

# Shuaihu WU

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## EDUCATION

### Tsinghua University

Master in Mechanical Engineering - Lab of Precision Equipment & Control; GPA: 3.63/4.0

Beijing, China

2020 - July, 2023

- **Core Courses:** Introduction to Modern Control Theories and Methods, Advanced Numerical Analysis, Mechatronic Intelligent Control Engineering, Modern Mechatronics System
- **Research Field:** Sensorless Control, Ultra-precision Control, Motor Driver Design
- **Scholarship:** Outstanding Postgraduate Students Award of Tsinghua University (First Prize)

### École CentraleSupélec

Master in Engineering (Dual degree); GPA: 4.00/4.3

Paris, France

2018 - July, 2023

- **Core Courses:** Algorithm, Machine Learning, Statistic Learning, Enterprise Management, Financial Management, Philosophy, Electronics, Quantum Physics

### Université Paris-Saclay

Bachelor in Mathematics (Dual degree); GPA: 3.00/4.0

Paris, France

2019 - 2020

- **Core Courses:** Measure and Probability, Topology, Ordinary Differential Equation, Abstract Algebra, Holomorphic Function

### Tsinghua University

Bachelor in Mechanical Engineering; GPA: 3.37/4.0

Beijing, China

2016 - 2020

- **Core Courses:** Theoretical Mechanics, Calculus, Linear Algebra, Discrete Mathematics, Basic Program Design, Electrical and Electronics Technologies
- **Program:** Selected for "Sino-France 4+4" Program (a dual degree program with 2 years in China as a bachelor student, 2 years in France as an engineer student, and 3 years in China as a master's student. Diplomas of two schools will be awarded upon finish).
- **Scholarship:** China Scholarship Council (CSC) Scholarship

## PUBLICATIONS AND PATENTS

- [1] **S. Wu**, C. Hu, Z. Zhao, R. Zhou, and Y. Zhu, "A Novel Flux Estimator using  $\alpha$ - $\beta$  Orthogonality Drift Elimination for High Performance Full-speed-range Sensorless Control," [2022 IEEE/ASME AIM](#) (Oral Report)
- [2] Z. Zhao, C. Hu, Z. Wang, **S. Wu**, Z. Liu, Y. Zhu, "Back EMF-Based Dynamic Position Estimation in the Whole Speed Range for Precision Sensorless Control of PMLSM," [IEEE Trans. Ind. Inform., 2022](#)
- [3] **S. Wu**, C. Hu, Z. Zhao, and Y. Zhu, "High Accuracy Sensorless Control of Permanent Magnet Linear Synchronous Motors for Variable Speed Trajectories," *Submitted to IEEE Trans. Ind. Electron.*
- [4] C. Hu, **S. Wu**, Z. Zhao, "Method and Device to Find Motor Position," *CN115632588A, 2023-01-20*.
- [5] E. Wang, C. Hu, X. Liu, B. Feng, **S. Wu**, "Crawling Robot," *CN114248252A, 2022-03-29*.
- [6] E. Wang, X. Liu, C. Hu, **S. Wu**, B. Feng, "Pole Climbing Device," *CN114161439A, 2022-03-11*.

## RESEARCH AND PROJECTS

### Research on sensorless control

2021-2023, Tsinghua, Beijing

- Proposed a novel flux estimator that can improve the performance of sensorless control in full speed range, with high accuracy and dynamic response.
- Theoretical proof of stability and criteria of parameter selection was given.
- Built an experiment set including a permanent magnet linear synchronous motor, a motor driver and a controller.
- Achieved a sensorless position estimation accuracy less than 50 micro meters.
- Author or co-authored 3 papers. (1 Journal paper and 1 conference paper accepted [1-2], 1 journal paper under review [3])
- Drafted and submitted 1 patents [4].

### **Under-mine Robot Design and Prototype Manufacturing**

2020, Tsinghua, Beijing

- Designed and manufactured a moving robot prototype to conduct coal-rock identification and mining condition monitoring.
- Special design for extreme under-mine environment, with flexible structure and a novel displacement strategy.
- Designed and built a high load (>10kg) gimbal and its auto-balance system.
- Drafted and submitted 2 patents [5-6].

### **Sensor Data Analysis of Wind Farms**

2019, CentraleSupélec, Paris

- Work including data cleaning, machine learning, presentation and communication with experts from EDF.
- Produced a script which can analysis the sensor data and predict future failure of wind turbines.

### **AFM Project**

2019, CentraleSupélec, Paris

- To build a low-budget Atomic Force Microscope (AFM) by using an optical pick-up unit (OPU) and a piezoelectric plate.
- Designed the circuit board and realized the control algorithm of the AFM tip.

### **Production Internship**

2019, Renault, Paris

- Worked in the production line as a ordinary worker; made interviews with line manager.
- Written a report on factory organization and modern production line management.

### **Virtual Design of an Electron Synchrotron**

2019, CentraleSupélec, Paris

- Work including literature research, magnetic field design, presentation and communication with experts.
- Written a report on principle and engineering realization of an electron synchrotron.

### **Analysis and Visualization of Social Media Data**

2018, TNP Consult, Paris

- Work including customer Profiling, coding and UI design.
- programmed an application which can produce a dashboard on customer's reputation on social media.

## **ACTIVITIES**

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### **Volunteer of 2022 Beijing Winter Olympics**

Feb 2022 - Apr 2022, Beijing, China

- Worked in the anti-doping team during the Olympic and Paralympic game.
- Honored as "Outstanding Volunteer in Olympics of Tsinghua University" (10% of the volunteers).

### **President of Chinese-French Association of Tsinghua University**

Sep 2020 - Sep 2021, Beijing, China

- Organized several activities about French culture and volunteered at French embassy to help to promote French education.
- Invited to attend the national day dinner party at French embassy.

### **Work-exchange in a Swiss Family**

Aug 2019, Sion, Switzerland

- Living with local people, worked in a Swiss farm in exchange of food and accommodation.

### **Class Leader**

Sep 2017 - Jun 2018, Beijing, China

- Elected as the class leader serving 30 students at Tsinghua University.
- Organized several meetings to discuss concerned issues and several activities to increase the sense of belonging.

### **Half Marathon**

April 2018, Beijing, China

- Finished a half marathon of 21km.

## **PRACTICAL SKILLS**

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- **Languages** English(IELTS 7.5), French(level B2), Chinese(Native)
- **Coding** Python, C++, L<sup>A</sup>T<sub>E</sub>X
- **Software** MATLAB, Simulink, SolidWorks, AutoCAD