

# Chaoyi Zhao

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## Ph.D. Candidate in Statistics

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## Research

**Investments:** Factor investing, High-frequency investing/trading, Sustainable investing

## Interests

**Statistics:** High-dimensional statistics, Machine learning & deep learning

**Actuarial Sciences**

## Education

### Peking University

Beijing, China

Ph.D. Candidate in Statistics Supervisor: Prof. Lan Wu

2019 – Present

### Peking University

Beijing, China

B.S. in Mathematics and Applied Mathematics

2015 – 2019

B.S. (Double Degree) in Computer Science and Technology

2016 – 2019

Elite Undergraduate Program of Applied Mathematics

2017 – 2019

## Honors

### Awards

[S&P Global Academic ESG Research Award](#)

2022

Merit Student

2016, 2020, 2021, 2022

Excellent Graduate of Elite Undergraduate Program of Applied Mathematics

2019

Peking University Excellent Graduate, Beijing Outstanding Graduate

2019

The Student of The Year (10 students per year)

2018

Merit Student Pacesetter

2018

Beijing Merit Student

2018

Excellent Student Leader

2017

### Scholarships

President Scholarship

2019 – 2023

Leo KoGuan Scholarship

2022

Huatai Science and Technology Scholarship

2021

CETC the 14th Research Institute Glarun Scholarship

2020

National Scholarship

2018

The National Southwest Associated University Scholarship

2018

Shenzhen Finance Institute Scholarship, the Chinese University of Hong Kong, Shenzhen

2017

Founder Scholarship

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  
Ruixun Zhang, Chaoyi Zhao\*, Yufan Chen, Lintong Wu, Yuehao Dai, Ermo Chen, Zhiwei Yao, Yihao Zhou, and Lan Wu.  
Under review. [SSRN]
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*, 2022, Forthcoming.

### Sustainable 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*, 2022, Forthcoming. [SSRN] Winner of the [S&P Global Academic ESG Research Award](#).
5. Optimal Impact Portfolios with General Dependence and Marginals  
Andrew W. Lo#, Lan Wu#, Ruixun Zhang#\*, and Chaoyi Zhao#\*.  
Working paper. [SSRN]

### Machine/Deep Learning and Their Applications in Finance

6. Channel and Spatial Attention CNN: Predicting Price Trends from Images  
Ruixun Zhang\*, Guanglian Lin, and Chaoyi Zhao.  
Under review. [SSRN]
7. 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]

### Actuarial Sciences

8. Construct Smith-Wilson Risk-Free Interest Rate Curves with Endogenous and Positive Ultimate Forward Rates  
Chaoyi Zhao\*, Zijian Jia, and Lan Wu.  
Under review.

## Books

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

## Research Projects

- High-Frequency T+0 Quantitative Trading Strategy Based on Deep Learning**  
Peking University and Founder Securities 2019 – 2020
- Gradient Optimization Model Based on Genetic Programming**  
Ernst & Young (China) Advisor Ltd 2019
- Multi-Factor Alpha Strategy Based on the AdaBoost Algorithm**  
Peking University and Founder Securities 2018 – 2019
- Application of Statistical Learning in Modeling the Relationship Between Stock Index and Futures**  
Undergraduate Research, Peking University 2017 – 2018

## Teaching Experience

- Teaching Assistant for Peking University**
- Quantitative Trading* Fall 2020, 2022  
Elective for Graduate and Senior Undergraduate Students. Instructor: Prof. Jian Sun and Lan Wu
- Practice for Fixed Income Securities* Fall 2021, 2022  
Elective for Graduate and Senior Undergraduate Students. Instructor: Prof. Lan Wu *et al.*
- Theory and Practice for Futures and Other Derivatives* Spring 2022  
Elective for Graduate and Senior Undergraduate Students. Instructor: 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
- Teaching Assistant for Master Program of Tulane University & University of Chinese Academy of Social Sciences**
- Fixed Income Analysis* 2020, 2021  
Core Class for Graduate Students. Instructor: Prof. Bill W. Reese

<i>Investment and Asset Pricing</i>	2020, 2021
Core Class for Graduate Students. Instructor: Prof. Frank H. Koger	
<i>Risk Management</i>	2019, 2020, 2021
Core Class for Graduate Students. Instructor: Prof. Frank H. Koger	
<i>Options and Other Derivatives</i>	2019, 2020, 2021
Core Class for Graduate Students. Instructor: Prof. Paul A. Spindt and Josh Pierce	
<i>Valuation</i>	2020, 2021
Core Class for Graduate Students. Instructor: Prof. Peggy Huang	
<i>Portfolio Management</i>	2020, 2021
Core Class for Graduate Students. Instructor: Prof. Helmuth Chavez	

## Talks

### **Optimal Impact Portfolios with General Dependence and Marginals**

*Seminar at Sun Yat-sen University* November 4, 2022

Invited talk.

*The 19th Chinese Finance Annual Meeting* October 30, 2022

Speaker of the ESG session. [[Link](#)]

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

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

Speaker. [[Link](#)]

*2022 INFORMS Annual Meeting* October 17, 2022

Speaker of the FinTech Session. [[Link](#)]

*11th World Congress of Bachelier Finance Society* June 15, 2022

Session chair and speaker of the Market Microstructure II Session. [[Link](#)]

### **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* June 12, 2021

Invited talk. [[Link](#)]

### **Construct Smith-Wilson Interest Rate Curves with Endogenous Ultimate Forward Rates**

*United As One: 24th International Congress on Insurance: Mathematics and Economics* June 5, 2021

Speaker of the Quantitative Finance session. [[Link](#)]

### **Speech for the Opening Ceremony of School of Mathematical Sciences**

*Opening Ceremony, School of Mathematical Sciences, Peking University* September 15, 2018

Representative of seniors. [[Link](#)]

## Skills

**Programming:** Python, C/C++, MATLAB, R, Java, SQL

**Languages:** Chinese, English, Chinese sign language

**Hobbies:** Swimming, Ukulele