Tiantian ZHANG

Education

Columbia University **New York**
Ms in Financial Engineer, B.A. in Computer Science, 4.00 GPA on a 4.0 scale *2021 Sep -2026 May*

- **Grad level Coursework:** Convex Optimization, Statistical Learning, Advanced Algorithm, Stochastic Models, Machine Learning Theory, Differential Equations, Game Theory, Stat Method, Probability and Statistics
- **Awards and Activities:** Distinguished New Student Scholarship, Dean List, Woman in CS, CU Putnam Math.

Work Experience

Cantor Fitzgerald, BGC Group **New York**
Quant Researcher Intern on Foreign Exchange Derivative *2024 Jun. -Aug.*

- Use k nearest neighbour to predict the correlation of currency pairs to forecast some unknown price of currency pair.
- Machine learning: Process real time market data and use it to pedict lognormal parameters from SABR parameters and market volatility surface. Annealing for calibration of the SABR model and analyzing the causes of data anomalies

Research Experience

Statistical Arbitrage: Pair Trading in the American Stock Market **Columbia Statistics**
Stat Method in Finance Best Project, advisor: Prof.Zhiliang Ying, h-index 62 *2024.1 - 2024.4*

- Filter the stocks through Johansen cointegration test and calculate the moving average of Bollinger Band using half-life signal to update the long/short position.
- Backtest on Covid Period Obatin maximum of 3.36 return. Run gridsearch to tune the best ADF testing frequency.

Approximation Sketch for Wasserstein-2 metric in High Dimensional **Columbia Engineering**
Advanced Algorithm theoretical CS, advisor: Prof.Alexandr Andoni, h-index 38 *2024.1 - 2024.4*

- Construct a directed spanner to approximately preserve squared L_2 norm, asymmetric locality-sensitive hashing.
- Applied a near-linear time min-cost flow $(1+\epsilon)$ approximation algorithm to compute W_2 distance in high-dimensional

Faster Probability Flow Model Inspired by Diffusion Model **UT Austin CS**
Visiting researcher on Probabilistic Graphical Model, advisor: Prof.Qiang Liu, h-index 51 *2023.1 - 2023.4*

- **Rectified Flow** (RF), a state-of-art proposed Deep Generative Model, top 25% in ICML conference(top tier ML conf.).
- Integrated RF with diffusion hitting process, leveraging stochastic calculus and Brownian bridge for faster sampling.

Out of Domain Robust Generalization Algorithm **Cityu CS**
Full-time Research Assistant in Statistical Optimization, advisor: Prof.Kede Ma, h-index 36 *2022.9 - 2023.5*

- Proposed **Casual Dro**, an algorithm on Distribution Robust Optimization that utilized GAN frameworks as generalization to duality optimization for unstuctured data to address DRO Pessimism(similar to overfitting), Github
- Achieved a 20% improvement in robust accuracy compared to ERM validation on a housing price dataset.

Math Competition

Chinese Maths Competition & Physics Competition **Pre-University**

- National First Prize (Maths top 13% National) and Provincial Second Prize (Physics top 200 provincial)
- Pre-selective competition for Chinese Mathematatics Olmpiad, and Physics Olmpaid, 8 years of competitive math.

Personal Projects

Jane Street Market Prediction Kaggle Competition **2021 Feb.**

- Optimized XGBoost through purged time-series group KFold CV,incorporating Gaussian noise to prevent overfitting.
- Employed a 5-fold, 31-gap purged time-series CV methodology, emphasizing statistical rigor in time-series data.

High-Speed File Processing & Sorting Operting System **2022 Mar.**

- Developed a distributed file processing system in C using MPI for scalability, real-time data streaming.
- Employed hash map for efficient sorting, integrated multi-threading for concurrent chunk processing.
- Incorporated a top-k algorithm in multi-thread, achieving ACMers comparable performance.

Others and Extracurricular

Languages: Python, C++(Data Structure), Latex, SQL, Java (Software Design), JavaScript, HTML, css, CVXPY, Git
Tools: SciPy, Tensorflow, NumPy, Pandas, Pytorch, AWS, Office, Docker, Linux, Computer Network, Database System