

Yuzhou Gu
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RESEARCH INTEREST Information theory, Statistics, Probability, Optimization

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

PROFESSIONAL EXPERIENCE **Institute for Advanced Study** Princeton, NJ, USA

- Postdoctoral Member, Sept. 2023 - July 2024

- PUBLICATIONS & PREPRINTS**
1. **Yuzhou Gu**, Yury Polyanskiy. “Non-linear Log-Sobolev Inequalities for the Potts Semigroup and Applications to Reconstruction Problems,” *Communications in Mathematical Physics*, 404:769–831, 2023.
 2. **Yuzhou Gu**, Ziqi Zhou, Onur Günlü, Rafael G. L. D’Oliveira, Parastoo Sadeghi, Muriel Médard, Rafael F. Schaefer. “Generalized Rainbow Differential Privacy,” *Preprint. arXiv: 2309.05871*
 3. Zongchen Chen, **Yuzhou Gu**. “Fast Sampling of b -Matchings and b -Edge Covers,” *ACM-SIAM Symposium on Discrete Algorithms (SODA) 2024*.
 4. **Yuzhou Gu**, Yury Polyanskiy. “Weak Recovery Threshold for the Hypergraph Stochastic Block Model,” *Conference on Learning Theory (COLT) 2023*.
 5. **Yuzhou Gu**, Yury Polyanskiy. “Uniqueness of BP fixed point for the Potts model and applications to community detection,” *Conference on Learning Theory (COLT) 2023*.
 6. **Yuzhou Gu**, Zhao Song, Lichen Zhang. “Faster Algorithms for Structured Linear and Kernel Support Vector Machines,” *Preprint. arXiv: 2307.07735*
 7. **Yuzhou Gu**, Zhao Song, Junze Yin, Lichen Zhang. “Low Rank Matrix Completion via Robust Alternating Minimization in Nearly Linear Time,” *Preprint. arXiv:2302.11068*
 8. **Yuzhou Gu**, Zhao Song. “A Faster Small Treewidth SDP Solver,” *Preprint. arXiv:2211.06033*
 9. **Yuzhou Gu**, Yinzhan Xu. “Optimal Bounds for Noisy Sorting,” *ACM Symposium on Theory of Computing (STOC) 2023*.
 10. 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*.
 11. **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*.
 12. **Yuzhou Gu**, Hajir Roozbehani, Yury Polyanskiy. “Broadcasting on trees near criticality,” *IEEE International Symposium on Information Theory (ISIT) 2020*.

13. 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.
14. 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*.
15. **Yuzhou Gu**. “Zero-error communication over adder MAC,” *Preprint*.
arXiv:1809.07364
16. **Yuzhou Gu**. “Graph magnitude homology via algebraic Morse theory,” *Preprint*.
arXiv:1809.07240
17. **Yuzhou Gu**. “Generalized equivariant model structure on \mathbf{Cat}^I ,” *Preprint*.
arXiv:1605.07983
18. **Yuzhou Gu**. “Some results on reversible gate classes over non-binary alphabets,” *Preprint*. *arXiv:1606.00804*

AWARDS

- Best Student Paper Award at *Conference on Learning Theory (COLT) 2021*.
- Jacobs Presidential Fellowship, 2018-2019
- Gold Medal (3rd place) at *International Olympiad in Informatics (IOI) 2012*.

WORK EXPERIENCE

- Quantitative Research Intern, D. E. Shaw & Co., Remote, June-Aug. 2021
- Engineering Intern, Pony.ai, Fremont, CA, June-Aug. 2018, June-Aug. 2019
- Engineering Intern, Google, Mountain View, CA, May-Aug. 2015

TALKS

1. Uniqueness of Belief Propagation Fixed Point, *Short Talks by Postdoctoral Members*. Institute for Advanced Study, Princeton NJ, Oct. 2023
2. Weak Recovery Threshold for the Hypergraph Stochastic Block Model, *Probability in High Dimensions Reading Seminar*. Princeton University, Princeton, NJ, Oct. 2023
3. Weak Recovery Threshold for the Hypergraph Stochastic Block Model, *Conference on Learning Theory (COLT) 2023*. Virtual, June 2023
4. Uniqueness of BP fixed point for the Potts model and applications to community detection, *Conference on Learning Theory (COLT) 2023*. Virtual, June 2023
5. Information Theory and Uniqueness of Belief Propagation Fixed Point, *Graduate Student Probability Conference*. University of Wisconsin-Madison, Madison, WI, Sept. 2022
6. Channel degradation and uniqueness of BP fixed point beyond binary alphabet, *Conference on Information Sciences and Systems (CISS)*. Virtual, Mar. 2022
7. Stochastic block model entropy and broadcasting on trees with survey, *Conference on Learning Theory (COLT) 2021*. Virtual, Aug. 2021
8. Faster monotone min-plus product, range mode, and single source replacement paths, *International Colloquium on Automata, Languages and Programming (ICALP) 2021*. Virtual, July 2021
9. Broadcasting on trees near criticality, *IEEE International Symposium on Information Theory (ISIT) 2020*. Virtual, July 2021

10. 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, IEEE Information Theory Workshop (ITW) 2022, 2023, ACM-SIAM Symposium on Discrete Algorithms (SODA) 2023, 2024, International Conference on Algorithmic Learning Theory (ALT) 2024, ACM Symposium on Theory of Computing (STOC) 2024, IEEE Transactions on Information Theory (TIT), *Algorithmica*, *Annals of Statistics*.

TEACHING

Teaching Assistant, MIT 6.441 Information Theory, Sept.-Dec. 2021

REFERENCES

- Yury Polyanskiy, Professor of EECS at MIT
- Emmanuel Abbe, Professor at EPFL
- Zhao Song, Research Scientist at Adobe Research