Xiaodong Li

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ACADEMIC APPOINTMENTS

Assistant Professor: Department of Statistics, UC Davis, 2015 – Present.

WORKING EXPERIENCE

Postdoctoral Research Associate: Department of Statistics, the Wharton School, Upenn, 2013 – 2015. Working with T. Tony Cai.

EDUCATION

Ph.D in Mathematics
Stanford University, 2009 – 2013 (in the department of Applied and Computational Mathematics at Caltech from 2008 – 2009). Advised by Prof. Emmanuel Candès.

B.S. in Mathematics
Peking University, 2004 – 2008.

Grants

NSF Career Award DMS-1848575 "CAREER: Statistical Analysis of Nonconvex Optimization in Unsupervised Learning"

RESEARCH

Research interests

- Statistical learning
- High-dimensional statistics

Preprints

P2. Nonconvex Matrix Completion with Linearly Parameterized Factors. Ji Chen, **Xiaodong Li**, and Zongming Ma, submitted.

P1. Consistency of Spectral Clustering on Hierarchical Stochastic Block Models. Lihua Lei, **Xiaodong Li**, and Xingmei Lou, submitted.

Journal Research Articles (Alphabetically ordered unless denoted by *)

J16*. Nonconvex Rectangular Matrix Completion via Gradient Descent without Regularization. Ji Chen, Dekai Liu and **Xiaodong Li**, *IEEE Transactions on Information Theory*, accepted.

J15*. Convex Relaxation Methods for Community Detection. **Xiaodong Li**, Yudong Chen, and Jiaming Xu, *Statistical Science*, accepted.

J14*. Subspace Perspective on Canonical Correlation Analysis: Dimension Reduction and Minimax Rates. Zhuang Ma and **Xiaodong Li**, *Bernoulli*, 26(1), 432-470, 2020..

J13. When Do Birds of a Feather Flock Together? K-Means, Proximity, and Conic Programming.

Xiaodong Li, Yang Li, Shuyang Ling, Thomas Strohmer, and Ke Wei, *Mathematical Programming Series A*, 179(1-2), 295-341, 2020.

J12. Model-free Nonconvex Matrix Completion: Local Minima Analysis and Applications in Memory-efficient Kernel PCA. Ji Chen, **Xiaodong Li**, *Journal of Machine Learning Research*, 20(142),1-39, 2019.

J11. Rapid, Robust, and Reliable Blind Deconvolution via Nonconvex Optimization. **Xiaodong Li**, Shuyang Ling, Thomas Strohmer, and Ke Wei, *Applied and Computational Harmonic Analysis*, 47(3), 893-934, 2019.

J10. Convexified Modularity Maximization for Degree-Corrected Stochastic Block Models. Yudong Chen, **Xiaodong Li**, and Jiaming Xu, *the Annals of Statistics*, 46(4), 1573–1602, 2018.

J9. Optimal Rates of Convergence for Noisy Sparse Phase Retrieval via Thresholded Wirtinger Flow. T. Tony Cai, **Xiaodong Li**, and Zongming Ma, *the Annals of Statistics*, 44(5), 2221–2251, 2016.

J8. Global Testing Against Sparse Alternatives in Time-frequency Analysis. T. Tony Cai, Yonina Eldar and **Xiaodong Li**, *the Annals of Statistics*, 44(4), 1438–1466, 2016.

J7. Phase Retrieval via Wirtinger Flow: Theory and Algorithms, Emmanuel J. Candès, **Xiaodong Li** and Mahdi Soltanolkotabi, *IEEE Transactions on Information Theory*, 61 (4), 1985–2007, 2015.

J6. Robust and Computationally Feasible Community Detection in the Presence of Arbitrary Outlier Nodes. T. Tony Cai and **Xiaodong Li**, *the Annals of Statistics*, 43 (3), 1027–1059, 2015.

J5. Phase Retrieval from Coded Diffraction Patterns. Emmanuel J. Candès, **Xiaodong Li** and Mahdi Soltanolkotabi, *Applied and Computational Harmonic Analysis*, 39 (2), 277–299 2015.

J4. Solving Quadratic Equations via PhaseLift when There Are About As Many Equations As Unknowns. Emmanuel J. Candès and **Xiaodong Li**, *Foundations of Computational Mathematics*, 14(5), 1017–1026 2014.

J3. Sparse Signal Recovery from Quadratic Measurements via Convex Programming. **Xiaodong Li** and Vladislav Voroninski, *SIAM J. Math. Anal.*, 45(5), 3019–3033, 2013.

J2. Compressed Sensing and Matrix Completion with Constant Proportion of Corruptions. **Xiaodong Li**, *Constructive Approximation.* 37(1), 73–99, 2013.

J1. Robust Principal Component Analysis? Emmanuel J. Candès, **Xiaodong Li**, Yi Ma, and John Wright, *Journal of ACM* 58(1), 1–37, 2011.

Conference Research Articles

C1. Stable principal component pursuit. Z. Zhou, **X. Li**, J. Wright, E. Candes, Y. Ma, *Information Theory Proceedings (ISIT), 2010 IEEE International Symposium on*, 1518-1522.

C2. Dense error correction for low-rank matrices via principal component pursuit. A. Ganesh, J. Wright, **X. Li**, E. J. Candes and Y. Ma, *Information Theory Proceedings (ISIT), 2010 IEEE International Symposium on*, 1513-1517.

TEACHING

1. STA 130A ***Mathematical statistics: Brief Course*** (Fall 2016)
2. STA 131A ***Introduction to Probability Theory*** (Fall 2017)

3. STA 135 ***Multivariate Data Analysis*** (Spring 2016, Spring 2017, Spring 2018, Winter 2019, Spring 2019, Winter 2020, Spring 2020)
4. STA 200C ***Introduction to Mathematical Statistics II*** (Spring 2020)
5. STA 224 ***Analysis of Longitudinal Data*** (Spring 2016, Spring 2017, Spring 2018)
6. STA 235 ***Probability Theory*** (Fall 2018)
7. STA 290 ***Seminar in Statistics*** (Winter 2018)
8. ***Phase Retrieval, Community Detection and Matrix Completion: Methods and Theory*** (Summer 2017, Peking University, Applied Math Summer School)

GRADUATE STUDENTS ADVISING

1. Ji Chen (PhD student, Math, UC Davis)
2. Xingmei Lou (PhD student, Stats, UC Davis)
3. Yucheng Liu (PhD student, Stats, UC Davis)

COMMITTEE SERVICES

- 2015 - 2016 Ad Hoc Committee: Machine Learning Track for MS Program
- 2015 - 2016 Ad Hoc Committee for Spring Conference
- 2015 - 2016 Faculty Search Committee.
- 2016 - 2017 Graduate Studies Internal Fellowship Review Committee
- 2016 - 2017 Master Admission Committee
- 2017 - 2018 Graduate Studies Internal Fellowship Review Committee
- 2017 - 2018 Master Admission Committee
- 2018 - 2019 Master Admission Committee
- 2018 - 2020 Graduate Advising Committee
- 2018 - 2020 Executive committee in GGAM
- 2019 - 2020 Education Policy and Curriculum Committee
- 2019 - 2020 Faculty Search Committee

SELECTED PRESENTATIONS

29. "Hierarchical Community Detection: Hierarchical SBM and Spectral Clustering", Invited talk (virtually), April 2020, Statistics Department, Oregon State University.

28. "Spectral methods in networks: hierarchical structures and risk estimation", *ICSA International Conference 2019*, December 2019, Hangzhou.

27. "Hierarchical Community Detection with Fiedler Vectors", *Allerton 2019*, September 2019, UIUC.

26. "Parameterized Matrix Factorization with missing data via nonconvex optimization", *EcoSta 2019*, June 2019, Taiwan.

25. "Parameterized Matrix Factorization with missing data via nonconvex optimization", *ICSA 2019*, June 2019, Raleigh.

24. "Nonconvex Matrix Completion: Assumption-free Local Minimum Analysis and Applications in Memory-efficient Kernel PCA", *Asilomar 2018*, October 2018, Pacific Grove.

23. "Low-rank approximation from via Partial Matrix Sampling: Assumption-free Local Minimum Analysis and Applications in Memory-efficient Kernel PCA", *CISS 2018*, March 2018, Princeton.

22. "Memory efficient low-rank approximation from incomplete entries via nonconvex optimization", *CFE-CMStatistics 2017*, December 2017, London, United Kindom.

21. "Low-rank Approximation via Nonconvex Completion: An Assumption-free Analysis of Local Minima", *Informs 2017*, October 2017.

20. "Convex Relaxation for Community Detection", Invited talk, September 2017, Statistics Department, Berkeley.

19. "Convexified Modularity Maximization for Degree-corrected Stochastic Block Models", *61st ISI World Statistics Congress*, July 2017, Marrakech, Morroco.

18. "Canonical Correlation Analysis: New Losses and New Rates", *2017 ICSA Applied Statistics Symposium*, June 2017, Chicago.

17. "Theory of Nonconvex Optimization: Phase Retrieval and Beyond", Invited talk, March 2017, Applied Math Department, Yale.

16. "Convexified Modularity Maximization for Degree-corrected Stochastic Block Models", Invited talk, February 2017, Statistics Department, UCLA.

15. "Provable Nonconvex Optimization in Signal Processing and Machine Learning", *2016 Young Mathematician Forum*, December 2016, Peking University, Beijing, China, P. R.

14. "Provable Nonconvex Optimization in Signal Processing and Machine Learning", *2016 International Conference on Some Mathematical Approximation Approaches in Data Science*, December 2016, Hangzhou, China, P. R.

13. "Convexified Modularity Maximization for Degree-corrected Stochastic Block Models", Invited talk, October 2016, Statistics Department, University of Chicago.

12. "Subspace Perspective on Canonical Correlation Analysis", *Peter Hall Memorial Symposium*, September 2016, UC Davis.

11. "Convexified Modularity Maximization for Degree-corrected Stochastic Block Models", Invited talk, September 2016, Statistics Department, Columbia University.

10. "Convexified Modularity Maximization for Community Detection", *ICSA Conference on Data Science*, July 2016, Dali, China, P. R.

9. "Nonconvex Optimization for Probabilistic Quadratic Models", *60th anniversary of the establishment of the subject of probability and statistics at Peking University*, June 2016, Beijing, China, P. R.

8. "Wirtinger Flow and Thresholded Wirtinger Flow", Statistical machine learning symposium talk, April 2016, UC Davis.

7. "Low-Rank Recovery in Community Detection and Phase Retrieval", Invited talk, March 2016, Statistics Department, Purdue University.

6. "Low-Rank Recovery in Phase Retrieval and Community Detection", Invited talk, March 2016, Math Department, Duke University.

5. "Convexified Modularity Maximization for Degree-Corrected Stochastic Block Models", Statistics seminar talk, March 2016, UC Davis.

4. "Phase Retrieval: from Convex to Nonconvex Methods", *Workshop on Low Complexity Models*, February 2016, Hausdorff Research Institute for Mathematics, Bonn, Germany.

3. "Phase Retrieval via Wirtinger Flow: Theory and Algorithms", *The 8th International Congress on Industrial and Applied Mathematics (ICIAM2015)*, August 2015, Beijing, China, P. R.

2. "Nonconvex Phase Retrieval from Coded Diffraction Patterns", *The 48th Annual Conference in Information Sciences and Systems (CISS2014)*, March 2014, Princeton University.

1. "Sparse Signal Recovery from Quadratic Measurements via Convex Programming", *February Fourier Talk (FFT2013)*, February 2013, University of Maryland.

PROFESSIONAL SERVICE

Reviewer, *the Annals of Statistics*
Reviewer, *Journal of Royal Society of Statistics Series B*
Reviewer, *Biometrika*
Reviewer, *Statistica Sinica*
Reviewer, *Electronic Journal of Probability*
Reviewer, *Journal of Machine Learning Research*
Reviewer, *COLT 2016*
Reviewer, *NIPS 2011*
Reviewer, *IEEE Transactions on Information Theory*
Reviewer, *IEEE Transactions on Signal Processing*
Reviewer, *IEEE Transactions on Image Processing*
Reviewer, *IEEE Transactions on Pattern Analysis and Machine Intelligence*
Reviewer, *IEEE Information Theory Workshop 2012*
Reviewer, *Applied and Computational Harmonic Analysis*
Reviewer, *Inverse Problems*
Reviewer, *Journal of Fourier Analysis and Applications*
Reviewer, *SIAM J. Optimization*
Reviewer, *Neural Computation*