

Chaoyi Zhao 赵朝熠

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Affiliations	Massachusetts Institute of Technology, Sloan School of Management Postdoctoral Associate, MIT Laboratory for Financial Engineering – Advisor: Prof. Andrew W. Lo	MA, USA 2024 – Present
	Society of Actuaries Fellow (FSA, SOA) Associate (ASA, SOA)	2024 – Present 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 Ph.D. in Statistics – Advisors: Prof. Lan Wu and Prof. Ruixun Zhang – Completed six months ahead of schedule	Beijing, China Sep 2019 – Jan 2024
	Peking University, School of Mathematical Sciences B.S. in Mathematics and Applied Mathematics – Elite Undergraduate Program of Applied Mathematics	Beijing, China Sep 2015 – Jul 2019 Sep 2017 – Jul 2019
	Peking University, School of EECS B.S. (Double Degree) in Computer Science and Technology	Beijing, China Sep 2016 – Jul 2019
Honors	Awards Outstanding Doctoral Dissertation Award (Peking University) Beijing Outstanding Graduate Excellent Graduate (Peking University) Merit Student (Peking University) S&P Global Academic ESG Research Award 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) Excellent Graduate of the Elite Undergraduate Program of Applied Mathematics The Student of The Year (10 students per year, Peking University) Merit Student Pacesetter (Peking University) Beijing Merit Student Excellent Student Leader (Peking University)	2024 2019, 2024 2019, 2024 2016, 2020, 2021, 2022, 2023 2022 2022 2019 2018 2018 2018 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	
Teaching Experience	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 Assistant at Massachusetts Institute of Technology		
	<i>Machine Learning and Financial Technology</i>	Spring 2026	
	Elective for Graduate Students. Instructors: Prof. Andrew W. Lo and Prof. Paul F. Mende		
	<i>Healthcare Finance</i>	Fall 2024	
Teaching Assistant at Peking University	Elective for Graduate and Senior Undergraduate Students. Instructor: Prof. Andrew W. Lo		
	Quantitative Trading	Fall 2020, 2022	
	Elective for Graduate and Senior Undergraduate Students. Instructors: Prof. Jian Sun and Lan Wu		
	<i>Practice for Fixed Income Securities</i>	Fall 2021, 2022	
	Elective for Graduate and Senior Undergraduate Students. Instructors: Prof. Lan Wu <i>et al.</i>		
	<i>Theory and Practice for Futures and Other Derivatives</i>	Spring 2022	
	Elective for Graduate and Senior Undergraduate Students. Instructors: Prof. Lan Wu <i>et al.</i>		
	<i>Mathematical Analysis III (Including Exercise Class)</i>	Fall 2021	
Talks	Core Class for Undergraduate Students. Instructor: Prof. Jiazhong Yang		
	<i>Mathematical Analysis II (Including Exercise Class)</i>	Spring 2021	
	Core Class for Undergraduate Students. Instructor: Prof. Jiazhong Yang		
	<i>Risk Management and Financial Regulation</i>	Spring 2021	
	Core Class for Graduate Students. Instructor: Prof. Lan Wu		
	<i>Exercise Class for Probability and Statistics</i>	Spring 2020	
	Elective for Undergraduate Students.		
	<i>Introduction to Financial Mathematics</i>	Fall 2019	
No Asset Is an Island: A Real Options Framework for Valuing Interdependent Projects	Core Class for Undergraduate Students. Instructor: Prof. Lan Wu		
	Peking University Seminar	Sep 18, 2025	
	On Consistency of Signature Using Lasso		
	<i>SIAM Conference on Financial Mathematics and Engineering (FM25)</i>	Jul 15, 2025	
(Session Chair) 2024 INFORMS Annual Meeting		Oct 22, 2024	

<i>CSIAM 2023</i>	Oct 15, 2023
<i>UC Berkeley Seminar</i>	May 7, 2023
Breaking the Factor Zootopia: Factor Selection via Significant Tests of Multi-Task Lasso	
<i>7th PKU-NUS Annual International Conference on Quantitative Finance and Economics</i>	May 20, 2023
<i>Peking University Seminar</i>	Apr 21, 2023
<i>CSIAM Financial Math Annual Conference</i>	Nov 13, 2022
Optimal Impact Portfolios with General Dependence and Marginals	
<i>ICIAM 2023</i>	Aug 20–25, 2023
<i>The 11th Annual Conference of the Operations Research Society of China (Financial Engineering and Risk Management Branch)</i>	Dec 10, 2022
– Second place in the Best Paper Prize for Young Scholars	
<i>Sun Yat-sen University Seminar</i>	Nov 4, 2022
<i>The 19th Chinese Finance Annual Meeting</i>	Oct 30, 2022
High-Frequency Liquidity in the Chinese Stock Market: Measurements, Patterns, and Determinants	
<i>China Finance Review International & China International Risk Forum Joint Conference</i>	Jul 29, 2023
<i>CSIAM Financial Math Annual Conference</i>	Nov 12, 2022
<i>IFZ FinTech Colloquium 2022, Lucerne University of Applied Sciences and Arts</i>	Nov 2, 2022
<i>2022 INFORMS Annual Meeting</i>	Oct 17, 2022
(Session Chair) <i>11th World Congress of Bachelier Finance Society</i>	Jun 15, 2022
Construct Smith–Wilson Interest Rate Curves with Endogenous Ultimate Forward Rates	
<i>United As One: 24th International Congress on Insurance: Mathematics and Economics</i>	Jun 5, 2021
Statistical Patterns of High-Frequency Data for A-share stocks in Shenzhen Stock Exchange	
<i>3rd Seminar for Young Scholars in Financial Engineering and Risk Management</i>	Jun 12, 2021
Discussions	
<i>2025 MRS International Risk Conference</i>	July 26, 2025
Non-Academic Talks	
<i>Speech for the Opening Ceremony of School of Mathematical Sciences, Peking University</i>	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