

Zirui Wang

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EDUCATION

The University of Manchester

Manchester, UK

- MSc Mathematical Finance 09/2023 – 12/2024
- GPA: 3.96/4.0 (Distinction)
- Relevant courses: Stochastic calculus, Brownian motion, Martingale Theory, Stochastic modelling, Stochastic control, Derivative securities, Asset pricing theory

Western University

London ON, Canada

- Bachelor of Management and Organizational Studies (Specialization: Finance) 09/2019 – 09/2023
- Dean's Honor List

Research Interests

Optimal stopping problems, stochastic control, mathematical finance

RESEARCH EXPERIENCES & INTERNSHIPS

Shandong University

Jinan Shandong, China

Research Assistant

12/2024 – 08/2025

- **Supervisor:** Shuzhen Yang
- **Description:** Starting December 2024, I will be joining the mathematics department at Shandong University as a research assistant until August 2025 to work on research in the areas of stochastic control and computational finance.

Qingdao Urban Construction Investment Co., Ltd.

Qingdao Shandong, China

Investment Analyst Intern

06/2023 – 08/2023

- **Industry Research:** Assisted the project manager in conducting industry fundamental analysis and developing analytical frameworks. Participated in research across sectors including healthcare, new energy vehicles, aviation, and real estate markets.
- **Data Analysis:** Supported data collection, cleaning, processing, and analysis, visualization. Independently conducted secondary data verification and maintained updated data records.

PROJECTS

Quickest real-time detection of arbitrage opportunities (MSc dissertation)

06/2024 – 09/2024

- **Research Focus:** This study explores the optimal stopping problems in multi-dimensional independent Brownian motions, particularly focusing on real-time detection of a drift being introduced at a random time point.
- **Techniques and Methods:** The research addresses the free-boundary problems, applying nonlinear Fredholm integral equations to solve the optimal stopping boundary.
- **Application Area:** The findings have practical significance in the financial sector, providing a theoretical foundation and methodological support for detecting and seizing arbitrage opportunities in financial markets. Through Monte Carlo simulations in a one-dimensional single-drift setting, the expected error between the stopping time and the actual disorder time approaches 0.

Finite Difference Method American Option Pricing Project

03/2024 – 05/2024

- **Project Overview:** Utilized the finite difference method to solve the bond pricing problem with stochastic interest rates, further extending it to the pricing of American call options on these bonds. Applied the Crank-Nicolson method to enhance the accuracy and stability of numerical solutions. Introduced new boundary conditions and solving PDEs to optimize the numerical behavior of bond prices under high-interest-rate environments. Implemented the penalty function method and direct solution method for American options to handle early exercise features.

Monte Carlo Option Pricing Project

01/2024 – 03/2024

- **Project Overview:** Implemented Monte Carlo simulations and variance reduction techniques (antithetic variates, moment matching, and Halton sequences) for European and path-dependent options. Modeled options on unconventional assets through their SDEs, using the law of large numbers for expected value pricing. Successfully validated the convergence of simulation results, showing high consistency with analytical solutions.

Skills and Interests

Standardized test: GRE General Test: 332 – Quantitative: 170/Verbal 162/Analytical Writing 4.5 / Programing: Python, R, LaTeX.