

# Zirui Zhang

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## EDUCATION

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| <b>National University of Singapore</b>                                | Singapore, SG              |
| PhD Student, Department of Analytics & Operations, NUS Business School | 2023.08–2028.08 (Expected) |
| <b>Columbia University</b>                                             | New York, US               |
| Master of Science in Electrical Engineering                            | 2019.09–2020.12            |
| <b>Zhejiang University</b>                                             | Zhejiang, CN               |
| Bachelor of Science in Automation                                      | 2015.09–2019.06            |

**Relevant Courses:** Stochastic Processes; Foundations of Optimization; Discrete Optimization and Algorithms; Theory and Algorithms for Nonlinear Optimization; Theory and Algorithms for Dynamic Programming.

## PUBLICATIONS AND WORKING PAPERS

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**Zhenyu Hu and Zirui Zhang.** “Gacha: A Simple Mechanism to Screen a Budget-Constrained Buyer.” Working paper.

- Studied a simple selling mechanism in which a budget-constrained buyer can repeatedly purchase a lottery until obtaining a designated item, motivated by applications in digital games and collectible products.
- Developed mathematical models to characterize consumer purchasing behavior and compared the revenue performance of the Gacha mechanism with optimal and posted-price selling mechanisms.
- Established theoretical performance guarantees for the Gacha mechanism and showed that it can effectively differentiate consumers with different spending budgets despite its simple implementation.

## PROJECTS

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| <b>Sequential Search with Flexible Information Acquisition</b>             | Singapore, SG   |
| At National University of Singapore    Project Supervisor: Prof. Zhenyu Hu | 2026.06–Present |

- Developed a sequential search model in which consumers can flexibly choose how much information to acquire about a product’s valuation, rather than paying a fixed cost to fully learn its valuation.
- Characterized consumers’ optimal information acquisition and search strategies under different information costs and product environments.
- Analyzed firms’ optimal pricing decisions in response to consumers’ endogenous search behavior and investigated the platform’s optimal product ranking strategy.

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| <b>Optimal Production Strategies for Adoption of Automation</b>   | New York, US    |
| At Columbia University    Project Supervisor: Prof. Debasis Mitra | 2020.05–2020.07 |

- Built up a production model of adoption of automation derived from the Cobb–Douglas production function to quantify the process of replacing labor with machines.
- Discussed profit under different production strategies considering factors including decision periods, demand distributions, fixed cost, and machine maintenance fees. Simulated the situations and concluded the optimal solution.

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| <b>Analysis of Social Network Applications Based on Rohlfs’s Model</b> | New York, US    |
| At Columbia University    Project Supervisor: Prof. Debasis Mitra      | 2019.10–2019.11 |

- Added a cost function into Rohlfs’s Model and altered the distribution of willingness to pay. Explored the new equilibrium points in the model.
- Explained why Internet companies often account for large market shares and discussed advertisement strategy and budget allocation strategy based on the new variant model.

## WORK EXPERIENCE

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|-----------------------------------------------------|-----------------|
| <b>Juliang Engine Computer Technology Co., Ltd.</b> | Shanghai, CN    |
| Lark Contract, Software Development Engineer        | 2021.08–2023.08 |

- Developed the electronic signature module and integrated DocuSign to enable customers to sign contracts remotely.
- Built a file-edit service, Magic Editor, supporting file conversion, editing, and export. Connected the editor to the company’s internal software ecosystem, linking content in the editor to Lark, Lark Docs, and other products.
- Utilized Java, Spring Boot, MySQL, Redis, and Elasticsearch to build backend systems. Adopted multithreading, asynchronous operations, caching, and other methods to improve system performance by 64% on average.
- Designed an error-information delivery tool using RocketMQ, reducing the on-call rate by 77%.

**Adxeed, Inc. (Internship)**

Software Engineer

Issaquah, US

2021.05–2021.07

- Designed, developed, and deployed front-end and back-end software applications for e-commerce services.
- Retrieved, cleaned, and extracted e-commerce user data and transaction data.

**PATENT APPLICATIONS**

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**A Document Processing Method and Related Devices - Pending**

Published: 2023.08.15

Publication No. CN116595952A

- Developed a document-processing method for collaborative editing, helping enterprise software maintain consistent document updates across multiple users.

**An Information Processing Method for Software Support - Pending**

Published: 2023.04.07

Publication No. CN115934146A

- Processed routine software logs to help technical support teams identify application bugs and resolve user-reported software issues more efficiently.

**An Information Processing Method for Software Debugging - Pending**

Published: 2023.04.11

Publication No. CN115952137A

- Displayed relevant application logs within a web interface to support routine software testing, debugging, and development.

**A Code Quality Checking Method and Related Components - Pending**

Published: 2023.04.07

Publication No. CN115934563A

- Configured coding rules to support consistent code-quality checks and routine software development and maintenance.

**SKILLS**

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- **Languages:** Chinese (Native), English (Fluent; TOEFL 102, GRE 332)
- **Programming Languages:** Python, Java, MATLAB