Chaoyi Zhao 赵朝熠

Updated May 5, 2025

Massachusetts Institute of Technology, Sloan School of Management
Cambridge, MA, USA
Email: cy_zhao@mit.edu
Homepage: https://zhaochaoyi.github.io/

Affiliations

Massachusetts Institute of Technology, Sloan School of Management — MA, USA
Postdoctoral Associate @ MIT Laboratory for Financial Engineering — 2024 – Present
- Advisor: Prof. Andrew W. Lo

Society of Actuaries
Fellow (FSA, SOA) — 2024 – Present
Associate (ASA, SOA) — 2023 – 2024

Research Interests

Investments: Factor investing, High-frequency investing/trading, Healthcare investing
Statistics: High-dimensional statistics, Machine learning & deep learning
Actuarial Sciences: Copula theory

Education

Peking University, School of Mathematical Sciences — Beijing, China
Ph.D. in Statistics — Sep 2019 – Jan 2024
- Main advisor: Prof. Lan Wu   Secondary advisor: Prof. Ruixun Zhang
- Early graduated for half a year

Peking University, School of Mathematical Sciences — Beijing, China
B.S. in Mathematics and Applied Mathematics — Sep 2015 – Jul 2019
- Elite Undergraduate Program of Applied Mathematics — Sep 2017 – Jul 2019

Peking University, School of EECS — Beijing, China
B.S. (Double Degree) in Computer Science and Technology — Sep 2016 – Jul 2019

Honors

Awards

Outstanding Doctoral Dissertation Award (Peking University)	2024
Beijing Outstanding Graduate, Peking University Excellent Graduate	2019, 2024
Merit Student (Peking University)	2016, 2020 – 2023
S&P Global Academic ESG Research Award	2022
Second place in the Best Paper Prize for Young Scholars, Annual Conference of the Operations Research Society of China (Financial Engineering and Risk Management Branch)	2022
Excellent Graduate of Elite Undergraduate Program of Applied Mathematics	2019
The Student of The Year (10 students per year, Peking University)	2018
Merit Student Pacesetter (Peking University)	2018
Beijing Merit Student	2018
Excellent Student Leader (Peking University)	2017

Scholarships

National Scholarship	2018, 2023

President Scholarship (Peking University)	2019 – 2022
Leo KoGuan Scholarship (Peking University)	2022
Huatai Science and Technology Scholarship (Peking University)	2021
CETC the 14th Research Institute Glarun Scholarship (Peking University)	2020
The National Southwest Associated University Scholarship (Peking University)	2018
Shenzhen Finance Institute Scholarship (the Chinese University of Hong Kong, Shenzhen)	2017
Founder Scholarship (Peking University)	2016

Publications

$^{\#}$Alphabetical order; *Corresponding author.

Factor Investing

1. Breaking the Factor Zootopia: Factor Selection via Significant Tests of Multi-Task Lasso
   Chaoyi Zhao* and Lan Wu.
   Working Paper.

High-Frequency Investing/Trading

2. High-Frequency Liquidity in the Chinese Stock Market: Measurements, Patterns, and Determinants
   Chaoyi Zhao, Yufan Chen, Lintong Wu, Yuehao Dai, Ermo Chen, Lan Wu, and Ruixun Zhang.
   Pacific-Basin Finance Journal, 90, 102681, 2025. [PDF][Appendix][Journal]
3. Order Types and Natural Price Change: Model and Empirical Study of the Chinese Market
   Siyu Liu, Chaoyi Zhao*, and Lan Wu.
   International Journal of Financial Engineering, 9(04), 2250033, 2022. [PDF][Journal]

Healthcare Investing

4. Measuring and Optimizing the Risk and Reward of Green Portfolios
   Andrew W. Lo#, Ruixun Zhang#, and Chaoyi Zhao#*.
   The Journal of Impact and ESG Investing, 3(2), 55–93, 2022. [PDF][Journal]
   Winner of the S&P Global Academic ESG Research Award.
   Reported by Center for Statistical Science and School of Mathematical Sciences, Peking University.
5. Optimal Impact Portfolios with General Dependence and Marginals
   Andrew W. Lo#, Lan Wu#, Ruixun Zhang#, and Chaoyi Zhao#*.
   Operations Research, 72(5), 1775–1789, 2024. [PDF][Appendix][Journal]
   Second place in the Best Paper Prize for Young Scholars, Annual Conference of the Operations Research Society of China (Financial Engineering and Risk Management Branch).
   Reported by Center for Statistical Science, Peking University.

Machine/Deep Learning and Applications in Finance

6. On Consistency of Signature Using Lasso
   Xin Guo#, Binnan Wang#, Ruixun Zhang#, and Chaoyi Zhao#*.
   Operations Research, forthcoming, 2025. [PDF][Appendix][Journal]
7. Interpretable Image-Based Deep Learning for Price Trend Prediction in ETF Markets
   Ruixun Zhang, Chaoyi Zhao, and Guanglian Lin.
   The European Journal of Finance, forthcoming, 2023. [PDF][Journal]

8. The Success of AdaBoost and its Application in Portfolio Management
   Yijian Chuan, Chaoyi Zhao, Zhenrui He, and Lan Wu.
   International Journal of Financial Engineering, 8(02), 2142001, 2021. [PDF][Journal]

Actuarial Sciences

9. The Checkerboard Copula and Dependence Concepts
   Liyuan Lin[#], Ruodu Wang[#], Ruixun Zhang[#], and Chaoyi Zhao[#].
   SIAM Journal on Financial Mathematics, 16(2), 426–447, 2025. [PDF][Journal]
10. Construct Smith–Wilson Risk-Free Interest Rate Curves with Endogenous and Positive Ultimate Forward Rates
   Chaoyi Zhao[*], Zijian Jia, and Lan Wu.
   Insurance: Mathematics and Economics, 114, 156–175, 2024. [PDF][Journal]

Application of Statistical Methods in Finance and Beyond

11. The Evolution of Discrimination: How Finite Memory Shape Population Behavior?
   Andrew W. Lo[#], Ruixun Zhang[#], and Chaoyi Zhao[#*].
   Under review. [SSRN]

Books

12. Quantitative Investing (in Chinese)
   Jian Sun, Lan Wu, and Chaoyi Zhao.
   Science Press, 2023. [Link]
13. Financial Market Risk Management Analytics (in Chinese)
   Frank H. Koger. Translated by Chaoyi Zhao.
   Truth & Wisdom Press, 2022. [Link]
14. The Maths Book (in Chinese)
   Dorling Kindersley Ltd. Translated by Chaoyi Zhao.
   Publishing House of Electronics Industry, 2021. [Link]

Research Projects

Data-driven Financial Risk Forecasting
National Key R&D Program of China, participant — 2023 – 2024

Portfolio Analytics and Risk Management for Green Investing: Theory and Application
National Natural Science Foundation of China, participant — 2023 – 2024

High-Frequency T+0 Quantitative Trading Strategy Based on Deep Learning
Peking University and Founder Securities, participant — 2019 – 2020

Gradient Optimization Model Based on Genetic Programming
Ernst & Young (China) Advisor Ltd, intern — 2019

Multi-Factor Alpha Strategy Based on the AdaBoost Algorithm
Peking University and Founder Securities, participant — 2018 – 2019

Application of Statistical Learning in Modeling the Relationship Between Stock Index and Futures
Peking University, undergraduate research, group leader — 2017 – 2018

Teaching Experience

Teaching Assistant for Massachusetts Institute of Technology

Healthcare Finance Fall 2024

Elective for Graduate and Senior Undergraduate Students. Instructor: Prof. Andrew W. Lo

Teaching Assistant for Peking University

Quantitative Trading Fall 2020, 2022

Elective for Graduate and Senior Undergraduate Students. Instructors: Prof. Jian Sun and Lan Wu

Practice for Fixed Income Securities Fall 2021, 2022

Elective for Graduate and Senior Undergraduate Students. Instructors: Prof. Lan Wu *et al.*

Theory and Practice for Futures and Other Derivatives Spring 2022

Elective for Graduate and Senior Undergraduate Students. Instructors: Prof. Lan Wu *et al.*

Mathematical Analysis III (Including Exercise Class) Fall 2021

Core Class for Undergraduate Students. Instructor: Prof. Jiazhong Yang

Mathematical Analysis II (Including Exercise Class) Spring 2021

Core Class for Undergraduate Students. Instructor: Prof. Jiazhong Yang

Risk Management and Financial Regulation Spring 2021

Core Class for Graduate Students. Instructor: Prof. Lan Wu

Exercise Class for Probability and Statistics Spring 2020

Elective for Undergraduate Students.

Introduction to Financial Mathematics Fall 2019

Core Class for Undergraduate Students. Instructor: Prof. Lan Wu

Talks

On Consistency of Signature Using Lasso

CSIAM 2023 Oct 15, 2023

UC Berkeley Seminar May 7, 2023

Breaking the Factor Zootopia: Factor Selection via Significant Tests of Multi-Task Lasso

7th PKU-NUS Annual International Conference on Quantitative Finance and Economics May 20, 2023

PKU Seminar Apr 21, 2023

CSIAM Financial Math Annual Conference Nov 13, 2022

Optimal Impact Portfolios with General Dependence and Marginals

ICIAM 2023 @ Tokyo Aug 20–25, 2023

The 11th Annual Conference of the Operations Research Society of China (Financial Engineering and Risk Management Branch) Dec 10, 2022

- Second place in the Best Paper Prize for Young Scholars

Sun Yat-sen University Seminar Nov 4, 2022

The 19th Chinese Finance Annual Meeting Oct 30, 2022

High-Frequency Liquidity in the Chinese Stock Market: Measurements, Patterns, and Determinants

China Finance Review International & China International Risk Forum Joint Conference Jul 29, 2023

CSIAM Financial Math Annual Conference Nov 12, 2022

IFZ FinTech Colloquium 2022, Lucerne University of Applied Sciences and Arts Nov 2, 2022

2022 INFORMS Annual Meeting Oct 17, 2022

11th World Congress of Bachelier Finance Society Jun 15, 2022

Statistical Patterns of High-Frequency Data for A-share stocks in Shenzhen Stock Exchange
3rd Seminar for Young Scholars in Financial Engineering and Risk Management Jun 12, 2021

Construct Smith-Wilson Interest Rate Curves with Endogenous Ultimate Forward Rates
United As One: 24th International Congress on Insurance: Mathematics and Economics Jun 5, 2021

Speech for the Opening Ceremony of School of Mathematical Sciences
Opening Ceremony, School of Mathematical Sciences, Peking University Sep 15, 2018
– Representative of seniors [Link]

Skills

Programming: Python, R, C/C++, MATLAB, Java, SQL
Languages: Mandarin Chinese, English
Hobbies: Swimming, Ukulele