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 2020-*2022*
S.M. In Computer Science

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

*author order is generally alphabetical denoting equal contribution

Learning quantum Hamiltonians at any temperature in polynomial time
A. Bakshi, A. Liu, A. Moitra, E. Tang
Quantum Information Processing (QIP 2024 Invited Plenary, Best Student Paper)
ACM Symposium on Theory of Computing (STOC 2024)

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

The Full Landscape of Robust Mean Testing: Sharp Separations between Oblivious and Adaptive Contamination
C. Canonne, S. Hopkins, J. Li, A. Liu, S. Narayanan
IEEE Symposium on Foundations of Computer Science (FOCS 2023, Invited to SICOMP Special Issue)

Matrix Completion in Almost-Verification Time
J. Kelner, J. Li, A. Liu, A. Sidford, K. Tian
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
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
ACM-SIAM Symposium on Discrete Algorithms (SODA 2023)

Minimax Rates for Robust Community Detection
A. Liu, A. Moitra
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
Quantum Information Processing (QIP 2023)
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, 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
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
IEEE Symposium on Foundations of Computer Science (FOCS 2018)

Teaching

Teaching Assistant for 6.S896 (Algorithmic Statistics) at MIT 2023
Teaching Assistant at USA Math Olympiad Summer Program 2017-2018

References

Available upon request