

Katherine Langille

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TECHNICAL SKILLS

Programming: Python, TypeScript, JavaScript, C++, SQL

ML & AI Systems: PyTorch, scikit-learn; LLM agents, AI evaluation, data preprocessing; LangGraph

Software & Infrastructure: React, API development & integration, PostgreSQL, MongoDB, Docker; observability (Langfuse)

EXPERIENCE

Machine Learning Engineering Intern

Jun. 2026 – Aug. 2026

Signal 1

Healthcare AI Startup

- Built and shipped **TRACE**, a full-stack AI-agent evaluation platform (React/TypeScript, PostgreSQL) to compare models and agent harnesses and run pre-deployment regression tests across **40+ custom and externally sourced benchmarks**
- Developed agent-monitoring methods using **process mining** to reconstruct workflows from execution traces and localize failures, policy violations, and regressions across system configurations
- Evaluated **LLM-judge reliability** through controlled comparisons of trace evidence and authorization context, **measuring verdict consistency, token usage, and latency**

Bioinformatics Software Research Student

Sep. 2025 – Dec. 2025

The Hospital for Sick Children (SickKids) — Centre for Applied Genomics

Research Hospital

- Built an **end-to-end ML pipeline** integrating demographic, clinical, and imaging data to predict cognitive, language, and motor outcomes in preterm infants, supporting interpretable and reproducible analysis
- Analyzed transformer attention and behaviour in a **protein language model** for variant-effect prediction

Data Science and Process Mining Analyst

Oct. 2024 – Mar. 2025

Transport Canada — Software Solutions

Federal Government

- Led **two process-mining analyses** in Python, pinpointing a major bottleneck in an internal workflow and communicating findings through dashboards
- Built an **ML classification pipeline** to address the bottleneck, projected to shorten client wait times by **1 day** and save **1 analyst hour per request (approximately 600 hours annually)**

PROJECTS & RESEARCH

Predictive Modelling of Human Gait

Winter 2026

Neuromechanics & Assistive Robotics Lab — Dr. Arami

- Harmonized heterogeneous gait datasets in Python through spatial mapping and temporal normalization; developed a **denoising diffusion model** to predict complete gait cycles from preceding kinematic measurements
- Achieved **1.82° joint-angle MAE** and **14.76 N ground-reaction-force MAE** on the project evaluation set

Byline (formerly Praxis): Rehabilitation Assessment Platform

Jul. 2026 – Present

1st Overall and Best Use of QNX, Hack the 6ix 2026

- Built a rehabilitation assessment prototype combining **computer vision and IMU data** to quantify tracing accuracy and movement stability across repeated sessions
- Integrated **QNX** sensor capture with a **MongoDB-backed** web application for longitudinal tracking and interpretable session summaries; continuing development as Byline

Cardiac Rhythm Modelling with Cellular Automata

Aug. 2026

Accepted Oral Presentation, ALIFE 2026

- Modelled cardiac-like re-entry in a two-dimensional **Greenberg–Hastings cellular automaton**, showing that re-entry emergence depended on recovery timing and perturbation history, while termination depended on **lesion geometry**

EMG-Controlled Robotic Hand | [Demo](#)

Summer 2025

Biomedical Engineering Project

- Built an embedded system for **real-time grasp control** from forearm EMG; designed the amplification, filtering, digitization, and classification pipeline for physiological signals and robotic actuation

EDUCATION

École polytechnique fédérale de Lausanne (EPFL)

Lausanne, Switzerland

Exchange Student, Mechanical Engineering

Sep. 2026 – Jan. 2027

University of Waterloo

Waterloo, ON

BASc, Biomedical Engineering, Honours Co-operative Program

Sep. 2023 – May 2028

- GPA: 3.95/4.00 (94.36%)**, Top of cohort, 2nd year; Dean's Honours List; **Fairfax Financial Academic All-Canadian**
- Competitions:** 1st Place, Bio-Engineering — Ontario Engineering Competition 2026; "Best Story Told" (\$5,000) — Innovation North Systems Innovation Challenge 2026
- Scholarships:** First in Class Engineering Scholarship, Ontario Professional Engineers Foundation Scholarship, President's Scholarship of Distinction, Alumni @ Microsoft Scholarship in Engineering
- Engineering Society Representative; Varsity Squash and Lacrosse; Campus Response Team Responder & Assistant Trainer