

ZHIPENG SHEN

📍 Shanghai, China | ✉ shenzhipeng1997@163.com | 📞 (+86) 159-1247-9316
🌐 [Personal Website](#) | 🎓 [Google Scholar](#) | 🗨 WeChat: shenzhipeng1997

Education

The Hong Kong Polytechnic University, Hong Kong SAR, China

Sept. 2022 – Dec. 2025

Ph.D., Department of Aeronautical and Aviation Engineering; [AIMS Lab](#)

Supervisor: Prof. [Hailong Huang](#)

Beihang University, Beijing, China (Outstanding Graduate)

Sept. 2019 – June 2022

*M.Eng. in Control Engineering; Science and Technology on Aircraft Control Laboratory,
School of Automation Science and Electrical Engineering*

Supervisor: Prof. [Zhang Ren](#)

Northwestern Polytechnical University, Xi'an, China

Sept. 2015 – June 2019

B.Eng. in Aircraft Design and Engineering, School of Aeronautics

Research Experience

Huawei Intelligent Automotive Solution BU (Yinwang) – 2030 Lab

Apr. 2026 – Present

Researcher, Research Department | VLA/WAM for Autonomous Driving

- Develop learning-based models for high-level decision-making in autonomous driving.
- Explore learning-based decision architectures for complex driving scenarios.

The University of Tokyo, Tokyo, Japan – [DRAGON Lab](#)

Oct. 2024 – Mar. 2025

Visiting Researcher | Host: Prof. [Moju Zhao](#)

- Conducted the research leading to a first-author paper in *IEEE TASE*, developing an efficient trajectory-optimization framework for generalized multirotors via sequential convex programming and convexity exploitation.
- Applied the framework to conventional and tilttable multicopters, spanning optimal-control formulation, solver development, implementation, and experimental validation.

Research Interests

- Trajectory optimization and optimal control for autonomous robots.
- Aerial robotics and generalized multirotor systems, with emphasis on motion planning, control, and real-world autonomy.
- Multi-agent motion planning, swarm autonomy, and learning-enabled decision-making for autonomous systems.

Publications

Journal Papers

1. **Z. Shen**, J. Li, S. Zhou, M. Zhao, and H. Huang, “Efficient Trajectory Optimization for Generalized Multirotors via Sequential Convex Programming and Convexity Exploitation,” *IEEE Transactions on Automation Science and Engineering*, 2026, Early Access. [[Video](#)] [[PDF](#)]
2. **Z. Shen**, G. Zhou, H. Huang, C. Huang, Y. Wang, and F.-Y. Wang, “Convex Optimization-Based Trajectory Planning for Quadrotors Landing on Aerial Vehicle Carriers,” *IEEE Transactions on Intelligent Vehicles*, vol. 9, no. 1, pp. 138–150, 2024. [[Video](#)] [[PDF](#)]
3. **Z. Shen**, J. Yu, X. Dong, Y. Hua, and Z. Ren, “Penetration Trajectory Optimization for the Hypersonic Gliding Vehicle Encountering Two Interceptors,” *Aerospace Science and Technology*, vol. 121, p. 107363, 2022. [[PDF](#)]
4. S. Dong, **Z. Shen**, R. Reiter, H. Huang, B. Gao, H. Chen, and W.-H. Chen, “A Fast Semidefinite Convex Relaxation for Optimal Control Problems With Spatio-Temporal Constraints,” *IEEE Transactions on Control Systems Technology*, 2026, Early Access. [[Video](#)] [[PDF](#)]
5. P. Sun, **Z. Shen**, S. Tong, H. Huang, J. Shao, K. Qin, and Z. Luo, “Covert Surveillance in Urban Scenarios by UAVs: A Sequential Convex Optimization-Empowered Online Trajectory Planning Approach,” *Chinese Journal of Aeronautics*, 104338, 2026. [[Video](#)] [[PDF](#)]
6. R. Xi, **Z. Shen**, H. Huang, and H. Zhang, “Command Filtered Adaptive Tracking Consensus of Random Nonlinear Multi-Agent Systems,” *IEEE Transactions on Automation Science and Engineering*, vol. 22, pp. 8361–8370, 2025.
7. H. Cao, L. Cheng, **Z. Shen**, C. Huang, H. Huang, and F.-Y. Wang, “Detecting and Tracking 6-DoF Motion of Unknown Dynamic Objects in Industrial Environments Using Stereo Visual Sensing,” *IEEE Transactions on Systems, Man, and Cybernetics: Systems*, vol. 54, no. 12, pp. 7558–7570, 2024. [[Video](#)]

Conference Papers

8. **Z. Shen**, G. Zhou, P. Sun, B. Lan, Q. Meng, H. Cao, S. Zhou, J. Shao, and H. Huang, “Autonomous Aerial Vehicle Carrier and MAV Collaboration: System Design, Trajectory Optimization, and Real-world Implementation,” *IEEE International Conference on Robotics and Automation (ICRA)*, 2026. [[Video](#)]
9. **Z. Shen**, S. Zhou, and H. Huang, “Convexity-Exploiting Successive Convexification for Safe Drone Racing,” *2026 IEEE 20th International Conference on Control and Automation (ICCA)*, 2026. [[PDF](#)]
10. **Z. Shen**, G. Zhou, and H. Huang, “Sequential Convex Programming for Time-Optimal Quadrotor Waypoint Flight,” *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2024. [[Video](#)]

11. **Z. Shen**, C. Huang, H. Huang, Y. Wang, F.-Y. Wang, A. Jamalipour, D. T. Pham, L. Vlacic, and A. V. Savkin, “The Emerging Intelligent Vehicles and Intelligent Vehicle Carriers Collaborative Systems,” *35th IEEE Intelligent Vehicles Symposium (IV)*, 2024.

12. D. Hu, **Z. Shen**, C. Huang, and H. Huang, “Enhancing Autonomous Driving Following Motion Decision-Making Through Model-Based Policy Optimization,” *International Conference on Electric Vehicle and Vehicle Engineering (CEVVE)*, 2023; Best Student Paper.

13. **Z. Shen**, J. Yu, X. Dong, and Z. Ren, “Deep Neural Network-Based Penetration Trajectory Generation for Hypersonic Gliding Vehicles Encountering Two Interceptors,” *41st Chinese Control Conference (CCC)*, 2022.

14. **Z. Shen**, J. Yu, X. Dong, Q. Li, and Z. Ren, “Penetration Trajectory Optimization of Hypersonic Gliding Vehicles with Multiple Constraints,” *40th Chinese Control Conference (CCC)*, 2021.

15. S. Zhou, **Z. Shen**, J. Yu, and X. Dong, “Output Group Formation-Tracking Control for Heterogeneous Systems with Collision Avoidance and Connectivity Maintenance,” *41st Chinese Control Conference (CCC)*, 2022.

Patents

- “Aircraft Penetration Trajectory Optimization Method and System,” granted Chinese invention patent; *Patent No. CN114489110B*.

• “Real-Time Penetration Trajectory Generation Method and System,” granted Chinese invention patent; *Patent No. CN114840019B*.

Research Projects

UAV-Based Balcony Logistics for Fourth-Generation Residential Buildings [\[Video\]](#)

Apr. 2024 – Nov. 2024

Student Project Lead | EHang and Huaafa Group

- Developed a balcony-delivery UAV using radar and RTK positioning for autonomous entry into residential balconies and parcel delivery; completed system integration and on-site tests in Zhuhai.

– Led path-planning and motion-control development and fused radar-based obstacle avoidance with RTK localization to improve accuracy and flight safety.

Close-Approach Guidance for On-Orbit Servicing Spacecraft (Outstanding Intern Award)

Jul. 2021

Research Intern | Beijing Institute of Spacecraft System Engineering, CAST

- Investigated close-approach guidance for rendezvous and docking of on-orbit servicing spacecraft; optimized relative trajectories using the Gaussian pseudospectral method and designed an LQR guidance law for the Clohessy–Wiltshire equations.

– Conducted representative mission simulations in Systems Tool Kit, analyzed guidance errors induced by measurement uncertainty.

Open-Source Projects

- [AIMS Drone Control](#) — An open-source ROS/Python framework for quadrotor simulation and real-world control, supporting Webots simulation and PX4 experiments through MAVROS and Vicon-based state estimation. Implemented acados-based NMPC and LQR for trajectory tracking, waypoint flight, takeoff, and landing, with a unified simulation-to-real workflow.

Honors and Awards

Silver Medal, International Exhibition of Inventions Geneva	2025
Gold Medal, Asia Exhibition of Innovations and Inventions Hong Kong	2024
Outstanding Graduate, Beihang University	2022
Outstanding Intern, Beijing Institute of Spacecraft System Engineering (CAST)	2021
Outstanding Volunteer, 4th National Conference on Swarm Intelligence and Cooperative Control	2021
Outstanding Volunteer, Inaugural Meeting of the Swarm Intelligence and Cooperative Control Committee	2020
First Prize, Solid Rocket Design and Manufacturing Competition, Northwestern Polytechnical University	2016

Skills and Interests

- **Languages:** Chinese (Native); English (Fluent, TOEFL 94, CET-4 542, CET-6 516).

• **Programming and robotics:** Python, C++, Linux, ROS 1/2, PX4, CasADi, acados, PyTorch, Gazebo, and MATLAB.

• **Interests:** Basketball, photography, and swimming.

Professional Services and Academic Activities

- Reviewer for *IEEE Transactions on Robotics*, *IEEE Transactions on Neural Networks and Learning Systems*, *Journal of Field Robotics*, *IEEE Transactions on Automation Science and Engineering*, and *IROS*.

• Memberships: IEEE Member, IEEE Robotics and Automation Society Member.