# Chao Xu

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## Skills

Algorithm implementation/research, combinatorial optimization, computational advertising, computational geometry.
Tools: Python, Java, Git, Haskell, SQL, Scala, Spark, Hadoop, Hive, Pig, LaTeX, APL, C++

## Education

2013-2018 PhD in Computer Science, University of Illinois at Urbana-Champaign
Advisors: Karthik Chandrasekaran and Chandra Chekuri.

2009-2013 BS in Mathematics and Applied Mathematics & Statistics with minor in Computer Science, Stony Brook University

## Experience

June 2018-now **Research Scientist, Yahoo! Research, New York, NY, USA.**
Scalable Machine Learning Group.

- Lead development of the household clustering algorithm and its data pipeline. Coordinate between multiple teams to obtain data, and measure resulting performance on ads targeting and attribution. (Scala, Spark, Pig, Hive).
- Maintain the transition platform on Search-to-Native Ads during the sale of Yahoo search business to Microsoft. Apply machine learning to improve the Search Ads click prediction model, and calibrates with the Native Ads click through rate. (Hadoop, Pig, Hive).
- Research, design and implement bipartite matching based ad placement and pricing system for Native Ads. Determine the effect of floor prices on ads revenue. (Hadoop, Hive).

May-Aug. 2015 **Google Summer of Code Student Mentee, SageMath**
Connectivity and optimization algorithms in matroids.

- Implement the unweighted and weighted matroid intersection algorithm. (Python, Cython).
- Improve the running time for $4$-connectivity computation from $O(n^5)$ to $O(n^{4.5}\sqrt{\log n})$. (Python, Cython).
- Produce end of project report for publication in the matroid research community. Maintain detailed documentation for developers.

Feb.-Aug. 2013 **Software Engineer, Google, Mountain View, CA, USA.**
Google Analytics Backend.

- Maintain the critical custom filter component used by every single request to Google Analytics. Refactoring by introducing reflections. (C++).

- Introduce algorithmic improvements to a load partition problem in data centers. Substantial running time reduction from $O(n^2)$ to $O(n)$. (C++).
- Solve backward compatibility issues for customers by designing short regular expressions generator for integer ranges. (Haskell, Regex).

## Conference Publications [1]

2019 C. Chekuri, K. Quanrud, and C. Xu. LP Relaxation and Tree Packing for Minimum k-cuts. In J. T. Fineman and M. Mitzenmacher, editors, *2nd Symposium on Simplicity in Algorithms (**SOSA** 2019)*, volume 69 of *OpenAccess Series in Informatics (OASIcs)*, pages 7:1–7:18, Dagstuhl, Germany, 2018. Schloss Dagstuhl–Leibniz-Zentrum fuer Informatik.

2018 K. Chandrasekara, C. Xu, and X. 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 K. Bérczi, K. Chandrasekaran, T. Király, E. Lee, and C. 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 K. Koiliaris and C. 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 C. Chekuri and C. 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 C. Chekuri, T. Rukkanchanunt, and C. Xu. On element-connectivity preserving graph simplification. In N. Bansal and I. Finocchi, editors, *Algorithms - **ESA** 2015*, volume 9294 of *Lecture Notes in Computer Science*, pages 313–324. Springer Berlin Heidelberg, 2015.

2015 H.-C. Chang, J. Erickson, and C. 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 C. Chekuri and C. Xu. Minimum cuts and sparsification in hypergraphs. ***SIAM Journal on Computing***, 47(6):2118–2156, 2018.

2018 C. Xu and Q. Zhang. The shortest kinship description problem. *Information Processing Letters*, 138:61 – 66, 2018.

2018 K. Bérczi, K. Chandrasekaran, T. Király, E. Lee, and C. Xu. Beating the 2-approximation factor for global bicut. ***Mathematical Programming***, Mar 2018.

2016 C. Xu. Reconstructing edge-disjoint paths faster. *Operations Research Letters*, 44(2):174 – 176, 2016.

2013 N. J. Calkin, J. E. Janoski, A. Nelson, S. Ryan, and C. Xu. Champion spiders in the game of Graph Nim. *Congr. Numer.*, 218:5–19, 2013.

[1] All author orders are alphabetical.