

Yuzhou Gu
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RESEARCH INTEREST High-dimensional statistics, Information theory, Theoretical computer science, Probability

EMPLOYMENT **New York University** New York, NY, USA
– Data Science Faculty Fellow & Courant Instructor, Sept. 2024 - Aug. 2026

Institute for Advanced Study Princeton, NJ, USA
– Member, Sept. 2023 - July 2024

EDUCATION **Massachusetts Institute of Technology** Cambridge, MA, USA
– Ph.D. in Electrical Engineering and Computer Science, Sept. 2018 - June 2023
Thesis: Channel Comparison Methods and Statistical Problems on Graphs
Advisor: Yury Polyanskiy
– M.Eng. in Electrical Engineering and Computer Science, Sept. 2017 - June 2018
Advisor: Yury Polyanskiy
– B.S. in Electrical Engineering and Computer Science
B.S. in Mathematics, Sept. 2013 - June 2017

AWARDS
– George M. Sprowls PhD Thesis Award, MIT EECS Department, 2024
– Best Student Paper Award at *Conference on Learning Theory (COLT) 2021*
– Jacobs Presidential Fellowship, MIT, 2018-2019
– Gold Medal (3rd place) at *International Olympiad in Informatics (IOI) 2012*

PUBLICATIONS & PREPRINTS

1. **Yuzhou Gu**, Yanjun Han, Jian Qian. “Evolution of Information in Interactive Decision Making: A Case Study for Multi-Armed Bandits,” *Preprint. arXiv:2503.00273*
2. **Yuzhou Gu**, Xin Li, Yinzhan Xu. “Tight Bounds for Noisy Computation of High-Influence Functions, Connectivity, and Threshold,” *Conference on Learning Theory (COLT) 2025*.
3. Pietro Caputo, Zongchen Chen, **Yuzhou Gu**, Yury Polyanskiy. “Entropy Contractions in Markov Chains: Half-Step, Full-Step and Continuous-Time,” *Electronic Journal of Probability*, 30:1-29, 2025.
4. **Yuzhou Gu**. “Exact condensation thresholds for NAE-SAT and the hypergraph stochastic block model,” *In preparation*.
5. **Yuzhou Gu**, Yury Polyanskiy. “Robust reconstruction on trees revisited,” *In preparation*.
6. **Yuzhou Gu**, Nikki Lijing Kuang, Yi-An Ma, Zhao Song, Lichen Zhang. “Log-concave Sampling over a Convex Body with a Barrier: a Robust and Unified Dikin Walk,” *Conference on Neural Information Processing Systems (NeurIPS) 2024*.
7. **Yuzhou Gu**, Aaradhya Pandey. “Community detection in the hypergraph stochastic block model and reconstruction on hypertrees,” *Conference on Learning Theory (COLT) 2024*.
8. **Yuzhou Gu**, Yury Polyanskiy. “Non-linear Log-Sobolev Inequalities for the Potts Semigroup and Applications to Reconstruction Problems,” *Communications in Mathematical Physics*, 404(2):769–831, 2023.

9. **Yuzhou Gu**, Ziqi Zhou, Onur Günlü, Rafael G. L. D'Oliveira, Parastoo Sadeghi, Muriel Médard, Rafael F. Schaefer. "Generalized Rainbow Differential Privacy," *Journal of Privacy and Confidentiality*, 14(2), 2024.
10. Zongchen Chen, **Yuzhou Gu**. "Fast Sampling of b -Matchings and b -Edge Covers," *ACM-SIAM Symposium on Discrete Algorithms (SODA)* 2024.
11. **Yuzhou Gu**, Yury Polyanskiy. "Weak Recovery Threshold for the Hypergraph Stochastic Block Model," *Conference on Learning Theory (COLT)* 2023.
12. **Yuzhou Gu**, Yury Polyanskiy. "Uniqueness of BP fixed point for the Potts model and applications to community detection," *Conference on Learning Theory (COLT)* 2023.
13. **Yuzhou Gu**, Zhao Song, Lichen Zhang. "Faster Algorithms for Structured Linear and Kernel Support Vector Machines," *International Conference on Learning Representations (ICLR)* 2025.
14. **Yuzhou Gu**, Zhao Song, Junze Yin, Lichen Zhang. "Low Rank Matrix Completion via Robust Alternating Minimization in Nearly Linear Time," *International Conference on Learning Representations (ICLR)* 2024.
15. **Yuzhou Gu**, Zhao Song. "A Faster Small Treewidth SDP Solver," *Preprint. arXiv:2211.06033*
16. **Yuzhou Gu**, Yinzhan Xu. "Optimal Bounds for Noisy Sorting," *ACM Symposium on Theory of Computing (STOC)* 2023.
17. Emmanuel Abbe, Elisabetta Cornacchia, **Yuzhou Gu**, Yury Polyanskiy. "Stochastic block model entropy and broadcasting on trees with survey," *Conference on Learning Theory (COLT)* 2021. **Best Student Paper Award.**
18. **Yuzhou Gu**, Adam Polak, Virginia Vassilevska Williams, Yinzhan Xu. "Faster monotone min-plus product, range mode, and single source replacement paths," *International Colloquium on Automata, Languages and Programming (ICALP)* 2021.
19. **Yuzhou Gu**, Hajir Roozbehani, Yury Polyanskiy. "Broadcasting on trees near criticality," *IEEE International Symposium on Information Theory (ISIT)* 2020.
20. Zeev Dvir, Sivakanth Gopi, **Yuzhou Gu**, Avi Wigderson. "Spanoids - an abstraction of spanning structures, and a barrier for LCCs," *Innovations in Theoretical Computer Science (ITCS)* 2019.
Zeev Dvir, Sivakanth Gopi, **Yuzhou Gu**, Avi Wigderson. "Spanoids - an abstraction of spanning structures, and a barrier for LCCs," *SIAM Journal on Computing (SICOMP)*, 49(3):465–496, 2020.
21. Lijie Chen, Erik D. Demaine, **Yuzhou Gu**, Virginia Vassilevska Williams, Yinzhan Xu, Yuancheng Yu. "Nearly optimal separation between partially and fully retroactive data structures," *Scandinavian Symposium and Workshops on Algorithm Theory (SWAT)* 2018.
22. **Yuzhou Gu**. "Zero-error communication over adder MAC," *Preprint. arXiv:1809.07364*
23. **Yuzhou Gu**. "Graph magnitude homology via algebraic Morse theory," *Preprint. arXiv:1809.07240*
24. **Yuzhou Gu**. "Generalized equivariant model structure on \mathbf{Cat}^I ," *Preprint. arXiv:1605.07983*
25. **Yuzhou Gu**. "Some results on reversible gate classes over non-binary alphabets," *Preprint. arXiv:1606.00804*

TALKS

1. Reconstruction on hypertrees, *Penn/Temple Probability Seminar*. University of Pennsylvania, Philadelphia, PA, Oct. 2024.
2. Community detection in the hypergraph stochastic block model, *CDS Colloquium*. New York University, New York, NY, Sept. 2024.
3. Community detection in the hypergraph stochastic block model, *SINE Seminar*. University of Illinois Urbana-Champaign, Champaign, IL, Sept. 2024.
4. Community detection in the hypergraph stochastic block model, *CS Theory Seminar*. Johns Hopkins University, Baltimore, MD, Sept. 2024.
5. Community detection in the hypergraph stochastic block model and reconstruction on hypertrees, *Conference on Learning Theory (COLT) 2024*. Edmonton, CA, Canada, June 2024
6. Weak Recovery Threshold for the Hypergraph Stochastic Block Model, *Rutgers Discrete Mathematics Seminar*. Rutgers University, Piscataway, NJ, Mar. 2024
7. Reconstruction on trees and hypertrees, *Computer Science/Discrete Mathematics Seminar II*. Institute for Advanced Study, Princeton, NJ, Feb. 2024
8. Fast Sampling of b -Matchings and b -Edge Covers, *ACM-SIAM Symposium on Discrete Algorithms (SODA) 2024*. Alexandria, VA, Jan. 2024
9. Uniqueness of Belief Propagation Fixed Point, *Short Talks by Postdoctoral Members*. Institute for Advanced Study, Princeton, NJ, Oct. 2023
10. Weak Recovery Threshold for the Hypergraph Stochastic Block Model, *Probability in High Dimensions Reading Seminar*. Princeton University, Princeton, NJ, Oct. 2023
11. Weak Recovery Threshold for the Hypergraph Stochastic Block Model, *Conference on Learning Theory (COLT) 2023*. Virtual, June 2023
12. Uniqueness of BP fixed point for the Potts model and applications to community detection, *Conference on Learning Theory (COLT) 2023*. Virtual, June 2023
13. Information Theory and Uniqueness of Belief Propagation Fixed Point, *Graduate Student Probability Conference*. University of Wisconsin-Madison, Madison, WI, Sept. 2022
14. Channel degradation and uniqueness of BP fixed point beyond binary alphabet, *Conference on Information Sciences and Systems (CISS)*. Virtual, Mar. 2022
15. Stochastic block model entropy and broadcasting on trees with survey, *Conference on Learning Theory (COLT) 2021*. Virtual, Aug. 2021
16. Faster monotone min-plus product, range mode, and single source replacement paths, *International Colloquium on Automata, Languages and Programming (ICALP) 2021*. Virtual, July 2021
17. Broadcasting on trees near criticality, *IEEE International Symposium on Information Theory (ISIT) 2020*. Virtual, July 2021
18. Strong data processing inequalities and reconstruction problems, *LIDS Student Conference 2020*. Massachusetts Institute of Technology, Cambridge, MA, Jan. 2020

SERVICE

- Reviewer for IEEE International Symposium on Information Theory (ISIT) 2021, 2023, 2024, 2025; IEEE Information Theory Workshop (ITW) 2022, 2023; ACM-SIAM Symposium on Discrete Algorithms (SODA) 2023, 2024; ACM Symposium on Theory of Computing (STOC) 2024, 2025; International Colloquium on Automata, Languages and Programming (ICALP) 2024; IEEE Symposium on Foundations of Computer Science (FOCS) 2024; Conference on Learning Theory (COLT) 2025; IEEE Transactions on Information Theory; Algorithmica; Annals of Statistics; Transactions on Algorithms; Journal of Computer and System Sciences; Mathematical Reviews
- Program committee member for International Conference on Algorithmic Learning Theory (ALT) 2024, 2025

TEACHING

- Instructor, NYU MATH-UA 148/MA-UY 3054 Honors Linear Algebra, Spring 2025
- Instructor, NYU MA-UY 3113 Advanced Linear Algebra and Complex Variables, Fall 2024
- Teaching Assistant, MIT 6.441 Information Theory, Fall 2021