Yueyang Zhong (Pronounced: "Yoo-eh-yahng Johng", Pronouns: she/her) (September 2022)

CONTACT INFORMATION

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RESEARCH INTERESTS

- My primary research interests are stochastic modeling and optimization of modern service systems with consideration of individual human behavior and imperfect systemic information. My research employs tools from applied probability, game theory, optimization, statistics, and learning theory (in particular, online learning and reinforcement learning).

- My current research studies, in the context of queueing systems, (i) how the strategic behavior of human customers and human servers influence service system design, and (ii) how analytical tools can enhance performance outcomes when full knowledge of the system is unavailable.

EDUCATION

The University of Chicago Booth School of Business — Chicago, IL

- Ph.D. in Operations Management (Minor in Applied Probability) — *2023 (expected)*

  Advisor: Professor Amy R. Ward

- M.B.A. — *2022*

Tsinghua University — Beijing, China

- B.S. in Industrial Engineering — *2018*

- B.A. in Economics — *2018*

PUBLICATIONS & PAPERS UNDER REVIEW

[1] **Yueyang Zhong**, Ragavendran Gopalakrishnan, Amy R. Ward. 2021. Behavior-Aware Queueing: The Finite-Buffer Setting with Strategic Servers. Minor Revision at *Operations Research*.

  - This foundational work develops a game-theoretic queueing framework to study how server work speed is affected by staffing level and wage when the queue buffer size is finite.
  - **Finalist, 2022 INFORMS IBM Best Student Paper Award**

[2] **Yueyang Zhong**, John R. Birge, Amy R. Ward. 2022. Learning the Scheduling Policy in Time-Varying Multiclass Many Server Queues. Major Revision at *Operations Research*.

  - This is the first performance guarantee for the learning-to-schedule problem with time-varying arrivals, customer abandonment, and general service and patience distributions.

[3] **Yueyang Zhong**, Amy R. Ward, Amber L. Puha. 2022. Asymptotically Optimal Idling in the $GI/GI/N+GI$ Queue. Published in *Operations Research Letters*.

  - An idling policy is proved to be asymptotically optimal in a fully general many-server queue with impatient customers, when servers trade off throughput with fatigue.

[4] **Yueyang Zhong**, YeeMan Bergstrom, Amy R. Ward. 2020. Data-Driven Market-Making via Model-Free Learning. Published in *In Proceedings of the Twenty-Ninth International Joint Conference on Artificial Intelligence (IJCAI-20): Special Track on AI in FinTech*.

  - This develops a Q-learning-based algorithm to guide how to sequentially place limit orders. The algorithmic performance passed the backtest of our partner market-making firm.

WORK IN PROGRESS

[a] **Yueyang Zhong**, Zhixi Wan, Zuo-Jun Max Shen. 2020. Queueing Versus Surge Pricing Mechanism: Efficiency, Equity, and Consumer Welfare. Reject and Resubmit at *Management Science*.

  - This uses a data-driven game-theoretic queueing model to study the operational benefits of a FCFS queueing mechanism over the commonly used dynamic pricing mechanism.
  - **Finalist, 2021 INFORMS Conference on Service Science Best Student Paper Award**

[b] **Yueyang Zhong**, Ragavendran Gopalakrishnan, Amy R. Ward. Some Properties of the Erlang B and C Formulae. 2022. *Working paper (available upon request)*.

- This derives some asymptotic properties of Erlang B and C formulae, which are key building blocks to study queueing systems when using the asymptotic approximation approach.

[c] **Yueyang Zhong**, Ragavendran Gopalakrishnan, Amy R. Ward. Behavior-Aware Queues with Strategic Arrivals and Strategic Servers. 2022. *In preparation.*

- This extends [1] to study the complicated interplay between customers and servers, and a price-of-anarchy result is discovered. A working paper is expected by November, 2022.

[d] **Yueyang Zhong**, John R. Birge, Amy R. Ward. Learning to Schedule in Multiclass Many Server Queues with Abandonment: An Instance-Independent Regret. 2022. *In preparation.*

- This extends [2] to concern a worst-case performance guarantee. A phased-UCB algorithm with forced exploration is provably optimal. A working paper is expected by June, 2023.

[e] **Yueyang Zhong**, Ragavendran Gopalakrishnan, Amy R. Ward. An Experimental Investigation of Strategic Server Behavior in Queueing Contexts. 2022. *In progress.*

- The experiment has been pre-registered on AsPredicted.org, approved by IRB, and completely coded up. We plan to launch it on Prolific to collect data by September, 2022.

HONORS AND AWARDS	- Finalist, IBM Best Student Paper Award, INFORMS	*2022*
	- Finalist, Best Service Science Student Paper Award, INFORMS Conference on Service Science	*2021*
	- Ph.D. Fellowship, Booth School of Business	*2018–2023*
	- Distinguished Undergraduate Thesis Award, Tsinghua University	*2018*
	- Outstanding Undergraduate Award, Tsinghua University	*2018*
	- First Prize, Chinese Physics Olympiad	*2016*

PRESENTATIONS

- Behavior-Aware Queueing: The Finite-Buffer Setting with Strategic Servers [1]

  - INFORMS Annual Meeting   Oct 2022

    SB31: Emerging Topics on Service Platform

    Sunday, October 16, 2022, 11:00AM-12:15PM, CC-Room 142

    MD51: Service Science Best Student Paper

    Monday, October 17, 2022, 2:00PM-3:15PM, M-Santa Fe

    MD56: APS Flash Talk

    Monday, October 17, 2022, 2:00PM-3:15PM, M-Marriott 3

  - Young Researchers Workshop, Cornell University (Poster), Ithaca   *Oct 2022*
  - CORS/INFORMS International Conference, Vancouver, Canada   *June 2022*
  - POMS, Virtual   *April 2022*
  - MSOM Conference Meeting, Virtual   *June 2021*
  - Stochastic Systems Seminar, Mathematical Sciences, UCSD, Virtual   *April 2021*
  - INFORMS Annual Meeting, Virtual   *Nov 2020*
  - INFORMS Annual Meeting, Phoenix, AZ   *Nov 2018*

- Learning the Scheduling Policy in Time-Varying Multiclass Many Server Queues [2]

  - INFORMS Annual Meeting   Oct 2022

    TB69: Learning Algorithms to Manage Service Systems

    Tuesday, October 18, 2022, 11:00AM-12:15PM, M-Indiana F (presented by Amy Ward)

  - International Conference of the Chinese Scholars Association for Management Science and Engineering (CSAMSE), Virtual   *July 2022*
  - CORS/INFORMS International Conference, Vancouver, Canada   *June 2022*
  - MOILS Seminar, Stern School of Business, NYU, Virtual   *Feb 2022*
  - INFORMS Annual Meeting, Anaheim, CA   *Oct 2021*

- Queueing Versus Surge Pricing Mechanism: Efficiency, Equity, and Consumer Welfare [a]

  - INFORMS Conference on Service Science, Virtual *Dec 2020*
  - Mechanism Design for Social Good (MD4SG), Virtual *Aug 2020*
  - INFORMS Annual Meeting, Seattle, WA *Oct 2019*

- Data-Driven Market-Making via Model-Free Learning [4]

  - POMS, Virtual *May 2021*
  - IJCAI-PRICAI, Virtual *Jan 2021*

TEACHING EXPERIENCE	**The University of Chicago Booth School of Business** Teaching Assistant (MBA Program)

The University of Chicago Booth School of Business
Teaching Assistant (MBA Program)

Applied Regression Analysis (MBA core, 180+ students) *Fall 2020, Fall 2021*

- Held weekly R review sessions to assist students with R programming.

Operations Management: Business Process Fundamentals (MBA core, 180+ students) *Winter 2020*

- Independently held two review sessions, and prepared midterm and final exam questions.

Managing Service Operations (MBA elective, 80+ students) *Winter 2022*

- Supervised student groups developing case materials in collaboration with multiple companies for the final project, independently held final review session, and led weekly office hours.

INDUSTRY EXPERIENCE

Pinterest Labs Remote
Research Intern, Ads Marketplace team *June 2021–Sept 2021*

- Designed and implemented a causal reinforcement learning algorithm to dynamically control the ad load leading to over 30% improvement in the yearly ad revenue from offline evaluation.

Blue Fire Capital, LLC Chicago, IL
Research Intern, Data Science Group *July 2019–Sept 2019*

- Developed a reinforcement learning based trading strategy, which passed the firm's backtest with a Sharpe ratio above 3 and tripled the cumulative PnL over one month; see [4] for reference.

DiDi Beijing, China
Research Intern, Research Center of Innovation and Operations *Jan 2018–July 2018*

- Built a theoretical queueing model to explain the firm's strategy transition from a surge pricing mechanism to a virtual queueing mechanism, which improves the passenger request fulfillment rate by 30.6% based on large-scale data with 10M+ users; see [a] for reference.

ACADEMIC SERVICE

Ad hoc Reviewer: *Operations Research, Mathematics of Operations Research, Operations Research Letters, Service Science, INFORMS Conference on Service Science*
Organizer: Session chair for INFORMS Annual Meeting 2021, CORS 2022.
Mentor: Advise Awaid Yasin (Master's student, the University of Chicago Division of Social Sciences) on experimental research [e]; Tutor students in the MBA program at the University of Chicago Booth School of Business on operations- and statistics-related MBA courses.

SELECTED PhD COURSES

Linear Programming, Convex Optimization, Infinite Dimensional Optimization, Dynamic Programming, Approximate Dynamic Programming, Stochastic Optimization, Online Optimization, Real Analysis, Measure-Theoretic Probability I, III, Stochastic Processes, Brownian Motion and Stochastic Calculus, Queueing Theory, Dynamic Control of Stochastic Networks, Stochastic Calculus and Queueing Applications, Queueing Models for Service Operations Management, Networks: Introduction to Modeling and Analysis, Machine Learning, Statistical Inference, Foundations of Advanced Quantitative Marketing, Microeconomics I, II, Macroeconomics.

SKILLS AND OTHERS

Language: Chinese (native), English (fluent)
Data/Statistical Tools: R, SQL
Optimization Tools: CPLEX, GUROBI, AMPL
Programming Language: Python, C/C++, JAVA
Hobbies: Piano, Yoga, Line-drawing, Calligraphy, Traveling, Photography

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