Hao Zhang

3720 Chestnut St, Philadelphia, PA 19104 shzyh@seas.upenn.edu +1(412)689-3075 hz996.github.io
linkedin.com/in/hao-zhang-968630273 github.com/Hz996

Education

University of Pennsylvania, Philadelphia, PA *Sept 2023 – Present*
MS in Electrical Engineering
- GPA: 4.0/4.0

University of Cincinnati, Cincinnati, OH *Sept 2018 – May 2023*
BS in Electrical Engineering
- GPA: 3.64/4.0 (Cum Laude)
- Dean's List every semester

CQU-UC Joint Co-op Institute, Chongqing University, China *Sept 2018 – June 2023*
BE in Electrical Engineering and Automation (4+1 program)
- GPA: 86/100

Publications

1. Tian Tan*, **Hao Zhang***, et al., "Integration of a gripper-equipped humanoid social robot...", 2024 Northeast Robotics Colloquium (NERC). (Abstract/Poster).
2. **Hao Zhang***, Tian Tan*, et al., "Integration of a gripper-equipped humanoid social robot...", 19th IEEE/RAS-EMBS International Conference on Rehabilitation Robotics (ICORR 2025) (In preparation).
3. **Hao Zhang**, et al., "Wireless Sensor Interrogation System for Wireless Magnetoelastic Sensors", Sensorium 2022 (Poster)

Research Experience

SOMRES-EP - Research Assistant *Philadelphia, PA*
ModLab Of GRASP Laboratory, University of Pennsylvania *Sept 2024 – Present*
Supervisor: Prof. Mark Yim
- Upgrade SMORES robot from version 3 to version 4
- Building gazebo-based simulations for SMORES robots
- Upgrading the robot firmware and porting it to a new control board

Little Flo Robot - Research Assistant *Philadelphia, PA*
Rehabilitation Robotics Lab, University of Pennsylvania *April 2024 – Present*
Supervisor: Prof. Michelle Jillian Johnson
- Designed humanoid robots featuring a facial interface, humanoid arm, and wire-controlled finger grips to enhance patient rehabilitation and human-robot interaction.
- Improved the single-motor wire-controlled gripper, allowing it to grab objects of different sizes
- Develop and assemble robot structures using SolidWorks and 3D printing technology, integrating components such as housings, arms, and grippers.
- Developed and implemented a ROS-based control system for dual-arm coordination, enabling automatic object grasping with camera-detected AprilTag coordinates. Integrated URDF models in Gazebo for real-time simulation and performance testing.
- Contributed to the design and implementation of clinical trials, including robot control, voice announcements, and EEG data acquisition for rehabilitation studies.

Research Assistant (Senior Design) *Cincinnati, OH*
MEMS and Autonomous Microsystems Lab, University of Cincinnati *Sept 2022 – April 2023*

Supervisor: Prof. Tao Li

- Designed and implemented current amplifier circuits to drive magnetoelastic sensors and low-noise amplifiers for signal reception, enabling accurate detection of biomarkers and bacteria in biomedical applications.
- Integrated Raspberry Pi with ADC and DDS modules for wireless signal generation and processing in a magnetoelastic sensor interrogation system, achieving real-time signal amplification and data acquisition.
- Developed and tested amplifier circuits on protoboard, and initiated PCB design to integrate the interrogation system components into a compact, portable form.

Research Assistant *Chongqing, China*
State Key Laboratory of Mechanical Transmission, Chongqing University *April 2022 – July 2022*
Supervisor: Long Bai

- Upgraded the motion control chip from STM32F1 to STM32F4, enhancing processing speed and efficiency.
- Reinstalled internal robot structure and successfully conducted field and seismic tests, improving system robustness and stability.
- Integrated GPS and cameras to enhance image and location transmission.

Team Leader, NEXTORS Robotics Team *Chongqing, China*
Chongqing University *Sep 2019 – April 2021*

- Led a team of 6 students in the design of robots based on STM32 control, DJI motors, and Mecanum wheels.
- Optimized C++ code for communication with remote controllers, write motor drive and motion control code. Integrated pneumatic ball-tossing devices, kicking machines, and quadrature encoders, enabling precise control and coordination during competition tasks.
- Achieved Third Prize in the 19th College Robocon Competition.

Internships

Production Assistant Intern *Beijing, China*
Siemens Cerberus Electronics *May 2021 – April 2022*

- Designed a Python-controlled Aubo robotic arm for automatic box folding, equipped with an industrial camera, deployed on production lines for automation.
- Developed automated guided vehicles (AGVs) with Aubo robotic arms and industrial cameras for automated pickup, delivery, and unloading tasks.
- Developed an automatic inspection device using Aubo robotic arms, 3D-printed grippers, and industrial cameras, improving product quality control and detection efficiency
- Developed a system to store and manage product monitoring data in SQL databases, enabling efficient data tracking and analysis.

Projects

Smart Alarm Clock **devpost.com/software/smart-alarm-clock-6nab7z**

- Developed a smartwatch with heart rate measurement, weather updates, alarm, stopwatch, timer, and sleep tracking.
- Tools: C, ESP8266, Arduino, LCD, Heart Rate Sensor

IoT Humidifier **github.com/ese5160/a14g-final-submission-t14-humidifierz**

- Created a cloud-connected humidifier with remote control and real-time monitoring of water volume, temperature, and humidity.
- Tools: C, MQTT, FreeRTOS

Technologies

Programming Languages: Python, C++, C, Java, SQL, Assembly

Software and Tools: SolidWorks, Altium Designer, MATLAB, Keil (MDK 5), MPLABX IDE, PyCharm, LaTeX

Embedded Systems: STM32, SAM W25, Arduino