

# Li, Gen

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## Education

<b>2022.1-now</b>	University of Pennsylvania. Statistics and Data Science, Wharton School	<b>Postdoc</b> Advisor: Yuxin Chen and Yuting Wei
<b>2021.9-2021.12</b>	Princeton University. Electrical and Computer Engineering	<b>Postdoc</b> Advisor: Yuxin Chen
<b>2016.8-2021.7</b>	Tsinghua University. Electronic Engineering	<b>Ph.D. (Hons.)</b> Advisor: Yuantao Gu
<b>2012.8-2016.7</b>	Electronic Engineering, Tsinghua University.	<b>Bachelor</b>
<b>2013.8-2016.7</b>	Mathematics, Tsinghua University.	<b>Bachelor</b>

## Research interest

Reinforcement learning, high-dimensional statistics, mathematical optimization, machine learning

## Journal Articles

- J1. G. Li, L. Shi, Y. Chen, Y. Gu, and Y. Chi, "Breaking the Sample Complexity Barrier to Regret-Optimal Model-Free Reinforcement Learning," accepted to Information and Inference: A Journal of the IMA, 2022.
- J2. G. Li, Y. Wei, Y. Chi, Y. Gu, and Y. Chen, "Sample Complexity of Asynchronous Q-Learning: Sharper Analysis and Variance Reduction," IEEE Transactions on Information Theory 68 (1), 448-473, January 2022.
- J3. G. Li, Y. Chi, Y. Wei, and Y. Chen, "Minimax-Optimal Multi-Agent RL in Markov Games With a Generative Model," arXiv preprint arXiv:2208.10458, 2022.
- J4. G. Li, and Y. Wei, "A Non-Asymptotic Framework for Approximate Message Passing in Spiked Models," arXiv preprint arXiv:2208.03313, 2022.
- J5. G. Li, L. Shi, Y. Chen, Y. Chi, and Y. Wei, "Settling the sample complexity of model-based offline reinforcement learning," arXiv preprint arXiv:2204.05275, 2022.
- J6. C. Cai, G. Li, H. V. Poor, and Y. Chen, "Nonconvex Low-Rank Tensor Completion from Noisy Data," Operations Research, vol. 70, no. 2, pp. 1219-1237, 2022.
- J7. Y. Yan, G. Li, Y. Chen, J. Fan, "Model-Based Reinforcement Learning Is Minimax-Optimal for Offline Zero-Sum Markov Games," arXiv preprint arXiv:2206.04044, 2022.
- J8. Y. Yan, G. Li, Y. Chen, J. Fan, "The Efficacy of Pessimism in Asynchronous Q-Learning," arXiv preprint arXiv:2203.07368, 2022.
- J9. G. Li, C. Cai, Y. Chen, Y. Gu, Y. Wei, and Y. Chi, "Is Q-Learning Minimax Optimal? A Tight Sample Complexity Analysis," arXiv preprint arXiv:2102.06548, 2021.
- J10. G. Li, Y. Wei, Y. Chi, Y. Gu, and Y. Chen, "Softmax Policy Gradient Methods Can Take Exponential Time to Converge," arXiv preprint arXiv:2102.11270, 2021.

- J11. G. Li, Y. Gu, and J. Ding, " $\ell_1$  Regularization in Two-Layer Neural Networks," IEEE Signal Processing Letters 29, 135-139, 2021.
- J12. C. Cai, G. Li, Y. Chi, H. V. Poor, and Y. Chen, "Subspace Estimation from Unbalanced and Incomplete Data Matrices:  $\ell_{2,\infty}$  Statistical Guarantees," Annals of Statistics 49 (2), 944-967, April 2021.
- J13. G. Li, Y. Wei, Y. Chi, Y. Gu, and Y. Chen, "Breaking the Sample Size Barrier in Model-Based Reinforcement Learning with a Generative Model," arXiv preprint arXiv:2005.12900, 2020.
- J14. G. Li, Q. Liu, and Y. Gu, "Rigorous Restricted Isometry Property for Low-Dimensional Subspaces," Applied and Computational Harmonic Analysis, 49(2):608-635, September 2020.
- J15. Y. M. Lu, and G. Li, "Phase transitions of spectral initialization for high-dimensional non-convex estimation," Information and Inference: A Journal of the IMA 9(3), 507-541, September 2020.
- J16. G. Li, X. Xu, and Y. Gu, "Lower Bound for RIP Constants and Concentration of Sum of Top Order Statistics," IEEE Transactions on Signal Processing, 68:3169-3178, April 2020.
- J17. X. Xu, G. Li, and Y. Gu, "Unraveling the Veil of Subspace RIP Through Near-Isometry on Subspaces," IEEE Transactions on Signal Processing, 68:3117-3131, April 2020.
- J18. G. Li, and Y. Gu, "Restricted Isometry Property of Gaussian Random Projection for Finite Set of Subspaces," IEEE Transactions on Signal Processing, 66(7):1705-1720, April 2018.
- J19. L. Meng, G. Li, J. Yan, and Y. Gu, "A General Framework for Understanding Compressed Subspace Clustering Algorithms," IEEE Journal of Selected Topics in Signal Processing, 12(6):1504-1519, December 2018.
- J20. J. Wang, G. Li, L. Rencker, W. Wang, and Y. Gu, "An RIP-Based Performance Guarantee of Covariance-Assisted Matching," IEEE Signal Processing Letters, 25(6), 828-832, March 2018.
- J21. Y. Chen, G. Li, and Y. Gu, "Active Orthogonal Matching Pursuit for Sparse Subspace Clustering," IEEE Signal Processing Letters, 25(2):164 - 168, February 2018.

## Conference papers

- C1. G. Li, Y. Chi, Y. Wei, and Y. Chen, "Minimax-Optimal Multi-Agent RL in Markov Games With a Generative Model," Neural Information Processing Systems (NeurIPS) (**Oral**), November 2022.
- C2. L. Shi, G. Li, Y. Wei, Y. Chen, Y. Chi, "Pessimistic Q-Learning for Offline Reinforcement Learning: Towards Optimal Sample Complexity," International Conference on Machine Learning (ICML), July 2022.
- C3. G. Li, L. Shi, Y. Chen, Y. Gu, and Y. Chi, "Breaking the Sample Complexity Barrier to Regret-Optimal Model-Free Reinforcement Learning," Neural Information Processing Systems (NeurIPS) (**Spotlight**), December 2021.
- C4. G. Li, Y. Chen, Y. Chi, Y. Gu, and Y. Wei, "Sample-Efficient Reinforcement Learning Is Feasible for Linearly Realizable MDPs with Limited Revisiting," Neural Information Processing Systems (NeurIPS), December 2021.
- C5. G. Li and Y. Gu, "Theory of Spectral Method for Union of Subspaces-Based Random Geometry Graph," International Conference on Machine Learning (ICML), July 2021.
- C6. G. Li, C. Cai, Y. Chen, Y. Gu, Y. Wei, and Y. Chi, "Tightening the Dependence on Horizon in the Sample Complexity of Q-Learning," International Conference on Machine Learning (ICML), July 2021.
- C7. G. Li, Y. Wei, Y. Chi, Y. Gu, and Y. Chen, "Softmax Policy Gradient Methods Can Take Exponential Time to Converge," Conference on Learning Theory (COLT), August 2021.
- C8. G. Li, Y. Wei, Y. Chi, Y. Gu, and Y. Chen, "Breaking the Sample Size Barrier in Model-Based Reinforcement Learning with a Generative Model," Neural Information Processing Systems (NeurIPS), December 2020.
- C9. G. Li, Y. Wei, Y. Chi, Y. Gu, and Y. Chen, "Sample Complexity of Asynchronous Q-Learning: Sharper Analysis and Variance Reduction," Neural Information Processing Systems (NeurIPS), December 2020.

- C10. C. Cai, G. Li, Y. Chi, H. V. Poor, and Y. Chen, “Nonconvex Low-Rank Symmetric Tensor Completion from Noisy Data,” Neural Information Processing Systems (NeurIPS), Vancouver, Canada, December 2019.
- C11. G. Li, J. Yan, and Y. Gu, Information Theoretic Lower Bound of Restricted Isometry Property Constant, IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP), Brighton, UK, May, 2019.
- C12. G. Li, J. Yan, and Y. Gu, “Outage Probability Conjecture Does Not Hold for Two-Input-Multiple-Output (TIMO) System,” IEEE International Symposium on Information Theory (ISIT), Vail, CO, USA, June 2018.
- C13. G. Li, Y. Jiao, and Y. Gu, “Convergence Analysis on A Fast Iterative Phase Retrieval Algorithm without Independence Assumption,” IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP), Calgary, Canada, April 2018.
- C14. Y. Jiao, G. Li, and Y. Gu, “Principal Angles Preserving Property of Gaussian Random Projection for Subspaces,” IEEE Global Conference on Signal and Information Processing (GlobalSIP), Montreal, Canada, November 2017.
- C15. G. Li and Y. Gu, “Distance-preserving property of random projection for subspaces,” IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP), New Orleans, USA, March 2017.
- C16. G. Li, Y. Gu, and Y. M. Lu, “Phase Retrieval Using Iterative Projections: Dynamics in the Large Systems Limit,” IEEE Allerton Conference on Communications, Control, and Computing, September 2015.

## Honors

<b>2020</b>	Excellent graduate award.	Tsinghua University (4 in EE department)
<b>2020</b>	Excellent thesis award.	Tsinghua University (6 in EE department)

## Visiting Experience

- Harvard University (2015.7 - 2015.8)
- Princeton University (2018.9 - 2018.11)
- Princeton University (2019.8 - 2019.11)