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: 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#*.
   Under review. [arXiv]

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[#].
   Under review. [arXiv]

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 Investing (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]

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