Isabel Frolick

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English [Native], French [DELF B2]

EDUCATION

McGill University - Master of Science (Thesis)

Computer Science — 4.0 GPA

- Researcher at: Quebec AI Institute (MILA), Montreal Neurological Institute, Centre for Intelligent Machines
- President of the Computer Science Graduate Society

Queen's University - Bachelor of Applied Science

Computer Engineering with Professional Internship — 3.7 GPA

EXPERIENCE

Engineering Teaching Assistant
Sept. 2021 – Present

McGill University — *Montreal, Canada*

- Teaching assistant in: *Electronics, Engineering Design, Data Structures in C, Software Development*
- Led tutorials, acted as technical mentor, designed assessments, and developed supplementary materials.

Research Assistant - Deep Learning Swimmer Detection Unit
Sept. 2023 – Aug. 2024

Ingenuity Labs Research Institute & Cooktop Safety — *Kingston, Canada*

- Designed and implemented deep learning pipeline for **real-time swimmer/drowning detection** from multi-modal hardware (audio, visual, spatial); awarded 2nd place in IEEE Eastern Ontario Student Competition.
- Advanced prototype to a **manufacturable stage**, adopted by industry partner (Cooktop Safety) for commericalization.
- Developed custom multi-modal ensemble pipeline within production codebase (150K+ LOC).
- Deployed inference models to Google Cloud Platform for real-time operation, configuring secure networking, storage, and compute infrastructure.

Graduate Cloud Engineer
June 2022 – June 2023

Lloyd's Banking Group, Insurance & Wealth Division — *Edinburgh, Scotland*

- Designed and deployed **secure cloud infrastructure** on Google Cloud Platform (GCP), using Infrastructure as Code for scalable, reliable banking services for customers.
- Developed backend services and large-scale processing pipelines, deploying via Docker & Kubernetes; contributed extensively to production code in an Agile environment.
- Developed backend services and large-scale pipelines, using Docker & Kubernetes for containerized deployment.
- Implemented platform enhancements (cluster configs, routing templates, network policies, storage), contributing extensively to production code in an Agile environment.

PROJECTS

M.Sc. Thesis – Deformable, Multi-Modal Image Registration | *PyTorch, TensorFlow, TensorBoard*   Ongoing

- Developing an **unsupervised, end-to-end deep learning framework** for non-rigid, multi-modal image registration between MRI and ultrasound, robust to large deformations and scarce ground truth data.
- Designed a pipeline combining **cross-modality image synthesis** and **segmentation-driven feature extraction** to overcome the absence of shared intensity metrics.
- Collaborating with neurosurgeons to ensure computational methods align with clinical requirements and practical use in the operating room.

Project Lead – Deformation Quantification Module, Slicer | *Python, Qt, Tkinter*   March 2025 – Present

- Produced a clinically relevant non-rigid image registration visualization module for neurosurgical research in Slicer
- Developed tensorized mathematical methods for millimetre-scale voxel-wise quantification of deformation fields.
- Built visualization tools for **real-time 3D rendering** of deformation using color-mapped overlays.

WOLF: Workflow for Optimized Learning in Deep Frameworks | *PyTorch, MONAI*   Dec. 2024 – July 2025

- Co-developed a novel ensemble learning framework to adapt standard architectures (e.g., DenseNet) to address **severe class imbalance** in medical imaging datasets (1% positive samples).
- Designed and trained a pneumonia classification pipeline on lung X-ray data, **outperforming conventional single-model optimization methods** under extreme imbalance.