

# Tianlin Zhang

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## Education

### Harbin Institute of Technology, Shenzhen

Sep 2021 - Mar 2024

M.S. Control Engineering, The First Prize Scholarship

Advisor: Xiaogang Xiong

### Changsha University of Science and Technology

Sep 2017 - Jun 2021

B.E. Automation Engineering, Outstanding Graduates Awards of Hunan Province (top 2% in Hunan), Rank within the Top 1%.

Core Courses: Automatic Control System (100), Advanced Mathematics (97), Analog Electronic Techniques (97), Circuit Theory (96), Principles of Electrical Machinery & Towing (95), Digital Signal Processing (94), Linear Algebra (90)

Advisor: Hui Zhang

## Research Experience

### Harbin Institute of Technology, Shenzhen

Sep 2021 - Present

Research Assistant, State Key Laboratory of Robotics and System

Shenzhen, China

- Developed **qm\_control** ([code](#)), a control framework for the quadruped manipulator based on model predictive control (MPC) and whole body control (WBC).
- Worked on fusing legged odometry and lidar-inertial odometry to build a legged SLAM framework ([code](#)).
- Worked on vision servo for the quadruped manipulator to track the dynamic target, and the result was accepted by IROS2023.
- Worked on the whole-body compliant control with torque saturation for the quadruped manipulator, and the result is under the review of RA-L ([video](#)).

### Hunan University

Sep 2019 - Jun 2021

Research Assistant, National Engineering Research Center of Robot Vision and Control

Changsha, China

- Worked on 6-DoF pose estimation using deep learning and implemented on the aerial manipulator to grasp targets ([video](#)).
- Worked on vision servo for the aerial manipulator to remove foreign objects on the power transmission line ([video](#)).

## Publications

### M.S.

- Tianlin Zhang**, Xuanbin Peng, Sikai Guo, Xiaogang Xiong, Yang Bai, Ke Li and Yunjiang Lou. "Whole-body Compliant Control for Quadruped Manipulator with Torque Saturation", *IEEE Robotics and Automation Letters (RA-L)*, Under review.
- Tianlin Zhang**, Sikai Guo, Xiaogang Xiong, Wanlei Li, Zezheng Qi, and Yunjiang Lou. "Dynamic Object Tracking for Quadruped Manipulator with Spherical Image-Based Approach", *2023 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Accepted, 2023.

### B.E.

- Ling Li, **Tianlin Zhang**, Hang Zhong, Hongwen Li, Hui Zhang, Shaosheng Fan, and Yijia Cao. "Autonomous removing foreign objects for power transmission line by using a vision-guided unmanned aerial manipulator", *Journal of Intelligent & Robotic Systems* 103 (2021): 1-14.
- Tianlin Zhang**, Hui Zhang, Hongwen Li, Hang Zhong, Xunhao Tang, and Yaonan Wang. "Catchit: Large-scale grasping combined with preliminary and precise localization method for aerial manipulator", *2020 Chinese Automation Congress (CAC)*. IEEE, 2020.

## Awards

- |   |                                      |
|---|--------------------------------------|
| • 2019 "TI" Cup National Undergraduate Electronic Design Competition<br><i>Lead the team to build a UAV that can track the target.</i>    | First Prize of Hunan Province        |
| • 2019 "NXP" Cup National Undergraduate Smart Car Competition<br><i>Lead the team to build a racing SLAM car (<a href="#">video</a>).</i> | Second Prize in South China Division |
| • 2019 Mathematical Contest In Modeling   | Honorable Mention                    |

## Skills

**Theory** Robot Kinematics and Dynamics; Floating-Base Dynamics; Optimal Control; Model Predictive Control; Whole Body Control; Compliant Control; Visual Servoing; Digital Image Processing; SLAM; Kalman Filter; Planning and Deep Learning.

**Program** C++/C, Python, and Matlab.

**Tools** Expert on ROS1 and Gazebo; Frequently use Pinocchio to solve robot kinematics and dynamics; Frequently use OCS2 and QPOASES to build the optimal controller (e.g., MPC and WBC); Frequently use Opencv to process 2D image; Frequently use PCL to process 3D point cloud; Frequent use of Linux, Pytorch and Latex.

**Robot** Extensive experience with legged robots, UAVs, and mobile manipulators.