

Kerun Xu

Innovation 4.0, #04-01| +65 83030295|e1521287@u.nus.edu

EDUCATION

National University of Singapore, NUS Business School

Aug 2025-Now

Degree: PhD in the Department of Analytics and Operations

- **Research Interests:** Online Auction, Reinforcement learning

Columbia University

Sep 2022 - Dec 2023

Degree: MS in Financial Engineering

- **Relevant coursework:** Foundation of FE, Stochastic Models, Machine Learning, Time Series, Monte Carlo Simulation, Programming in C++, Deep Learning, Corporate Finance

New York University, Courant Institute

Sep 2018 - May 2022

Degree: B.A. in Honors Mathematics

- **Honors:** Dean's List 2019-2022; Mathematical Contest in Modeling Distinguished Participant 2020
- **Relevant Courseworks:** Basic Algorithms, Linear Algebra, Calculus, Linear and Non-Linear Optimization, Theory of Probability, Ordinary Differential Equation, Partial Differential Equation, Foreign Exchange

EXPERIENCE

Institute for Advanced Algorithms Research, Shanghai, LLM Memory Algorithm Intern

Jun 2025 – Aug 2025

- Built a MemOS-based “MemCube” for novels: extracted per-character, time-ordered memories, stored them in Neo4j, and used embedding + temporal-relation search to power a MUD-style interactive novel (story continuation & in-character chat), significantly improving output via memory prompts.
- Prototyped a Text-to-Memory framework: drafted the atomic-operation taxonomy and Memory Language schema, and built prompts that let a base LLM classify user intent into operations and perform schema slot-filling.

Orient Futures, Quantitative Researcher

Jun 2023 – Aug 2023

- Modified genetic programming learn package to make it compatible with time series data and performed factor mining with self-designed operators. Explained mined factors using reasonable market logics.
- Built deep learning models, Temporal Fusion Transformers, to predict the future's returns. Modified loss function and applied Multi-GPU distributed training to achieve better predictive accuracy and accelerate the training speed.
- Used predicted returns together with Mean-Variance asset allocation strategy to construct a CTA strategy. Gained over 22% return in a 15 month backtest and trading live in September 2023 after continued fine-tuning.

CITIC Securities, Quantitative Analyst

Jun 2021 – Aug 2021

- Engineered and standardized financial datasets, optimizing database performance and automating daily data validation & correction for dividends and debts.
- Integrated Geographic Information System data with historical pricing to improve investment decision-making.
- Developed a REITs valuation model using 20+ macroeconomic and energy-related features, enhancing accuracy.

PUBLICATION

- Xu, K., & Holmes-Cerfon, M. (2024). Monte Carlo on Manifolds in High Dimensions. *Journal of Computational Physics*. Published March 19, 2024. <https://doi.org/10.1016/j.jcp.2024.112939>

RESEARCH

Strategic Optimization in Multi-Platform Online Auctions

Aug 2024 – Now

- Proved the existence of Return on Investment equilibrium for First Price Pacing Equilibrium in multi-advertiser, multi-platform online auctions. Presented at INFORMS International 2025.
- Designed a general solution framework in multi-platform auctions and derived structural conditions under which FPPE is revenue-optimal and when it is suboptimal relative to the general solution.

Container Damage Detection using YOLOv8 & SwinTransformer

January 2025 – April 2025

- Developed a two-stage YOLOv8-based model for container damage detection at Ningbo Port, identifying issues such as holes, oil stains, misaligned doors, and bent locking bars.
- Stage 1: Fine-tuned YOLOv8 to detect broad damage categories (e.g., structural damage vs. surface contamination).
- Stage 2: For each major category, trained a separate YOLOv8 model using 128×128 cropped images, adding a SwinTransformer for fine-grained classification, achieving <5% false positive rate and >99% accuracy.

Synthesizing Futures Trading Data and ETF Prices using Generative Adversarial Networks

Sept 2023 – Feb 2024

- Designed and implemented advanced HMM and Markov Switching models, including supervised and semi-supervised neural HMMs, to improve prediction accuracy and stability in regime shift analysis.
- Trained and evaluated four distinct GAN models (TAGAN, TAGAN SM, TTGAN, TTGAN SM) on 512 simulated time series, using ACF similarity with historical data to measure and compare performance.

SKILLS

Programming: MATLAB, Java, Python, C++, SQL