

# Songyu Ye

224-436-4797 | [songyu29@gmail.com](mailto:songyu29@gmail.com) | [s-ye.github.io](https://s-ye.github.io)

## EDUCATION

### Cornell University

Aug. 2021 - May 2025

*B.A. Computer Science and Mathematics, GPA 3.97/4.0,*

*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 - present

*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 - present

*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.
- Engineered a hybrid trading system to retrieve real-time data, process signals, and manage execution, ensuring accurate and timely trades.
- Optimized trading system performance by implementing asynchronous data handling and error logging to ensure reliability in live market conditions.

### Backtesting and Paper Trading Strategies

2024

- Developed backtesting systems in Python (pandas, Matplotlib) and C++ for efficient computation, supporting strategies like moving average crossover, RSI divergence, and Bollinger Bands.
- Utilized grid search and machine learning to optimize strategy parameters, balancing profitability with adaptability to varying market regimes.

## SKILLS

**Languages:** C++, Python, Java, OCaml

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

**Libraries:** pandas, NumPy, Matplotlib, PyTorch