TIANYANG PAN

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Google Scholar

EDUCATION

Rice University Aug. 2019 – Aug. 2024
Ph.D. in Computer Science GPA: 3.94/4.0
Dissertation: *Towards Robust and Scalable Task and Motion Planning in the Real World*
Advisor: Dr. Lydia E. Kavraki

University of Michigan, Ann Arbor Aug. 2017 – Apr. 2019
M.S. in Electrical and Computer Engineering GPA: 4.0/4.0

University of California, Berkeley Aug. 2016 – Dec. 2016
Visiting Student, Department of Electrical Engineering and Computer Science GPA: 4.0/4.0

Southeast University, Nanjing, China Sept. 2013 – Jun. 2017
B.E. in Information Engineering GPA: 3.73/4.0

WORK EXPERIENCE

Meta Platforms, Inc. Aug. 19th 2024 – Present
Research Scientist

· Lead machine learning research projects for Meta product content understanding.

· Lead research on leveraging Large-Language-Models (LLM) through fine-tuning, retrieval-augmented generation (RAG), prompt engineering, etc., for data efficiency for content understanding.

Rice University Aug. 26th 2019 – Aug. 9th 2024
Research Assistant *Advisor: Dr. Lydia E. Kavraki*

· Developed a multi-robot navigation framework combining controller design, motion planners, and path-finding algorithms, improved over baselines in computation time (100 times faster) [IROS '24]

· Developed a framework for long-horizon tasks with relaxed world knowledge assumptions, improved over baselines in task completion time (30% less) and solved more problems [T-RO '24].

· Developed a task and motion planner that can reason over real-world execution failures, improved over baselines in solution quality (40% improvement) and computation time (60% less) [ICRA '22]

· Developed multi-robot collaborative manipulation methods improved over the state-of-the-art in both computation time (40% less) and solution quality (50% improvement) [IROS '21]

· Developed a framework on scaling multi-robot coordinated navigation combining controller design and motion planners, solving much more problems than only using a designed controller [IROS '20].

· Combined traditional task and motion planning solvers with cutting-edge developments in AI such as large-language-models (LLM) for powerful, robust and flexible robotic frameworks [*in progress*].

· Integrated large-scale software projects on real-robot systems that contributed to research in the lab, enhanced lab infrastructure, and led to robust lab demos.

University of Michigan, Ann Arbor Mar. 2018 – May. 2019
Research Assistant *Advisor: Dr. Odest Chadwicke Jenkins*

· Collaborated in several research projects and co-author papers on (1) robot learning from human demonstrations, (2) grasp pose detection algorithms for transparent objects.

· Responsible for the construction and maintenance of the manipulation pipeline on the Fetch robot.

· Performed an on-site demonstration of mobile manipulation at Magna International, Troy.

Information Security Lab, Southeast University July. 2015 – Jun. 2017
Advisor: Dr. Liquan Chen

· Collaborated as undergraduate researcher on wireless sensor network.

· Authored undergraduate thesis on encryption algorithm.

PUBLICATIONS

Journal Papers

1. **Tianyang Pan**, Rahul Shome and Lydia E. Kavraki, "Task and Motion Planning for Execution in the Real," in IEEE Transactions on Robotics, 2024, doi:10.1109/TRO.2024.3418550, ☆**2024 IEEE Transactions on Robotics King-Sun Fu Memorial Best Paper Award** honorable mention

Conference Papers

1. **Tianyang Pan**, Christos K. Verginis and Lydia E. Kavraki, "Robust and Safe Task-driven Navigation for Heterogeneous Multi-Robot Teams with Uncertain Dynamics," *2024 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2024, doi:10.1109/IROS58592.2024.10802695.
2. Carlos Quintero-Peña, Zachary Kingston, **Tianyang Pan**, Rahul Shome, Anastasios Kyrillidis and Lydia E. Kavraki, "Optimal Grasps and Placements for Task and Motion Planning in Clutter," *2023 IEEE International Conference on Robotics and Automation (ICRA)*, 2023, pp. 3707-3713, doi:10.1109/ICRA48891.2023.10161455
3. **Tianyang Pan**, Andrew M. Wells, Rahul Shome and Lydia E. Kavraki, "Failure is an option: Task and Motion Planning with Failing Executions," *2022 International Conference on Robotics and Automation (ICRA)*, 2022, pp. 1947-1953, doi:10.1109/ICRA46639.2022.9812273
4. **Tianyang Pan**, Andrew M. Wells, Rahul Shome, Lydia E. Kavraki, "A General Task and Motion Planning Framework For Multiple Manipulators," *2021 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2021, pp. 3168-3174, doi:10.1109/IROS51168.2021.9636119
5. **Tianyang Pan**, Christos. K. Verginis, Andrew M. Wells, Lydia E. Kavraki, and Dimos. V. Dimarogonas, "Augmenting Control Policies with Motion Planning for Robust and Safe Multi-robot Navigation," *2020 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2020, pp. 6975-6981, doi:10.1109/IROS45743.2020.9341153
6. Zheming Zhou, **Tianyang Pan**, Shiyu Wu, Haonan Chang and Odest Chadwicke Jenkins, "GlassLoc: Plenoptic Grasp Pose Detection in Transparent Clutter," *2019 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2019, pp. 4776-4783, doi:10.1109/IROS40897.2019.8967685
7. Kevin French, Shiyu Wu, **Tianyang Pan**, Zheming Zhou and Odest Chadwicke Jenkins, "Learning Behavior Trees From Demonstration," *2019 IEEE International Conference on Robotics and Automation (ICRA)*, 2019, pp. 7791-7797, doi:10.1109/ICRA.2019.8794104

AWARDS

IEEE Transactions on Robotics King-Sun Fu Memorial Best Paper Award honorable mention 2024

Andrew Ladd Memorial Excellence in Computer Science Graduate Fellowship 2023

Outstanding Graduate of Southeast University (top 2%)	2017
Best Undergraduate Thesis Paper (Southeast University)	2016 – 2017
University Award for Outstanding Student Abroad (Southeast University to UC-Berkeley)	2016
The Second Prize in University Mathematical Modeling Contest	2014 – 2015
Mitsubishi EE Scholarship	2013 – 2014
The Third Prize in University Robotics and CV Contest	2013 – 2014

TECHNICAL SKILLS

Robotics and AI	Task and motion planning, AI planning, sampling-based motion planning, multi-robot systems, model checking, Markov Decision Processes, LLMs, behavior trees, reinforcement learning, deep learning, full-stack robotics, SLAM, computer vision, Linear Systems Theory, SMT planning
Robotics Hardware	Fetch, UR5, Baxter, Depth Camera (Primesense Carmine, Realsense) Vicon System, Light field Camera (Lytro), Robotiq gripper
Programming	C/C++, Python, JAVA, MATLAB
Software & Tools	ROS, OMPL, Robowflex, MoveIt, DART, Gazebo, PyTorch, Tensorflow SQL, OpenAI Gym, Linux, Git, Docker, Anaconda, Latex, Markdown

TEACHING EXPERIENCE

Algorithmic Robotics (COMP 450/550) — Rice University

- Teaching Assistant — *Fall 2021*
- Teaching Assistant — *Fall 2020*

SERVICE

Organizer	Texas Regional Robotics Symposium 2023 (around 190 attendants from 6 universities)
Reviewer	ICRA, IROS, RSS, RA-L, T-RO, T-MECH, Unmanned Systems