Benjamin Heyfitch

Los Gatos, C.A.
(408) 458-6560 benjamin.heyfitch@gmail.com linkedin.com/in/benjamin-heyfitch

Education

University of British Columbia **Expected May 2027**
Electrical Engineering *Vancouver, B.C.*

Technical Skills

Software: Python, C, Linux, Bash
Hardware: Microcontrollers, SystemVerilog, FPGA, Intel Quartus Prime, ModelSim
Machine Learning: Model Training and Evaluation, Decision Trees, Gradient Boosting, Pandas

Experience

Systopia Lab **June 2025 – Present**
Research Assistant *Vancouver, B.C.*

- Trained and optimized a two-stage LightGBM AI model on HPC workloads with up to 6 million memory access traces, combining classification and regression to predict future memory access deltas.
- Wrote Bash and Python scripts to automate AI model training, validation, and testing workflows on Compute Canada HPC clusters, executing large-scale Slurm jobs in Linux for profiling and loss-curve analysis.

Engaging Math Circles **August 2023 – Present**
Math Teacher *Virtual*

- Teach and mentor K–8 students in mathematics through interactive lessons that build conceptual understanding and problem-solving confidence.
- Communicate learning progress and adapt instruction in collaboration with parents to support individual student growth.

Projects

iPod | *SystemVerilog, Intel Quartus Prime, ModelSim, Assembly* **June 2025**

- Designed an iPod system on an FPGA that plays back a song stored in flash memory, with user controls via a keyboard to start, stop, rewind, change direction, and adjust playback speed.
- Implemented multiple finite state machines to read audio samples from flash memory, synchronize with an audio digital to analog converter, and handle keyboard input and playback logic.
- Integrated a PicoBlaze Xilinx processor to measure audio signal strength in real time by averaging 256 absolute sample values and displaying the result as a strength meter using LEDs.

Autonomous Coin-Picking Robot with Wireless Remote Control | *C, STM32, PIC32* **March 2025**

- Built an autonomous coin-picking robot and remote system using STM32 and PIC32 microcontrollers with full C firmware.
- Designed and implemented PWM motor control, opto-isolated H-bridges, Colpitts oscillator-based metal detection, and perimeter sensing.
- Integrated JDY-40 radio communication, LCD, joystick, and speaker for real-time wireless control and feedback.

RISC Processor | *SystemVerilog, Assembly, FPGA, ModelSim, Quartus* **November 2024**

- Implemented a datapath with registers, an ALU, and multiplexers for arithmetic operations.
- Developed a Finite State Machine to control instruction execution, managing control signals for automated processing.
- Integrated instruction and data memory with memory-mapped I/O to enable program execution and external hardware communication.
- Implemented the processor onto an FPGA and wrote comprehensive testbenches to verify functional correctness through ModelSim and Intel Quartus Prime.

Relevant Coursework

- Data Structures and Algorithms
- Control Systems
- Digital Systems Design
- Electromagnetic Waves and Fields
- Circuit Analysis
- Differential Equations

Leadership / Extracurricular

UBC IEEE Student Chapter **September 2024 – May 2025**
Partnership Lead *University of British Columbia*

- Built sponsor partnerships and secured company participation in career fairs and technical events to expand UBC IEEE's industry outreach.