Rudy Zhou

rbz@andrew.cmu.edu https://rudyzhou.github.io/

Research Interests

I want to understand how much information we *really* need to solve an optimization problem. On the methodological side, I have worked on

- breakthrough algorithms for fundamental optimization problems under various kinds of uncertainty – especially stochastic models
- general-purpose technical tools in probability and discrete/continuous optimization, leading to a unified understanding of these problems and new algorithm design approaches
- new models to illuminate the benefits and limitations of augmenting algorithms with machine-learned predictions

On the applied side, I have long-term collaborations with Microsoft Research and the Office of Naval Research in the areas of cloud computing and logistics, respectively. These collaborations have led to

- more power-efficient resource allocation algorithms for cloud data centers that can potentially save millions of dollars in power consumption and greatly reduce the environmental impact of cloud computing
- an end-to-end optimization tool for scheduling fleets that enables more efficient and robust scheduling in the face of disruptions **(currently used in production)**

Academic Experience

Postdoc *2023 - present*
Tepper School of Business, Carnegie Mellon University
Advisor: Benjamin Moseley

PhD Algorithms, Combinatorics, and Optimization *2018 - 2023*
Tepper School of Business, Carnegie Mellon University
Advisor: Benjamin Moseley
Winner of 2023 Gerald L. Thompson Doctoral Dissertation Award in Management Science

MS Computer Science *2016 - 2017*
Washington University in St. Louis
Advisor: Brendan Juba

BA Mathematics *2012 - 2016*
Washington University in St. Louis

Industry Experience

Research Intern *Summer 2022*
Microsoft Research Redmond, Cloud Operations Research (CORE) group
Mentor: Konstantina Mellou

Publications

Author order is alphabetical by last name unless otherwise noted by ($\star$).

Preprints

Franziska Eberle, Thomas Kesselheim, Rudy Zhou
Stochastic Scheduling with General Norms

In preparation.

Anupam Gupta, Benjamin Moseley, Rudy Zhou
Bayesian Probing on Graphs
In preparation.

Benjamin Moseley, Heather Newman, Kirk Pruhs, Rudy Zhou
Gittins with Distribution Errors
In preparation.

Konstantina Mellou, Marco Molinaro, Rudy Zhou
The Power of Migrations in Dynamic Bin Packing
Conditionally accepted at Sigmetrics 2025. Link

Journal Publications

Franziska Eberle, Anupam Gupta, Nicole Megow, Benjamin Moseley, Rudy Zhou
Configuration Balancing for Stochastic Requests
Mathematical Programming B 2024. Link

Anupam Gupta, Benjamin Moseley, Rudy Zhou
Structural Iterative Rounding for Generalized k-Median Problems
Mathematical Programming A 2024. Link

Benjamin Moseley, Kirk Pruhs, Clifford Stein, Rudy Zhou
A Competitive Algorithm for Throughput Maximization on Identical Machines
Mathematical Programming B 2024. Link

Sungjin Im, Benjamin Moseley, Rudy Zhou
The Matroid Cup Game
Operations Research Letters 2021. Link

Rudy Zhou, Han Liu, Tao Ju, Ram Dixit (⋆)
Quantifying the polymerization dynamics of plant cortical microtubules using kymograph analysis
Methods in Cell Biology, 2020. Link

Conference Publications

Konstantina Mellou, Marco Molinaro, Rudy Zhou
Online Demand Scheduling with Failovers
International Colloquium on Automata, Languages and Programming (ICALP) 2023. Link

Franziska Eberle, Anupam Gupta, Nicole Megow, Benjamin Moseley, Rudy Zhou
Configuration Balancing for Stochastic Requests
Integer Programming and Combinatorial Optimization (IPCO) 2023. Link

Anupam Gupta, Benjamin Moseley, Rudy Zhou
Minimizing Completion Times for Stochastic Jobs via Batched Free Times
Symposium on Discrete Algorithms (SODA) 2023. Link

Benjamin Moseley, Kirk Pruhs, Clifford Stein, Rudy Zhou
A Competitive Algorithm for Throughput Maximization on Identical Machines
Integer Programming and Combinatorial Optimization (IPCO) 2022. Link

Silvio Lattanzi, Benjamin Moseley, Sergei Vassilvitskii, Yuyan Wang, Rudy Zhou
Robust Online Correlation Clustering

Neural Information Processing Systems (NeurIPS) 2021. Link

Anupam Gupta, Benjamin Moseley, Rudy Zhou
Structural Iterative Rounding for Generalized k-Median Problems
International Colloquium on Automata, Languages and Programming (ICALP) 2021. Link

Sungjin Im, Mahshid Montazer Qaem, Benjamin Moseley, Xiaorui Sun, Rudy Zhou
Fast Noise Removal for k-Means Clustering
Artificial Intelligence and Statistics (AISTATS) 2020. Link

Teaching

***(Course Designer)** MSBA Machine Learning Fundamentals (Main Instructor)* *Spring 2024 Session 1*
Teaching Evaluations: 4.88/5 Course, 4.91/5 Instruction
Highest teaching evaluation in course history

MBA Calculus Fundamentals (Main Instructor) *Spring 2023 Session 2*
Teaching Evaluations: 3.75/5 Course, 4.75/5 Instruction

MBA Calculus Fundamentals (Main Instructor) *Spring 2022 Session 2*
Teaching Evaluations: 5/5 Course, 5/5 Instruction

MBA Calculus Fundamentals (Main Instructor) *Spring 2022 Session 1*
Teaching Evaluations: 4.8/5 Course, 4.93/5 Instruction

Teaching Assistant at Carnegie Mellon University: PhD Graph Theory (Fall 2020, Fall 2021)

Teaching Assistant at Washington University in St. Louis: Computational Geometry (Fall 2017), Object-Oriented Software Development Laboratory (Spring 2017)

Awards and Honors

Gerald L. Thompson Doctoral Dissertation Award in Management Science *2023*
4 × Provost Conference Fund Award *2020 - 2023*
William Larimer Mellon Fellowship *2018 - 2023*

Invited Talks

INFORMS Annual Meeting *2023*
Online Demand Scheduling with Failovers

Banff International Research Station *2023*
Online Demand Scheduling with Failovers

Dagstuhl Scheduling Seminar *2023*
Minimizing Completion Times for Stochastic Jobs via Batched Free Times

INFORMS Annual Meeting *2022*
Combinatorial Optimization under Uncertainty

Combinatorial Optimization and Logistics Seminar, University of Bremen *2022*
A Competitive Algorithm for Throughput Maximization on Identical Machines

Theory Reading Group, Dartmouth College *2022*
Structural Iterative Rounding for Generalized k-Median Problems

INFORMS Annual Meeting *2020*

Structural Iterative Rounding for Generalized k-Median Problems

Service

Organization: *Session chair for approximation algorithms at INFORMS Annual Meeting 2024*

Program Committee: *Workshop on Models and Algorithms for Planning and Scheduling Problems (MAPSP) 2024*

Journal Reviewer: *Mathematics of Operations Research, Mathematical Programming, Information Processing Letters*

Conference Reviewer: *STOC, SODA, IPCO, ITCS, ICALP, AISTATS, ISAAC, ESA, APPROX, SWAT*