

Chao Xu

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Research Interest

Combinatorial Optimization · Computational Geometry · Algorithms

Education

- 2018 PHD in Computer Science, University of Illinois at Urbana-Champaign
Advisors: Karthik Chandrasekaran and Chandra Chekuri.
- 2013 BS in Mathematics and Applied Mathematics & Statistics with minor in Computer Science, Stony Brook University

Visiting Research Positions

- Jun.-Aug. 2017 **Visiting Researcher, National Institute of Informatics, Tokyo, Japan.**
Hosted by Ken-ichi Kawarabayashi.
- Jun.-Aug. 2015 **Visiting Scholar, New York University, New York, USA.**
Hosted by Boris Aronov.

Industry Employment

- Feb.-Aug. 2013 **Software Engineer, Google, Mountain View, USA.**
Google Analytics Backend.
- Maintained the critical custom filter component. It is used by every single request to Google Analytics. Refactoring by introducing reflections. C++.
 - Introduced algorithmic improvements to a load partition problem. Substantial running time reduction from $O(n^2)$ to $O(n)$. C++.
 - Solved backward compatibility issues for customers by designing short regular expressions for common tasks. Haskell, Regex.

Conference Publications

- 2018 Karthekeyan Chandrasekara, Chao Xu, and Xilin Yu. Hypergraph k -cut in randomized polynomial time. In *Proceedings of the Twenty-Ninth Annual ACM-SIAM Symposium on Discrete Algorithms (SODA)*, pages 1426–1438.

- 2017 Kristóf Bérczi, Karthekeyan Chandrasekaran, Tamás Király, Euiwoong Lee, and Chao Xu. Global and Fixed-Terminal Cuts in Digraphs. In *Approximation, Randomization, and Combinatorial Optimization. Algorithms and Techniques (APPROX/RANDOM 2017)*, volume 81 of *Leibniz International Proceedings in Informatics (LIPIcs)*, pages 2:1–2:20, Dagstuhl, Germany, 2017.
- 2017 Konstantinos Koiliaris and Chao Xu. A faster pseudopolynomial time algorithm for subset sum. In *Proceedings of the Twenty-Eighth Annual ACM-SIAM Symposium on Discrete Algorithms (SODA)*, pages 1062–1072. SIAM, 2017.
- 2017 Chandra Chekuri and Chao Xu. Computing minimum cuts in hypergraphs. In *Proceedings of the Twenty-Eighth Annual ACM-SIAM Symposium on Discrete Algorithms (SODA)*, pages 1085–1100. SIAM, 2017.
- 2015 Chandra Chekuri, Thapanapong Rukkanchanunt, and Chao Xu. On element-connectivity preserving graph simplification. In Nikhil Bansal and Irene Finocchi, editors, *Algorithms - ESA 2015*, volume 9294 of *Lecture Notes in Computer Science*, pages 313–324. Springer Berlin Heidelberg, 2015.
- 2015 Hsien-Chih Chang, Jeff Erickson, and Chao Xu. Detecting weakly simple polygons. In *Proceedings of the Twenty-Sixth Annual ACM-SIAM Symposium on Discrete Algorithms (SODA)*, pages 1655–1670. SIAM, 2015.

Journal Publications

- 2018 Kristóf Bérczi, Karthekeyan Chandrasekaran, Tamás Király, Euiwoong Lee, and Chao Xu. Beating the 2-approximation factor for global bicut. *Mathematical Programming*, Mar 2018.
- 2016 Chao Xu. Reconstructing edge-disjoint paths faster. *Operations Research Letters*, 44(2):174 – 176, 2016.
- 2013 Neil J. Calkin, Janine E. Janoski, Allison Nelson, Sydney Ryan, and Chao Xu. Champion spiders in the game of Graph Nim. *Congr. Numer.*, 218:5–19, 2013.

Projects

- 2016 **Peer-to-peer distributed lookup service**
Implementation based on Chord. Handles insertion, deletion, node joins and node failures. Python.
- 2015 **Connectivity and optimization algorithms in matroids**
Open source project. Implement connectivity and matroid intersection algorithms in SageMath as part of Google Summer of Code. Improved the running time for 4-connectivity computation from $O(n^5)$ to $O(n^{4.5}\sqrt{\log n})$. Python, Cython.

Language and Skills

- Python; Haskell; APL; Java; C++; SQL; Gurobi
- Git; LaTeX;

Teaching

F 2016	CS 374 Algorithms and Models of Computation @ UIUC. Teaching Assistant
F 2015	CS 498 DL1 “new ” CS 473 Theory II @ UIUC. Teaching Assistant
S 2015	CS 498 DL1 “new ” CS 473 Theory II @ UIUC. Teaching Assistant
F 2014	CS 374 Algorithms and Models of Computation @ UIUC. Teaching Assistant
F 2013	CS 373 Introduction to Theory of Computation @ UIUC. Teaching Assistant
F 2010	AMS 345 Computational Geometry @ Stony Brook University. Teaching Assistant

Fellowship/Scholarship

2017	NSF East Asia and Pacific Summer Institute (EAPSI) Fellow
2016-2017	State Farm Companies Foundation Doctoral Scholar
2010-2012	NSF Scholarships in Science, Technology, Engineering, and Mathematics (S-STEM)