Shuaihu WU

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Education

Tsinghua University - Lab of Precision Equipment & Control — Beijing, China
Master in Mechanical Engineering; GPA: 3.63/4.0 — *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 — Paris, France
Master in Engineering (Dual degree); GPA: 4.00/4.3 — *2018 - July, 2023*

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

Université Paris-Saclay — Paris, France
Bachelor in Mathematics (Dual degree); GPA: 3.00/4.0 — *2019 - 2020*

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

Tsinghua University — Beijing, China
Bachelor in Mechanical Engineering; GPA: 3.37/4.0 — *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 engineering 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 α-β Orthogonality Drift Elimination for High-Performance Full-speed-range Sensorless Control," *2022 IEEE/ASME AIM.* IEEE, 2022. **(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," *IEEE Trans. Ind. Electron.* 2023. (Under Review)

[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 [1-4] — 2020-2023, 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.
- Performed stability analysis of the sensorless control system. By giving the theoretical proof of stability, the criteria of parameter selection are obtained as well.
- Built an experiment set including a permanent magnet linear synchronous motor, a motor driver, and a controller. Achieved a sensorless position estimation accuracy of less than 50 micrometers.

Under-mine Robot Design and Prototype Manufacturing [5-6] 2021, 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.

Sensor Data Analysis of Wind Farms 2019, CentraleSupélec, Paris

- Implemented machine learning methods including random forest, SVM and neural networks to predict real-time power output in a wind farm.
- Work included data cleaning, machine learning, presentation, and communication with experts from EDF.

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. Supervised by Prof. Pascal Morenton.
- Designed the circuit board and realized the control algorithm of the AFM tip.

Production Internship 2019, Renault, Paris

- Worked in the production line as an 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 included literature research, magnetic field design, presentation, and communication with experts.
- Written a report on the principle and engineering realization of an electron synchrotron.

Analysis and Visualization of Social Media Data 2018, TNP Consult, Paris

- Work included customer Profiling, coding, and UI design.
- Programmed an application that can produce a dashboard on customers' reputations on social media.

Activities

Volunteer of 2022 Beijing Winter Olympics Feb 2022 - Apr 2022, Beijing, China

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

President of Chinese-French Association (Tsinghua University) 2020 - 2021, Beijing, China

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

Work-Exchange in a Swiss Family Aug 2019, Sion, Switzerland

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

Class Leader 2017 - 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 Finisher April 2018, Beijing, China

- Finished a half marathon of 21km.

Practical Skills

- **Languages** English(IELTS 7.5), French(level B2), Chinese(Native)
- **Coding** Python, C++, LaTeX
- **Software** MATLAB, Simulink, SolidWorks, AutoCAD