Simon Marcotte

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EDUCATION

University of Alberta   **2021–2026**
Bachelor of Science - Computer Engineering Co-op   *4th Year*

EXPERIENCE

Software Engineering Intern   **January 2024 – August 2024**
General Fusion Inc.   *Richmond, BC*

- Led the design of the core control system using Python to build an OOP-based async TCP server, simultaneously collecting data from 20+ machine diagnostics 30 times per day, relied on by the company for data driven decisions.
- Redesigned the existing data pipeline by implementing from scratch a Docker-deployed Flask service to serve raw data files, complete with error handling and swagger docs, speeding up raw data access by reducing API calls by 60%.
- Collaborated with Lisbon researchers to gather requirements, design, test, and deliver a custom driver in Python to interface with three diagnostics over SSH, leveraging Pydantic models for configuration type safety.
- Implemented a server system monitor by redirecting docker logs to Elasticsearch via Fluentd, visualised with Kibana.
- Refactored and improved MATLAB signal analysis code into Python by leveraging NumPy, SciPy and cProfiler, achieving an 87% speedup in runtime, and using regression testing techniques to verify intermediate and final results.
- Introduced GitHub Actions and hooks to ensure accurate company-wide Git submodules and configuration files, resulting in consistent server uptime by guaranteeing correct project backend setup.
- Collaborated in multiple cross-functional teams, working with engineering physicists, software, and electrical engineers, to manage and gather requirements, and deploying projects with the best interests in mind.

PROJECTS

Airflow Stock Data Pipeline | *link* | *Apache Airflow, BigQuery, Docker, Python, Astro, APIs*   **August 2024**

- Designed and implemented a data pipeline using Apache Airflow and Alpha Vantage API to extract, load and transform 20 years of historical stock data and load the total maximum growth for the daily top gainer into a data warehouse.
- Achieved efficient data storage and querying by leveraging Google BigQuery as a scalable data warehouse solution.
- Utilized Docker and Astro CLI to containerize and manage the Airflow environment across operating systems.
- Developed Apache Airflow DAGs using Python and Pandas to analyze 2000+ entries of stock data per day.
- Mounted Docker volumes for GCP project integration, leveraging Airflow Variables for sercret key storage.
- Leveraged Airflow Xcoms to smoothly transfer key value pairs between tasks via Airflow's internal database.

Bot2Engg Discord bot | *link* | *Python, Asyncio, Terraform, GCP Compute Engine*   **June 2024**

- Deployed a Discord Bot with a Terraform-provisioned GCP Compute Engine, created using Python and discord.py.
- Facilitated task automation, information delivery, and active engagement for 300+ members across 3 servers.
- Designed and implemented a secure virtual private cloud (VPC) environment with custom subnets and firewall rules to safely host the application and manage traffic, enhancing overall security and isolation.

CUDA Mandelbrot Speedup | *C++, CUDA, Parallel GPU Programming*   **April 2024**

- Leveraged CUDA GPU parallel programming to redesign a program which computes and renders the Mandelbrot set, achieving a 1280% speedup with CUDA C compared to its CPU C++ equivalent.
- Dynamically scaled threads with image dimension, capable of generating an 11kx11k resolution gray scale image in 5s.

EXTRA CURRICULAR

Program Instructor | *Faculty of Engineering - University of Alberta*   **May 2023 – August 2023**

- Led the redesign process for a virtual engineering camp, coordinating tasks among team members, setting deadlines, resulting in a one-month advancement in project schedule, and instructing 45+ students during the camp sessions.
- Designed an automated engineering discipline quiz using Google Apps Scripts with personalized email responses, with its success in the program resulting in its integration into an engineering class, available to 1000+ students.
- Managed and organized communication platforms between staff and students in a hybrid environment, led weekly meetings to improve content to adapt to students needs.

Senior Exec - Co-VP Academic | *Computer Engineering Club*   **August 2024 – Present**

- Designing a certification program for freshman computer engineering students to gain experience in software projects.

ENGG 100 Teaching Assistant | *Faculty of Engineering - University of Alberta*   **August 2024 – Present**

- Preparing class resources, and facilitating communication with students to provide academic support and feedback.

SKILLS

Software: Python, Apache Airflow, Docker, Astro, GCP, Compute Engine, BigQuery, Terraform, C++, Flask, APIs
Developer Tools: Git, Linux, WSL, VS Code, Postman, MySQLWorkbench, MongoDB Compass