

MACHINE LEARNING ENGINEER | APPLIED RESEARCHER

4 years of professional experience with proven delivery of performant ML systems and high-impact research

EDUCATION

- ◇ **M.Sc. Computer Science** - MCGILL UNIVERSITY *2024 - Present*
ADVISORS: PROF. NICOLAS LE ROUX and PROF. REIHANEH RABBANY
- ◇ **Honours B.Sc. Computer Science & Mathematics** - UNIVERSITY OF TORONTO *2017 - 2022*
SELECTED COURSES: COMPUTER VISION(100%), PROBABILISTIC LEARNING(95%), NLP(96%), DEEP LEARNING(91%)
DIFFERENTIAL GEOMETRY(97%), MEASURE THEORY(95%), TOPOLOGY(93%), ANALYSIS(91%) CGPA: 3.96

SELECTED

WORK EXPERIENCE

- ◇ **Mila, Quebec AI Institute** *2024 - Present*
ML Researcher | COMPLEX DATA LAB
- ◇ **Royal Bank of Canada, Algorithmic Research** *2022 - 2024*
ML Engineer | REINFORCEMENT LEARNING PLATFORM FOR TRADING, AIDEN
 - Led research, architecture, and development of a smart order router optimizing exchange selection from real-time market features. Deployed multi-region, trading over 2B shares and saving 650k annually in exchange fees.
 - Worked on a distributed feature store with ZMQ that publishes aggregated market features as a service. Streamed real-time price prediction signals with Cython accelerated code for the Aiden platform.
 - Addressed difficulty evaluating market impact by developing a new metric grounded in optimal transport theory. Measures distributional shifts in the limit order book and is robust to non-stationary market conditions.
 - Developed a Python library that manages the lifecycle of supervised learning tasks and designed APIs that integrate Apache Parquet and Pytorch with time series KDB data. Standardised model evaluation and versioning.
 - Led reinforcement learning research in compression-based auxiliary tasks that improve sample efficiency.
- ◇ **Royal Bank of Canada, Algorithmic Research** *2020 - 2021*
ML Engineer, Intern | REINFORCEMENT LEARNING PLATFORM FOR TRADING, AIDEN
 - Led research and development of a decentralized multi-task policy gradient method that learns a unified policy across various trading objectives. Enabled online adaptation to client preferences, a significant leap in RL trading.
 - Prepared models for production by automating simulation under different market regimes and reward designs.
 - Created a reinforcement learning reading group. Designed the curriculum and presented literature bi-weekly.
- ◇ **Vector Institute for Artificial Intelligence** *2019 - 2020*
ML Researcher | QUAID MORRIS LAB
 - Published an information-theoretic dynamic programming algorithm in C that reduces mutations needed to differentiate cancer by 20%. Found genome segmentation that maximize mutual information with cancer type.
 - Addressed lack of interpretability in a pre-trained tumour classifier by implementing DeepLIFT feature importance. Discovered spatial patterns in importance that reflected biological characters in mutation topology.
 - Built Python framework comparing predictive uncertainty estimators. Addressed trust barriers in clinical applications by reducing over-confident and rare misclassifications with ensembles and Monte-Carlo dropout.
- ◇ **Fio Corp.** *Aug 2017*
Software Engineer, Intern
 - Performed verification and validation of edge-based image classification system for disease diagnostics.

PATENTS & PUBLICATIONS

- ◇ Optimal division of the genome into regions with cancer specific differences in mutation
- ◇ Information Context Exploration for sparse Markov Decision Processes
- ◇ Multi-Objective Reinforcement Learning For Personalized Client Execution
- ◇ Multi-Objective Reinforcement Learning with Gradient Modulation

SELECTED PROJECTS

- ◇ **Position Based Fluid Simulation** | C++
- ◇ **Deep Learning Cancer Classifier Feature Importance** | *Undergraduate Summer Research Program*

AWARDS

- ◇ **Royal Bank of Canada**
 - RBC Performance Award Winner | 2023
- ◇ **University of Toronto**
 - Louis Savlov Scholarship for Sciences | 2017-2020
 - Ted Mossman Scholarship for Mathematics | 2017

SKILLS

- ◇ Languages
 - Python, Cython, C, Q, Java, KDB, Bash, SQL, C++
- ◇ Frameworks
 - Pytorch, Numpy, Pandas, Pyarrow, Mlflow, Seaborn, Matplotlib
 - ZMQ, Protobuf, gRPC, Spark, Kafka, Redis, Cassandra, Slurm