Chang Liu

Courant Institute of Mathematical Sciences, NYU
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EDUCATION

Master of Science, Mathematics — New York, NY
Courant Institute of Mathematical Sciences, NYU — Summer 2024, expected

- Coursework in Math: Probability Theory[1], Stochastic Analysis[1], Large Deviation and Interface Models[1], Real Variables I[1], Complex Analysis[1], Ordinary Differential Equations, Differential Geometry I, Linear Algebra; Numerical Methods II, Convex and Nonsmooth Optimization, Machine Learning
- Coursework in Quantitative Finance: Alternative Data, Financial Securities and Markets, Advanced Risk Management, Stochastic Calculus, Time Series Analysis and Statistical Arbitrage, Cryptocurrency and Blockchains

Bachelor of Arts, Honors Mathematics — New York, NY
New York University — Sep 2020 - May 2023
Minors: Computer Science, Cinema Studies — GPA 3.9/4.0

- Selected Coursework: Analysis[2], Algebra[2], Numerical Analysis[2], Probability[2], Mathematical Statistics, Combinatorics; Data Structures, Algorithms, Computer Systems Organization
- Honors and Activities: Phi Beta Kappa (2023), Magna Cum Laude (2023), Dean's List (2022, 2021), 3rd place of Harvard-MIT Math Tournament (2019), Top 2% of American Invitational Mathematics Examination (2019); Member of NYU Math Society and Society for Industrial and Applied Mathematics

SKILLS

Programming: Python, Julia, R, MATLAB, Java, C
Languages: Mandarin Chinese (native), English

RESEARCH EXPERIENCE

Courant Institute of Mathematical Sciences — New York, NY

- *(Ongoing) thesis on Markov chain Monte Carlo* — Spring – Summer 2024
  - Investigate how the spectral properties of Metropolis-adjusted Langevin algorithm's (MALA) Markov operators in infinite-dimensional settings affect the algorithm's convergence rates and efficiency.
  - Will form a thesis by graduation, advised by Dr. Jonathan B. Goodman[3].
- *Properties of surface tension in the convex Ginzburg-Landau case* — Fall 2023
  - Studied Scott Sheffield's PhD thesis, Chapter 8, on Random Surfaces. Explore the geometric techniques of cluster swapping and its applications in the proofs of some properties of surface tension, such as strict convexity.
  - Wrote a summary and presented in class, advised by Dr. Ofer Zeitouni[3].
- *Class Embeddings Enter Class-conditional Diffusion Models* — Fall 2022
  - Assessed Class Embedding Networks techniques (Pyramid and Bottleneck) for classifier-free diffusion guidance, and enhanced class-conditionality of the noise estimator through strategic embedding during the reverse diffusion process.

[1] PhD level courses. [2] Honors level courses. [3] Professor of Mathematics, Courant Institute.

- Investigated applications of noisy-label datasets in class-conditional diffusion.
- Wrote a paper and presented in class, advised by Dr. Rajesh Ranganath[4].

- *Summer Undergraduate Research Experience (SURE) Program* Summer 2022
  - Conducted research in Topological Graph Theory (graph embedding on surfaces). Explored the major results and open questions of the Heawood Conjecture, Four-color Theorem, and Three Color Problem.
  - Wrote a report and presented in the math department, advised by Dr. Fedor Bogomolov[5].

WORK EXPERIENCE

Teaching Assistant (TA) Summer 2023, Spring 2024
Neoscholar Education Shanghai, China and Remotely

- TA to Dr. Johannes Ruf[6], Intro to Option Pricing; to Dr. Mete Soner[7], Intro to Mathematical Finance. Teach topics including stochastic calculus, time series analysis, binomial and Black-Scholes models, volatility, etc.
- Offered technical support for student research projects, spanning areas like Asian Options, FX, convertible bonds, and VIX.

Quantitative Analyst Internship Summer 2021
Alpha Squared Capital Hangzhou, China

- Gained insights into futures and commodity trading within the Chinese market.
- Analyzed historical data for the top 30 futures contracts (in trading volumes), identifying key trends and seasonality. Applied SARIMAX and other time-series models and analyzed ACF and PACF to adjust trading signals and bolster the efficacy of trend-following strategies.

Tutor and Grader Fall 2021, Spring and Fall 2022
Courant Institute of Mathematical Sciences New York, NY

- Instructed undergraduates in subjects such as analysis, probability, and statistics and graded assignments and quizzes for vector calculus and discrete math.

Participant of the SEE Trading Program Spring 2021
Jane Street Capital New York, NY

- Selected by a Blotto Challenge strategy problem.
- Learned about mathematical and financial topics – including probability, market structure, and arbitrage – through short lectures, interactive group games such as Figgie, and mocked trading sessions.

OTHER ACADEMIC INTERESTS

Paleontology
Cinema Studies
Culinary Arts

EXTERNAL LINKS

Personal Website
LinkedIn Profile

[4] Assistant Professor of Computer Science and Date Science, Courant Institute. [5] Silver Professor of Mathematics, Courant Institute. [6] Professor of Mathematics, London School of Economics. [7] Professor of Operations Research and Financial Engineering, Princeton University.