

# Nijash Sooriyakumaran

(647) 542-6482 • nijash.sooriyakumaran@mail.utoronto.ca • <http://github.com/nijashsooriya> • <http://linkedin.com/in/nijashsooriya>

---

## Summary of Qualifications

Graduate researcher with dual master's training in engineering and financial mathematics, specializing in: machine learning, uncertainty-aware optimization, and high-dimensional statistical modelling. Experienced in building both academic and industrial-grade ML systems for risk and uncertainty quantification. Excellent academic track-record with distinction in relevant highly-technical graduate courses.

## EDUCATION

---

### Master of Applied Science, Biomedical Engineering Sep 2024 - Expected Sep 2026 CGPA: 4.0/4.0

*University of Toronto, Toronto, ON*

- **Thesis:** Uncertainty-aware optimization in high-dimensional systems
- Built a risk-aware autonomous experimentation algorithm for high-dimensional optimization
- Improved time to discovery by 17× and 6× for naive versus ML (XGBoost and MLP) baselines
- **Awards:** IBBME Fellowship
- **TA, Rotman School of Commerce:** Risk Analytics, Master of Management Analytics

### Master of Financial Mathematics Sep 2023 - Aug 2024 CGPA: 3.9/4.0

*McMaster University, Hamilton, ON*

- **Awards:** Mathematics Graduate Scholarship
- **Relevant Courses:** Portfolio Theory and Optimization, Risk and Financial Markets, Stochastic Calculus, Deep Learning

### Bachelor of Electrical Engineering Sep 2018 - Apr 2023

*McMaster University, Hamilton, ON*

- **Relevant Courses:** Partial Differential Equations, Digital Signal Processing, Probability
- **Thesis:** Computational Efficiency of the Weiss-Weinstein Lower Bound for Non-linear Filtering

## PROFESSIONAL EXPERIENCE

---

### AML Risk Intern May 2024 - Sep 2024

*Royal Bank of Canada, Toronto, ON*

- Built Variational Autoencoder sensitivity analysis to assess AML risk across 200+ holdings
- Created a Natural Language Processing model to identify and flag high-risk/illegal transactions
- Increased high-risk transaction detection by 30%

### Software Developer Intern Sep 2021 - Apr 2022

*Ciena Corporation, Ottawa, ON*

- Developed Python bindings for ~100 complex C++ libraries for cross-language interoperability
- Developed and debugged Python unit test suites validating PCEP and Segment Routing protocols

## PROJECTS

---

### Dynamic Portfolio Allocation with Deep Gaussian Processes

Feb 2026 - Mar 2026

*University of Toronto, Toronto, ON*

- Designed a DGP for t+1 log-return prediction on 3-month high-frequency data for crypto assets
- Designed signals from perpetual funding rates for leverage imbalance and near-term market pressure
- Built portfolio allocator for variance-based sizing, regime-adaptivity, 5bps transaction cost
- Achieved +81% Sharpe vs XGBoost (65.5 vs 36.1), 50% lower max drawdown (-9.4% vs -18.9%) in 3-fold walk-forward backtest

### Heath-Jarrow-Morton Interest Rate Simulator

Feb 2026 - Mar 2026

*University of Toronto, Toronto, ON*

- Built multi-factor HJM model in C++ for forward-rate curve simulation and PCA factors
- Achieved ~30x speedup vs Python in Monte-Carlo forward-rate simulations using Eigen
- Computed key rate durations and curve sensitivities to analyze exposure under shocks

### Variational Autoencoder for IV Surfaces

Nov 2023 - Dec 2023

*McMaster University, Hamilton, ON*

- Developed a VAE in Python to learn latent implied volatility surfaces and moneyness
- Modelled volatility surface structure across strikes and maturities, capturing nonlinearity

## CONFERENCE SUBMISSIONS

---

“Developing Algorithms for the Discovery of Serum-Free Cell Culture Media” (Sooriyakumaran, Audet & Feng, Omics4CMeat 2025)

## SKILLS & INTERESTS

---

**Languages:** Python, C++, MATLAB, R, SQL, Bash  
**Technologies:** Git, PyTorch, Sci-kit Learn, Ray Tune, Eigen, XGBoost, Ax, BoTorch, Optuna

**Infrastructure:** Linux, Tableau, Bloomberg Terminal  
**Interests:** Violin (Teacher's Grade), Chess, Sudoku