Mengqi Lou

Personal website Google scholar page
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Education

Georgia Institute of Technology
Ph.D., Algorithms, Combinatorics, and Optimization, 2020-present
H. Milton Stewart School of Industrial and Systems Engineering
Advisor: Ashwin Pananjady

Johns Hopkins University
M.Eng., Robotics Engineering, 2018-2020
Advisor: Donniell Fishkind

Zhejiang University
B.Eng., Mechanical and Electrical Engineering, 2013-2017

Visiting position

University of California, Berkeley
Visiting student at Simons Institute for the Theory of Computing, Fall 2021
Program: Computational Complexity of Statistical Inference

Research Interests

High-dimensional statistics, optimization, applied probability, statistical-computational tradeoffs

Honors and Awards

- **2025** Cornell ORIE Young Researchers Workshop, Invited talk.
- **2025** Outstanding Paper Award of The 36th International Conference on Algorithmic Learning Theory. Awarded annually to 4 among 150 submitted papers.
- **2025** Research Fellowship from Algorithms and Randomness Center, Georgia Tech. Awarded annually to 10 students across the university.
- **2024** Robert Goodell Brown Award – Research Excellence in Data Science and Statistics. Awarded annually to one student in the department.
- **2020-2021** Stewart Fellowship, William Green Fellowship, ACO Student Fellowship, Georgia Tech.

Journal papers and preprints

1. **Mengqi Lou**, Guy Bresler, Ashwin Pananjady. "Efficient reductions from a Gaussian source with applications to statistical-computational tradeoffs", under review at *Annals of Statistics,* 2025. [arXiv].
2. **Mengqi Lou**, Kabir Aladin Verchand, Sara Fridovich-Keil, Ashwin Pananjady. "Accurate, provable, and fast polychromatic tomographic reconstruction: A variational inequality approach", *SIAM Journal on Imaging Sciences (to appear),* 2025. [arXiv].
3. **Mengqi Lou**, Guy Bresler, Ashwin Pananjady. "Computationally efficient reductions between some statistical models", *IEEE Transactions on Information Theory,* Volume 71, Issue 9, September 2025. [arXiv], [IEEE].

4. **Mengqi Lou**, Kabir Aladin Verchand, Ashwin Pananjady. "Hyperparameter tuning via trajectory predictions: Stochastic prox-linear methods in matrix sensing", *Mathematical Programming, Series B,* September 2025. [arXiv], [MP].
    - Spotlight presentation in the ICML 2023 workshop on High-dimensional Learning Dynamics
5. Kabir Aladin Verchand*, **Mengqi Lou***, Ashwin Pananjady ($\star$ = equal contribution). "Alternating minimization for generalized rank one matrix sensing: sharp predictions from a random initialization", *Information and Inference: A Journal of IMA,* Volume 13, Issue 3, September 2024. [arXiv], [IMA].
    - Spotlight presentation in the NeurIPS 2022 workshop on The Benefits of Higher-Order Optimization in Machine Learning
6. Guanyi Wang, **Mengqi Lou**, Ashwin Pananjady. "Do algorithms and barriers for sparse principal component analysis extend to other structured settings?", *IEEE Transactions on Signal Processing,* Volume 72, July 2024. [arXiv], [IEEE].
7. Lingyao Meng, **Mengqi Lou**, Jianyu Lin, Vince Lyzinski, Donniell E. Fishkind, "On seeded subgraph-to-subgraph matching: The ssSGM Algorithm and matchability information theory", *Journal of Computational and Graphical Statistics,* August 2025. [arXiv], [JCGS].

Conference papers

1. **Mengqi Lou**, Guy Bresler, Ashwin Pananjady. "Computationally efficient reductions between some statistical models", *The 36th International Conference on Algorithmic Learning Theory, 2025.* Extended abstract, superseded by journal version. [ALT]
2. Kabir Aladin Verchand*, **Mengqi Lou***, Ashwin Pananjady ($\star$ = equal contribution). "Alternating minimization for generalized rank one matrix sensing: Sharp predictions from a random initialization", *The 35th International Conference on Algorithmic Learning Theory, 2024.* Extended abstract, superseded by journal version. [ALT]

Teaching

Georgia Institute of Technology

Instructor

- Statistics and Applications, Summer 2023
  Course description: Introductory probability and statistics course for engineering and computer science students; enrollment included 39 online and 29 in-person students.

Teaching assistant

- Foundations of Modern Data Science, Fall 2022

Johns Hopkins University

Teaching assistant

- Matrix Analysis and Linear Algebra, Fall 2019

Talks and Presentations

1. *(Upcoming)* "Computationally efficient reductions between some statistical models", INFORMS Job Market Showcase Session, Atlanta, Oct 2025.
2. "Computationally efficient reductions between some statistical models", Cornell ORIE Young Researchers Workshop, Ithaca, Oct 2025.

3. "Computationally efficient reductions between some statistical models", Stochastics Seminar, School of Mathematics, Georgia Tech, Sep 2025
4. "Computationally efficient reductions between some statistical models", 22nd INFORMS Applied Probability Society Conference, Atlanta, July, 2025
5. "Computationally efficient reductions between some statistical models", The ARC-ACO Fellowship Presentations, Algorithms Randomness Center, Georgia Tech, Aug, 2025
6. "Computationally efficient reductions between some statistical models", The International Indian Statistical Association Conference (Poster), Nebraska, June, 2025
7. "Computationally efficient reductions between some statistical models", 36th International Conference on Algorithmic Learning Theory, Italy, Feb, 2025
8. "Sharp predictions for mini-batched prox-linear iterations in rank one matrix sensing", INFORMS Annual Meeting (Invited Talk), Seattle, Oct, 2024
9. "Sharp predictions for mini-batched prox-linear iterations in rank one matrix sensing", SIAM Conference on Mathematics of Data Science (Poster), Atlanta, Oct 2024
10. "Sharp predictions for mini-batched prox-linear iterations in rank one matrix sensing", SIAM Conference on Mathematics of Data Science (Poster), Atlanta, Oct 2024
11. "Sharp predictions for mini-batched prox-linear iterations in rank one matrix sensing", INFORMS Annual Meeting (Invited Talk), Phoenix, Oct, 2023
12. "Sharp predictions for mini-batched prox-linear iterations in rank one matrix sensing", ICML Workshop on High-dimensional Learning Dynamics (Spotlight Talk), Hawaii, June, 2023
13. "Alternating minimization for generalized rank one matrix sensing: sharp predictions from a random initialization", 35th International Conference on Algorithmic Learning Theory, San Diego, Feb, 2024
14. "Alternating minimization for generalized rank one matrix sensing: sharp predictions from a random initialization", Information Theory and Applications Workshop (Poster), San Diego, Feb, 2024
15. "Alternating minimization for generalized rank one matrix sensing: sharp predictions from a random initialization", Georgia Statistics Day (Poster), Atlanta, Oct, 2023
16. "Alternating minimization for generalized rank one matrix sensing: sharp predictions from a random initialization", ACO Student Seminar, Georgia Tech, April, 2023
17. "Alternating minimization for generalized rank one matrix sensing: sharp predictions from a random initialization", NeurIPS Workshop on The Benefits of Higher-Order Optimization in Machine Learning (Poster), New Orleans, Dec, 2022
18. "Accurate, provable, and fast nonlinear tomographic reconstruction: A variational inequality approach", IEEE International Symposium on Information Theory (Poster), Michigan, June, 2025.

Service

- *Session Chair* for INFORMS Applied Probability Society Conference, Atlanta, July, 2025.
  Session title: *Statistical Learning in High-dimensions II.*
- *Program Committee* for Conference on Learning Theory (COLT) 2025.
- *Journal reviewer* for IEEE Transactions on Information Theory.
- *Conference reviewer* for Conference on Learning Theory (COLT) 2024.

References

- Professor Ashwin Pananjady. Assistant Professor, Schools of Industrial and Systems Engineering, Electrical and Computer Engineering, Georgia Institute of Technology. Email: ashwinpm@gatech.edu
- Professor Guy Bresler. Associate Professor, Department of Electrical Engineering and Computer Science, Massachusetts Institute of Technology. Email: guy@mit.edu
- Professor Justin Romberg. Professor, School of Electrical and Computer Engineering, Georgia Institute of Technology. Email: jrom@ece.gatech.edu
- Professor Cheng Mao. Assistant Professor, School of Mathematics, Georgia Institute of Technology. Email: cheng.mao@math.gatech.edu
- Professor Sara Fridovich-Keil. Assistant Professor, School of Electrical and Computer Engineering, Georgia Institute of Technology. Email: sfk@gatech.edu