

Ayaan Rezwan

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EDUCATION

Bachelor of Applied Science (Co-Op), Biomedical Engineering — 3.97/4.0 GPA

University of Waterloo · Specialization in Biomedical Artificial Intelligence

Sep 2025 – Apr 2030

Waterloo, ON

Relevant Coursework: Data Structures & Algorithms, Digital Computation, Linear Systems & Matrices, Engineering Design

TECHNICAL SKILLS

Machine Learning: PyTorch, scikit-learn, NumPy, pandas, SciPy, Seaborn, matplotlib (classification, regression, feature engineering)

Bioinformatics: Biopython, NCBI/BLAST, UniProt, AlphaFold, Benchling, Addgene, sequence analysis

Programming: Python (primary), C++, C#, MATLAB, Arduino (Embedded C)

Web & Tools: Git/GitHub, Linux/Zsh, HTML, CSS, JS, Vercel, LaTeX, Markdown, SOLIDWORKS

EXPERIENCE

Process Engineering Intern

AstraZeneca Canada

May 2026 – August 2026

Hamilton, ON

- Worked at **Fusion Pharmaceuticals** branch of AstraZeneca for **radioconjugate R&D** in therapeutics
- Maintained and repaired facilities using **mechanical engineering** and **workshop skills**, including machines such as **hot cells and isolators**
- Became a **certified Nuclear Energy Worker (NEW)**, building an understanding of **GxP in radioisotope work**
- Conducted research on **machine learning applications** within target selection and optimization in **radioconjugate R&D**

Weatherloo – Machine Learning Project Manager

WAT.ai Artificial Intelligence Design Team, University of Waterloo

April 2026 – Present

Remote + Waterloo, ON

- Acted as a **technical project manager** and leader of the **Weatherloo** project, an eight-member team developing an **automated machine learning pipeline** for **CNN-based post processing** to eliminate historical bias within **weather forecasting models**
- Led efforts within **ML pipeline architecture**, app/web development, and **arXiv paper writing**
- Implemented an **automated machine learning pipeline** to develop post processing layers for **any user-inputted region**

Firmware & Machine Learning Developer

EMG Fabric Biomechatronics Design Team, University of Waterloo

Sep 2025 – April 2026

Waterloo, ON

- Trained a PyTorch ML model** on EMG biosignal data achieving 77% classification accuracy across muscle activation patterns
 - Built end-to-end data acquisition & preprocessing pipelines** for noisy muscle signal recordings, including filtering and normalization
 - Designed custom PCB (KiCad)** improving signal stability and reproducibility for wearable biosensor prototyping
 - Collaborated across a multidisciplinary team integrating software, hardware, and biomechanics perspectives
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PROJECTS

earlySignal – Liquid Biopsy Cancer Classifier | Python, XGBoost, scikit-learn, pandas, NumPy, Streamlit, Git

- Built an end-to-end **cfDNA methylation ML pipeline** on TCGA-LUAD data (**132 samples, 413K CpG probes**) for early lung cancer detection, achieving **0.924 CV AUC** and **1.0 holdout AUC**
- Implemented a custom **scikit-learn transformer** (TopVarianceSelector) for variance-based feature selection inside a leak-free **cross-validation pipeline**, reducing dimensionality from **413K to 5K probes**
- Designed an in-silico **tumor fraction simulation** modeling plasma cfDNA dilution; **quantified AUC degradation from 1.0 to 0.542** at 1% tumor fraction, directly characterizing the **core unsolved challenge** in liquid biopsy diagnostics
- Deployed interactive **Streamlit web app** with live tumor fraction simulation; project inspired by and discussed with **Dr. Fei Geng (McMaster University)** whose lab researches plasma-based early cancer detection from cfDNA

Genomics Promoter Classification | Python, scikit-learn, Git

- Developed a **machine learning pipeline** to classify promoter DNA sequences using **real genomic datasets**
- Engineered domain-specific features including **k-mer frequency encoding** and **sequence composition metrics**
- Trained classical ML models (**Logistic Regression, SVM, Random Forest**), achieving >95% AUC
- Conducted feature importance analysis to interpret biological relevance of high yielding k-mers