Yuzhou Gu

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ACADEMIC 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

INDUSTRY EXPERIENCE　**D. E. Shaw & Co.**

– Quantitative Research Intern, June - Aug. 2025　London, UK

– Quantitative Research Intern, June - Aug. 2021　Remote (New York, NY, USA)

Pony.ai　Fremont, CA, USA

– Engineering Intern, June - Aug. 2019

– Engineering Intern, June - Aug. 2018

Google　Mountain View, CA, USA

– Engineering Intern, May - Aug. 2015

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**, Zhao Song, Junze Yin. Binary Hypothesis Testing for Softmax Models and Leverage Score Models. *International Conference on Machine Learning (ICML) 2025.*

7. **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.*

8. **Yuzhou Gu**, Aaradhya Pandey. "Community detection in the hypergraph stochastic block model and reconstruction on hypertrees," *Conference on Learning Theory (COLT) 2024.*

9. **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.*

10. **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.*

11. Zongchen Chen, **Yuzhou Gu**. "Fast Sampling of b-Matchings and b-Edge Covers," *ACM-SIAM Symposium on Discrete Algorithms (SODA) 2024.*

12. **Yuzhou Gu**, Yury Polyanskiy. "Weak Recovery Threshold for the Hypergraph Stochastic Block Model," *Conference on Learning Theory (COLT) 2023.*

13. **Yuzhou Gu**, Yury Polyanskiy. "Uniqueness of BP fixed point for the Potts model and applications to community detection," *Conference on Learning Theory (COLT) 2023.*

14. **Yuzhou Gu**, Zhao Song, Lichen Zhang. "Faster Algorithms for Structured Linear and Kernel Support Vector Machines," *International Conference on Learning Representations (ICLR) 2025.*

15. **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.*

16. **Yuzhou Gu**, Zhao Song. "A Faster Small Treewidth SDP Solver," *Preprint. arXiv:2211.06033*

17. **Yuzhou Gu**, Yinzhan Xu. "Optimal Bounds for Noisy Sorting," *ACM Symposium on Theory of Computing (STOC) 2023.*

18. 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.**

19. **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.*

20. **Yuzhou Gu**, Hajir Roozbehani, Yury Polyanskiy. "Broadcasting on trees near criticality," *IEEE International Symposium on Information Theory (ISIT) 2020.*

21. 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.*

22. 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.*

23. **Yuzhou Gu**. "Zero-error communication over adder MAC," *Preprint. arXiv:1809.07364*

24. **Yuzhou Gu**. "Graph magnitude homology via algebraic Morse theory," *Preprint. arXiv:1809.07240*

25. **Yuzhou Gu**. "Generalized equivariant model structure on $\mathbf{Cat}^I$," *Preprint. arXiv:1605.07983*

26. **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

SKILLS

Programming languages: C++, Python, LaTeX

Languages: Mandarin, English, Japanese