

Xinkai Shu

Contact Information

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Research Interest

Online Algorithms
Approximation Algorithms
Fundamental Graph Algorithms

Academic Positions

2025 – now	Postdoctoral researcher Department 1: Algorithm & Complexity Max Planck Institute for Informatics
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Education

2019 – 2024	Doctor of Philosophy Computer Science <i>The University of Hong Kong</i>	Supervisor: Prof. Zhiyi Huang
2015 – 2019	Bachelor of Engineering Computer Science and Technology (“Yao Class”) <i>Tsinghua University</i>	Instructor: Prof. Ran Duan

Conference Publications

Authors are listed in alphabetical order following the traditions of theoretical computer science, unless stated otherwise.

- [1] The Long Arm of Nashian Allocation in Online p-Mean Welfare Maximization [[arXiv](#)] [[link](#)]
Zhiyi Huang, Chui Shan Lee, Xinkai Shu, and Zhaozi Wang
52nd EATCS International Colloquium on Automata, Languages, and Programming (ICALP 2025)
- [2] Breaking the Sorting Barrier for Directed Single-Source Shortest Paths [[arXiv](#)] [[link](#)]
Ran Duan, Jiayi Mao, Xiao Mao, Xinkai Shu, and Longhui Yin
57th Annual ACM SIGACT Symposium on Theory of Computing (STOC 2025)
Best paper award
- [3] Online Matching Meets Sampling Without Replacement [[arXiv](#)] [[link](#)]
Zhiyi Huang, Chui Shan Lee, Jianqiao Lu, and Xinkai Shu
20th Conference on Web and Internet Economics (WINE 2024)

- [4] Online Nash Welfare Maximization Without Predictions [[arXiv](#)] [[link](#)]
Zhiyi Huang, Minming Li, Xinkai Shu, and Tianze Wei
19th Conference on Web and Internet Economics (WINE 2023)
- [5] A Randomized Algorithm for Single-Source Shortest Path on Undirected Real-Weighted Graphs [[arXiv](#)] [[link](#)]
Ran Duan, Jiayi Mao, Xinkai Shu, and Longhui Yin
64th IEEE Annual Symposium on Foundations of Computer Science (FOCS 2023)
- [6] The Power of Multiple Choices in Online Stochastic Matching [[arXiv](#)] [[link](#)]
Zhiyi Huang, Xinkai Shu, and Shuyi Yan
54th Annual ACM SIGACT Symposium on Theory of Computing (STOC 2022)
- [7] Online Stochastic Matching, Poisson Arrivals, and the Natural Linear Program [[arXiv](#)] [[link](#)]
Zhiyi Huang and Xinkai Shu
53rd Annual ACM SIGACT Symposium on Theory of Computing (STOC 2021)

Theses

Online Matching and Resource Allocation under Stochasticity
Doctoral thesis, supervised by Prof. Zhiyi Huang, 2024

Quick Algorithms for Dynamic Edge Coloring (in Chinese)
Bachelor thesis, instructed by Prof. Ran Duan, 2019

Invited Talks

Breaking the Sorting Barrier for Directed Single-Source Shortest Paths
– *International Joint Conference on Theoretical Computer Science – Frontier of Algorithmic Wisdom (IJTCS-FAW) 2025*
Sorbonne University, June 30 – July 2, 2025

A Randomized Algorithm for Single-Source Shortest Path on Undirected Real-Weighted Graphs
– *CCF Forum for distinguished Ph.D. Candidates in Theoretical Computer Science 2023*
The Hong Kong Polytechnic University, July 20 – 21, 2023
– *Institute for Theoretical Computer Science (ITCS) Seminar*
Shanghai University of Finance and Economics, July 11, 2023

Online Nash Welfare Maximization Without Predictions
– *Complexity & Algorithms Workshop (C&A) 2023*
Shandong University, April 1 – 2, 2023

The Power of Multiple Choices in Online Stochastic Matching
– *International Joint Conference on Theoretical Computer Science – Frontier of Algorithmic Wisdom (IJTCS-FAW) 2022*
City University of Hong Kong, August 15 – 19, 2022 (virtually)

Research Visits

Mar 1, 2023 – Institute for Theoretical Computer Science
Aug 31, 2023 Shanghai University of Finance and Economics

Honors and Awards

2025 **Best Paper Award**
57th Annual ACM SIGACT Symposium on Theory of Computing

2019 **Postgraduate Scholarship**
The University of Hong Kong

2016 **Tsinghua-Baidu Scholarship**
Tsinghua University & Baidu, Inc.

2014 & 2013 **Gold Medal**
China National Olympiad in Informatics

Academic Services

Conference reviewing:

- 2026: STOC, SODA
- 2025: WAOA, APPROX, ICML, STOC, SODA
- 2024: ICALP, SODA
- 2023: ICALP, ISSAC, SODA
- 2022: STOC

Teaching Experience

Teaching assistant at *the University of Hong Kong*:

- 2022 Spring COMP 3250B Design and analysis of algorithms
- 2021 Fall COMP 3250A Design and analysis of algorithms (Advanced)
- 2021 Fall COMP 3351 Advanced algorithm analysis
- 2020 Spring COMP 3250A Design and analysis of algorithms

Additional Information

Language Native Chinese, Fluent English, Intermediate Japanese

Programming Proficient in C++, Python, PASCAL, used to be competitive programmer

Puzzle I love solving puzzles, especially mathematical puzzles (e.g. sudoku, kakuro, slitherlink and masyu), as well as chess problems, go problems and tsume-shogi