

# Allen X. Liu

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## Personal Information

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Phone: (585)-643-0696

Date of Birth: June 12, 1999

Citizenship: USA

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## Education

**Massachusetts Institute of Technology**

2020-present

Candidate for Ph.D in Computer Science

**Massachusetts Institute of Technology**

2016-2020

B. Sc. in Mathematics

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## 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)

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## Research

### Research Interests

Theoretical Computer Science, Machine Learning

### Selected Publications

#### Minimax Rates for Robust Community Detection

A. Liu, A. Moitra

*Proceedings of the 63rd 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 63rd Annual IEEE Symposium on Foundations of Computer Science (FOCS 2022)*

#### The Pareto Frontier of Instance-Dependent Guarantees in Multi-Player Multi-Armed Bandits with no Communication

A. Liu, M. Sellke

*Proceedings of the 35th Annual Conference on Learning Theory (COLT 2022)*

#### Learning GMMs with Nearly Optimal Robustness Guarantees

A. Liu, A. Moitra

*Proceedings of the 35th Annual Conference on Learning Theory (COLT 2022)*

#### Clustering Mixtures with Almost Optimal Separation in Polynomial Time

J. Li, A. Liu

*54th ACM Symposium on Theory of Computing (STOC 2022)*

#### Settling the Robust Learnability of Mixtures of Gaussians

A. Liu, A. Moitra

*53rd ACM Symposium on Theory of Computing (STOC 2021)*

#### Variable Decomposition for Prophet Inequalities and Optimal Ordering

A. Liu, R. Paes Leme, M. Pal, J. Schneider, B. Sivan

*22nd ACM Conference on Economics and Computation (EC 2021)*

#### Optimal Contextual Pricing and Extensions

A. Liu, R. Paes Leme, J. Schneider

*Proceedings of the 30th Annual ACM-SIAM Symposium on Discrete Algorithms (SODA 2021)*

## Tensor Completion Made Practical

A. Liu, A. Moitra

*Advances in Neural Information Processing Systems 33 (NeurIPS 2020)*

## Myersonian Regression

A. Liu, R. Paes Leme, J. Schneider

*Advances in Neural Information Processing Systems 33 (NeurIPS 2020)*

## Better Algorithms for Estimating Non-Parametric Models in Crowd-Sourcing and Rank Aggregation

A. Liu, A. Moitra

*Proceedings of the 33rd Annual Conference on Learning Theory (COLT 2020)*

## Fourier and Circulant Matrices are not Rigid

Z. Dvir, A. Liu

*34th Computational Complexity Conference (CCC 2019)*

## Efficiently Learning Mixtures of Mallows Models

A. Liu, A. Moitra

*Proceedings of the 59th Annual IEEE Symposium on Foundations of Computer Science (FOCS 2018)*

## Wavelet decomposition and bandwidth of functions defined on vector spaces over finite fields

A. Iosevich, A. Liu, A. Mayeli, J. Pakianathan

*Bulletin of the Hellenic Mathematical Society, Volume 62, 2018 (80–93)*

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## Working Experience

**Microsoft Research, WA** 2021

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

**MIT Computer Science and Artificial Intelligence Laboratory, MA** 2017-2020

Researching and developing algorithms with provable guarantees for learning and modeling ranking data

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## 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.

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## References

Available upon request