

Jiayou Liang

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EDUCATION BACKGROUND

University of Chicago

Chicago, IL

- **Program:** MS in Applied Data Science **GPA:** 4.0/4.0

12/2025

Beijing Normal University-Hong Kong Baptist University United International College

Zhuhai, China

- **Degree:** BS in Financial Mathematics, First Class Honours **GPA:** 3.77/4.0

09/2020–06/2024

University of Oxford

Online

- **Summer course:** Artificial Intelligence and Machine Learning (Grade: A)

08/2022

RESEARCH EXPERIENCE

Accelerating Adaptive Algorithms At Scale through Reparameterization | Research Assistant 4/2025 – Present

The University of Chicago | Supervisor: Prof. Rebecca Willett Illinois, United States

- **Implemented scalable approximations of EGOP:** built low-rank estimation and periodic reparameterization modules based on *auxiliary EGOP* and *randomized SVD*, enabling faster convergence of Adam/Adagrad in large-scale model training without significant computational overhead.
- **Conducted hyperparameter search and ablation studies** on **Fashion-MNIST, TinyMNIST, EMNIST (Letters/Digits) and CIFAR10**, comparing models with/without reparameterization, different optimizers;

Neural Assortment Optimization | Research Intern 4/2025 – Present

The University of Texas at Austin | Supervisor: Prof. Rui Gao Remote

- Developed a complete implementation of the Deep Assortment Optimization (DAO) framework, supporting both capacity-constrained and unconstrained formulations across three discrete choice model families—basic attraction model (BAM), nested logit (NL), and mixed logit (ML). The implementation incorporates Lovász extension-based continuous relaxation, stochastic subgradient estimation, and chain-based rounding procedures.

Foundation Model Fine-tuning for Breast Cancer Biomarker Prediction | **HONORABLE MENTION** 4/2025 – Present

The University of Chicago Capstone Project | Supervisor: Prof. Utku Pamuksuz, Dr. Samir Atiya Illinois, United States

- Adapting Direct Preference Optimization from natural language processing to computational pathology through self-supervised preference construction, enabling parameter-efficient fine-tuning of the TITAN foundation model for improved breast cancer biomarker prediction from whole slide images.

Examining the Impact of Macroeconomic Variables on the Correlations Between Carbon, Clean Energy, and CRB Markets: Insights from GARCH-MIDAS and DCC-MIDAS Models | Data Scientist 06/2023–12/2023

Beijing Normal University-Hong Kong Baptist University United International College | Supervisor: Prof. Zhefang ZHOU

- Investigated how the macroeconomic factors have affected the long-term correlation between the carbon-clean, carbon industrial spot price and their volatility using GARCH-MIDAS and DCC-MIDAS models.

PAPER

- Liu, Rui, **Jiayou Liang**, Haolong Chen, and Yujia Hu. 2025. "Analyst Reports and Stock Performance: Evidence from the Chinese Market." *Asia-Pacific Financial Markets*. <https://doi.org/10.1007/s10690-025-09522-w>

Keywords: Chinese stock market, Sentiment analysis, Natural language processing, BERT

PAPER In PREPARATION

- Adela DePavia, Jose Cruzado, **Jiayou Liang**, Vasileios Charisopoulos, Rebecca Wilett. (Submitted to SIMODS).

[Faster Adaptive Optimization via Expected Gradient Outer Product Reparameterization](#).

Keywords: Optimization, adaptive gradient methods, Adam, Adagrad, expected gradient outer product, reparameterization, low-rank, preconditioning, neural networks

- Zhen Yang, **Jiayou Liang**, Yang An, Zhi Wang, Rui Gao, Shuang Li. (In prep). Neural Assortment Optimization.

Keywords: Assortment optimization, Lovasz extension, Choice model

- Samir Atiya, **Jiayou Liang**, Kwaku Ofori-Atta, Michelle Peng, Huili Wang, Yifei Zhou, Utku Pamuksuz, Ankush Patel, Junhun Zhao, Mary Edgerton. (In prep). Validating two pathological foundation models for breast biomarker detection.

Keywords: Breast biomarker detection, Pathology foundational model.

PROJECT EXPERIENCE

AI-Assisted Clinical Data Navigation Platform | Data Scientist | St. Jude Children's Research Hospital

- We built an LLM agentic chat interface that lets researchers explore the Childhood Cancer Survivor Study (CCSS) via natural-language questions, automatically translating them to SQL and returning instant summary stats and visualizations across 15k+ de-identified variables and two cohorts (survivors, siblings). Deployed a secure PostgreSQL backend with controlled access, and wired it to a LangChain agents, and Azure Cognitive Search to accelerate pre-proposal exploration and variable discovery.

Cross Impact Analysis of Order Flow Imbalance OFI | Programmer

- This project investigates Order Flow Imbalance (OFI) cross-impact in equity markets using high-frequency data from 5 Nasdaq 100 stocks across different sectors (AAPL, AMGN, TSLA, JPM, XOM). The analysis involves: 1. Computing multi-level OFI metrics up to 5 levels of the limit order book 2. Using PCA to integrate multi-level OFIs into a unified metric 3. Analyzing contemporaneous and lagged cross-asset impacts on price changes 4. Evaluating predictive power at 1-minute and 5-minute horizons
- GitHub: [rickliang-JY/Work-Trial-Task-Cross-Impact-Analysis-of-Order-Flow-Imbalance-OFI-](https://github.com/rickliang-JY/Work-Trial-Task-Cross-Impact-Analysis-of-Order-Flow-Imbalance-OFI-)

INTERNSHIP EXPERIENCE

Exion Asia (HuiZhou) Co., Ltd, Assistant for Marketing and Sales Analysis 06/2023-08/2023

- **Decomposed sales** and revenue trends by region, industry, and product line, identifying seasonal patterns and promotional effects; created weekly/monthly reports and executive summaries to pinpoint growth and decline drivers.
- **Visualization and automation:** Built multi-dimensional dashboards (KPI, funnel, geographic distribution) in Tableau;

Bank of Communications Huizhou Branch, Customer Service Manager 06/2022-07/2022

- Managed customer banking inquiries, ensuring a satisfactory service experience with prompt resolution

AWARD and HONORS

- First Class Award, Beijing Normal University–Hong Kong Baptist University United International College 2021,2022
- Third Prize in Guangdong Division of China Undergraduate Mathematical Contest in Modeling 2022
- HONORABLE MENTION, University of Chicago Applied Data Science Capstone Showcase 2025
- President's Honor Roll, Beijing Normal University–Hong Kong Baptist University United International College

SKILLS

Programming: Python (PyTorch, scikit-learn, NumPy, Pandas), SQL (PostgreSQL, MySQL), R, Bash

Machine Learning: Deep learning, foundation model fine-tuning, optimization algorithms, supervised/contrastive learning, NLP, Agentic AI

Tools & Platforms: LangChain, LangGraph, Google Cloud, Azure Cognitive Search, Tableau, Git, LaTeX