

# Thomas Cole

[thomaswcole.github.io](https://thomaswcole.github.io) | [linkedin.com/in/thomascole](https://linkedin.com/in/thomascole) | [twc2131@columbia.edu](mailto:twc2131@columbia.edu) | 438-462-2918 | New York, New York

## EDUCATION

### Columbia University

New York, NY

*Master of Arts, Mathematics of Finance* | CGPA: 3.9/4.0

Sept. 2024 – Dec. 2025

- **Coursework:** Stochastic Processes, Time Series Analysis, Computational Portfolio Construction, Numerical Methods, Convex Optimization, Computational Statistics (PhD), Machine Learning (PhD)

### McGill University

Montreal, QC

*Bachelor of Commerce, Major in Mathematics, Minor in Finance* | CGPA: 3.8/4.0

Sept. 2019 – May. 2024

- **Coursework:** Probability, Statistics, Linear Algebra, Single and Multivariable Calculus, ODE's, PDE's

## WORK EXPERIENCE

### Graham Capital Management

Rowayton, CT

*Risk Analyst Intern*

June 2025 – Aug. 2025

- Researched and implemented distributional clustering techniques such as Wasserstein K-Means to classify discretionary portfolio managers into peer groups, enabling synthetic performance benchmarking
- Applied two-stage PCA factor modeling to uncover 3 dominant drivers of portfolio manager performance (+70% variance explained) and identified portfolios with significant idiosyncratic returns for further analysis
- Reviewed and evaluated alternative methodologies from academic literature (Fed, ECB) to enhance the firm risk factor index, testing and implementing improved models for more accurate and interpretable measurements

### TD Bank

Toronto, ON

*Analyst Intern, Treasury Hedge Strategy*

May 2024 – Aug. 2024

- Analyzed time series data of mortgage commitment hedging performance, examining the impact of factors such as interest rate fluctuations and loan terms on the propensity to fund
- Streamlined the data processing pipeline and enabled real-time access to key performance metrics through an interactive dashboard using Python with Pandas, Dash and Plotly
- Created an SQL script to parse a daily data feed of over 1 million mortgage records to track features such as funding status, while ensuring efficient storage for historical comparison

*Analyst Intern, Treasury Investment Strategy and Analytics*

Jan. 2024 – May 2024

- Developed a Python package to support analytics for the front office investments team, automating daily and weekly reporting procedures for portfolios exceeding \$130B, significantly reducing turnaround time on ad-hoc requests
- Led and prepared weekly Python workshops, translating complex technical concepts into practical tools

## PROJECTS AND RESEARCH EXPERIENCE

### Semi-Systematic Event-Driven Equities

McGill University — Montreal, QC

- Built a Python package to systematically collect and curate 20+ years of automotive recall data from government sources (e.g., NHTSA), creating a proprietary dataset for analysis
- Developed and backtested an event-driven equity strategy exploiting mispricings in automotive companies triggered by negative recall sentiment
- Deployed the strategy in live trading on a CAD \$200,000 portfolio, generating 7.5% annualized returns over a 9-month period

### Equities Statistical Arbitrage Using Clustering

Columbia University — New York, NY

- Developed a systematic, market-neutral statistical arbitrage strategy by clustering equities based on their correlation matrix and applying K-means and graph algorithms such as spectral clustering
- Optimized the number of clusters using the Marchenko-Pastur law and the explained variance threshold.
- Achieved an annualized return of 10% with a Sharpe ratio of 1.3, while effectively managing downside risk, achieving a Sortino ratio of 1.8

### PCA Applications on Implied Volatility Surfaces

McGill University — Montreal, QC

- Conducted independent research under the guidance of a faculty member on the application of PCA to implied volatility surfaces of US equity options
- Benchmarked 11 principal component selection methods including Kaiser-Guttman, and the Marchenko-Pastur Law by utilizing Monte Carlo simulations and bootstrapping to identify statistically robust eigenvalue thresholds
- Efficiently processed 75GB+ of both price and implied volatility data for all options on equities in S&P500 over a multi-year period utilizing Python with scikit-learn, NumPy, Pandas, and Dask

## SKILLS AND ACHIEVEMENTS

**Computer Skills:** Python, R, Java, MATLAB, SQL, Bloomberg Terminal

**Language Skills:** English (Native), French (Intermediate)

**Achievements:** Winner, 2025 IAQF Academic Competition

**Interests:** Guitar, Computers, Personal Finance