

Rudy Zhou

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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

<i>Postdoc</i> Tepper School of Business, Carnegie Mellon University Advisor: Benjamin Moseley	2023 - present
<i>PhD Algorithms, Combinatorics, and Optimization</i> Tepper School of Business, Carnegie Mellon University Advisor: Benjamin Moseley Winner of 2023 Gerald L. Thompson Doctoral Dissertation Award in Management Science	2018 - 2023
<i>MS Computer Science</i> Washington University in St. Louis Advisor: Brendan Juba	2016 - 2017
<i>BA Mathematics</i> Washington University in St. Louis	2012 - 2016

Industry Experience

<i>Research Intern</i> Microsoft Research Redmond, Cloud Operations Research (CORE) group Mentor: Konstantina Mellou	Summer 2022
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Publications

Author order is alphabetical by last name unless otherwise noted by (★).

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.

Journal Publications

Konstantina Mellou, Marco Molinaro, Rudy Zhou
The Power of Migrations in Dynamic Bin Packing
Proceedings of the ACM on Measurement and Analysis of Computing Systems (POMACS) 2024 (to appear). [Link](#)

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
The Power of Migrations in Dynamic Bin Packing
Sigmetrics 2025 (to appear). [Link](#)

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*