Chaoyi Zhao 赵朝熠

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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: Portfolio theory, Factor investing, Market microstructure	
Statistics: High-dimensional statistics, Machine learning, Artificial intelligence	
Actuarial Sciences: Copula theory, Term structure modeling	

Education		
Peking University, School of Mathematical Sciences		Beijing, China
Ph.D. in Statistics		Sep 2019 – Jan 2024
– Advisors: Prof. Lan Wu and Prof. Ruixun Zhang		
– Completed six months ahead of schedule		
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		2019, 2024
Excellent Graduate (Peking University)		2019, 2024
Merit Student (Peking University)		2016, 2020, 2021, 2022, 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 the 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, 2020, 2021, 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.

Portfolio Theory and Investing

1. 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]

2. 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.

3. 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 Practical Applications [PDF].
   – Reported by Center for Statistical Science and School of Mathematical Sciences, Peking University.

4. 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]

High-Dimensional Statistics, Machine Learning, and Artificial Intelligence

5. On Consistency of Signature Using Lasso
   Xin Guo, Binnan Wang, Ruixun Zhang, and Chaoyi Zhao#*.
   Operations Research, 73(5), 2530–2549, 2025. [PDF][Appendix][Journal]
   – Reported by Center for Statistical Science, Peking University.

6. The Evolution of Discrimination Under Finite Memory Constraints
   Andrew W. Lo, Ruixun Zhang, and Chaoyi Zhao#*.
   Scientific Reports, 15, 31774, 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]

Books

11. Quantitative Investment (in Chinese)
    Jian Sun, Lan Wu, and Chaoyi Zhao.
    Science Press, 2023. [Link]

12. Financial Market Risk Management Analytics (in Chinese)
    Frank H. Koger. Translated by Chaoyi Zhao.
    Truth & Wisdom Press, 2022. [Link]

13. The Maths Book (in Chinese)
    Dorling Kindersley Ltd. Translated by Chaoyi Zhao.
    Publishing House of Electronics Industry, 2021. [Link]

Doctoral Dissertation

14. Stochastic Models and Statistical Analysis for High-dimensional Multi-factor Models and Induced Order Statistics
    Chaoyi Zhao.
    Doctoral Dissertation in Statistics, Peking University, 2024.

Preprints

15. No Asset Is an Island: A Real Options Framework for Valuing Interdependent Projects
    Shomesh E. Chaudhuri, Andrew W. Lo, and Chaoyi Zhao[#*].
    Under review.

16. The Health of Nations Fund: Financing Global Drug Development
    Joonhyuk Cho, Manish Singh, Chaoyi Zhao, Shomesh E. Chaudhuri, and Andrew W. Lo.
    Under review.

17. Optimal Multi-Period Dynamic Portfolios for Sustainable Investing
    Danping Li, Ruixun Zhang, and Chaoyi Zhao[#*].
    Under review. [SSRN]

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

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 at Massachusetts Institute of Technology**	
	Machine Learning and Financial Technology	Spring 2026
	Elective for Graduate Students. Instructors: Prof. Andrew W. Lo and Prof. Paul F. Mende	
	Healthcare Finance	Fall 2024
	Elective for Graduate and Senior Undergraduate Students. Instructor: Prof. Andrew W. Lo	
	Teaching Assistant at 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	**No Asset Is an Island: A Real Options Framework for Valuing Interdependent Projects**	
	Peking University Seminar	Sep 18, 2025
	On Consistency of Signature Using Lasso	
	SIAM Conference on Financial Mathematics and Engineering (FM25)	Jul 15, 2025
	(Session Chair) 2024 INFORMS Annual Meeting	Oct 22, 2024

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
Peking University Seminar	Apr 21, 2023
CSIAM Financial Math Annual Conference	Nov 13, 2022

Optimal Impact Portfolios with General Dependence and Marginals

ICIAM 2023	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
(Session Chair) 11th World Congress of Bachelier Finance Society	Jun 15, 2022

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

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

Discussions

2025 MRS International Risk Conference	July 26, 2025

Non-Academic Talks

Speech for the Opening Ceremony of School of Mathematical Sciences, Peking University	Sep 15, 2018

   – Representative of seniors [Link]

Academic Services

Referee Service

ASTIN Bulletin, IEEE Transactions on Multimedia, Insurance: Mathematics and Economics, Management Science, North American Actuarial Journal, Operations Research

Skills

Programming: Python, R, C/C++, MATLAB, Java, SQL
Languages: Mandarin Chinese, English
Hobbies: Swimming, Rowing, Hiking, Bouldering, Stand-up Comedy