JOSEPH MITCHELL

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SKILLS

LANGUAGES: C, C++, Java, Python, MATLAB, JavaScript, HTML, CSS

TECHNOLOGIES: Linux, Mac, Windows, Git, Postman, MySQL, PostgreSQL, SolidWorks

WORK EXPERIENCE

SOFTWARE ENGINEERING STUDENT — *St. John's, NL*
Nasdaq Verafin — *January 2024 – September 2024*

- Automated **preprocessing** and **importing** of sensitive and complex data files through **AWS Lambda** and **S3,** reducing manual intervention by **85%**.
- Employed advanced **SQL** tuning techniques and query plan visualization tools for in-depth analysis and optimization of queries, improving execution times and system efficiency.
- Conducted impact analysis from changes to **fuzzy match algorithms**, reducing false positives, and enhancing compliance workflows.

SDK ENGINEERING INTERN — *Ottawa, ON*
Infinera — *May 2023 – August 2023*

- Redesigned onboard messaging system, introducing **asynchronous communication** between microcontrollers through **multithreading** to increase communication throughput and limit blocking.
- Engineered robust parent class architecture, enabling inheritance for multiple subclasses and **cutting code redundancy by 50%**.
- Thoroughly documented and tested **C++** projects to ensure seamless handovers and ease of reference for future development teams.

FIRMWARE ENGINEERING INTERN — *St. John's, NL*
BreatheSuite — *August 2022 – December 2022*

- Researched and applied advanced **digital signal processing** techniques to analyse hundreds of previously unexplored inhalation audio files, discovering new feature sets to enhance effective medication dose measurement model.
- Developed **data processing pipeline** to extract and refine these audio features for integration with AI-based classification model, **improving performance** by up to **12%**.
- Ported Python-based DSP pipeline to C for **real-time execution** on microcontroller, enabling seamless integration into Breathesuite's metered-dose inhaler system.

PROJECT PLANNER — *Toronto, ON*
Topology Health (PuraJuniper) — *April 2022 – September 2022*

- Pitched business opportunity for deploying app suite throughout NL health authorities and facilitated meetings between Topology Health executives and local industry professionals, leading to the development of a new major project.

JUNIOR SOFTWARE DEVELOPER — *Toronto, ON*
Topology Health (PuraJuniper) — *January 2022 – April 2022*

- Overhauled UI of **React application** that creates and displays clinical practice guidelines complying to FHIR standards/guidelines, leading to significantly increased stakeholder confidence.
- Conducted multiple meetings to pitch new **UI mock-ups** created in Figma.
- Represented Topology Health at the March 2022 Infoway Projectathon, **completing over 8 tests** related to **interoperability** and **exchange of health data** within Canada.

PROJECTS

HEMOTREK *September 2023 – Present*

- Integrating **mechanical design, fluid dynamics**, **electronics** and regulatory compliance within multidisciplinary team to develop cohesive medical device prototype for measuring blood viscosity.
- Designed and implemented **2D gantry system** incorporating servo-driven rack-and-pinion mechanisms, contributing to precise, **automated**, fluid transfer.
- Innovated and validated self-sealing reservoir-capillary tube system that maintained leak-proof performance over 100+ cycles, significantly enhancing device reliability and user convenience.
- Contributed to Design Analysis Report by writing comprehensive literature reviews, validating design components, and planning future development stages, ensuring thorough documentation and project continuity.

INTOXICATION DETECTION BY PUPILLARY LIGHT RELFEX *March 2022 – April 2022*

- Researched and implemented state-space model of neural delay caused by intoxication.
- Integrated neural delay into larger state-space system modeling pupillary light reflex.

PARKINSON'S DISEASE DETECTOR *January 2021*

- Implemented Parkinson's Disease Detector using Jupyter Notebook, achieving classification accuracy of **93.8%**.

EDUCATION

UNIVERSITY OF WATERLOO *Waterloo, ON*
BASc. Biomedical Engineering - **Cumulative GPA: 89.19%** *Sept 2020 – Apr 2025*

Relevant Coursework: **Data Structures and Algorithms | Linear Signals and Systems | Database Systems | Digital Systems | Circuits, Instrumentation, and Measurements | Computer-Aided Design | Control Systems**