

# SAMI DAVIES

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*position*                    Post-doc at Northwestern CS

## Research Objective

To design algorithms for combinatorial optimization problems that go beyond worst-case analysis in order to (1) develop a more complete theoretical understanding of a problem's difficulty and (2) provide performance guarantees that are representative of what happens in practice.

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## Education

<i>University of Washington</i>	2016–2021	Ph.D. in Mathematics
<i>University of Illinois at Chicago</i>	2015–2016	M.S. in Mathematics
<i>Carnegie Mellon University</i>	2011–2015	B.S. in Mathematics Minor in Economics, College and University Honors

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## Publications

- [1] *Feb. 2023*                      Fast Combinatorial Algorithms for Min Max Correlation Clustering  
*ICML 2023*                      Sami Davies, Benjamin Moseley, Heather Newman
- [2] *Oct. 2022*                      Predictive Flows for Faster Ford-Fulkerson  
*ICML 2023*                      Sami Davies, Benjamin Moseley, Sergei Vassilvitskii, Yuyan Wang
- [3] *July 2022*                      Robust Factorizations and Colorings of Tensor Graphs  
*In submission*                      Joshua Brakensiek, Sami Davies
- [4] *Feb. 2022*                      Balancing Flow Time and Energy Consumption  
*SPAA 2022*                      Sami Davies, Samir Khuller, Shirley Zhang
- [5] *Sept. 2021*                      New Lower Bounds on the Total Variation Distance Between Mixtures of Two Gaussians  
*ALT 2022*                      Sami Davies, Arya Mazumdar, Soumyabrata Pal, Cyrus Rashtchian
- [6] *July 2021*                      On the Hardness of Scheduling with Non-Uniform Communication Delays  
*SODA 2022*                      Sami Davies, Janardhan Kulkarni, Thomas Rothvoss, Sai Sandeep, Jakub Tarnawski, Yihao Zhang
- [7] *July 2021*                      Approximate Trace Reconstruction: Algorithms  
*ISIT 2021*                      Sami Davies, Miklós Z. Rácz, Benjamin Schiffer, Cyrus Rashtchian

- [8] *July 2020* Scheduling with Communication Delays via LP Hierarchies and Clustering II: Weighted Completion Times on Related Machines  
SODA 2021 Sami Davies, Janardhan Kulkarni, Thomas Rothvoss, Jakub Tarnawski, Yihao Zhang
- [9] *April 2020* Scheduling with Communication Delays via LP Hierarchies and Clustering  
FOCS 2020 Sami Davies, Janardhan Kulkarni, Thomas Rothvoss, Jakub Tarnawski, Yihao Zhang
- [10] *July 2018* A Tale of Santa Claus, Hypergraphs and Matroids  
SODA 2020 Sami Davies, Thomas Rothvoss, Yihao Zhang
- [11] *Jan. 2019* Reconstructing Trees from Traces  
COLT 2019 Sami Davies, Miklós Z. Rácz, Cyrus Rashtchian. Full version in the Annals of Applied Probability 31(6): 2772–2810, 2021

### Recent Invited Participation and Internships

- Sept. 2023* Simons Institute  
Program on Logic and Algorithms in Database Theory and AI
- Sept. 2023* Banff International Research Station (BIRS)  
Approximation Algorithms and the Hardness of Approximations workshop
- Feb. 2023* Dagstuhl Seminar in Scheduling  
1 of 5 invited hour long talks
- Oct. 2022* EECS Rising Stars  
Workshop, held at UT Austin in 2022
- June 2022* TCS Women Rising Stars at STOC 2022  
Virtual talk on robust tensor factorization
- May 2022* IDEAL Workshop on Algorithms for Massive Data Sets  
Virtual talk on learning-augmented algorithms
- May 2021* CanaDAM(Canadian Discrete and Algorithmic Mathematics)  
Virtual talk on scheduling with communication delays
- Summer 2020* Microsoft Research, Redmond Intern  
Hosted by Janardhan Kulkarni and Jakub Tarnawski in the Algorithms group
- Feb. 2020* Dagstuhl Seminar in Scheduling  
Talk on the Santa Claus problem

### Awards and Fellowships

- 2021-2023 NSF Computing Innovation Fellow  
Awarded funding for a two-year post-doctoral fellowship
- 2020 Tanzi-Egerton Fellow  
Awarded to an outstanding senior graduate student in mathematics at UW

- 2020 Microsoft Research Dissertation Grant  
Awarded to ten graduate students in computer science across the US
- 2017-2019 McKibben and Merner Endowed Fellowship in Mathematics  
Awarded to two mathematics Ph.D. students at UW who were exceptional in their preliminary exams and first-year courses

## Teaching

I taught the following courses:

**Math 107** Math in Society FEPPS Summer 2018  
**CSE 311** Foundations of Computing I UW Spring 2020

I served as a teaching assistant for the following courses:

**Math 111** Algebra with Applications UW Fall 2017  
**Math 124** Calculus I UW Winter & Spring 2017  
**Math 126** Multivariable Calculus UW Fall 2016  
**Math 121** Pre-Calculus UIC Fall 2015 & Spring 2016  
**21-241** Matrices & Linear Transformations CMU Spring 2015

## Service and Outreach

### External Reviewer

SODA 2020, ICALP 2020, *IEEE Transactions on Information Theory*, MFCS 2020, ISAAC 2020, *Operations Research*, PODS 2021, WADS 2021, ICALP 2021, STOC 2022, ICALP 2022, ESA 2022, *Discrete Mathematics*, ISAAC 2022, SODA 2023, *Algorithmica*, FOCS 2023

### PC Member

APPROX 2023, WAOA 2023, IPCO 2024

- Dec. 2021 Co-organizer 2021 Northwestern Junior Theorists Workshop  
Co-organized a workshop highlighting rising theoretical computer scientists.  
<https://theory.cs.northwestern.edu/events/2021-junior-theorists-workshop/>
- 2018-2021 Washington Directed Reading Program  
Mentored for the WDRP, a program that pairs undergraduate students with graduate students for independent reading projects. Helped conceive and write grants for the WDRP in summer 2018.
- 2021 Mastery Learning Hour  
Tutored math for K-12 students. Provided support to students during COVID-19 pandemic.
- 2017-2019 Freedom Education Project Puget Sound (FEPPS)  
Tutored incarcerated women during the fall and winter of 2017. Served as the course co-instructor for Math 107 during the summer of 2018 at the Washington Corrections Center for Women.
- 2018 Math Circle  
Served as an instructor during the spring of 2018.

May 31, 2023