

Songyu Ye

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EDUCATION

Cornell University

Aug. 2021 - Dec 2024

B.A. with Distinction, Summa Cum Laude Mathematics, Computer Science, GPA 3.851/4.0

Ithaca, NY

- **Awards:** USAJMO 2020, Top 350 on Putnam 2023, Top 3 Cornell Math Prize Exam, Dean's List
- **Coursework:** Probability Theory, Real Analysis, Stochastic Processes, Numerical Analysis, Machine Learning, Algorithms and Data Structures, Computer System Organization, Algebraic Geometry, Algebraic Topology, Representation Theory

EXPERIENCE

Cornell Quant Club

Sept 2022 - Dec 2024

Senior Officer: Machine Learning Subteam

- Developed and optimized deep learning trading algorithms using Python for model development and data processing, and C++ for high-performance implementations.
- Built and trained neural networks to analyze financial time series data and implement predictive models for trading, leveraging TensorFlow and PyTorch libraries.
- Utilized C++ for latency-sensitive components, enhancing algorithmic speed and optimizing performance in trading environments.
- Designed and tested strategies incorporating recurrent neural networks (RNNs) and convolutional neural networks (CNNs) to forecast stock price movements.

Pure Mathematics Research

May 2023 - Dec 2024

Research

- Pure mathematics research (algebraic geometry and representation theory) aiming for publication in top algebraic geometry journal. Advised by Professor Allen Knutson at Cornell and supported by prestigious NSF grant (DMS-1953948)
- Researching moment maps in symplectic and algebraic geometry and equivariant cohomology of GKM spaces

Combinatorics and Algorithms REU

June 2022 – Aug 2022

Research

- Prestigious NSF-funded Research Experience for Undergraduates at the University of Maryland.
- Developed a randomized incremental insertion algorithm in C++ for generating Voronoi Diagrams, leveraging efficiency to handle computational geometry tasks under the guidance of Prof. David Mount.

PROJECTS

Bayesian Neural Networks for Time Series Forecasting

2024

- Developed a Bayesian Neural Network (BNN) to predict stock prices with uncertainty quantification, using probabilistic forecasts to generate confidence intervals around price predictions.
- Implemented variational inference and Monte Carlo dropout to approximate posterior weight distributions, allowing robust forecasts adaptable to dynamic market conditions.
- Backtested BNN-based trading strategies, integrating a custom framework with transaction cost modeling and out-of-sample testing, using Sharpe ratio and max drawdown to evaluate performance.

Interactive Brokers API Integration for Algorithmic Trading

2024

- Integrated BNN model predictions with Interactive Brokers (IBKR) API for live/paper trading, using Python for data handling and C++ for low-latency order execution.
- Optimized trading system performance by implementing asynchronous data handling and error logging to ensure reliability in live market conditions.

SKILLS

Languages: C++, Python, Java, OCaml

Developer Tools: Git, VS Code, Visual Studio, Jupyter Notebook

Libraries: pandas, NumPy, Matplotlib, PyTorch