Yang P. Liu

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Stanford University
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Education

Stanford University, Stanford, CA
Ph.D. in Mathematics
2018 - present

Massachusetts Institute of Technology, Cambridge, MA
Bachelor of Science in Mathematics
2015 - 2018

Honors and Awards

Best Paper, FOCS 2022

Best Student Paper, ITCS 2022

Best Student Paper, STOC 2021

Google Research Fellowship, 2022 - 2023

National Defense Science and Engineering Graduate Fellowship, 2018 - 2021

Gold Medal, International Math Olympiad 2014, 2015

Papers and Preprints

Liu, Y. P. (2023). Vertex sparsification for edge connectivity in polynomial time. *ITCS 2023*. Available at https://arxiv.org/pdf/2011.15101.pdf

Brand, J. v. d., Liu, Y. P., and Sidford, A. (2022b). Dynamic maxflow via dynamic interior point methods. *CoRR*, abs/2212.06315. Available at https://arxiv.org/pdf/2212.06315.pdf

Jambulapati, A., Liu, Y. P., and Sidford, A. (2022a). Chaining, group leverage score overestimates, and fast spectral hypergraph sparsification. *arXiv preprint arXiv:2209.10539*. Available at https://arxiv.org/pdf/2209.10539.pdf

Chen, L., Kyng, R., Liu, Y. P., Peng, R., Gutenberg, M. P., and Sachdeva, S. (2022b). Maximum flow and minimum-cost flow in almost-linear time. *FOCS 2022*. Available at https://arxiv.org/abs/2203.00671
Best Paper

Chen, J., Liu, Y. P., Peng, R., and Ramaswami, A. (2022a). Exponential convergence of sinkhorn under regularization scheduling. *CoRR*, abs/2207.00736. Available at `https://arxiv.org/pdf/2207.00736.pdf`

Anari, N., Liu, Y. P., and Vuong, T.-D. (2022). Optimal sublinear sampling of spanning trees and determinantal point processes via average-case entropic independence. *FOCS 2022*. Available at `https://arxiv.org/abs/2204.02570`
Invited to SICOMP Special Issue

Kulkarni, J., Liu, Y. P., Sah, A., Sawhney, M., and Tarnawski, J. (2022). Online edge coloring via tree recurrences and correlation decay. In *STOC*, pages 104–116. ACM
Invited to SICOMP Special Issue

Brand, J. v. d., Gao, Y., Jambulapati, A., Lee, Y. T., Liu, Y. P., Peng, R., and Sidford, A. (2022a). Faster maxflow via improved dynamic spectral vertex sparsifiers. In *STOC*, pages 543–556. ACM

Jambulapati, A., Liu, Y. P., and Sidford, A. (2022b). Improved iteration complexities for overconstrained p-norm regression. In *STOC*, pages 529–542. ACM

Liu, Y. P., Sah, A., and Sawhney, M. (2022). A gaussian fixed point random walk. In *ITCS*, volume 215 of *LIPIcs*, pages 101:1–101:10. Schloss Dagstuhl - Leibniz-Zentrum für Informatik
Best Student Paper

Gao, Y., Liu, Y. P., and Peng, R. (2021). Fully dynamic electrical flows: Sparse maxflow faster than goldberg-rao. In *FOCS*, pages 516–527. IEEE
Invited to SICOMP Special Issue

Forster, S., Goranci, G., Liu, Y. P., Peng, R., Sun, X., and Ye, M. (2021). Minor sparsifiers and the distributed laplacian paradigm. In *FOCS*, pages 989–999. IEEE

Brand, J. v. d., Lee, Y. T., Liu, Y. P., Saranurak, T., Sidford, A., Song, Z., and Wang, D. (2021). Minimum cost flows, mdps, and ℓ_1-regression in nearly linear time for dense instances. In *STOC 2021*

Alon, N., Alweiss, R., Liu, Y. P., Martinsson, A., and Narayanan, S. (2021). Arithmetic progressions in sumsets of sparse sets. *Integers*, 21A(Ron Graham Memorial Volume):Paper No. A3, 7

Alweiss, R., Liu, Y. P., and Sawhney, M. (2021). Discrepancy minimization via a self-balancing walk. In *STOC 2021*
Best Student Paper
Invited to SICOMP Special Issue

Liu, Y. P. and Sidford, A. (2020a). Faster divergence maximization for faster maximum flow. In *FOCS 2020*. `https://arxiv.org/pdf/2003.08929.pdf`
Invited to SICOMP Special Issue

Liu, Y. P. and Sidford, A. (2020b). Faster energy maximization for faster maximum flow. In *Proceedings of the 52nd Annual ACM SIGACT Symposium on Theory of Computing*, pages 803–

814

Chechik, S., Liu, Y. P., Rotem, O., and Sidford, A. (2020). Constant girth approximation for directed graphs in subquadratic time. In *Proceedings of the 52nd Annual ACM SIGACT Symposium on Theory of Computing*, pages 1010–1023

Liu, Y. P., Peng, R., and Sellke, M. (2019a). Vertex sparsifiers for c-edge connectivity. *arXiv preprint arXiv:1910.10359*

Axelrod, B., Liu, Y. P., and Sidford, A. (2020). Near-optimal approximate discrete and continuous submodular function minimization. In *Proceedings of the Fourteenth Annual ACM-SIAM Symposium on Discrete Algorithms*, pages 837–853. SIAM

Jambulapati, A., Liu, Y. P., and Sidford, A. (2019). Parallel reachability in almost linear work and square root depth. In *2019 IEEE 60th Annual Symposium on Foundations of Computer Science (FOCS)*, pages 1664–1686. IEEE

Liu, Y. P. and Zhao, Y. (2019). On the upper tail problem for random hypergraphs. *Random Structures & Algorithms, to appear*

Liu, Y. P., Sachdeva, S., and Yu, Z. (2019b). Short cycles via low-diameter decompositions. In *Proceedings of the Thirtieth Annual ACM-SIAM Symposium on Discrete Algorithms*, pages 2602–2615. SIAM

Grossman, O. and Liu, Y. P. (2019). Reproducibility and pseudo-determinism in log-space. In *Proceedings of the Thirtieth Annual ACM-SIAM Symposium on Discrete Algorithms*, pages 606–620. SIAM

Gur, T., Liu, Y. P., and Rothblum, R. D. (2018). An exponential separation between MA and AM proofs of proximity. In *45th International Colloquium on Automata, Languages, and Programming (ICALP 2018)*. Schloss Dagstuhl-Leibniz-Zentrum fuer Informatik

Liu, Y., Park, P. S., and Song, Z. Q. (2017). Bounded gaps between products of distinct primes. *Research in Number Theory*, 3(1):26

Liu, Y., Park, P. S., and Song, Z. Q. (2016). The Riemann Hypothesis is true for period polynomials of almost all newforms. *Research in the Mathematical Sciences*, 3(1):31

Invited Talks

MIT Theory of Computation Colloquium
Maximum Flow and Minimum-Cost Flow in Almost-Linear Time
November 2022

University of Michigan Theory Seminar
Lessons on Algorithmic Graph Theory from Maxflow

November 2022

University of Washington Theory Seminar
Lessons on Algorithmic Graph Theory from Maxflow
November 2022

Harvard Center for Mathematical Sciences & Applications Interdisciplinary Seminar
Recent Advances on Maximum Flows and Minimum-Cost Flows
August 2022

UC Santa Barbara Theory Colloquium
Maximum Flow and Minimum-Cost Flow in Almost-Linear Time
April 2022

UC Berkeley Theory Lunch
Maximum Flow and Minimum-Cost Flow in Almost-Linear Time
April 2022

Stanford Theory Seminar
Maximum Flow and Minimum-Cost Flow in Almost-Linear Time
March 2022

Carnegie Mellon University Theory Seminar
Discrepancy Minimization via a Self-Balancing Walk
October 2021

ETH Zurich Algorithms and Complexity Seminar
Fully Dynamic Electrical Flows: Sparse Maxflow Faster Than Goldberg-Rao
April 2021

MIT Algorithms & Complexity Seminar
Fully Dynamic Electrical Flows: Sparse Maxflow Faster Than Goldberg-Rao
March 2021

TCS+
Faster Algorithms for Unit Maxflow
December 2020

Georgia Tech Combinatorics Seminar
Discrepancy Minimization via a Self-Balancing Walk
August 2020

Microsoft Research Talk Series
Discrepancy Minimization via a Self-Balancing Walk
August 2020

Work Experience

Research Intern at Microsoft Research Redmond, June 2021 - September 2021

Trading Intern at Jane Street Capital, May 2017 - August 2017

Service

Subreviewer for SODA 2023, FOCS 2022, STOC 2022, SODA 2022, FOCS 2021, SODA 2021, APPROX 2020, ICALP 2020, SODA 2020, ICALP 2019