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Hao Sun

Personal Data

Degrees

Ph.D. Sept 2016 - Sept 2022
University of Waterloo, Ontario, Canada
Thesis title: *Transversal Problems In Sparse Graphs*
Thesis advisor: Prof. Jochen Koenemann

Masters of Mathematics Sept 2014 - Aug 2016
University of Waterloo, Ontario, Canada
Thesis title: *ADMM for SDP Relaxation of GP*
Thesis advisors: Prof. Henry Wolkowicz, Prof. William Cook

Honours Bachelor of Math Sept 2010 - May 2014

(Double Major in Combinatorics & Optimization and Pure Math), with distinction –Dean's Honours List. University of Waterloo

Employment/Affiliation

University of California Berkeley, California, USA Sept 2025-Dec 2025
Simons Institute for the Theory of Computing
Visiting research scholar

University of Houston, Houston, Texas, USA Sept 2024- present
Postdoctoral fellow

University of Alberta, Edmonton, Alberta, Canada Sept 2022 - Aug 2024
Postdoctoral fellow

University of Waterloo, Waterloo, Ontario, Canada Sept-Dec 2020
Instructor

University of Waterloo, Waterloo, Ontario, Canada May-Aug, 2014
C&O Undergraduate Summer Research Assistant

University of Waterloo, Waterloo, Ontario, Canada May-Aug, 2013
C&O Undergraduate Summer Research Assistant

University of Waterloo, Waterloo, Ontario, Canada May-Aug, 2012
C&O Undergraduate Summer Research Assistant

Research

Areas of Interest

Combinatorial Optimization, Approximation and Online Algorithms, Caching and Paging Algorithms.

Publications

1. Rathish Das and Hao Sun. Approximation Hardness of Resource Scheduling. *Proceedings of the 37th ACM Symposium on Parallelism in Algorithms and Architectures* (SPAA), 2025 [PDF].

   Invited to *ACM Transactions on Parallel Computing* (TOPC), special issue for SPAA.

2. Zachary Friggstad, Mohammad Salavatipour and Hao Sun. Approximation Algorithms for the Generalized Point-to-Point Problem. *19th International Symposium on Algorithms and Data Structures Symposium* (WADS), 2025 [PDF].

3. Zachary Friggstad, Mohsen Rezapour, Mohammad Salavatipour and Hao Sun. A QPTAS for Facility Location on Unit Disk Graphs. *19th International Symposium on Algorithms and Data Structures Symposium* (WADS), 2025 [PDF].

4. Hao Sun. A Constant Factor Approximation for Directed Feedback Vertex Set in Graphs of Bounded Genus. *International Conference on Approximation Algorithms for Combinatorial Optimization Problems* (APPROX), 2024 [PDF].

5. Zachary Friggstad and Hao Sun A Logarithmic Integrality Gap for Generalizations of Quasi-bipartite Instances of Directed Steiner Tree. *Scandinavian Symposium and Workshops on Algorithm Theory* (SWAT), 2024 [PDF].

6. Alexander Göke, Jochen Koenemann, Matthias Mnich and Hao Sun. Hitting Weighted Even Cycles in Planar Graphs. *International Conference on Approximation Algorithms for Combinatorial Optimization Problems* (APPROX), 2021 [PDF]. Also in *SIAM Journal on Discrete Mathematics* (SIDMA), 2022 [PDF].

7. Hao Sun. An Improved Aproximation Bound for Minimum Weight Dominating Set on Graphs of Bounded Arboricity. *In Approximation and Online Algorithms* (WAOA), Springer, 2021. [PDF].

8. Xinxin Li, Ting Kei Pong, Hao Sun and Henry Wolkowicz. A Strictly Contractive Peaceman-Rachford Splitting Method for the Doubly Nonnegative Relaxation of the Minimum Cut Problem. *Computational Optimization and Applications* 2021 [PDF]

9. Jim Geelen and Hao Sun. A proof of Rado's Theorem via Principal Extension. *Advances in Applied Mathematics* 2020 [PDF].

10. Ting Kei Pong, Hao Sun, Ningchuan Wang and Henry Wolkowicz. Eigenvalue, Quadratic programming, and Semidefinite Programming Relaxations for a Cut Minimization Problem. *Computational Optimization and Applications* 2016 [PDF].

Awards and Scholarships

Graduate Research Award 2020 - 2022

Math Faculty Award – C&O 2019 – 2022

William Tutte Postgrad Scholarship 2018

Graduate Experience Awards 2014 - 2016

Dean of Mathematics Excellence Scholarship 2014 - 2015

Undergraduate Student Research Award 2014 / 2013 / 2012

Dean of Math Graduate Scholarship 2016 – 2020

Math Domestic Graduate Award 2016 – 2020

The Dr. Nathan Mendelsohn Prize, University of Manitoba June 2013

University of Waterloo President's Research Award Winter 2013 & Fall 2013

The University of Waterloo National Scholarship (Kenneth D. Fryer Scholarship) 2010-2014

Conferences Attended

Approximation Algorithms and the Hardness of Approximation September 17-22, 2023
Banff International Research Station, Canada

Discrete Optimization Trimester Program at the Hausdorff Research Institute for Mathematics
September 6 - December 17, 2021

The 22nd Conference on Integer Programming and Combinatorial Optimization May 19–21, 2021
Atlanta, Georgia, USA

The 20th Conference on Integer Programming and Combinatorial Optimization, University of Michigan, Michigan. (May 22-24 2019)

Summer School on Combinatorial Optimization, Hausdorff Center for Mathematics, Bonn, Germany. (August 20-24 2018)

The 19th Conference on Integer Programming and Combinatorial Optimization Waterloo, Canada
June 26 - 28, 2017,

22nd International Symposium on Mathematical Programming Pittsburgh (12-17 Jul 15)

The Summer School on Optimization. The Pacific Institute & University of Calgary July 2013

Canadian Undergraduate Math Conference / Optimization Training Workshop (UBCO) June 2012

Teaching Activities (at University of Waterloo)

Math 135 Instructor Sept-Dec 2020

Graduate T.A. Sept 2014 – Aug 2020, Jan 2021 - Aug 2022

CO 250 Guest Lecturer (two 80 minute lectures) Fall 2018

Math 136 (Linear Algebra), Residence MKV Tutor Winter 2012

Math 147 (Calculus -Advanced), TA Fall 2011

Students Advised

Shallu Tomer Jan 2025 - present

Sasoun Krikorian Aug 2025 -present

Service

The PM/AM/C&O Club, Vice President Fall 2013

University of Waterloo Go Club, President Fall 2012- May 2014