Nathan Hsiao
440-281-4418 * Email: nnh2@rice.edu
3218 Orchard Way, Westlake Ohio

Education

Rice University — **Houston, Texas**
B.S.E Electrical and Computer Engineering | George R. Brown School of Engineering — *August 2022-June2024*
Cumulative GPA: 3.5 out of 4.0

Case Western Reserve University — **Cleveland, Ohio**
B.S.E Electrical Engineering | Case School of Engineering — *August 2020-May 2022*
Cumulative GPA: 3.6 out of 4.0

- **Courses:** Embedded Systems (Linux OS), Machine Learning, Physical Electronics II(Transistor), Computer Architecture, Data structures, Digital Logic Design.
- **Technical Skills:** Firmware, Full-Stack Web Development, Simulation (LTSpice, ModelSim, Keysight ADS), Schematic/PCB Design,
- **Software:** C/C++, Verilog/VHDL, Python, Java, Linux, Django, Numpy, Git (version control), Java, Altium Designer, Python.

Experience

Amazon Inc. — **Seattle, Washington**
Embedded Software Intern | Amazon Web Service (Server Firmware) — *May 2023- August 2023 & May 2022 -August 2022*

- Created a **CPU monitoring processes (C/C++)** to capture **x86 data** on an **AWS EC2 server's** motherboard through a **request/response service** from a **microcontroller** (Baseboard Management Controller - BMC) into Core CPU (**C/C++).**
- Integrated **real-time CPU data capture** through a low-level driver to handle serial communication between microcontroller and CPU slave. Application is triggered via manual IPMI command or GPIO activation when CPU failure occurred (CATERR, SMI timeout).
- Programmed a **firmware application** to capture **power supply readings** on an AWS EC2 server's main motherboard to provide engineers analyze server hardware **(C/C++)**.
- Created an autonomous cloud source application to fetch firmware readings and to automatically return faulty issues to the engineers. Used Power Management Bus (PMBus) protocol to transmit readings from server to the microcontroller.

Rice University — **Houston, Texas**
Lead Software Engineer | Rice Facilities Department — *Feb 2023 – May 2024*

- **Debugged + fixed** customer issues for an internal facility web-application related to **data upload failures in Production**. This internal application creates financial reports for department staff to use + document - based off uploaded university Excel data.
- Programmed an archive feature to remove obsolete data. (Makes the **SQL query** into data application's SQLite database table **+ JavaScript Ajax request to await/dynamically** update frontend). Created a timeout feature to monitor user idle time to notify of system inactivity (Python, JavaScript, HMTL).
- Responsible for **promoting code to Production** and facilitated onboarding + environment setup. **Conducted software testing** for software written by other team members to ensure functionality and adherence to coding standards.

Moog Inc — **East Aurora, New York**
Electrical Engineering Intern | Aircraft Group — *May 2021 – August 2021*

- Utilized **oscilloscopes, logic analyzers, power supplies** to test 5 prototyped Motor Control Electronic boards for a Challenger 300 Aircraft's actuator control unit for external customers. Discovered **issue with extra bit shift** in Serial Peripheral Interface communication bus.
- Found root cause to be an improper low voltage differential signaling (LVDS) chip due to a high current leakage. **Prevented broken prototypes from being shipped into production.**
- Performed testing for a new voltage supervisory IC to replace the current less robust IC in an Airbus A350 aircraft's hydraulic control unit. Set up multi-day thermal cycles by a programming function generator and construct waveform for test setup.

Intellitronix Corporation — **Euclid, Ohio**
Electrical Engineering Co-Op | Automotive Electronic Product Development Team — *December 2020 – Jan 2021*

- Worked on circuit schematic + PCB layout redesigns for electronic dashboards to **convert a two-layer PCB into a four-layer PCB** to increase higher level of signal integrity, decrease distortion, and allow more space for component placement using DipTrace Software.

Independent Projects

Embedded Drone — *April 2024 – May 2024*

- Developed an embedded flight control application for a remotely operated drone. Utilized a **Texas Instruments MSP430 microcontroller** to process flight operations. Application controlled by radio-frequency joystick, features real-time GPS coordinate mapping, self-balancing using a PID feedback controller.
- Wrote **SPI driver** for MSP430 to **transmit + receive radio frequency commands** from joystick + **I2C** to **process accelerometer readings** for the PID controller to reduce position disparities.
- Communicates over **UART** to **retrieve coordinates** from a GPS module + generates **PWM** signals to control drone propellers using H-bridge motor controller.

Rice ECE Design Capstone: Electric Vehicle Electronic Controls Design — *Aug 2023- May 2024*

- Worked in a sub-team of 4 to convert **P30 Chevy Van into electric power**. Replaced existing gasoline-powered engine with custom electronic controls and CAN-powered brake system with target specification of 80 MPH top speed.
- Developed **firmware** for vehicle's **CAN bus network** to allow vehicle radar system, power-side mirrors, HVAC, peripheral lights, and accelerator transmit + receive CAN messages to the main controller in Arduino C++ (using MCP515 CAN Bus module).

Autonomous RC Car — *November 2023- Dec 2023*

- Developed software for a fully autonomous RC car that can self-drive through any designated path. Features lane keeping and digital processing of traffic stop signs.
- Wrote **firmware** for an **ARM-based processor** to support direct motor control interface (steering, speed, throttle) and a Kernel speed encoder (**C/C++).**

LED Microcontroller Indicator Module — *November 2020- Dec 2020*

- Module indicates LED for NASA Robot Mining Competition excavation robot by commanding an STM32 microcontroller via a CAN bus transceiver to indicate robot autonomy state. Designed **electronic schematic/PCB layout** using Altium Designer for
- Wrote LED Module firmware on **STM32 microcontroller** interface over CAN (**C/C++)** to control LED driver and receive LED values from Robot Operating System (ROS) node from main control computer.

Autonomous Submarine Robot Motherboard — *September 2022 – December 2022*

- Custom designed a control board to control our university's semi-autonomous submarine robot (**electronic schematic and PCB layout using Altium Designer**).
- **Routed PCIe connections** to enable camera connectivity from microcontroller into surface computer and GPIO header connection to drive ESC thrusters.