Zach Hao

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EDUCATION

University of Washington, *Seattle, WA* *Expected Graduation: March 2026*

- Master of Science, Electrical and Computer Engineering (ECE)**,** GPA: ***3.88***
- Relevant Courses: Tiny Machine Learning, AI mobile Robots, Human Robot Interaction

Southern University of Science and Technology, *Shenzhen, China* *September 2020 – June 2024*

- Bachelor of Enigneering, Automation, GPA: **86.24**
- Ruoshui Scholarship(2%, 2023) , Graduated with distinction(2024)

SUMMARY OF QUALIFICATIONS

- **Programming Languages:** Python, C/C++, Java, CSS/HTML/Javascript, Verilog, MATLAB
- **Tools & Frameworks:** Git, Jenkins, Docker, Zookeeper, Flask, PyTorch, ROS, AWS
- **Databases:** MongoDB, PostgreSQL, MySql
- **Hardware Proficiency and Integration:** Skilled in utilizing Raspberry Pi, Arduino, ESP32, STM32, DE1SoC, TinyCircuit and Zephyr RTOS for IoT, robotics, and hardware-software integration, including experience with EDA tools (Multisim, LT Spice, KiCad, Vivado,Quartus) for circuit design and FPGA development.

RESEARCH EXPERIENCE

PPG Ring, University of Washington, *Seattle, WA* *January 2025 – present*

- Implemented ***Zephyr RTOS*** firmware on an Xiao Board to sample MAX30102 PPG and a strain gauge for oscillometric BP estimation with on-device filtering and timestamping.
- Leveraged Zephyr's BLE stack to stream synchronized PPG + strain data in real time.
- Developed a Python tool for live logging and visualization of incoming sensor streams.

Pressure-Based Smartwatch Gesture Sensing, University of Washington, *Seattle, WA* *January 2025 – May 2025*

- Developed C/C++ firmware on an nRF52840-based smartwatch to sample four strain gauges at 100 Hz and stream CSV-formatted data via BLE
- Designed/calibrated a wrist-strap pressure-sensor array with analog front-end circuitry for low-noise, high-fidelity measurements.
- Deployed a ***TensorFlow Lite*** Micro gesture classifier on-device (>**90%** accuracy, <**10 ms** latency)
- Submitted manuscript to **IMWUT/Ubicomp** on May 1, 2025

Caterpillar-inspired Robot with Battery and PCB board, NC State University, *Raleigh, NC* *January – February 2024*

- Led the control system development for a caterpillar-inspired robot, designing and implementing circuits that enabled switching between crawling modes, which reduced wiring complexity by **45%.**
- Created custom PCB circuits with NMOS switches for precise thermal-driven motion, increasing power efficiency by **25%** and shortening test cycles by **29.8%.**
- Integrated Wi-Fi and Bluetooth for dynamic remote control, cutting setup time by 50% and enabling real time performance monitoring to fine-tune motion parameters.

Intelligent Fridge System, National University of Singapore, *Singapore* *June 2023*

- Collaborated with a team to develop an AIOT-driven smart refrigerator to monitor food freshness, track expiration dates, and provide AI-based recipe suggestions, reducing food waste.
- Deployed ***YOLOv8*** and sensor modules to achieve **98%** accuracy in food classification and expiration predictions.
- Built a cloud-based web interface on Huawei Cloud with GAUSS DB for real-time inventory updates, dynamic recipe recommendations, and user-friendly alerts.

Smart Fully Automatic Flowerpot Based on Micropump, SUSTech, *Shenzhen, China* *September 2023 – May 2024*

- Developed an AI-driven, fully automatic planter using Raspberry Pi as the core controller, integrating sensors and micropumps for precise water and nutrient supply.
- Implemented real-time image analysis and environmental monitoring (**95%** detection accuracy) to identify nutrient deficiencies or diseases and provide AI-driven care recommendations.
- Integrated with ***Alibaba Cloud***'s IoT platform for real-time data visualization and website-based remote monitoring, cutting manual oversight by **60%** and boosting plant management efficiency.
- Secured a **patent** from the China National Intellectual Property Administration (**CN220441530U**)

ENTREPEURSHIP EXPERIENCE

Founder, Shenzhen Suishi Technology Co, Ltd., *Shenzhen, China* *April 2023 – June 2024*

- Partnered with top companies to launch a campus discount platform, expanding to **3 universities** and reaching **10K+ users**.
- Achieving **68K+** views in one single post and used Tableau to analyze data and optimize engagement strategies.