

# Kaixin Liu

United Kingdom | K.Liu31@lse.ac.uk | +44 7467 162417

## EDUCATION

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### London School of Economics and Political Science (LSE)

London, UK

*PhD in Statistics*

*Sept. 2024 – Sept. 2028*

- LSE Statistics **PhD Scholarship**
- Supervisors: Prof. Clifford Lam & Dr. Yunxiao Chen
- Courses taken include: Probability and Mathematical Statistics I (Mainly focused on Measure Theory).

### London School of Economics and Political Science (LSE)

London, UK

*MSc in Statistics (Financial Statistics)*

*Sept. 2023 – July 2024*

- Class: **Distinction**
- Courses taken include: Time Series, Financial Statistics, Reinforcement Learning, Computational Data Science, Distributed Computing for Big Data.

### Beihang University

Beijing, China

*BEcon in Economic Statistics (Major)*

*Sept. 2019 – July 2023*

- Grade: **90.29**/100, 3.74/4.0
- Courses taken include: Mathematical Analysis, Advanced Algebra, Programming Techniques Today (Python), Statistical Learning, Applied Stochastic Process, Bayesian Statistics and Calculation, Non-parametric Statistics.

*BSc in Mathematics and Applied Mathematics (Minor)*

*Sept. 2020 – July 2023*

- Grade: **91.08**/100, 3.79/4.0
- Courses taken include: Mathematical Statistics, Matrix Analysis, Numerical Analysis, ODE, Combinatorics, Mathematical Modeling, Operations Research.

## HONORS AND AWARDS

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**Outstanding Graduate**, Beihang University

*June 2023*

**Academic Merit Scholarship (Top 30%)**, Beihang University

*Sept. 2019 – July 2022*

**Second Prize in FengRu Cup Essay Competition**, Beihang University

*June 2022*

**College Students' Innovation and Entrepreneurship Competition**

*Dec. 2021*

**Third Prize in National College Students Mathematics Competition**

*Dec. 2020*

## RESEARCH EXPERIENCES

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### AI Doodler – A Reinforcement Learning Agent for Doodle Jump

*Coursework of Reinforcement Learning*

*Apr. 2024 – May 2024*

- Developed a **Python** environment for Doodle Jump featuring a scrolling screen, the Doodler, randomly generated platforms, and obstacles, incorporating specific game logic.
- Implemented 3 distinct RL algorithms: i) **Q-learning** with discrete state space, ii) **Deep Q-learning** with 2 types of continuous state spaces incorporating varying information, and iii) **CNN-based DQN** using game image.
- Experimented various reward functions to enhance the learning efficiency and performance of the Doodler.
- Conducted thorough analyses of different RL algorithms and reward function settings, demonstrating their impact on gameplay performance and efficiency

### Distributed SARIMA Models for Ultra-Long Time Series

*Coursework of Distributed Computing for Big Data*

*Apr. 2024 – May 2024*

- Reproduced a research paper introducing the DARIMA method for **forecasting ultra-long time series**, utilizing the **MapReduce** framework to **Map** segmented subseries to different SARIMA models and **Reduce** by aggregating the fitted coefficients to minimize a global loss function, improving upon the homogeneity settings of traditional ARIMA, enhancing both forecasting efficiency and accuracy.
- Explored distributed computing using **Google Cloud Platform**, simulated 3,000 ultra-long time series across 3 time frequency settings, and analyzed the impact of varying numbers of worker nodes, subseries, and forecasting horizons on forecast accuracy and efficiency, benchmarking against standard models.
- Conducted real-life data empirical tests, demonstrating that our method surpasses traditional whole-dataset analysis in terms of accuracy and efficiency.

## Carbon Risk Premium in China's A-share Market and Its Hedging

BEcon Dissertation

Nov. 2022 – June 2023

- Quantified the **carbon risk** of China's listed company in constructing the micro carbon risk composite index BGS, with 12 indices in 3 dimensions, and used econometric models exploring its impact mechanism towards company stock returns, especially taking the expected and unexpected carbon risk changes into consideration.
- Quantified the carbon risk of China's A-share market in constructing the macro carbon risk composite index BMG based on BGS using factor mimicking portfolio approach, and used mainstream and state-of-the-art **factor models** to identify the carbon risk premium in the market.
- Applied asset pricing tests to study the pricing errors before and after adding the BMG factor, further validating the carbon risk premium.

## Research of ESG Results of Chinese Companies Considering Rating Agency Divergence

National Key Research and Development Plan, Ministry of Science and Technology

Dec. 2021 – Nov. 2022

- Established a unified model using both the entropy method and the deviation weight method dynamically determining the weights for group decisions in order to **eliminate the disparities**.
- Built an **ESG indicator system** containing 51 indices, collected and processed data of 278 Chinese listed companies via database and web crawling.
- Determined the index contribution based on a **machine learning** method of random forest regression, and **penalised regression** methods of LASSO, MCP, SCAD and Adaptive LASSO, aiming to reduce its dimensionality.
- Implemented regression model to verify the rationality and the robustness of the unified model.

## WORK EXPERIENCE

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### iQIYI.com

Beijing, China

Business Analyst Intern, Business Intelligence Department

Sept. 2022 – Jan. 2023

- **Analysis of “Evergreen” Series and Its Forecast:** Explored the “evergreen” variable as the dependent variable, identified potential explanatory variables, and established the features of *machine learning* models, including random forest and XGBoost, for predictive analysis.
- **Research on the Timing of Two-Round Revolving Payments:** Developed a statistical model and employed regression and correlation analyses to quantitatively determine the *optimal start date* for two-round revolving payments to maximize profits. Additionally, utilized an *LSTM* model to forecast the revenue series.
- **N-brush Billboard Product Design:** Developed the N-brush Billboard, using average viewing times as the primary metric, constructed the underlying logic of the N-brush Billboard, and integrated upstream and downstream data to facilitate the *product's implementation*.

### Industrial and Commercial Bank of China (ICBC)

Beijing, China

Statistical Analyst Intern, Statistical Management Department

July 2022 – Aug. 2022

- **Industry Research in Banks Supporting the Real Economy:** Examined indicators demonstrating the impact of bank services on the real economy, including comparisons with 4 major state-owned banks and culminated in the composition of *industry research reports*.
- **Industry Research in Bank Digital Transformation:** Collected and synthesized executive papers on the digital transformation practices of major financial institutions in China, formed a comprehensive 248-page document:
  - \* *Qualitative:* Explored the varied logic of digital transformation across institutions qualitatively.
  - \* *Quantitative:* Applied Natural Language Processing (NLP) for text mining, incorporating quantitative methods such as word frequency analysis, keyword extraction, and similarity analysis to detail differences.

### KPMG China

Beijing, China

Audit Intern

July 2021 – Aug. 2021

- Audited inter-bank lending between the Agricultural Bank of China and its branches.
- Drafted its half-year manuscript of interbank lending.

## EXTRACURRICULAR ACTIVITIES

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### News Center, Beihang University

Beijing, China

Vice Director

Sept. 2019 – Aug. 2021

- Directed the WeChat official account, and published 2 articles monthly.
- Organized 16 college-scale photography events.

## SKILLS

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**Coding:** Python, C, R, SQL, Hive, Spark, MATLAB

**Language:** TOEFL 108 (R30, L29, S25, W24)