer ICRA 2023, ICLR 2025, RA-L 2025, T-RO 2025.

Mentoring [AI4ALL Summer Program](#) at UMD.

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## Technical Skills

Languages Python, C++, Matlab

Librarys PyTorch, Tensorflow, PyMARL, RLlib, Stable Baseline 3, OpenAI Gym

Other Tools ROS, Gazebo, Unreal Engine