Gabriel Ethan Vainer

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Education

University of Toronto Sep. 2020 – Dec. 2024
Honors Bachelor of Science – Computer Science Specialist, Software Engineering Stream *Toronto, CAN*

Experience

Software Engineer Feb. 2025 – Present
Empyrean Medical Systems | C#,C, .NET, Node.js *Remote*

- Engineered Network Controller Services for the Artemis 300/500 motor subsystems by developing a packetized command framework to standardize Collimator, XYZ stage, and filter wheel motion control.
- Designed a messaging scheme with sync headers, packet type encoding, and bitmask-validated encoder feedback to enable constant status polling, homing commands, and real-time motor tracking with robust data integrity.
- Developed a Fault-Tolerant Asynchronous Command Pipeline with a semaphore-based response queue, achieving sub-100ms response times, CRC verification, and automated retries for reliable motor control.
- Prevented race conditions in multi-threaded motor control by implementing mutex-based synchronization of shared motor states, ensuring precise execution of concurrent motion commands.
- Integrated an Embedded DWIN LCD API into the Hercules' telemetry subsystem as an official **C# Worker Service**, leveraging a multi-threaded architecture to concurrently transmit byte frames to the displays while monitoring UDP broadcast packets for emission headers in real time.

Software Engineer Intern Apr. 2022 – Sept. 2024
Empyrean Medical Systems | C#,C, .NET, Node.js *Remote*

- Developed an **Embedded API** using **UART serial communication** to interface with **DWIN DGUSII LCM** displays for Empyrean's **Hercules** Radiation Device, enabling real-time hardware interactions and advanced display control.
- Integrated **Dose Calculation Algorithms** and **TCP/IP socket protocols** into Empyrean's **Dosimetry Engine** for **voxel-based radiation transport simulations** for Radiology equipment, while refactoring the codebase by **64%**.

Software Engineer Intern Jan. 2022 – Apr. 2022
Royal Bank of Canada | Java, Spring, Maven, SQL, Confluence, Cucumber Framework *Toronto, CAN*

- Developed and maintained scalable **Microservices** for RBC's **File Management** and **User Compliance** systems within the **Retail Banking Payments Technology & Integrations Lab**.
- Built advanced file scenario features for **Profile Compliance** & **Client Identification** APIs, strengthening **Input Validation**, **Schema Validation**, and **Enforcement** protocols to prevent injection attacks and unauthorized access.
- Leveraged Continuous Integration pipelines with **Jenkins**, automating build, test, and deployment processes to enhance development efficiency and accelerate delivery cycles.

Documentation Consultant Jan. 2023 – Apr. 2023
Taichi Graphics | React, Node.js, Docusaurus *Toronto, CAN*

- Maintained, oversaw, and proposed documentation updates for Taichi's **Developer Documentation application** by working with their Documentation team to enhance developer engagement for the open-source community.

Projects & Clubs

Pintos

- Developed kernel features for an operating system framework written in **C**, including thread scheduling, system calls, virtual memory management with paging and swapping, and a file system with extensible files.

UofT Blueprint | *Project Lead - Internal Team*

- Led a team of 4 developers in implementing UofT Blueprint's website redesign and a custom CRM solution using **TypeScript**, **React**, **Next.js**, and **Firebase**, applying **Agile principles** for efficient sprint planning.

Traffic Racer

- Wrote a 2D rendition of the Traffic Racer game in **MIPS assembly**, implementing **bitmap graphics** for real-time vehicle movement, **memory-mapped I/O** for responsive keyboard controls, and **collision detection** logic.

Technical Skills

Languages: Python, C, C++, C#, Java, JavaScript, Typescript, SQL, Haskell, Hack
Frameworks and Databases: React, React Native, Django, Mongo, Spring, Cucumber, MySQL, Firebase, Next.js
Environments and Other: Linux/UNIX, Operating Systems, Algorithm Design, Data Structures