Chao Qin

chao.qin@mail.utoronto.ca · +1 (647) 939-9372 · Toronto, Canada

Education

Ph.D. Candidate, University of Toronto, Aerospace Engineering   2020.09 – present
• Thesis: Autonomous Drone Racing: Planning and Control

M.Sc., Shanghai Jiao Tong University, Aerospace Engineering   2016.09 – 2019.03
• Thesis: Visible-Light Aided Visual-Inertial Indoor Localization System

Bachelor, Xidian University, Electrical Engineering and Automation   2012.09 – 2016.07
• Major GPA: 87/100 (Ranking: 12/80)

Publications

[1] Time-optimal gate-traversing planner for autonomous drone racing, Qin C. et al., 2024 IEEE International Conference on Robotics and Automation (ICRA2024), **Best Paper Award on Unmanned Aerial Vehicles**

[2] Perception-constrained vision-based quadrotor control, Qin C. et al., 2023 International Conference on Advanced Unmanned Aerial Systems (ICAUAS2023)

[3] Perception-aware image-based visual servoing of aggressive quadrotor UAVs, Qin C. et al., IEEE/ASME Transactions on Mechatronics, 2024

[4] Perception-aware image-based visual servoing of aggressive quadrotor UAVs, Qin C. et al., 2023 IEEE/ASME International Conference on Advanced Intelligent Mechatronics (AIM2023)

[5] CPA-Planner: Motion planner with complete perception awareness for sensing-limited quadrotors, Yu Q., Qin C. et al., IEEE Robotics and Automation Letters (R-AL), 2022

[6] Robust pedestrian tracking in crowd scenarios using an adaptive GMM-based framework, Zhang S., Qin C. et al., 2020 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS2022)

[7] Lins: A lidar-inertial state estimator for robust and efficient navigation, Qin C. et al., 2020 IEEE International Conference on Robotics and Automation (ICRA2020), **250+ Citations**

[8] Space Vehicle Orbital Determination Performance Analysis Considering GNSS Side Lobe Signals, Liu X., Qin C. et al., 2019 International Conference on Aerospace System Science and Engineering (ICAUAS2019)

[9] VLIP: Tightly coupled visible-light/inertial positioning system to cope with intermittent outage, Qin C. et al., IEEE Photonics Technology Letters, 2018

Work Experience

Chief Engineer & Founder   2022.09 – present
Autonomous Drone Racing (ADR) Team, University of Toronto, Toronto, Canada, part-time
• Found the ADR team with **over 20 undergraduate students** for the international autonomous drone racing competition.
• Lead **4 sub-teams**: the visual localization sub-team, planning and control sub-team, AI sub-team, and hardware sub-team.

• Designed the team structure and provided a **3-month** training program about Robot Operating System (ROS) for new members in each year.
• Raised **$5000** funds from the University of Toronto Institute of Aerospace Studies to build a drone racing dome for experiments.

Teaching Assistant   2024.01 – 2024.05
AER1217, University of Toronto, Toronto, Canada, part-time
• Undertook the lecture of computer vision and pose estimation for **over 20 graduate students**.
• Designed the laboratory section of the geometric controller for quad-rotors. Gave **2 tutorials** about Python and vision-based state estimation.

Research Assistant   2019.03 – 2020.03
RAM Lab, Hong Kong University of Science and Technology, Hong Kong, China, full-time
• Developed the LiDAR-inertial navigation system (based on C++ and ROS) for robust localization of self-driving cars. Improved the average runtime **from 200 ms to 20 ms**. Open-sourced the code on GitHub and collected **>600 stars** so far.
• Published a paper in IEEE ICRA2020 and received **250+ citations**.

Summer Student   2018.06 – 2018.09
RAM Lab, Hong Kong University of Science and Technology, Hong Kong, China, full-time
• Developed the GNSS-aided inertial navigation system for autonomous delivery vehicles.
• Enabled high-frequency position & velocity outputs **up to 200 Hz** by implementing a loosely-coupled Extended Kalman Filter (EKF) with C++.

Teaching Assistant   2017.09 – 2018.02
Academic Writing, Shanghai Jiao Tong University, Shanghai, China, part-time
• Provided technical and logistic assistance for a series of lectures given by **6 professors**.
• Created and maintained the course website with high-quality content on a weekly basis.
• Hosted the first virtual conference in the School of Aeronautics and Astronautics to share first-hand experience presenting at an academic conference for **over 40 graduate students. Received best teaching assistant award** in 2018.

Chief Engineer & Co-Founder   2015.09 – 2016.09
Star Logistics Ltd., Xi'an, China, part-time
• Developed self pickup locker with service provided to Xi'an Jiaotong University, China.
• Designed system pipeline and implemented in STM32 (based on C); designed electrical door-opening mechanism and corresponding circuit & PCB; developed an Android mobile app to enable users to open lockers in two taps.

Awards

[1] IEEE ICRA2024 Best Paper Award on Unmanned Aerial Vehicles, 2024
[2] Kenneth M. Molson Aerospace Scholarship, Canada, 2023
[3] Kenneth M. Molson Aerospace Scholarship, Canada, 2022
[4] China National Scholarship, China, 2015
[5] First Prize, National Undergraduate Electronic Design Contest, China, 2015
[6] Honorable Mention, International Undergraduate Mathematical Contest In Modeling, United States, 2015
[7] Honorable Mention, National Students' Platform for Innovation and Entrepreneurship Training Program, China, 2015
[8] First Prize, National Undergraduate Electronic Design Contest of Shaanxi Division, China, 2015
[9] Second Prize, Shaanxi National Undergraduate "TI Cup" Electronic Design Contest, China, 2014
[10] Grand Prize, Spark Cup Extracurricular Academics Science and Technology Contest, China, 2013