Haolei Tong

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Education

Technical University of Darmstadt *Darmstadt, Germany*
Master of Science, Autonomous systems and robotics *Oct. 2022 - Sep. 2025*

- GPA: 1.64
- **Coursework:** Foundations of Robotics, Data Mining and Machine Learning, Deep Learning, Reinforcement Learning

Zhejiang University of Science and Technology (ZUST) *Zhejiang, China*
Joint Bachelor's Program with FH Westküste, Germany *Sep. 2017 – Aug. 2021*
Bachelor of Science, Electrical Engineering and Automation

- GPA: 1.9

Work and Research Experience

Neura Robotics GmbH *Bielefeld, Germany*
Dual-Arm Planning Engineer, Full-time Employment *Dec. 2025 – Present*

- Working within the R&D team on **bimanual manipulation** leveraging **Reinforcement Learning** and **Vision-Language-Action (VLA)** models for next-generation robotic assistants.

PEARL Lab, TU Darmstadt *Darmstadt, Germany*
Student Research Assistant / HiWi *Oct. 2024 - Sep.2025*

- Introduced an NLP-based constrained sampling strategy to generate diverse, feasible configurations across foliated constraint manifolds.
- Tested the method on real-world dual-arm robotic platforms, including Franka Emika and Tiago.

SIM Lab, TU Darmstadt *Darmstadt, Germany*
Student Research Assistant / HiWi *Sep. 2023 - Sep.2024*

- Integrated collision detection mechanisms for both the robot and objects in the Webots simulation environment; visualized real-time collision states in RViz.
- Designed and implemented virtual line segments to act as collision triggers, along with a timing mechanism to record collision duration upon contact.
- Developed a lightweight UI on Raspberry Pi for handheld SLAM applications, featuring start/stop control, topic selection, and data recording status display.

Robot Learning Course Tutor *Darmstadt, Germany*
student research assistant/ HiWi *Oct. 2023 - Mar. 2024*

- Responsible for Robot Learning course assignment grading and Q&A.

Ningbo Yanhua Intelligent Technology Co., Ltd. *Ningbo, China*
Embedded Systems Intern *Jul. 2020 - Sep. 2020*

- Worked on STM32-based software development and intelligent control panel software development, including firmware implementation, peripheral configuration, and debugging.

Publications

Adaptive Diffusion Constrained Sampling for Bimanual Robot Manipulation *May 2025*

Haolei Tong, Yuezhe Zhang, Sophie Lueth, Georgia Chalvatzaki

Accepted by **ICRA 2026** & Workshop on The Rational Robots Workshop, CoRL 2025
arxiv.org/abs/2505.13667

Master Thesis

Adaptive Diffusion Constrained Sampling for Bimanual Robot Manipulation *PEARL, TU Darmstadt*
Dec. 2024 - May 2025

Supervised by M.Sc. Yuezhe Zhang and Prof.'in Georgia Chalvatzaki, Ph.D
Grade: 1.0 (Excellent)

- Proposed a generative sampling framework that integrates equality and inequality constraints into a unified energy-based diffusion model for dual-arm manipulation.
- Designed a Transformer-based mechanism for adaptive weighting of constraint-specific energies during inference, enabling context-aware sampling.
- Achieved high sample diversity and constraint satisfaction through a two-phase sampling strategy combining Langevin dynamics and density-aware resampling.

Academic Projects

Narrow Passage Detection and Control Algorithm for Autonomous Ground Robots *github.com/NPDC*

- Implemented fast narrow passage detection using elevation maps via circular iterative expansion.
- Generated paths close to narrow passages based on arc geometry.
- Designed a Model Predictive Controller (MPC) to avoid collisions within narrow passages.

Multi-Robot Pick and Place *github.com/MRPP*

- Two robotic arms collaborate to complete the object grasping task.
- Computed the position of the second end-effector based on the first end-effector's pose and the object's geometry.
- Performed path planning using RRT and the KOMO optimization framework.

Honours and Awards

ICRA 2026 travel grant *Mar. 2026*

Selected for ELLIS PhD Program Shortlist *Jan. 2026*
European Laboratory for Learning and Intelligent Systems (Top-tier AI Network)

Outstanding Graduate Award (Top 5%) *2021*
First-class School scholarships *2020, 2021*
Second Place, China Robotics Competition *2019, 2020*

Programming Skills

Languages: Python, C++, C, C#
Technologies: Franka Robot, TIAGo Robot, ROS, Git, Gazebo, Webots, Isaac Sim, Rviz