Shuyang Ling

Courant Institute of Mathematical Sciences
New York University
251 Mercer Street, New York, NY 10012, USA

Email: sling@cims.nyu.edu
https://www.cims.nyu.edu/~sling/

EMPLOYMENT

- **Assistant Professor/Courant Instructor** Sep 2017 - Sep 2020
  Courant Institute of Mathematical Sciences
  Center for Data Science
  New York University, NY, USA

EDUCATION

- **Ph.D. in Applied Mathematics** Sep 2012 - Jun 2017
  Advisor: Prof. Thomas Strohmer
  University of California Davis, CA, USA
- **M.S. in Mathematics** Sep 2012 - Jun 2016
  University of California Davis, CA, USA
- **M.S. in Statistics** Sep 2015 - Jun 2016
  University of California Davis, CA, USA
- **B.S. in Mathematics and Applied Mathematics**
  Fudan University, Shanghai, China Sep 2008 - Jun 2012

RESEARCH INTERESTS

- Mathematics of signal processing and machine learning
- Iterative algorithms, convex and non-convex optimization, optimization landscape
- Compressive sensing, low-rank matrix recovery, blind deconvolution
- Inverse problems in image processing and signal processing
- Computational harmonic analysis, random matrix, spectral graph theory

PUBLICATIONS

Preprints:

1. **Shuyang Ling**, Ruitu Xu, Afonso S. Bandeira. On the landscape of synchronization networks: a perspective from nonconvex optimization, *arXiv:1809.11083, Preprint 2018*, Submitted.
2. **Shuyang Ling** and Thomas Strohmer. Certifying global optimality of graph cuts via semidefinite relaxation: A performance guarantee for spectral clustering, *arXiv:1806.11429, Preprint 2018*, Submitted.

Journal Publications:

3. Xiaodong Li, Yang Li, **Shuyang Ling**, Thomas Strohmer, and Ke Wei. When do birds of a feather flock together? k-means, proximity, and conic programming, *arXiv:1710.06008, 2017*. Accepted by *Mathematical Programming, Series A*.
4. **Shuyang Ling** and Thomas Strohmer. Regularized gradient descent: a non-convex recipe for fast joint blind deconvolution and demixing, *arXiv:1703.08642, 2017*. Accepted by *Information and Inference: A Journal of the IMA*.
5. Xiaodong Li, **Shuyang Ling**, Thomas Strohmer, and Ke Wei. Rapid, robust, and reliable blind deconvolution via nonconvex optimization. *arXiv:1606.04933, 2016*. Accepted by *Applied and Computational Harmonic Analysis*.

6. **Shuyang Ling** and Thomas Strohmer. Self-calibration and bilinear inverse problems via linear least squares. *SIAM Journal on Imaging Sciences* 11-1 (2018), pp.252-292.
7. **Shuyang Ling** and Thomas Strohmer. Blind deconvolution meets blind demixing: algorithms and performance bounds. *IEEE Transactions on Information Theory*, Vol.63, No.7, pp.4497 - 4520, Jul 2017.
8. **Shuyang Ling** and Thomas Strohmer. Self-calibration and biconvex compressive sensing. *Inverse Problems*, Vol. 31(11): 115002, 2015.**(SIAM Student Paper Prize 2017)**
9. Xinghua Shi, Yimin Wei and **Shuyang Ling**. Backward error and perturbation bounds for high order Sylvester tensor equation. *Linear and Multilinear Algebra* 61 (10), 1436-1446. (Undergraduate research)

Conference Proceedings:

10. **Shuyang Ling** and Thomas Strohmer. Simultaneous blind deconvolution and blind demixing via convex programming. *50th Asilomar Conference on Signals, Systems and Computers* 2016, pp.1223-1227.
11. **Shuyang Ling** and Thomas Strohmer. Fast blind deconvolution and blind demixing via nonconvex optimization. *International Conference on Sampling Theory and Applications (SampTA)* 2017, pp.114-118.

GRANTS

- AMS-Simons Travel Grant ($4000 for two years) — May 2018

HONORS

1. Travel Awards, ICCHA 7, Vanderbilt University, TN — May 2018
2. U.S. Junior Oberwolfach Fellow — Mar 2018
3. SIAM Student Paper Prize — Jul 2017
4. SIAM Student Travel Award — Jan 2017
5. NSF/ORAU Travel Award for the 4th Heidelberg Laureate Forum, Heidelberg, Germany — Sep 2016
6. MPS Dean's Graduate Student Prize, UC Davis — Jun 2016
   College award for a high scholarly achievement
7. Alice Leung Scholarship in Mathematics, UC Davis — Jun 2016
   Department award for exceptional promise in mathematics
8. Departmental Fellowship, UC Davis — Apr 2016
9. Travel Awards, Hausdorff Research Institute for Mathematics, Bonn, Germany — Jan 2016
10. Oberwolfach Leibniz Graduate Student, Germany — Aug 2015
11. Graduate Student Travel Award from Graduate Studies, UC Davis — May 2015
12. Travel Awards, AMS Sectional Meetings, Lansing, MI — Mar 2015
13. Travel Awards, ICCHA 5, Vanderbilt University, TN — May 2014
14. Block Grant Fellowship in Mathematics, UC Davis, CA — 2012-2014
15. National Scholarship (Awarded to top 1% students), Fudan University, Shanghai, China — 2010, 2011

PRESENTATIONS

Conference Talks:

1. Conference on Big Data and Information Analytics, Houston, TX — Dec 2018
2. Canadian Mathematical Society Winter Meeting, Vancouver, Canada — Dec 2018
3. ICCHA 7, Nashville, TN — May 2018
4. SIAM-SEA Conference, Chapel Hill, NC — Mar 2018
5. Special Session on "Nonconvex Optimization", Asilomar, CA — Nov 2017
6. The International Linear Algebra Society (ILAS 2017), Ames, IA — Jul 2017
7. Foundation of Computational Mathematics (FOCM), Barcelona, Spain — Jul 2017
8. SIAM Annual Meeting, Pittsburgh, PA — Jul 2017
9. SampTA 2017, Tallin, Estonia — Jul 2017
10. SIAM Conference on Optimization, Vancouver, Canada — May 2017
11. Special Session on "Bilinear Inverse Problems", Asilomar, CA — Nov 2016
12. Applied Harmonic Analysis, Massive Data Sets, Machine Learning, and Signal Processing, BIRS-Affiliated Mathematics Research Centre, Casa Matematica Oaxaca (CMO), Mexico — Oct 2016
13. SIAM Minisymposium at Joint Mathematical Meeting, Seattle, WA — Jan 2016
14. The 8th ICIAM, Beijing, China — Aug 2015
15. SPARS 15, Cambridge, UK — Jul 2015
16. IEEE Communication Theory Workshop 2015, Orange County, CA — May 2015
17. American Mathematical Society Sectional Meetings, Lansing, MI — Mar 2015
18. Bay Area Scientific Computing Day, Stanford University, CA — Dec 2014

Seminar Talks:

19. Seminar on Applied Mathematics, Yale University, CT — Oct 2018
20. Seminar on Data Sciences, HKUST, Hong Kong — Aug 2018
21. Seminar at the Norbert Wiener Center, University of Maryland, MD — Apr 2018
22. Seminar at CIMS, NYU, New York, NY — Nov 2017
23. Seminar at Fudan University, Shanghai, China — Sep 2016
24. Seminar at Technical University of Munich, Germany, — Sep 2016
25. Seminar on Applied Mathematics, HKUST, Hong Kong — Sep 2015

Poster Presentations:

26. ITA 2017 Graduation Day, San Diego, CA — Feb 2017
27. The 4th Heidelberg Laureate Forum, Heidelberg, Germany — Sep 2016
28. Workshop on Algorithms for Modern Massive Data Sets (MMDS), Berkeley, CA, USA — Jun 2016
29. Advances in Mathematics of Signal Processing, Hausdorff Research Institute for Mathematics, Bonn, Germany — Jan 2016

PROFESSIONAL SERVICE

Reviewer for the following journals:

1. Acta Applicandae Mathematicae
2. Advances in Computational Mathematics
3. Applied and Computational Harmonic Analysis
4. IEEE Journal of Selected Topics in Signal Processing
5. IEEE Signal Processing Letters
6. IEEE Transactions on Computational Imaging
7. IEEE Transactions on Information Theory
8. IEEE Transactions on Signal Processing
9. IEEE Transactions on Wireless Communications
10. IEEE Wireless Communications Letters
11. Information and Inference: A Journal of the IMA
12. SIAM Journal on Imaging Sciences

Reviewer for the following conference proceedings:

13. ACM-SIAM Symposium on Discrete Algorithms (SODA 2019)
14. International Conference on Latent Variable Analysis and Signal Separation (LVA/ICA 2018)
15. International Conference on Learning theory (COLT 2018)
16. Sampling Theory and Applications (SampTA 2015, 2017)
17. Signal Processing with Adaptive Sparse Structured Representations (SPARS 2017)

TEACHING EXPERIENCE

Instructor:

1. MATH-UA 0211: Math for Economics (Calculus, NYU, 127 students) Fall 2018
2. DS-GA 1002: Probability and Statistics for Data Science (Graduate Level, for Master Program in Data Science, 131 students) Fall 2018
3. MATH-GA 2840: Graphs and Networks (Graduate Level, NYU) (Co-instruct with Prof. Afonso S. Bandeira, 25 students) Spring 2018
4. MATH-UA 0211: Math for Economics (Calculus, NYU, 102 students) Fall 2017
5. MAT 180: Mathematical Algorithms for AI and Big Data Analysis Guest speaker on spectral clustering (UC Davis, 60 students) Spring 2017
6. MAT 21C: Calculus for Science and Engineering (UC Davis, 58 students) Summer 2013

Teaching Assistant:

1. MAT 280: Mathematical Foundations for Big Data (Graduate Level) Spring 2016
2. MAT 207B: Applied Mathematics (Graduate Level) Winter 2014
3. MAT 207A: Applied Mathematics (Graduate Level) Fall 2013
4. MAT 180: Mathematical Algorithms for AI and Big Data Analysis Spring 2017
5. MAT 185A: Complex Analysis Winter 2017
6. MAT 17C: Calculus for Bio-science Spring 2013
7. MAT 22A: Linear Algebra Winter 2013
8. MAT 22B: Ordinary Differential Equation Fall 2012