

# TIANYANG PAN

<https://tianyangepan.com> ◊ [Tianyong.Pan@rice.edu](mailto:Tianyong.Pan@rice.edu)

## EDUCATION

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<b>Rice University</b> Ph.D. in Computer Science Dissertation: <i>Towards Robust and Scalable Task and Motion Planning in the Real World</i> Advisor: Dr. Lydia E. Kavraki	Aug. 2019 – Aug. 2024 ( <i>expected</i> ) GPA: 3.94/4.0
<b>University of Michigan, Ann Arbor</b> M.S. in Electrical and Computer Engineering	Aug. 2017 – Apr. 2019 GPA: 4.0/4.0
<b>University of California, Berkeley</b> Visiting Student, Department of Electrical Engineering and Computer Science	Aug. 2016 – Dec. 2016 GPA: 4.0/4.0
<b>Southeast University, Nanjing, China</b> B.E. in Information Engineering	Sept. 2013 – Jun 2017 GPA: 3.73/4.0

## RESEARCH EXPERIENCE

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<b>Kavraki Lab, Rice University</b> <i>Advisor: Dr. Lydia E. Kavraki</i>	Aug. 2019 – Present
<ul style="list-style-type: none"><li>· Led several research projects and authored papers in the field of robotic task and motion planning.<ol style="list-style-type: none"><li>1. Extended task and motion planning to break the standard assumptions prevalent in the field. Developed methods that enable robots to robustly and efficiently accomplish long-horizon real-world manipulation tasks, even with limited domain knowledge of the world.</li><li>2. Developed task and motion planning methods that focus on scaling multi-robot collaborative manipulation and coordinated navigation, collaborating with control systems specialists.</li><li>3. 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.</li></ol></li><li>· Integrated large-scale software projects on real-robot systems contributing to research in the lab.<ol style="list-style-type: none"><li>1. Performed extensive real-robot experiments and shared collected data as open-source dataset.</li><li>2. Developed software that enhanced lab infrastructure, led to lab demos and shared for research.</li></ol></li></ul>	
<b>Lab for Progress, University of Michigan, Ann Arbor</b> <i>Advisor: Dr. Odest Chadwicke Jenkins</i>	Mar. 2018 – May. 2019
<ul style="list-style-type: none"><li>· Collaborated in several research projects and co-author papers on (1) robot learning from human demonstrations, (2) grasp pose detection algorithms for transparent objects.</li><li>· Responsible for the construction and maintenance of the manipulation pipeline on the Fetch robot.</li><li>· Performed an on-site demonstration of mobile manipulation at Magna International, Troy.</li></ul>	
<b>Information Security Lab, Southeast University</b> <i>Advisor: Dr. Liquan Chen</i>	July. 2015 – Jun. 2017
<ul style="list-style-type: none"><li>· Collaborated as undergraduate researcher on wireless sensor network.</li><li>· Authored undergraduate thesis on encryption algorithm.</li></ul>	
<b>Undergraduate Research Project at Southeast University</b> <i>Position: Research Team Leader</i>	Dec. 2014 – Dec. 2015
<ul style="list-style-type: none"><li>· Architected the scripts that integrate ultrasonic module, steering engine, and control logic.</li><li>· Led the team to design and assembled the mechanical and electrical elements.</li></ul>	

## PUBLICATIONS

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### 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

### Conference Papers

1. **Tianyang Pan**, Christos K. Verginis and Lydia E. Kavraki, "Safe and Robust Task-driven Navigation for Heterogeneous Multi-Robot Teams," *2024 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2024, *To Appear*.
2. Carlos Quintero-Peña, Zachary Kingston, **Tianyang Pan**, Rahul Shome, Anastasios Kyriallidis 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

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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

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**Robotics Specialties** 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  
OpenAI Gym, FPGA, Linux, Git, Docker, Anaconda, Latex, Markdown

## TEACHING EXPERIENCE

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**Algorithmic Robotics (COMP 450/550)** Rice University  
· Teaching Assistant *Fall 2021*  
· Teaching Assistant *Fall 2020*

## SERVICE

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