Lichen Zhang

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Cambridge, Massachusetts - 02139, U.S.A.

EDUCATION

• **Massachusetts Institute of Technology** *Sep 2022 - Present*
Ph.D in Applied Mathematics Cambridge, MA
  ◦ Advisor: Jonathan Kelner

• **Carnegie Mellon University** *June 2021 - May 2022*
M.S. in Computer Science Pittsburgh, PA
  ◦ Advisor: Gary Miller
  ◦ Thesis: **Speeding Up Optimizations via Data Structures: Faster Search, Sample and Maintenance**

• **Carnegie Mellon University** *Aug 2017 - May 2021*
B.S. in Computer Science Pittsburgh, PA

RESEARCH INTERESTS

Machine learning, large language models, optimization, numerical linear algebra, sketching and streaming, differential privacy, quantum computing.

EXPERIENCE

• **Google Research** *June 2025 - Aug 2025*
Student Researcher Mountain View, CA
  ◦ Mentors: Fotis Iliopoulos, Gaurav Menghani, Erik Vee

• **Amazon Web Services (AWS)** *May 2024 - Aug 2024*
Applied Scientist Intern East Palo Alto, CA
  ◦ Mentors: Nina Mishra, Yonatan Naamad, Tal Wagner

• **Simons Institute for the Theory of Computing** *Aug 2023 - Dec 2023*
Visiting Student Berkeley, CA
  ◦ Data Structures and Optimization for Fast Algorithms program

• **Adobe Research** *May 2023 - Aug 2023*
Research Scientist Intern San Jose, CA
  ◦ Mentors: Zhao Song, Ritwik Sinha, Raghavendra Addanki

• **University of Washington** *June 2022 - Aug 2022*
Research Assistant Seattle, WA
  ◦ Advisor: Yin Tat Lee

• **Carnegie Mellon University** *May 2020 - Aug 2020*
Undergraduate Research Assistant Pittsburgh, PA
  ◦ Advisor: Gary Miller
  ◦ Supported by CMU Summer Undergraduate Research Fellowship (SURF)

TEACHING

• **Intro to Numerical Methods (18.335)** *Spring 2025*
Teaching Assistant MIT
  ◦ Instructor: Shi Chen

• **An Algorithmist's Toolkit (18.408)** *Fall 2024*
Teaching Assistant MIT
  ◦ Instructor: Jonathan Kelner

• **Intro to Numerical Methods (18.335)** *Spring 2024*
Teaching Assistant MIT
  ◦ Instructor: John Urschel

• **The Computational Lens (15-155)** *Spring 2022*
Teaching Assistant CMU
  ◦ Instructors: Pravesh Kothari and Anil Ada

• **Undergraduate Complexity Theory (15-455)** *Spring 2021*
Teaching Assistant CMU
  ◦ Instructor: Pravesh Kothari

Awards and Scholarships

- **Simons Dissertation Fellowship in Mathematics** — *2025 - 2027*
  Simons Foundation
- **Mathworks Fellowship** — *2025 - 2026*
  Mathworks
- **Finalist of the Two Sigma Graduate Research Fellowship** — *2025*
  Two Sigma
- **Finalist of the Jane Street Graduate Research Fellowship** — *2025*
  Jane Street
- **Finalist of the Jane Street Graduate Research Fellowship** — *2024*
  Jane Street
- **Reitano Fellowship** — *2022 - 2023*
  MIT
- **Summer Undergraduate Research Fellowship** — *2020*
  CMU

Services

- **Conference Reviewer**
  - NeurIPS: 2023, 2024, 2025
  - ICML: 2024, 2025, 2026
  - ICLR: 2024, 2025, 2026
  - AISTATS: 2023, 2024, 2025, 2026
  - AAAI: 2025, 2026
  - PODS: 2025
  - ICALP: 2025
  - SODA: 2023, 2026
  - STOC: 2026

- **Journal Reviewer**
  - ACM Transactions on Quantum Computing
  - Transactions on Machine Learning Research (TMLR)
  - Transactions on Pattern Analysis and Machine Intelligence

Publications (Author Names in Alphabetical Order)

[1] Nina Mishra, Yonatan Naamad, Tal Wagner and **Lichen Zhang**. **Graph-based Nearest Neighbors with Dynamic Updates via Random Walks**. In *Proceedings of the 14th International Conference on Learning Representations (ICLR), 2026.*

[2] Zhao Song, Jianfei Xue, Jiahao Zhang and **Lichen Zhang**. **Sublinear Time Quantum Algorithm for Attention Approximation**. In *Proceedings of the 14th International Conference on Learning Representations (ICLR), 2026.*

[3] Zhao Song, Jianfei Xue and **Lichen Zhang**. **Differential Privacy for Euclidean Jordan Algebra with Applications to Private Symmetric Cone Programming**. In *Proceedings of the 39th Conference on Neural Information Processing Systems (NeurIPS), 2025.*

[4] Shiyuan Feng, Ying Feng, George Z. Li, Zhao Song, David P. Woodruff and **Lichen Zhang**. **On Differential Privacy for Adaptively Solving Search Problems via Sketching**. In *Proceedings of the 42nd International Conference on Machine Learning (ICML), 2025.* Selected for Oral Presentation (top 1% of submissions).

[5] Yuzhou Gu, Zhao Song and **Lichen Zhang**. **Faster Algorithms for Structured Linear and Kernel Support Vector Machines**. In *Proceedings of the 13th International Conference on Learning Representations (ICLR), 2025.*

[6] Zhao Song, Mingquan Ye, Junze Yin and **Lichen Zhang**. **Efficient Alternating Minimization with Applications to Weighted Low Rank Approximation**. In *Proceedings of the 13th International Conference on Learning Representations (ICLR), 2025.*

[7] Yuzhou Gu, Nikki Lijing Kuang, Yi-An Ma, Zhao Song and **Lichen Zhang**. **Log-concave Sampling from a Convex Body with a Barrier: a Robust and Unified Dikin Walk**. In *Proceedings of the 38th Conference on Neural Information Processing Systems (NeurIPS), 2024.*

[8] Zhao Song, Junze Yin and **Lichen Zhang**. **Solving Attention Kernel Regression Problem via Pre-conditioner**. In *Proceedings of the 27th International Conference on Artificial Intelligence and Statistics (AISTATS), 2024.*

[9] Zhao Song, Junze Yin, **Lichen Zhang** and Ruizhe Zhang. **Fast Dynamic Sampling for Determinantal Point Processes**. In *Proceedings of the 27th International Conference on Artificial Intelligence and Statistics (AISTATS), 2024.*

[10] Yuzhou Gu, Zhao Song, Junze Yin and **Lichen Zhang**. **Low Rank Matrix Completion via Robust Alternating Minimization in Nearly Linear Time**. In *Proceedings of the 12th International Conference on Learning Representations (ICLR)*, 2024.

[11] Zhao Song, **Lichen Zhang** and Ruizhe Zhang. **Training Multi-Layer Over-Parametrized Neural Network in Subquadratic Time**. In *Proceedings of the 15th Innovations in Theoretical Computer Science (ITCS)*, 2024.

[12] Haotian Jiang, Yin Tat Lee, Zhao Song and **Lichen Zhang**. **Convex Minimization with Integer Minima in $\widetilde{O}(n^4)$ Time**. In *Proceedings of the 35th Annual ACM-SIAM Symposium on Discrete Algorithms (SODA)*, 2024.

[13] Zhao Song, Xin Yang, Yuanyuan Yang and **Lichen Zhang**. **Sketching Meets Differential Privacy: Fast Algorithm for Dynamic Kronecker Projection Maintenance**. In *Proceedings of the 40th International Conference on Machine Learning (ICML)*, 2023.

[14] Zhao Song, Yitan Wang, Zheng Yu and **Lichen Zhang**. **Sketching for First Order Method: Efficient Algorithm for Low-Bandwidth Channel and Vulnerability**. In *Proceedings of the 40th International Conference on Machine Learning (ICML)*, 2023.

[15] Zhao Song, Mingquan Ye, Junze Yin and **Lichen Zhang**. **A Nearly-Optimal Bound for Fast Regression with ℓ_∞ Guarantee**. In *Proceedings of the 40th International Conference on Machine Learning (ICML)*, 2023.

[16] S. Cliff Liu, Zhao Song, Hengjie Zhang, **Lichen Zhang** and Tianyi Zhou. **Space-Efficient Interior Point Method, with applications to Linear Programming and Maximum Weight Bipartite Matching**. In *Proceedings of the 50th International Colloquium on Automata, Languages and Programming (ICALP)*, 2023.

[17] Lianke Qin, Zhao Song, **Lichen Zhang** and Danyang Zhuo. **An Online and Unified Algorithm for Projection Matrix Vector Multiplication with Application to Empirical Risk Minimization**. In *Proceedings of the 26th International Conference on Artificial Intelligence and Statistics (AISTATS)*, 2023.

[18] Aravind Reddy, Zhao Song and **Lichen Zhang**. **Dynamic Tensor Product Regression**. In *Proceedings of the 36th Conference on Neural Information Processing Systems (NeurIPS)*, 2022.

[19] Zhao Song, David P. Woodruff, Zheng Yu and **Lichen Zhang**. **Fast Sketching of Polynomial Kernels of Polynomial Degree**. In *Proceedings of the 38th International Conference on Machine Learning (ICML)*, 2021.