

Interests: Robotics, Dynamics and Control, Reinforcement Learning

Education

- **Beihang University**

M.Sc in Dynamics and Control, GPA:3.88/4 (3%), **National Scholarship** (1%) Sept. 2022 - Now

- **Beihang University**

B.Eng. in Flight Vehicle Design, GPA:3.8/4 (5%), **National Scholarship** (1%) Sept. 2018 - Jun. 2022

Publications

Journals

- Zicen Xiong, Yue Wang, “Constant-Thrust Orbital Transfer about Binary Asteroids Using BLT Guidance”, *IEEE TRANS on AERO ELEC SYS*.[\[paper\]](#)

Conferences

- Zicen Xiong, Yue Wang, Zheng Chen, “Satellite formation control using multi-agent deep reinforcement learning”, *International Astronautical Congress, IAC*, 2024.[\[code\]](#)
- Zicen Xiong, Ruikang Zhang, Yue Wang, “Near-optimal Finite-thrust Orbital Control Near A Binary Asteroid System”, *28th International Symposium on Space Flight Dynamics, ISSFD*, 2022.[\[pdf\]](#)

Researches

- **In-cabin Robot *LINGSUO*** Apr. 2024 - Present
World Robot Contest 2024
 - **Aim:** Assisting astronauts in their work - finding and delivering cargo; Lunar surface movement - lunar surface obstacle movement and opening tasks. Developed with Jetson Nano.
 - Shortlisted for finals in the [Space Contest Session](#), World Robot Contest 2024 (to be held in Sept.)
- **In-cabin Teleoperation Assistant Robotic Arm** Jan. 2024 - Present
Research Project
 - **Problem:** Human-machine synergy can strongly affect the efficiency in the space. Teleoperation robots provide a feasible solution.
 - **Hardware:** 7 DoF ARM: OMEGA Haptic-FRANKA Panda; Agile Hand: SENSEGlove-Libertec
- **Satellite Formation Reconfiguration using Reinforcement Learning** Nov. 2023 - Present
Master's Thesis
 - **Aim:** Multi-agent Learning algorithms are needed in cooperation, reconfiguration and collision avoidance control to acquire autonomy on handling nonlinear constraints in satellite formation flying.
 - **Method:** Multi-agent Soft Actor-critic is developed for satellite formation flying tracking problems and over-performed some state of art methods, e.g. MAPPO and MADDPG.
 - Accepted by [International Astronautical Congress, IAC, 2024](#).[\[code\]](#)
- **Free-Flying Cubic Robot for Space Station** Jun. 2023 - Present
Conceptual Design for IAF-Space Universities CubeSat Challenge, SUCC
 - **Aim:** Self-propelled in-cabin assistant robot for astronauts in space stations with 6-DoF arm
 - **Method:** Double-gimbal fans enables the robot to have 6 DoF. SLAM mapping is used for in-cabin navigation. The deep neural network is applied to monitoring astronauts's emotion.
 - The prototype is still under development and the conceptual design won 2nd Prize in China Grand Finale.[\[pdf\]](#)[\[report\]](#)[\[code\]](#)
- **Constant-Thrust Orbital Transfer about Binary Asteroids Using BLT Control** Dec. 2021 - May 2023
Bachelor Thesis
 - **Aim:** Current control algorithms near asteroids are computationally expensive for autonomous orbital tracking. This research tries to achieve efficient guidance for autonomous constant low-thrust guidance about binary asteroid systems.

- **Method:** A bilinear tangent control is derived by Pontryagin's maximum principle and manifold theory. Acquire near-optimal control profiles and 200 times faster than IPOPT results.
- Talks on 2nd International Stardust Conference [[abstract](#)] and ISSFD28.[[pdf](#)][[slide](#)]
- **Multi-functional Electronic Scale with Quotation**
Course Project of Electrical and Electronic Experiment 2 Sept. 2020 - Dec. 2020
 - Proteus design, prototype made with 74 series and NE555. Support functions: tare module, unit price-total price display. Score:95/100.[[slide](#)]
- **Heavy Load P3E Class Piston-Powered Aeromodelling**
Member, Beihang Aeromodelling Team Sept. 2018 - Dec. 2019
 - The aircraft for time-limited airdrop competition. Participated in manufacturing the composite parts for all race aircraft and fixed-point automatic airdrop mechanism based on Arduino and GPS.
 - **Achievement:** Championship in 2019 China Aeromodelling Design Challenge.[[video](#)]

Competitions

- **2nd Prize, 2nd Space Universities CubeSat Challenge, SUCC** Aug. 2023
 by International Astronautical Federation
- **1st Prize, 12th China's Trajectory Optimization Competition, CTOC** Oct. 2022
 by Center for Space Utilization, Chinese Academy of Sciences Ranked 3rd Team[[rankinglist](#)]
- **2nd Prize, 13th National Mechanics Competition for College Students** May. 2021
 by Chinese Society of Theoretical and Applied Mechanics Ranked 130th[[rankinglist](#)]
- **1st Prize in 12th National Mathematics Competition for College Students** Dec. 2020
 by Chinese Society of Theoretical and Applied Mechanics
- **2nd Prize in China Undergraduate Mathematical Contest in Modeling 2020** Oct. 2020
 by China Society for Industrial and Applied Mathematics
- **Champion in China Aeromodelling Design Challenge 2019** Oct. 2019
 by Aero Sports Federation of China Champion Team[[rankinglist](#)]

Honors and Awards

Items by Ministry of Education

- **National Scholarship for Graduates, Top 1% Student** [[announcement](#)] 2024
- **National Scholarship, Top 1% Student** [[announcement](#)][[report](#)] 2021

Items by Beihang University

- **Academic Excellence Scholarship for Graduates** 2022, 2023
- **Freshman Scholarship** 2022
- **Outstanding Graduate** 2022
- **Academic Excellence Scholarship for Undergraduates** 2019 - 2021

Skills

- **Language:** English(IELTS 8.0, TOEFL 104), Chinese(Native)
- **Coding:** Python, MATLAB, C/C++, C#, Git, bash, L^AT_EX
- **Hardware:** Arduino, STM32
- **Software:** ROS, CAD (SolidWorks), ADAMS, ANSYS, Multisim, Proteus
- **Photograph:** Aircrafts[[homepage](#)]/Railway/Astronomical/Underwater/Wildlife[[video](#)]
- **Misc.:** Miniature Model Manufacturing, HAM(Amateur Radio)[[BI1RKD's QRZ](#)], Illustration[[report](#)]