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)*

Publication

[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),* ***Highly Cited Paper (250+) with 600+ Stars in the GitHub Repository***
[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 the drone racing dome for experiments.*

Teaching Assistance *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 Assistance *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 in the 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 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 Assistance *2017.09 – 2018.02*

Academic Writing, Shanghai Jiao Tong University, Shanghai, China, part-time
*• Provided assistance for a series of lectures given by **6 professors** and recorded the videos.*
• Created the course website with weekly high-quality content.
*• Hosted the first virtual conference in the School of Aeronautics and Astronautics to offer realistic presentation experience in an academic conference for **over 40 graduate students.** Won the award of the **best teaching assistance** in 2018.*

Chief Engineer & Co-Founder *2015.09 – 2016.09*

Star Logistics Ltd., Xi'an, China, part-time
• Developed the self pickup locker for the Star Logistics Ltd.and provided service to Xi'an Jiaotong University, China.
•Designed the system pipeline and implemented in the STM32 (based on C). Designed the electrical door-opening mechanism and the corresponding circuit & PCB. Designed a mobile app in Android to enable users to open lockers that contains their packages by a few clicks.

Award

[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, USA,2015*
[7] *Qualified Award, 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*