Richard Beattie

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EDUCATION

Massachusetts Institute of Technology — Cambridge, MA
B.S. & M.Eng Computer Science and Electrical Engineering — *September 2021 – May 2026*

- GPA: 4.9/5.0
- **Relevant Courses:** Digital Logic Design (A), Embedded Systems (A), Algorithms (A)

PROFESSIONAL EXPERIENCE

EECS @ MIT — Cambridge, MA
Digital Logic Design Lab Assistant — *September 2024 – Present*

- Develop and guide students through FPGA SystemVerilog labs inc. implementations of UART, SPI, BRAM

Distributed Robotics Lab @ MIT CSAIL — Cambridge, MA
Undergraduate Researcher — *June 2023 – Present*

- Developed embedded firmware for Nordic nRF52/53 series SoC to control a swarm of 30 BLE Sphero BOLT robots concurrently (C++, C, Zephyr real-time operating system (RTOS), nRF Connect SDK)
- Designed a real-time computer vision algorithm to monitor the positions and orientations of 30 robots from webcam live stream (Python, OpenCV)
- Implemented multithreaded Swarmalator robotics model to perform experiments (Python, Numpy, Rust)
- Wrote C bindings for Linux BlueZ kernel protocol to use multiple bluetooth adapters on a Raspberry Pi

Milwaukee Tool — Milwaukee, WI
Electrical Engineering Intern — *June 2024 – August 2024*

- Prototyped an IoT real-time stock monitoring system using a Bluetooth Low Energy (BLE) Angle of Arrival (AoA) antenna array (Python, C++)
- Designed an automated test setup, including mechanical fixtures, electrical wiring, and firmware, to evaluate BLE AoA. Cut test runtime from 5 hours to 30 minutes, saving 45 days across multiple cycles.
- Performed schematic design and completed PCB layout for an analog high-speed high-impedance active oscilloscope probe circuit board to cheaply and accurately measure low-current microcontrollers

Evervault — Dublin, Ireland
Product Engineering Intern — *May 2022 – July 2022*

- Launched "Secured by Evervault" feature to automatically validate customers' encryption deployment
- Refactored React web app, Rust backend (API) and SQL databases to implement app tenancy

PROJECTS & OUTSIDE EXPERIENCE

Connect-4 Robot — *February 2024 – May 2024*

- Designed, built, and programmed a robot to play Connect-4 on a physical board using custom C algorithm
- Wrote C firmware to detect the opponent's move using photo interrupters and a ADC, actuate servo motors to place game pieces by generating PWM signals, and display the game state on a TFT screen over SPI
- Integrated and debugged processors and I2C sensors with oscilloscopes and logic analyzers

FPGA controlled Voice Following Robot — *October 2023 – December 2023*

- Created an Spartan 7 FPGA powered robot that recognizes and moves towards its owner's voice
- Implemented pipelined SystemVerilog modules to read audio over I2S, perform DSP to filter for human voices, calculate the angle of arrival from a microphone array, and drive DC motors in real time
- Performed static timing analysis and developed unit-level tests to validate FPGA-based system

Prepsheets (https://prepsheets.com) — *June 2020 – June 2021*

- Built and scaled a full-stack (React, Typescript, Firebase) web app for 10+ cafés in Ireland to manage ingredient pricing. Saved users over €100,000.

Awards

- Irish Representative at the International Science and Engineering Fair 2019
  - Best in Category Award (top 23 out of 1,400 projects globally) for developing low-cost bat detector

SKILLS & INTERESTS

Programming Languages: C++, C, Python, Typescript, Javascript, Rust, SQL, SystemVerilog, MATLAB, Assembly
Software and Tools: Numpy, MQTT, KiCAD, Fusion360, Eagle, Git, Cadence, Altium, CocoTB, Arduino
Hardware: Embedded Systems, Breadboarding, Soldering, Lab Equipment