

## Liuaao Pei

Email: [plaptq@gmail.com](mailto:plaptq@gmail.com) Phone: (+86) 18845771137  
Homepage: [liuaopei.com](http://liuaopei.com)

### EDUCATION BACKGROUND

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**Zhejiang University, Hangzhou**  
MEng of Control Science and Engineering

Sep 2022 — now  
Supervisor: [Prof. Fei Gao](#)

**Harbin Institute of Technology**  
BEng of Control Science and Engineering

Sep 2018 — Jun 2022  
Average Score: 94.03/100 (Rank: 1/25)

### HONOR AND AWARDS

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|------------------------------------|---|-----------------------------|
| • Sep 2022                         | Unmanned Aerial Vehicle Intelligent Sensing Technology Competition    | <b>National First Prize</b> |
| • May 2022                         | Robomaster AI Challenge of National University Robotics Competition   | <b>National Runner-up</b>   |
| • Aug 2021                         | National University Robotics Competition Robomaster Mecha Match       | <b>National Runner-up</b>   |
| • May 2021                         | National University Robotics Competition Robomaster Mecha Match       | <b>Northern Quarter</b>     |
| • Aug 2020                         | National University Robotics Competition Robomaster Mecha Match       | <b>National First Prize</b> |
| • Aug 2020                         | National University Robotics Competition Embedded Technology Category | <b>National First Prize</b> |
| • Qiming Space Scholarship (3/180) | , Multiple First and Second Class People's Scholarships               |                             |

### COMPETITION EXPERIENCES

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**Robomaster AI Challenge of National University Robotics Competition** **National Runner-up**  
*Team Leader* Jan 2022 — May 2022

- Came early to the FAST lab at Zhejiang University to lead the lab team of 8 people, team **first year of participation**;
- Based on the mechanical foundation of the official infantry robot, we choose our own sensors and computing platforms, design and develop the robot's **localization, planning, visual servoing, decision-making and perception** algorithms, which enable the robot to **full-automatically** complete the 2v2 shooting confrontation match on the field of play, and ultimately obtain the **national runner-up** achievement.

**National University Robotics Competition Robomaster Mecha Match 2021** **National Runner-up**  
*Team Leader* Sep 2020 — Aug 2021

- For one year, led **50+ person team** training, R&D, competitions, outreach, and was mainly responsible for coordinating the R&D of **7 different types** robots;
- Implementing a robot-versus-robot match similar to the Honor of Kings/League of Legends mechanism, with **4 robot iteration cycles** during the preparation period;
- The final result was to complete the preparation of **12 sets of 7 types of robots** for the national competition, **robot performance is stable, the team members are united, and the ability to deal with emergency problems is strong**, and to achieve the result of **National Runner-up**.

**National University Robotics Competition Robomaster Mecha Match 2020** **National First Prize**  
*Sentinel Group Control* Sep 2019 — Aug 2020

- The competition lasted nearly a year and achieved **National 6th**. During this period, mainly responsible for **The debugging of the Sentinel robot, control algorithm design work**;
- Mainly familiar with the application of control algorithms such as PID and sliding mode control, communication protocols such as CAN, USART and SPI, and the use of the UCOS operating system;
- Multi-task fully automated function realization of **dual gimbal launching mechanism automatic targeting, chassis movement, power control, communication and decision making** of the sentinel robot is realized.

**Harbin Institute of Technology Annual Program - Musical Fountains** **First Prize at School Level**  
*Project team member* Sep 2018 — Jun 2019

- Participated in a research project for the first time during his undergraduate studies, during which he mastered the skills of microcontroller-based C programming and hardware design, applying A/D sampling, digital logic implementation, and PWM output;
- Implemented the function of controlling water pumps and colored lights based on the input audio, and was awarded **school-level first prize** in the closing defense.

### PUBLICATIONS

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- **L. Pei**, J. Lin, Z. Han, L. Quan, Y. Cao, C. Xu, F. Gao, "Collaborative Planning for Catching and Transporting Objects in Unstructured Environments," in [IEEE Robotics and Automation Letters \(RAL\)](#), vol. 9, no. 2, pp. 1098-1105, Feb. 2024, doi: 10.1109/LRA.2023.3335770.
- Z. Han, Y. Wu, T. Li, L. Zhang, **L. Pei**, L. Xu, C. Li, C. Ma, C. Xu, S. Shen, F. Gao, "An Efficient Spatial-Temporal Trajectory Planner for Autonomous Vehicles in Unstructured Environments," in [IEEE Transactions on Intelligent Transportation Systems \(TITS\)](#), vol. 25, no. 2, pp. 1797-1814, Feb. 2024, doi: 10.1109/TITS.2023.3315320.

- Q. Wang, Z. Wang, **L. Pei**, C. Xu and F. Gao, "A Linear and Exact Algorithm for Whole-Body Collision Evaluation via Scale Optimization," [2023 IEEE International Conference on Robotics and Automation \(ICRA\)](#), London, United Kingdom, 2023, pp. 3621-3627, doi: 10.1109/ICRA48891.2023.10160516.

## SKILLS

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- Able to skillfully use C/C++, Python, Matlab, Linux
- Familiar with motion planning algorithms for mobile robots, familiar with multi-robot cooperative planning algorithms, and understand the basic theoretical knowledge of SLAM
- Skilled in ARM Cortex-M embedded development, and ROS-based robotics system development
- English score CET-6 563
- Like table tennis, photography, driving