

# Shou Quanxin

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## EDUCATION

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**School of Automation Science and Electrical Engineering,** Beijing, China  
**Beihang University (BUAA)**

Bachelor of Engineering in Control Theory and Engineering Sep.2021-Jun.2025(expected)

- **GPA: 3.85/4.00**
- **Major GPA: 3.88/4.00**
- **Weighted average score: 92/100 (5/224, top 2%)**
- **Professional Skills:** C, C++, Python, MATLAB, Verilog; SolidWorks, AutoCAD; ROS
- **Standardized Tests:** IELTS 7.0, R8.0/L8.0/W6.0/S6.0 || GRE 330, V160/Q170/AW4.0

**School of Control Science and Engineering,**

**Zhejiang University** Hangzhou, Zhejiang, China

Summer Camp Aug. 12<sup>th</sup> 2024-Aug. 23<sup>rd</sup> 2024

*Supervised by Prof. Li Gaofeng*

Under supervision, I learned the basic knowledge of robot manipulation and did a small project on the end pose estimation of a robotic arm using MATLAB and C++.

**School of Electrical and Computer Engineering,**

**Hong Kong University of Science and Technology (HKUST)** Hong Kong, China

Exchange Student Sep.2024-Jan.2025(expected)

- **Course Taken:** Sys Model, Analysis & Control by Prof. Ling Shi  
Intro to Mobile Robotics by Prof. Shaojie Shen  
Intro to Robotics by Prof. Fuming Zhang

## PROJECT EXPERIENCE

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### Research Projects:

**A modular wormlike robot adaptive for different scenes** Dec.2023-Jul.2024

*School of Automation Science and Electrical Engineering, Beihang University*

*Supervised by Prof. Wang Shaoping and Associate Prof. Zhang Yixin*

- **Abstract:** For complex terrain exploration tasks, such as debris detection, traditional wheeled and legged robots are unable to reconstruct their shape and adapt to the ever-changing environment. To solve this problem, **we designed a modular wormlike robot that can wriggle like a worm through cable drive, so it can adapt to different terrains through passive deformation.** Additionally, individual modules of this robot can be easily docked, allowing for a family of robots with varying sizes and specifications.  
In this project, my work includes **designing the mechanical structure of the robot, designing the solution of cable drive, coding the motors and testing the robot's performance.** An independent module of the robot includes three different joints and PVB pipes, through cable drive, the module can expand or contract, allowing for movement of the whole robot.

From flat ground and slope to grass field and sand, this robot shows good performance. The project gained **a national patent** and won the second prize in Beihang Fengru competition.

**Dynamic Locomotion of Underwater Quadruped Robots Based on** Jan.2023-Jun.2023  
**Whole-Body-Control Method**

*School of Automation Science and Electrical Engineering, Beihang University*

*Supervised by Prof Jiao Zongxia and Associate Prof. Qi Pengyuan*

- **Abstract:** UUVs can operate without a human occupant and have wide applications. However, it is hard for a UUV to do operation tasks on the rugged seabed. To overcome this difficulty, we designed an underwater quadruped robot, which perform well in locomotion and manipulation tasks on the seabed.

**In this project, my work includes applying Fossen model which is usually for UUVs to the robot and coming up with the mathematical model of MPC control considering the disturbance of the water.**

Simulation results show that the robot can track velocity commands accurately and maintain body posture stability under the sea. We have a paper that is accepted by CAC2023.

**Research on Multi-state Modeling and Simulation Analysis of Cyber-Physical Systems** Sep.2022-Dec.2022

*School of Reliability and Systems Engineering, Beihang University*

*Supervised by Associate Prof. Guo Linhan*

- **Abstract:** This project is from the scientific research training program of Beihang. The task is to do a research on multi-state modeling and simulation analysis of a satellite system. In this project, my work includes constructing a constellation network of multi-input in OMNeT++, setting the data transmission buffer size and queuing rules to simulate the data transmission process of the network and evaluating communication delay, analyzing the sensitivity of combinations of high, medium and low orbit satellite nodes in the constellation network to the regional communication transmission capacity.

**Competition Experiences:**

**China Undergraduate Mathematical Contest in Modeling** Sep.2023

- **Abstract:** The problem is about the multi-beam detecting problem. Specifically speaking, the task is to establish a mathematical model to study the relationship of coverage width and overlap rate between adjacent bands in the multibeam sounding problem. In this project, my work includes coming up with the general geometry model of the multi-beam detecting problem, using PSO Algorithm to analyze and optimize the coverage rate of the detecting ship with an extremely complex topography of the seabed.

**PUBLICATION**

- Wang Xinhui, Zhang Kang, Zhu Xiaoyang, Shou Quanxin, Liu Xiaochao, Qi Pengyuan (2024). Dynamic Locomotion of Underwater Quadruped Robots Based on Whole-Body-Control Method. In the 2023 China Automation Congress (CAC).

**AWARDS AND HONORS**

**Scholarships:**

- Beihang Outstanding Student (three times) 2021 - 2023
- The First Prize of Learning Excellence Scholarship (5%) 2023 - 2024
- The First Prize of Academic Competition Scholarship (5%) 2023 - 2024
- The Grand Prize of Yang Weimin Scholarship (3%) 2022 - 2023

**Competitions:**

- Second Prize, the 34th Beihang Fengru Competition (10%) May. 2024
- First Prize, the 39th College Physics Competition (Beijing area) (3%) Dec. 2023
- Second Prize, China Undergraduate Mathematical Contest in Modeling Oct. 2023

(Beijing area) (10%)

- College Students' Innovation and Entrepreneurship Training Program, 2024 - 2025  
National level project

### **EXTRACURRICULAR ACTIVITIES**

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**Habits:** jogging, hiking, ping-pong, badminton, archery, reading

**Student Job:** I was the leader of Beihang film society, which is a five-star student club, in my third year. We had variety of activities, such as outdoor cinemas, French cinema weeks, which earned compliments from students and staffs.