Tarun Kathuria

Contact Information

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Research Interests

Iterative methods for Convex and Non-Convex Optimization, Random Matrix Theory, High-Dimensional Probability, Stochastic Processes, Algebraic and Spectral Methods in Combinatorics, Randomized Numerical Linear Algebra and their applications to Machine Learning and Database Theory

Employment

Yale University, New Haven, CT — *Summer 2019*
Summer Intern — *Prof. Daniel Spielman*

Microsoft Research India, Bangalore — *July 2015 - July 2017*
Research Fellow, Algorithms and Theory Group — *Mentor: Dr. Amit Deshpande*

IBM Research India, Bangalore — *Summer 2014*
Summer Intern, Data Mining Group — *Mentor: Dr. Indrajit Bhattacharya*

Education

University of California, Berkeley — *August 2017 - Present*
Doctor of Philosophy (Ph.D.)

- Major: Computer Science (Convex Optimization and Graph Algorithms)
- Minor: Mathematics
- *Advisor:* Prasad Raghavendra

Indian Institute of Technology - Bombay, Mumbai, India — *July 2011 - June 2015*
Bachelor of Technology (Honors)

- Major: Computer Science & Engineering
- Minor: Applied Statistics and Informatics

Publications

1. Ankit Garg, Tarun Kathuria, Nikhil Srivastava Scalar Poincare implies Matrix Poincare. *Electronic Communications in Probability(26) 2021*
2. Tarun Kathuria A Potential Reduction Inspired Algorithm for Exact Max Flow in Almost $O(m^{4/3})$ Time. *61st IEEE Annual Symposium on Foundations of Computer Science,* ***(FOCS 2020)***,
3. Haotian Jiang, Tarun Kathuria, Yin Tat Lee, Swati Padmanabhan, Zhao Song A Faster Interior Point Method for Semidefinite Programming. *61st IEEE Annual Symposium on Foundations of Computer Science,* ***(FOCS 2020)***
4. Yeshwanth Cherpanamjeri, Samuel B. Hopkins, Tarun Kathuria, Prasad Raghavendra, Nilesh Tripuraneni Algorithms for heavy-tailed statistics: regression, covariance estimation, and beyond. *52nd Annual ACM-SIGACT Symposium on Theory of Computing,* ***(STOC 2020)***
5. L. Elisa Celis, Vijay Keswani, Damian Straszak, Amit Deshpande, Tarun Kathuria, Nisheeth K. Vishnoi Fair and Diverse DPP-based Data Summarization. *35th International Conference on Machine Learning* ***(ICML 2018)***
6. L. Elisa Celis, Amit Deshpande, Tarun Kathuria, Damian Straszak, Nisheeth K. Vishnoi On the Complexity of Constrained Determinantal Point Processes. **(APPROX-RANDOM 2017)**
7. Tarun Kathuria, S. Sudarshan. Efficient and Provable Multi-Query Optimization. *Proceedings of the 36th ACM SIGMOD-SIGACT-SIGART Symposium on Principles of Database Systems* ***(PODS 2017)***
8. Tarun Kathuria, Amit Deshpande, Pushmeet Kohli. Batched Gaussian Process Bandit Optimization via Determinantal Point Processes. *Advances in Neural Information Processing Systems* ***(NIPS 2016)***
9. L. Elisa Celis, Amit Deshpande, Tarun Kathuria, Nisheeth K. Vishnoi. How to be Fair and Diverse? *3rd Workshop on Fairness, Accountability, and Transparency in Machine Learning* ***(FATML 2016)*** (selected for oral presentation)

Manuscripts

1. Tarun Kathuria. Sharper Matrix Concentration and Strong Asymptotic Freeness of Gaussian Random Matrices and the Peterson Thom Conjecture. *In Preparation*
2. Tarun Kathuria, Satyaki Mukherjee, Nikhil Srivastava. On Concentration Inequalities for Random Matrix Products. 2020
3. Tarun Kathuria A Matrix Bernstein Inequality for Strong Rayleigh Distributions. 2020

External Reviewer

Conference on Learning Theory (COLT), Neural Information Processing Systems (NIPS), International Conference on Machine Learning (ICML), Symposium on Discrete Algorithms (SODA), Foundations of Computer Science (FOCS), Symposium on Theory of Computing (STOC)

Teaching Experience

Graduate Teaching Assistant, UC Berkeley *Fall 2022*
Course : Optimization Models in Engineering (EECS127/227A)

Graduate Teaching Assistant, UC Berkeley *Fall 2018, Spring 2019*
Course : Efficient Algorithms and Intractable Problems (CS170)

Undergraduate Teaching Assistant, IIT Bombay *Summer 2013, Spring 2014, 2015*
Course : Introduction to Numerical Analysis

Undergraduate Teaching Assistant, IIT Bombay *Autumn 2014*
Course : Linear Algebra

Undergraduate Teaching Assistant, IIT Bombay *Autumn 2012*
Course : Electricity & Magnetism

Technical Skills

Programming Python, Julia, C++, Java
Machine Learning Numpy, Scikit-learn, Pytorch, TensorFlow