Kalen Patton

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Research Interests

Optimization under uncertainty, online algorithms, resource allocation, submodular functions, prophet inequalities

Education

PhD Candidate, Georgia Institute of Technology, Mathematics — Aug 2021 – Present
- Part of the Algorithms, Combinatorics, and Optimization (ACO) program — GPA: 4.0/4.0
- Advised by Sahil Singla

BS, Georgia Institute of Technology, Mathematics, Computer Science — Aug 2017 – May 2021
- Dual degree, concentrations in machine learning, networks, and discrete math — GPA: 4.0/4.0

Publications

Intergral Online Algorithms for Set Cover and Load Balancing with Convex Objectives 🔗 — FOCS 2025

Thomas Kesselheim, Marco Molinaro, Kalen Patton, Sahil Singla.

IEEE Symposium on Foundations of Computer Science (FOCS). 2025.

The Online Submodular Assigment Problem 🔗 — FOCS 2024

Daniel Hathcock, Billy Jin, Kalen Patton, Sherry Sarkar, Michael Zlatin.

IEEE Symposium on Foundations of Computer Science (FOCS). 2024.

Improved Mechanisms and Prophet Inequalities for Graphical Dependencies 🔗 — EC 2024

Vasilis Livanos, Kalen Patton, Sahil Singla.

The Twenty-Fifth ACM Conference on Economics and Computation (EC). 2024.

Submodular Norms with Applications To Online Facility Location and Stochastic Probing 🔗 — APPROX 2023

Kalen Patton, Matteo Russo, Sahil Singla.

Approximation Algorithms for Combinatorial Optimization Problems (APPROX/RANDOM). 2023.

Prague Dimension of Random Graphs 🔗 — 2023

He Guo, Kalen Patton, Lutz Warnke.

Combinatorica 43, 853-884. 2023.

Markov Chain-Based Sampling for Exploring RNA Secondary Structure under the Nearest Neighbor Thermodynamic Model and Extended Applications 🔗 — 2020

Anna Kirkpatrick, Kalen Patton, Prasad Tetali, Cassie Mitchell.

Mathematical and Computational Applications. 25(4), 67. 2020.

Preprints

Online Resource Allocation with Concave Diminishing-Returns Objectives 🔗 — 2025

Kalen Patton.

Online Combinatorial Optimization with Graphical Dependencies 🔗 — 2025

Zhimeng Gao, Evangelia Gergatsouli, Kalen Patton, Sahil Singla.

Awards

ACO-ARC Research Fellowship. Georgia Tech, Algorithms and Randomness Center	2024
David L. Brown Fellowship. Georgia Tech, School of Mathematics	2023
Robert A. Pierotti Memorial Scholarship. Georgia Tech, College of Science	2021
Provost's Academic Excellence Award. Georgia Tech, College of Science & College of Computing	2021

Work Experience

Software Engineer Intern, Expanse (acquired by Palo Alto Networks) – Atlanta, GA   May 2020 – July 2020
- Designed efficient algorithms and software for transferring large datasets between web APIs.
- Worked in Python with use of Docker and cron scheduling.

Technical Skills

Languages: Python, C, C++, Javascript, Java   **Software:** Git, Docker, Cron, Jenkins

Teaching Experience

Graduate Courses
- CS 6550 Advanced Algorithms and Uncertainty, Teaching Assistant   Spring 2024
- Math 7018 Probabilistic Combinatorics, Grader   Spring 2022
- Math 7018 Probabilistic Combinatorics, Grader   Spring 2021

Undergraduate Courses
- Math 4108 Abstract Algebra, Grader   Spring 2023
- Math 1554 Linear Algebra, Teaching Assistant   Fall 2022
- Math 4022 Intro to Graph Theory, Grader   Fall 2022
- Math 1554 Linear Algebra, Teaching Assistant   Spring 2022
- Math 1553 Linear Algebra, Teaching Assistant   Spring 2020
- Math 1553 Linear Algebra, Teaching Assistant   Fall 2019
- Math 4221 Stochastic Processes, Grader   Fall 2019
- Math 2551 Multivariable Calculus, Teaching Assistant   Summer 2019
- Math 1552 Integral Calculus, Teaching Assistant   Fall 2018

Academic Service

Volunteering
- Georgia Tech High School Math Day, Organizer   Mar 2024
- FOCS 2024, Volunteer and session chair   Oct 2024

Conference/Journal Reviewing
- SODA 2025
- ITCS 2025
- Mathematical Programming
- STOC 2024
- SODA 2024