

Jiayi Ying

Email: jx.ying@connect.ust.hk | Phone: (852) 9010 3340

I am a postdoctoral fellow in the Department of Mathematics at Hong Kong University of Science and Technology. My research focuses on developing algorithms that are both statistically and computationally efficient to address problems in data science, machine learning, and signal processing, utilizing tools from statistics, optimization, and artificial intelligence.

1 Professional Positions

- Postdoctoral Fellow, 05/2022 - Present, Department of Mathematics, Hong Kong University of Science and Technology, Hong Kong. (Supervisor: Jian-Feng Cai)
- Research Assistant, 10/2017 - 08/2018, Department of Mathematics, Hong Kong University of Science and Technology, Hong Kong. (Supervisor: Jian-Feng Cai)

2 Academic Qualifications

- Hong Kong University of Science and Technology, 09/2018 - 04/2022, Doctor of Philosophy in Electronic and Computer Engineering, Field of Study: Statistical Machine Learning and Optimization. (Supervisor: Daniel P. Palomar)
- Xiamen University, 09/2014 - 06/2017, Master of Engineering, Field of Study: Statistical Signal Processing. (Supervisors: Zhong Chen and Xiaobo Qu)
- Nanjing University of Science and Technology, 09/2008 - 06/2012, Bachelor of Science, Field of Study: Applied Physics.

3 Honors and Awards

- Hong Kong Research Grants Council Postdoctoral Fellowship with project titled "Sample-Efficient and Robust Algorithms for Sparse Principal Component Analysis", HK\$1.26 millions, 2024-2027.
- NeurIPS Scholar Award, 2023.
- HKUST Redbird Academic Excellent Scholarship, Highest Honor at HKUST, 2021.
- Outstanding Master's Thesis Award of Chinese Institute of Electronics, 2018.
- Excellent Master Thesis in Fujian Province, 2017.

4 Publications ([Google Scholar](#))

Articles distinguished by "with ..." have alphabetical author lists; "*" indicates corresponding author.

Preprints

1. **J. Ying**, J.V.M. Cardoso, D.P. Palomar, "Does the ℓ_1 -norm Learn a Sparse Graph under Laplacian Constrained Graphical Models?" under review in *Journal of Machine Learning Research*. [\[PDF\]](#)
2. **J. Ying*** with J.-F. Cai, and Z. Xian, "Fast and Provable Algorithms for Sparse PCA with Improved Sample Complexity," under review in *International Conference on Learning Representations (ICLR)*.
3. A. Buciualea, **J. Ying**, A. G. Marques, and D. P. Palomar, "Polynomial Graphical Lasso: Learning Edges from Gaussian Graph-Stationary Signals" under review in *IEEE Transactions on Signal Processing*. [\[PDF\]](#)

Journals and Selected Conference Papers

1. R. Shi, **J. Ying**, and D.P. Palomar, "Adaptive Passive-Aggressive Framework for Online Regression with Side Information," *Advances in Neural Information Processing Systems (NeurIPS)*, 2024. [\[PDF\]](#)
2. **J. Ying*** with J.-F. Cai, Y. Long, and R. Wen, "A Fast and Provable Algorithm for Sparse Phase Retrieval," *International Conference on Learning Representations (ICLR)*, 2024. [\[PDF\]](#)
3. **J. Ying*** with J.-F. Cai, J.V.M. Cardoso, and D.P. Palomar, "Fast Projected Newton-like Method for Precision Matrix Estimation under Total Positivity," *Advances in Neural Information Processing Systems (NeurIPS)*, 2023. [\[PDF\]](#)
4. X. Wang, **J. Ying***, and D.P. Palomar, "Learning High-Dimensional Sparse MTP₂ Gaussian Graphical Models via Bridge-Block Decomposition," *Advances in Neural Information Processing Systems (NeurIPS)*, 2023. [\[PDF\]](#)

5. X. Wang, R. Zhou, **J. Ying***, and D.P. Palomar, "Efficient and Scalable High-Order Portfolios Design via Parametric Skew-t Distribution," *IEEE Transactions on Signal Processing*, vol. 71, pp. 3726-3740, 2023. [\[PDF\]](#)
6. **J. Ying***, J.V.M. Cardoso, and D.P. Palomar, "Adaptive Estimation of Graphical Models under Total Positivity," *International Conference on Machine Learning (ICML)*, pp. 40054-40074, 2023. [\[PDF\]](#)
7. J.V.M. Cardoso, **J. Ying**, and D.P. Palomar, "Learning Bipartite Graphs: Heavy Tails and Multiple Components," *Advances in Neural Information Processing Systems (NeurIPS)*, vol. 35, p.14044-14057, 2022. [\[PDF\]](#)
8. R. Zhou, **J. Ying***, and D.P. Palomar, "Covariance Matrix Estimation Under Low-Rank Factor Model with Nonnegative Correlations," *IEEE Transactions on Signal Processing*, vol. 70, pp. 4020-4030, 2022. [\[PDF\]](#)
9. X. Wang, **J. Ying**, J.V.M. Cardoso, and D.P. Palomar, "Efficient Algorithms for General Isotone Optimization," *The AAAI Conference on Artificial Intelligence (AAAI)*, vol. 36, no. 8, pp. 8575-8583, 2022. [\[PDF\]](#)
10. **J. Ying**, J.V.M. Cardoso, and D.P. Palomar, "Minimax Estimation of Laplacian Constrained Precision Matrices," *The International Conference on Artificial Intelligence and Statistics (AISTATS)*, vol. 130, pp. 3736-3744, 2021. [\[PDF\]](#)
11. J.V.M. Cardoso, **J. Ying**, and D.P. Palomar, "Graphical Models for Heavy-Tailed Markets," *Advances in Neural Information Processing Systems (NeurIPS)*, vol. 34, pp. 19989-20001, 2021. [\[PDF\]](#)
12. **J. Ying**, J.V.M. Cardoso, and D.P. Palomar, "Nonconvex Sparse Graph Learning under Laplacian Constrained Graphical Model," *Advances in Neural Information Processing Systems (NeurIPS)*, vol. 33, pp. 7101-7113, Dec. 2020. [\[PDF\]](#)
13. S. Kumar, **J. Ying***, J.V.M. Cardoso, and D.P. Palomar, "A Unified Framework For Structured Graph Learning Via Spectral Constraints," *Journal of Machine Learning Research*, vol. 21, no. 22, pp. 1-60, 2020. [\[PDF\]](#)
14. S. Kumar, **J. Ying**, J.V.M. Cardoso, and D.P. Palomar, "Structured Graph Learning Via Laplacian Spectral Constraints," *Advances in Neural Information Processing Systems (NeurIPS)*, vol. 32, 2019. [\[PDF\]](#)
15. **J. Ying**, J.-F. Cai, D. Guo, G. Tang, Z. Chen, et al., "Vandermonde Factorization of Hankel Matrix for Complex Exponential Signal Recovery – Application in Fast NMR Spectroscopy," *IEEE Transactions on Signal Processing*, vol. 66, no. 21, pp. 5520-5533, 2018. [\[PDF\]](#)
16. **J. Ying**, H. Lu, Q. Wei, J.-F. Cai, D. Guo, et al., "Hankel Matrix Nuclear Norm Regularized Tensor Completion for N -dimensional Exponential Signals," *IEEE Transactions on Signal Processing*, vol. 65, no. 14, pp. 3702-3717, 2017. [\[PDF\]](#)
17. X. Han, **J. Ying**, A. Liu, and L. Ma. "A Nested Tensor-based Receiver Employing Triple Constellation Precoding for Three-hop Cooperative Communication Systems," *Digital Signal Processing*, vol. 133, pp. 103862, 2023. [\[PDF\]](#)
18. X. Han, X. Zhao, **J. Ying**, and F. Gao, "Tensor-Based Information Monitoring Receiver in UAV-Aided MIMO Communication Systems," *IEEE Wireless Communications Letters*, vol. 11, no. 1, pp. 155-159, 2022. [\[PDF\]](#)
19. X. Han, Y. Zhao and, **J. Ying**, "Semi-Blind Receivers for UAV M-KRST Coding MIMO Systems Based on Nested Tensor Models," *IEEE Wireless Communications Letters*, vol. 10, no. 1, pp. 185-188, 2021. [\[PDF\]](#)
20. H. Lu, X. Zhang, T. Qiu, J. Yang, **J. Ying**, et al., "Low Rank Enhanced Matrix Recovery of Hybrid Time and Frequency Data in Fast Magnetic Resonance Spectroscopy," *IEEE Transactions on Biomedical Engineering*, vol. 65, no. 4, pp. 809-820, 2018. [\[PDF\]](#)
21. X. Qu, T. Qiu, D. Guo, H. Lu, **J. Ying**, et al., "High-fidelity Spectroscopy Reconstruction in Accelerated NMR," *Chemical Communications*, 54(78): 10958-10961, 2018. [\[PDF\]](#)
22. H. Zheng, K. Zeng, D. Guo, **J. Ying**, Y. Yang, et al., "Multi-Contrast Brain MRI Image Super-Resolution With Gradient-Guided Edge Enhancement," *IEEE Access*, vol. 6, pp. 57856-57867, 2018. [\[PDF\]](#)

Book Chapters and Other Conference Papers

1. J.V.M. Cardoso, **J. Ying**, and D.P. Palomar, “Learning Graphs from Heavy-Tailed Data,” in *Elliptically Symmetric Distributions in Signal Processing and Machine Learning*, Eds. J.-P. Delmas, M. N. El Korso, S. Fortunati, F. Pascal, Springer, Jul. 2024. [\[PDF\]](#)
2. J.V.M. Cardoso, **J. Ying**, and D.P. Palomar, “Nonconvex Graph Learning: Sparsity, Heavy-tails, and Clustering,” in *Signal Processing and Machine Learning Theory*, pp. 1049–1072. Academic Press, 2024. [\[PDF\]](#)
3. **J. Ying**, X. Han, R. Zhou, X. Wang, and H.C. So, “Network Topology Inference with Sparsity and Laplacian Constraints”, *IEEE International Conference on Information, Communication and Networks (ICICN)*, pp. 283-288, 2023. [\[PDF\]](#)
4. J.V.M. Cardoso, **J. Ying**, and D.P. Palomar, “Estimating Normalized Graph Laplacians in Financial Markets”, in *IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, pp. 1-5, 2023. [\[PDF\]](#)
5. **J. Ying**, J.V.M. Cardoso, and D.P. Palomar, “A Fast Algorithm for Graph Learning under Attractive Gaussian Markov Random Fields,” in *The 55th Asilomar Conference on Signals, Systems and Computers (Asilomar)*, pp. 1520-1524, 2021. [\[PDF\]](#)
6. S. Kumar, **J. Ying**, J.V.M. Cardoso, and D.P. Palomar, “Bipartite Structured Gaussian Graphical Modeling via Adjacency Spectral Priors,” in *The 53rd Asilomar Conference on Signals, Systems and Computers (Asilomar)*, pp. 322-326, 2019. [\[PDF\]](#)
7. X. Qu, **J. Ying**, J.-F. Cai, Z. Chen, “Accelerated Magnetic Resonance Spectroscopy with Vandermonde Factorization,” in *Proc. of the 39th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC)*, pp. 3537-3540, 2017. [\[PDF\]](#)

5 Seminars and Invited Talks

1. “Learning Graphs from Data: Theory and Algorithms,” *2024 Workshop on Mathematical Theories and Algorithms for AI for Science*, September 20, 2024, Workshop.
2. “Inferring Network Topologies: Modelling, Algorithms, and Theory,” *IEEE International Conference on Information, Communication and Networks*, August 19, 2023, Invited talk.
3. “Learning Laplacian Constrained Graphical Models: Sparsity, Algorithms, and Theory,” *Hong Kong Workshop on Inverse Problems and Imaging*, November 29, 2022, Workshop.
4. “Inferring Graphs from Data: Sparsity, Algorithms and Applications,” *SIAM Conference on Mathematics of Data Science*, September 26, 2022, Invited talk.

6 Academic Service

1. Journal review: Journal of the Royal Statistical Society, Journal of Machine Learning Research, Transactions on Machine Learning Research, Journal of Computational and Graphical Statistics, IEEE Transactions on Signal Processing, IEEE Transactions on Signal and Information Processing over Networks, IEEE Transactions on Network Science and Engineering.
2. Conference review: NeurIPS, ICML, ICLR, AISTATS, AAAI (PC member).

7 Programming Skills

- Python, R, and C++.