

Lichen Zhang

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EDUCATION

Massachusetts Institute of Technology <i>Ph.D in Applied Mathematics, Advisor: Jonathan Kelner</i>	Sep 2022 - May 2027 (expected) <i>Cambridge, MA</i>
Carnegie Mellon University <i>M.S. in Computer Science, Advisor: Gary Miller</i>	June 2021 – May 2022 <i>Pittsburgh, PA</i>
Carnegie Mellon University <i>B.S. in Computer Science</i>	Aug 2017 – May 2021 <i>Pittsburgh, PA</i>

RESEARCH INTERESTS

- Optimization
- Sketching and streaming
- Differential privacy

TEACHING

MIT 18.335 Intro to Numerical Methods • Instructor: Professor John Urschel	Feb 2024 – May 2024
CMU 15-155 The Computational Lens • Instructor: Professor Pravesh Kothari and Professor Anil Ada	Jan 2022 – May 2022
CMU 15-455 Undergraduate Complexity Theory • Instructor: Professor Pravesh Kothari	Jan 2021 – May 2021

EXPERIENCE

Visiting Student at Simons Institute for the Theory of Computing • Data Structures and Optimization for Fast Algorithms program	Aug 2023 – Dec 2023
Research Scientist Intern at Adobe Inc. (Adobe Research) • Mentor: Ritwik Sinha, Zhao Song, Raghavendra Addanki	May 2023 – Aug 2023
Research Assistant at University of Washington • Advisor: Yin Tat Lee	Jun 2022 – Aug 2022
Undergraduate Research Assistant at Carnegie Mellon University • Advisor: Gary Miller • Supported by CMU Summer Undergraduate Research Fellowship (SURF).	May 2020 – Aug 2020

SERVICES

Conference Reviewer • ICML 2024, AISTATS 2024, ICLR 2024, NeurIPS 2023, AISTATS 2023, SODA 2023
Journal Reviewer • ACM Transactions on Quantum Computing

AWARDS & HONORS

Jane Street Graduate Research Fellowship Finalist	2024
MIT Reitano Fellowship	Sep 2022 – Aug 2023
CMU Summer Undergraduate Research Fellowship	May 2020 – Aug 2020

PUBLICATIONS (Author names in alphabetical order)

Solving Attention Kernel Regression Problem via Pre-conditioner

- Zhao Song, Junze Yin and **Lichen Zhang**
- Published in the 27th International Conference on Artificial Intelligence and Statistics (AISTATS 2024)
- arxiv link: <https://arxiv.org/pdf/2308.14304.pdf>

Fast Dynamic Sampling for Determinantal Point Processes

- Zhao Song, Junze Yin, **Lichen Zhang** and Ruizhe Zhang
- Published in the 27th International Conference on Artificial Intelligence and Statistics (AISTATS 2024)
- link: <https://proceedings.mlr.press/v238/song24b.html>

Low Rank Matrix Completion via Robust Alternating Minimization in Nearly Linear Time

- Yuzhou Gu, Zhao Song, Junze Yin and **Lichen Zhang**
- To appear in the 12th International Conference on Learning Representations (ICLR 2024)
- arxiv link: <https://arxiv.org/pdf/2302.11068.pdf>

Training Multi-Layer Over-Parametrized Neural Network in Subquadratic Time

- Zhao Song, **Lichen Zhang** and Ruizhe Zhang
- Published in the 15th Innovations in Theoretical Computer Science (ITCS 2024)
- arxiv link: <https://arxiv.org/pdf/2112.07628.pdf>

Convex Minimization with Integer Minima in $\tilde{O}(n^4)$ Time

- Haotian Jiang, Yin Tat Lee, Zhao Song and **Lichen Zhang**
- Published in the 35th Annual ACM-SIAM Symposium on Discrete Algorithms (SODA 2024)
- arxiv link: <https://arxiv.org/pdf/2304.03426.pdf>

Sketching Meets Differential Privacy: Fast Algorithm for Dynamic Kronecker Projection Maintenance

- Zhao Song, Xin Yang, Yuanyuan Yang and **Lichen Zhang**
- Published in the 40th International Conference on Machine Learning (ICML 2023)
- arxiv link: <https://arxiv.org/pdf/2210.11542.pdf>

Sketching for First Order Method: Efficient Algorithm for Low-Bandwidth Channel and Vulnerability

- Zhao Song, Yitan Wang, Zheng Yu and **Lichen Zhang**
- Published in the 40th International Conference on Machine Learning (ICML 2023)
- arxiv link: <https://arxiv.org/pdf/2210.08371.pdf>

A Nearly-Optimal Bound for Fast Regression with ℓ_∞ Guarantee

- Zhao Song, Mingquan Ye, Junze Yin and **Lichen Zhang**
- Published in the 40th International Conference on Machine Learning (ICML 2023)

Space-Efficient Interior Point Method, with applications to Linear Programming and Maximum Weight Bipartite Matching

- S. Cliff Liu, Zhao Song, Hengjie Zhang, **Lichen Zhang** and Tianyi Zhou
- Published in the 50th International Colloquium on Automata, Languages and Programming (ICALP 2023)
- arxiv link: <https://arxiv.org/pdf/2009.06106.pdf>

An Online and Unified Algorithm for Projection Matrix Vector Multiplication with Application to Empirical Risk Minimization

- Lianke Qin, Zhao Song, **Lichen Zhang** and Danyang Zhuo
- Published in the 26th International Conference on Artificial Intelligence and Statistics (AISTATS 2023)
- link: <https://proceedings.mlr.press/v206/qin23a/qin23a.pdf>

Dynamic Tensor Product Regression

- Aravind Reddy, Zhao Song and **Lichen Zhang**
- Published in the 36th Conference on Neural Information Processing Systems (NeurIPS 2022)
- arxiv link: <https://arxiv.org/pdf/2210.03961.pdf>

Fast Sketching of Polynomial Kernels of Polynomial Degree

- Zhao Song, David P. Woodruff, Zheng Yu, and **Lichen Zhang**
- Published in the 38th International Conference on Machine Learning (ICML 2021).
- arxiv link: <https://arxiv.org/pdf/2108.09420.pdf>