Allen X. Liu

Personal Information

Email: cliu568@mit.edu
Phone: (585)-643-0696
Date of Birth: June 12, 1999
Citizenship: USA

Education

Massachusetts Institute of Technology *2020-present*
Candidate for Ph.D in Computer Science (expected graduation 2025)

Massachusetts Institute of Technology *2016-2020*
B. Sc. in Mathematics

Awards and Honors

Hertz Fellowship (awarded 2021)
NSF Graduate Research Fellowship (awarded 2020)
William Lowell Putnam Mathematical Competition: N1 (2016,17,19), N2 (2018)
International Mathematical Olympiad (IMO): Gold medalist (2014-2016), Perfect Scorer (2016)
USA Mathematical Olympiad (USAMO): National winner (2014-2016), Perfect Scorer (2015,16)

Working Experience

Microsoft Research, WA *2021,2022*
Worked on theoretical research in high-dimensional statistics, mixture models, and optimization

Google Research, MA *2020*
Worked on proving theoretical guarantees for distributed load balancing algorithms and correlation clustering

Google Research, NY *2019*
Worked on theoretical research in online learning related to bandits, contextual search, and prophet inequalities

D. E. Shaw & Co., NY *2018*
Quantitative research intern, worked on generating synthetic orderbook data using recurrent neural networks

Jane Street Capital, NY *2017*
Trading intern, analyzed real market data and built models to develop trading strategies for options and commodity futures

Research

Research Interests: Theoretical Computer Science, Machine Learning, Quantum Information

Selected Publications

When Does Adaptivity Help for Quantum State Learning?
S. Chen, B. Huang, J. Li, A. Liu, M. Sellke
Proceedings of the Annual IEEE Symposium on Foundations of Computer Science (FOCS 2023)

Matrix Completion in Almost-Verification Time
J. Kelner, J. Li, A. Liu, A. Sidford, K. Tian
Proceedings of the Annual IEEE Symposium on Foundations of Computer Science (FOCS 2023)

Semi-Random Sparse Recovery in Nearly-Linear Time
J. Kelner, J. Li, A. Liu, A. Sidford, K. Tian
Proceedings of the Annual Conference on Learning Theory (COLT 2023)

Learning Mixtures of Linear Dynamical Systems
A. Bakshi, A. Liu, A. Moitra, M. Yau
International Conference on Machine Learning (ICML 2023)
A New Approach to Learning Linear Dynamical Systems
A. Bakshi, A. Liu, A. Moitra, M. Yau
ACM Symposium on Theory of Computing (STOC 2023)
Robust Voting Rules from Algorithmic Robust Statistics
A. Liu, A. Moitra
Proceedings of the Annual ACM-SIAM Symposium on Discrete Algorithms (SODA 2023)
Robust Model Selection and Nearly-Proper Learning for GMMs
J. Li, A. Liu, A. Moitra
Advances in Neural Information Processing Systems (NeurIPS 2022)
Minimax Rates for Robust Community Detection
A. Liu, A. Moitra
Proceedings of the Annual IEEE Symposium on Foundations of Computer Science (FOCS 2022)
Tight Bounds for Quantum State Certification with Incoherent Measurements
S. Chen, B. Huang, J. Li, A. Liu
Proceedings of the Annual IEEE Symposium on Foundations of Computer Science (FOCS 2022)
Clustering Mixtures with Almost Optimal Separation in Polynomial Time
J. Li, A. Liu
ACM Symposium on Theory of Computing (STOC 2022, Invited to SICOMP Special Issue)
Settling the Robust Learnability of Mixtures of Gaussians
A. Liu, A. Moitra
ACM Symposium on Theory of Computing (STOC 2021, Journal of the ACM 2023)
Variable Decomposition for Prophet Inequalities and Optimal Ordering
A. Liu, R. Paes Leme, M. Pal, J. Schneider, B. Sivan
ACM Conference on Economics and Computation (EC 2021)
Optimal Contextual Pricing and Extensions
A. Liu, R. Paes Leme, J. Schneider
Proceedings of the Annual ACM-SIAM Symposium on Discrete Algorithms (SODA 2021)
Tensor Completion Made Practical
A. Liu, A. Moitra
Advances in Neural Information Processing Systems (NeurIPS 2020)
Fourier and Circulant Matrices are not Rigid
Z. Dvir, A. Liu
Computational Complexity Conference (CCC 2019)
Efficiently Learning Mixtures of Mallows Models
A. Liu, A. Moitra
Proceedings of the Annual IEEE Symposium on Foundations of Computer Science (FOCS 2018)

Volunteer and Teaching

Problem Czar for Harvard MIT Math Tournament 2016-2018
Wrote problems and assembled tests for the tournament.
Teaching Assistant and Grader at USA Math Olympiad Summer Program 2017-2018
Training program for the USA team for the International Math Olympiad (IMO). Gave lectures to students on a variety of topics and helped coordinate logistics and grading.

References

Available upon request