Richard Beattie

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Education

Massachusetts Institute of Technology **2021 - 2026**

Candidate for B.Sc. in Computer Science and Electrical Engineering (graduating May 2025) & MEng. in Computer Science and Electrical Engineering (graduating May 2026) *GPA: 4.9/5.0*

Experience

Electrical Engineering Intern | Milwaukee Tool **June 2024 – Present**

- Automated BLE Angle of Arrival (AoA) experiments, reducing runtime by 85% from 2 weeks to 2 days
- Created automatic tool check-in / check-out IoT product with BLE AoA (Python, C++)
- Designed schematic and completed PCB layout for a high-impedance active scope probe to cheaply and accurately measure low-current MCUs

Undergraduate Researcher | Distributed Robotics Lab @ MIT CSAIL **June 2023 – Present**

- Developed firmware for Nordic nRF52840 SoC to control 30 Bluetooth Low Energy (BLE) Sphero BOLT robots concurrently (C++, C, Zephyr RTOS, nRF Connect SDK)
- Designed a real-time algorithm to monitor the positions and orientations of 30 robots (Python, OpenCV)
- Implemented multithreaded Swarmalator robotics model to perform experiments (Python, Numpy, Rust)
- Wrote C bindings for Linux BlueZ Bluetooth protocol to use multiple bluetooth adapters on Raspberry Pi

Product Engineering Intern | Evervault **June 2022 – Aug 2022**

- Launched the "Secured by Evervault" feature. Automatically validates customer's encryption deployment
- Refactored React web app, Rust backend (API) and SQL databases to implement multi-tenancy

Founding Developer | Prepsheets.com **Jan 2021 – June 2022**

- Designed full-stack application (React, Typescript, Firebase) for >30 hospitality companies to control their ingredient prices during COVID
- Created GCP .NET cloud functions to convert HTML templates into PDF labels for Zebra label printers
- Built Python scrapers to parse and extract prices from PDF invoices. Speed up onboarding by 75%.

Product Engineer | ToDesktop **Sept 2020 – Aug 2021**

- Developed Node.JS C++ to Typescript bindings for Windows UIAutomation DLL

Projects

Connect-4 Robot **Feb - 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, actuate the board to place game pieces, and display the game state on a TFT screen

Differential Amplifier for 22nm Intel FinFET Process **Feb - May 2024**

- Designed schematic in Cadence composed of the Amplifier, Pass Gates, and a CMOS Code Checker
- Verified circuit performance with Cadence Spectre. Completed layout and tapeout preparation process.

Feline Programmable Gate Array (FPGA) Robot **Oct - Dec 2023**

- Created an FPGA-powered robotic 'cat' that recognizes and move towards its owner's voice
- Implemented pipelined System Verilog modules to read audio from a microphone array (I2S), filter for human voices, perform angle of arrival calculations, and drive DC motors in real time.

Low-Cost Bat Detector **Oct 2017 - May 2019**

- Built a bat detector at 1/10th regular cost to aid Bat Conservation Ireland in performing national surveys
- Represented Ireland at International Science & Engineering Fair (ISEF); Awarded Best in Category.

Skills

Programming Languages: C++, C, Python, Typescript, Javascript, PHP, SQL, System Verilog, MATLAB, Assembly
Technologies: React, Svelte, nRF Connect SDK, Numpy, Electron, Node.js, Express, Pandas, Dash, Plotly, MQTT
Software: KiCAD, Fusion360 CAD & CAM, Eagle, Git, Cadence, Altium