

# Aubrey T. Tsambatare

2025 Candidate, Master of Mathematical Finance | University of Toronto

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Motivated by solving complex problems in quantitative finance, with strong interests in portfolio analytics, factor models, and factor-based portfolio construction and optimization. Experienced in applying macroeconomic insights and quantitative techniques to enhance asset allocation strategies. Known for being adaptable, eager to learn, and highly responsive to feedback in collaborative, team-based settings.

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## SKILLS

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C/C++ • Python • SQL • Java • HTML • CSS • JavaScript • ReactJS  
CI/CD  
Git • Docker • Bloomberg • Excel • Power BI  
Teamwork • Communication • Problem Solving

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## WORK EXPERIENCE

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### KPMG | Toronto, Canada

January 2025 – April 2025

*Intern, Consultant – Complex Financial Instruments Valuations (Derivatives)*

- Developed Monte Carlo-based models to value performance share units (PSUs) and exotic equity derivatives, incorporating features like peer-relative performance, payout caps, and path dependency.
- Built and calibrated Black-Scholes and binomial tree models for standard and barrier options, leveraging market data extracted from Bloomberg and Capital IQ.
- Engineered valuation frameworks that integrated key risk factors including volatility term structures, peer correlations, discount curves, and credit risk adjustments.
- Produced technical documentation and valuation memos supporting audit and advisory engagements, ensuring compliance with IFRS 13 and internal governance standards.

### HSBC | Toronto, Canada

September 2022 – August 2024

*Full Stack Engineer, HSBC Software Development*

- Participated in the design and development of an in-house Inventory Management System for REPO trading, replacing legacy vendor software and aligning closely with trader requirements across regions.
- Applied design thinking and UX principles to enhance the usability of HSBC's E-trading platforms in both equities and REPO markets, including interface design, prototyping, and feature reviews.
- Contributed to the development of APIs, database components, and technical specifications supporting robust, high-performance electronic trading systems across capital markets.
- Supported modernization efforts in Cash Prime Brokerage by helping develop a flexible trade entry platform to replace outdated vendor solutions, improving integration and workflow efficiency.

### HSBC Software Development | Guangzhou, China

October 2019 – September 2022

*Senior Software Engineer & UX Analyst Developer*

- Contributed to the development of AI and NLP driven tools aimed at enhancing HSBC's REPO trading platform, working closely with designers, developers, and data scientists across global teams.
- Supported the design and deployment of a secure FIX Engine for Cash Equities trading, replacing a third-party solution and improving system performance and cost efficiency.
- Participated in UX design initiatives for trading tools and internal dashboards within Global Banking & Markets (GBM), including user research, prototyping, and interface enhancements.
- Helped build interactive dashboards that provided data-driven insights into software delivery and team productivity across GBM.
- Collaborated with sales and product teams to create tools that structured trade-related messages into formats ready for order generation, improving usability and front-office efficiency.

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## PROJECTS

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### Factor Models & Portfolio Optimization – Masters Project

2025

*Supervised by Luis Seco, University of Toronto*

- Investigated four factor models (OLS, Fama–French, LASSO, Best Subset Selection) to estimate expected returns and covariances for 20 U.S. stocks.
- Implemented a dynamic Mean–Variance Optimization strategy with rolling rebalancing (2008–2016) to construct optimal portfolios.
- Compared in-sample vs. out-of-sample performance: OLS achieved the highest Sharpe ratio (1.14), while simpler models (FF, BSS) traded interpretability for lower returns.
- Highlighted trade-offs between model complexity, overfitting risk, and real-world portfolio performance.
- Read the report at: <https://www.tsambatare.com/factor-models-report.pdf>

### Dynamic Hedging Strategy Analysis – Masters Project

2025

*Supervised by Luis Seco, University of Toronto*

- Analyzed Delta and Delta-Gamma hedging strategies under the Black-Scholes framework using a stochastic Geometric Brownian Motion model.
- Simulated 5,000 asset price paths and investigated the impact of drift ( $\mu$ ) and volatility ( $\sigma$ ) on PnL distributions.
- Delta hedging exhibited higher sensitivity to drift and volatility assumptions, while Delta-Gamma hedging mitigated risk by accounting for second-order sensitivities, achieving greater PnL stability at the cost of reduced returns.
- Read the report at: <https://www.tsambatare.com/dynamic-hedging-report.pdf>

### Mean-Reverting Pairs Trading Model – Masters Project

2025

*Supervised by Luis Seco, University of Toronto*

- Developed a mean-reversion pairs trading strategy using 10 years of historical spread data between Coca-Cola and Pepsi.
- Simulated price dynamics via Cholesky decomposition to capture realistic correlations, and defined entry/exit signals to target a 5% short-term return on investment.
- Read the report at: <https://www.tsambatare.com/pair-trading-coke&pepsi.pdf>

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## EDUCATION

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### University of Toronto | Toronto, Canada

Aug 2024 – July 2025

*Master's Degree, Mathematical Finance*

Relevant Coursework: Stochastic Analysis, Pricing Theory, Numerical Methods, Risk Management, Machine Learning for Finance, Asset Management, Financial Modelling, Operations Research

### Beijing Jiaotong University | Kingston, Canada

Sept 2014 – June 2018

*Bachelor of Engineering – Computer Software Engineering*

Relevant Coursework: Machine Vision & Deep Learning, Database Management Systems, Advanced Data Analytics, Neural & Genetic Computing, Engineering Economics & Finance

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## INTERESTS

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Rugby • Travel • Hiking & Camping • Cooking • Board games (Catan)