

Zirui Zhang

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EDUCATION

National University of Singapore

PhD Student, Department of Analytics & Operations, NUS Business School

Singapore, SG

2023.08–2028.08 (Expected)

Columbia University

Master of Science in Electrical Engineering

New York, US

2019.09–2020.12

Zhejiang University

Bachelor of Science in Automation

Zhejiang, CN

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

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

Sequential Search with Flexible Information Acquisition

At National University of Singapore Advisor: Prof. Zhenyu Hu

Singapore, SG

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.

Optimal Production Strategies for Adoption of Automation

At Columbia University Advisor: Prof. Debasis Mitra

New York, US

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.

Analysis of Social Network Applications Based on Rohlfs’s Model

At Columbia University Advisor: Prof. Debasis Mitra

New York, US

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.

Simulation of Inventory Scheduling System

At Zhejiang University Advisor: Prof. Weimin Wu

Hangzhou, CN

2019.02–2019.04

- Constructed an inventory system with goods, shelves, conveyor belts, robot arms, and consumers in FlexSim.
- Simulated cargo identification, grabbing, and sorting processes of robot arms using inverse kinematics and control algorithms.
- Analyzed system throughput under different storage costs, order prices, sorting speeds, and scheduling strategies.

WORK EXPERIENCE

ByteDance (Juliang Engine Computer Technology Co., Ltd.)

Lark Contract, Software Development Engineer

Shanghai, CN

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 ByteDance 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 (ON SUBMITTING)

An intelligent recommendation on-call warning platform based on error log

- Analyzed error logs using predefined processes and recommended potential issues to technical support staff.

An integrated log debugging browser plug-in tool

- Connected the web page, server, and compiled application. Developers can test and view logs on the same web page and navigate to code in compilation software by clicking the log.

A pluggable and centrally managed code content inspection tool

- Unified configuration and injection of checking logic for easier code management.

SKILLS

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