

# Stanford

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## Aaron Sidford

Assistant Professor of Management Science and Engineering and of Computer Science

### CONTACT INFORMATION

- **Administrator**

Jenny Lam - Administrative Associate

**Email** lamjenny@stanford.edu

**Tel** (650) 725-0550

### Bio

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### ACADEMIC APPOINTMENTS

- Assistant Professor, Management Science and Engineering
- Assistant Professor, Computer Science
- Member, Institute for Computational and Mathematical Engineering (ICME)

### LINKS

- Personal Website: <http://web.stanford.edu/~sidford/>

### Research & Scholarship

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### CURRENT RESEARCH AND SCHOLARLY INTERESTS

My research interests lie broadly in the optimization, the theory of computation, and the design and analysis of algorithms. I am particularly interested in work at the intersection of continuous optimization, graph theory, numerical linear algebra, and data structures.

### Teaching

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### COURSES

#### 2021-22

- Discrete Mathematics and Algorithms: CME 305, MS&E 316 (Win)

#### 2020-21

- Discrete Mathematics and Algorithms: CME 305, MS&E 316 (Win)
- Introduction to Optimization Theory: CS 269O, MS&E 213 (Aut)
- Senior Project: MS&E 108 (Win)

#### 2019-20

- Discrete Mathematics and Algorithms: CME 305, MS&E 316 (Win)
- Introduction to Optimization Theory: CS 269O, MS&E 213 (Aut)

## 2018-19

- Almost Linear Time Graph Algorithms: CS 269G, MS&E 313 (Aut)
- Discrete Mathematics and Algorithms: CME 305, MS&E 316 (Win)
- Introduction to Optimization Theory: CS 269O, MS&E 213 (Spr)

## STANFORD ADVISEES

### Doctoral Dissertation Reader (AC)

Maxwell Allman, Arun Jambulapati, Honglin Yuan

### Doctoral Dissertation Advisor (AC)

Yujia Jin, Yang Liu, Kiran Shiragur, Kevin Tian

### Orals Evaluator

Alexandra Porter, Kevin Tian

### Master's Program Advisor

Yosheb Getachew, Eric Kuang, Daniel Lee, Sharmila Nangi, Amrita Palaparthi, Kavya Srikanth, Elaine Sui, Annie Vesey, Yuxin Wu, Miao-Chin Yen

### Doctoral (Program)

Kevin Tian, Wanqiao Xu

## Publications

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## PUBLICATIONS

- **Parallel Reachability in Almost Linear Work and Square Root Depth**  
Jambulapati, A., Liu, Y. P., Sidford, A., IEEE  
IEEE COMPUTER SOC.2019: 1664–86
- **Faster Matroid Intersection**  
Chakrabarty, D., Lee, Y., Sidford, A., Singla, S., Wong, S., IEEE  
IEEE COMPUTER SOC.2019: 1146–68
- **ACCELERATED METHODS FOR NONCONVEX OPTIMIZATION** *SIAM JOURNAL ON OPTIMIZATION*  
Carmon, Y., Duchi, J. C., Hinder, O., Sidford, A.  
2018; 28 (2): 1751–72
- **Approximating Cycles in Directed Graphs: Fast Algorithms for Girth and Roundtrip Spanners**  
Pachocki, J., Roditty, L., Sidford, A., Tov, R., Williams, V., Assoc Comp Machinery  
ASSOC COMPUTING MACHINERY.2018: 1374–92
- **Stability of the Lanczos Method for Matrix Function Approximation**  
Musco, C., Musco, C., Sidford, A., Assoc Comp Machinery  
ASSOC COMPUTING MACHINERY.2018: 1605–24
- **Efficient (O)over-tilde(n/epsilon) Spectral Sketches for the Laplacian and its Pseudoinverse**  
Jambulapati, A., Sidford, A., Assoc Comp Machinery  
ASSOC COMPUTING MACHINERY.2018: 2487–2503
- **Variance Reduced Value Iteration and Faster Algorithms for Solving Markov Decision Processes**  
Sidford, A., Wang, M., Wu, X., Ye, Y., Assoc Comp Machinery  
ASSOC COMPUTING MACHINERY.2018: 770–87
- **Exploiting Numerical Sparsity for Efficient Learning : Faster Eigenvector Computation and Regression**  
Gupta, N., Sidford, A., Bengio, S., Wallach, H., Larochelle, H., Grauman, K., CesaBianchi, N., Garnett, R.

NEURAL INFORMATION PROCESSING SYSTEMS (NIPS).2018

- **Near-Optimal Time and Sample Complexities for Solving Markov Decision Processes with a Generative Model**

Sidford, A., Wang, M., Wu, X., Yang, L. F., Ye, Y., Bengio, S., Wallach, H., Larochelle, H., Grauman, K., CesaBianchi, N., Garnett, R.  
NEURAL INFORMATION PROCESSING SYSTEMS (NIPS).2018

- **Coordinate Methods for Accelerating  $l(\infty)$  Regression and Faster Approximate Maximum Flow**

Sidford, A., Tian, K., Thorup, M.  
IEEE COMPUTER SOC.2018: 922–33

- **Solving Directed Laplacian Systems in Nearly-Linear Time through Sparse LU Factorizations**

Cohen, M. B., Kelner, J., Kyng, R., Peebles, J., Peng, R., Rao, A. B., Sidford, A., Thorup, M.  
IEEE COMPUTER SOC.2018: 898–909

- **Parallelizing Stochastic Gradient Descent for Least Squares Regression: Mini-batching, Averaging, and Model Misspecification** *JOURNAL OF MACHINE LEARNING RESEARCH*

Jain, P., Netrapalli, P., Kakade, S. M., Kidambi, R., Sidford, A.  
2018; 18

- **SINGLE PASS SPECTRAL SPARSIFICATION IN DYNAMIC STREAMS** *SIAM JOURNAL ON COMPUTING*

Kapralov, M., Lee, Y. T., Musco, C. N., Musco, C. P., Sidford, A.  
2017; 46 (1): 456-477

- **Derandomization Beyond Connectivity: Undirected Laplacian Systems in Nearly Logarithmic Space**

Murtagh, J., Reingold, O., Sidford, A., Vadhan, S., IEEE  
IEEE.2017: 801–12

- **Subquadratic Submodular Function Minimization**

Chakrabarty, D., Lee, Y., Sidford, A., Wong, S., Hatami, H., McKenzie, P., King  
ASSOC COMPUTING MACHINERY.2017: 1220–31