Jason Baik

(416) 797 2593 | Jason.baik.24@gmail.com | https://www.linkedin.com/in/hansol-baik/

Education

McMaster University | Expected Graduation: **May 2028** **Hamilton, ON**
Electrical Engineering

Project Experience

Spatial Mapping System – MSP432 **Hamilton, ON**

- Engineered a 3D room-mapping system using an MSP432E401Y microcontroller and VL53L1X time-of-flight sensor, enabling automated 360° scans via stepper motor control. Integrated I2C at 100kps for sensor data acquisition and UART for data transfer to MATLAB at a 115200 baud rate. System controlled through a combination of C and embedded assembly for performance-critical tasks.
- Developed a complete software pipeline in C, Assembly, and MATLAB to acquire, process, and visualize spatial data. Applied trigonometric transformations to sensor output, generating mesh-based 3D maps using MATLAB.
- Analyzed and optimized system limitations including FPU rounding errors, stepper motor delays, and serial transmission constraints; achieved a maximum quantization error of 1mm in distance measurements, ensuring high-fidelity spatial mapping under real-time data constraints.

Dog Chase Toy – Closed-Loop Motor Controlled System **Richmond Hill, ON**

- Designed and implemented a 12V brushed DC motor control system using a BTS7960 H-bridge motor driver and an ESP32, with PID feedback loop tuned via encoder and UWB sensor data for precision tracking in Arduino.
- Integrated high-current motor control circuitry with voltage regulation via buck converters; validated safe current delivery and thermal limits under full-load operation.
- Implemented embedded code for ESP32 in C++, driving real-time PWM control and direction logic with interrupt-driven encoder sampling and UART debugging interface.

Analog Amplifier – BJT **Hamilton, ON**

- Designed and implemented a common collector BJT amplifier with <10% signal attenuation for a given input voltage and a given source/load impedance, achieving a measured midband gain of 0.92 within target range.
- Used LTspice extensively to simulate and validate amplifier behavior prior to construction, including transient analysis, DC sweep, and AC sweep, confirming expected gain, linearity, and frequency response above 100 Hz.
- Constructed and tested the physical circuit, verifying close agreement between simulated and real-world performance using oscilloscope measurements and demonstrating superior gain compared to theoretical estimates.

Web Scraper Bus Time Display **Hamilton, ON**

- Designed and developed a Python web scraper leveraging Selenium and PySerial to automate the extraction of real-time bus schedule data from Google Maps. The process involved configuring browser automation and handling dynamic web content.
- Processed and formatted the extracted schedule data in Python to ensure compatibility with an Arduino microcontroller, utilizing serial communication protocols to transfer the information seamlessly between the software and hardware.
- Programmed the Arduino to control a crystal LCD display module, implementing logic to dynamically update and present bus arrival times. This demonstrated advanced skills in Python development, hardware integration, and real-time data visualization for practical applications.

Experience

Instructor – Co-op Position **Richmond Hill, ON**
The STEAM Project *May 2025 - Present*

- Guided students through hands-on projects using tools like CAD software, 3D printers, robotics, and woodworking tools, promoting practical problem-solving in a creative makerspace environment.
- Taught beginner-level coding, python, robotics, and microcontroller programming using platforms such as Arduino and educational robotics kits.

Skills

Programming Languages: C, C++, Python, Assembly, Verilog, VHDL, HTML, CSS, R
Design & Simulation Tools: LTspice, PSpice, MATLAB, Simulink, Fusion 360, Autodesk Inventor
Software: Microsoft Suite, Github, VSCode, Arduino, Quanser Labs, Cura
Technical Skills: PCB Soldering, Mechanical Assembly, 3D Printing, Welding, Oscilloscope Measurement