Benjamin Nicholson

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About Me

I am a current graduate student studying Quantitative Finance with a research interest in reinforcement learning and algorithmic trading. My background in data science provides a strong foundation in machine learning, statistical modeling, and data engineering, which I apply to develop and backtest trading strategies. I have experience in a variety of domains which allows me to tackle complex challenges with creativity and confidence.

Education

Stony Brook University — New York, USA
MS in Applied Mathematics - Quantitative Finance — *August 2025 - Present*

- Relevant Coursework: Intro to Quantitative Finance, Simulation and Modeling, Analytical Methods, Dynamic Programming

Seton Hill University — Greensburg, USA
BS in Data Science; GPA: 3.7/4.0 — *January 2022 - May 2025*

- Relevant Coursework: Machine Learning, Applied Statistics & Modeling, Advanced Data Science, Graph Theory, Numerical Analysis, Calculus I-III, Mathematical Modeling

Work Experience

Seton Hill University — Greensburg, USA
Database Engineer Intern — *May 2025 - August 2025*

- Architected and deployed a normalized SQL Server database enabling real-time tracking of 10,000+ student engagement records across the university
- Optimized complex SQL queries (CTEs, multi-level joins, subqueries) to build scalable reporting views powering Apache Superset dashboards used by Student Affairs leadership
- Designed dynamic filtering logic to quantify engagement strength by demographic/academic characteristics, enabling data-driven comparisons across terms and targeted program improvements

CMMB — New York (Remote), USA
Data Analyst Intern — *September 2024 - March 2025*

- Built donor segmentation models (clustering + statistical profiling) to drive personalized marketing campaigns, increasing outreach efficiency by 20%
- Designed Python pipelines to calculate donor lifetime value (CLV) and retention metrics, providing actionable insights for fundraising strategy optimization
- Conducted data integrity audit of 1M+ donor records, removing 50k+ duplicate/erroneous entries, improving accuracy of marketing analytics and reporting

Projects

Reinforcement Learning in Pairs Trading — Stony Brook University
Developing a reinforcement learning framework to dynamically trade cointegrated stock pairs — *August 2025 - Present*

- Implementing reinforcement learning algorithms (Q-Learning, Policy Gradient) to determine optimal entry/exit points in cointegrated equity pairs.

EY Data Challenge - Predicting Urban Heat Islands — Seton Hill University
Developed a predictive model ranking 86th out of 10000+ global participants — *January 2025 - March 2025*

- Developed a Random Forest Model leveraging Bayesian Optimization to achieve an R2 of 0.9606
- Leveraged computer vision through satellite imagery and geospatial data using Earth Science APIs
- Collaborated with local urban planners in Greensburg, PA to translate model findings into actionable city planning recommendations, bridging research with practical community impact

Enhancing Technical Analysis with Data Science — Seton Hill University
Optimized Technical Analysis Indicators in Paper Trading Simulation — *June 2024 - December 2024*

- Optimized technical analysis techniques by using ML based hyperparameter tuning, showing 2% improvements over traditional methods
- Developed a hybrid RSI-Bollinger Band strategy, outperforming Buy and Hold investments by 10%
- Evaluated success of Technical Analysis investment strategies integrating business cycle regime filtering

Skills

Technical Skills: Algorithmic Trading, Machine Learning Pipelines, Statistical Models, Numerical Methods, Optimization, Time Series Analysis, Reinforcement Learning, Computer Vision, Feature Engineering
Programming Skills: Python, R, SQL
Packages/Libraries: NumPy, Pandas, SciPy, scikit-learn, statsmodels, PyTorch, Plotly
Leadership: NCAA D2 Men's Soccer Captain, Head Resident Assistant, Fundraising Coordinator