

# Nuotianhong Xu (Rico)

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## EDUCATION

### University of Michigan

B.S.E. in Robotics & B.S.E. in Computer Engineering

Aug 2020 – Dec 2024

Ann Arbor, MI

- **Relevant Coursework:** Advanced Embedded Systems, Perception and Control of Autonomous Vehicles, Computer Vision, Computer Architecture, Data Structures & Algorithms, Logic Design, Micro-electromechanical Systems (**GPA: 3.97, Dean's List**)

## PROFESSIONAL EXPERIENCE

### Subaru Research and Development Inc.

ADAS Mechatronics Engineer Intern

Jun 2023 – Aug 2023

Van Buren, MI

- Initiated and orchestrated a \$6000 project, successfully spearheading the development of an innovative active aerodynamic spoiler for a prototype vehicle, enhancing vehicle performance and exceeding expectations for project management efficiency
- Leveraged Python and Embedded C programming to interface with industrial servo motors via RS-485 (Modbus RTU) and CAN protocols, eliminating the need for PLCs and resulting in a 10% improvement in control precision and robustness
- Engineered a Simulink four-bar linkage model, establishing a tangible input-output relationship critical for linear rear wing control
- Collaborated closely with colleagues to facilitate fusion of LiDAR and IR cameras in ROS, accelerating the workflow by 50%
- Championed advanced rapid-prototyping techniques like 3D scanning and SLS printing, accelerating my prototype iterations by 30%

### Multidisciplinary Design Program

Mechatronics & Embedded Systems Engineer

Jan 2023 – Present

Ann Arbor, MI

- Spearheaded the development of the sensing, control, and actuation electro-mechanical system for the automatic driver's door on the Subaru WRX Sedan using ultrasonic sensors and stereo cameras, optimizing user experience and functionality
- Engineered an innovative STM32-based (Cortex®-M4) embedded feedback control system, integrating Ethernet communication with the main computing unit, thereby ensuring seamless and efficient data exchange and reducing the computation burden by 25%
- Pioneered the creation and manufacturing of an electromagnetic clutch transmission mechanism, providing the capability for actuator disengagement and manual/powerless door operation, enhancing safety and versatility

## RECENT PROJECTS

### Smart Driver Passport

Advanced Embedded Systems Course Project

Sep 2023 - Present

Ann Arbor, MI

- Partnering with Infineon Technologies to design and implement a set of automotive wireless technology demonstration devices, which respond according to user preferences configured on mobile apps automatically upon vehicle entry, showcasing Infineon products
- Leveraging FreeRTOS on the Raspberry Pi and custom PCB, implementing device drivers that compactly integrating a SPI LCD screen, feedback controlled motors, BLE wireless, and USB-C charging to control different components from an iOS application

### Smart Pill Dispenser

Embedded Systems Course Project

Jan 2023 - Apr 2023

Ann Arbor, MI

- Led the development of an STM32L4 controlled automatic pill dispenser, featuring a SPI touch screen with customizable user interface, an I<sup>2</sup>C LCD display, a UART audio I/O module, BLE data transmission, and feedback controlled motorized dispensers
- Designed and implemented an iOS mobile application that allows users to upload prescriptions to the embedded system from iPhones
- Optimized the feedback P-I control with four STM32 timers to achieve simultaneous precision control of four pill dispensing motors
- CAD designed and 3D printed the entire low-cost and anti-jam dispensing mechanism with Autodesk Fusion 360 and FDM printer

### Motor-driven Four-bar Linkage

Mechatronics Course Project

Jan 2023 - Apr 2023

Ann Arbor, MI

- Led the development of an Arduino-based PID-controlled four-bar linkage mechanism capable of switching positions and aim between any of the 5 user-defined targets in fewer than 0.25 seconds with 100% accuracy, achieving a class ranking of second place

### Four Function Calculator

FPGA Design Project

Sep 2022 - Oct 2022

Ann Arbor, MI

- Devised and implemented a fully-functional four-function calculator as a 32-state Finite State Machine in Verilog HDL that is capable of operating consistently at a clock speed of 50 MHz on a DE2-115 FPGA board
- Improved familiarity in working with finite state machines, complex sequential logic, and RTL design implementation and debugging

## SKILLS AND QUALIFICATIONS

- **Programming:** C / C++ / Python / Swift / Assembly / Verilog HDL / Bash Scripting
- **Software Tools:** Altium Designer / MATLAB & Simulink / SolidWorks / Git / LTspice / COMSOL
- **Hardware:** STM32 (Cortex® M4) / Arduino / Raspberry Pi (Cortex®-A72) / ESP32 / Infineon PSoC 6 (Cortex®-M4 / M0+)
- **OS Platforms:** Embedded Linux / FreeRTOS / mBed OS / Arduino-core / Windows 10
- **Others:** Microsoft Office / L<sup>A</sup>T<sub>E</sub>X / Markdown / Commercial Driver's License (Class B)