Shuyang Ling

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EMPLOYMENT

- **Assistant Professor Faculty Fellow of Data Science** Sep 2019 - Now
  New York University Shanghai, China

- **Assistant Professor/Courant Instructor** Sep 2017 - Aug 2019
  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
- Machine learning, especially unsupervised learning and data clustering
- 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 theory, spectral graph theory

PUBLICATIONS **My google scholar** page can be found here.

Journal Publications:

1. **Shuyang Ling*** and Thomas Strohmer. Certifying global optimality of graph cuts via semidefinite relaxation: A performance guarantee for spectral clustering, *arXiv:1806.11429, 2018*, Accepted by *Foundations of Computational Mathematics*.

2. 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*.

3. Xiaodong Li, **Shuyang Ling**, Thomas Strohmer*, and Ke Wei. Rapid, robust, and reliable blind deconvolution via nonconvex optimization. *Applied and Computational Harmonic Analysis*, Vol 47, Issue 3, pp.893-934, Nov 2019.

4. **Shuyang Ling***, Ruitu Xu, Afonso S. Bandeira. On the landscape of synchronization networks: a perspective from nonconvex optimization, *SIAM Journal on Optimization*, Vol.29, No.3, pp.1879-1907, 2019.

5. **Shuyang Ling**[*] and Thomas Strohmer. Regularized gradient descent: a non-convex recipe for fast joint blind deconvolution and demixing. *Information and Inference: A Journal of the IMA*, Volume 8, Issue 1, 2019, Pages 1-49.

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, 2013. (Undergraduate research)

Conference Proceedings:

10. **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.

11. **Shuyang Ling** and Thomas Strohmer. You can have it all – Fast algorithms for blind deconvolution, self-calibration, and demixing. *Mathematics in Imaging*, 2017, MW1C.1.

12. **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.

GRANTS	• AMS-Simons Travel Grant	May 2018

HONORS

1. SIAM NSF Early Career Travel Award - ICIAM19 — Jul 2019
2. New World Mathematics Awards, Honorable Mention, Tsinghua University, Beijing — Jun 2019
3. SIAM NSF Early Career Travel Award - DS19 — May 2019
4. Travel Awards, ICCHA 7, Vanderbilt University, TN — May 2018
5. U.S. Junior Oberwolfach Fellow — Mar 2018
6. SIAM Student Paper Prize - AN17 — Jul 2017
7. SIAM Student Travel Award - OP17 — Jan 2017
8. NSF/ORAU Travel Award for the 4th Heidelberg Laureate Forum, Heidelberg, Germany — Sep 2016
9. MPS Dean's Graduate Student Prize, UC Davis — Jun 2016
   College award for a high scholarly achievement
10. Alice Leung Scholarship in Mathematics, UC Davis — Jun 2016
    Department award for exceptional promise in mathematics
11. Departmental Fellowship, UC Davis — Apr 2016
12. Travel Awards, Hausdorff Research Institute for Mathematics, Bonn, Germany — Jan 2016
13. Oberwolfach Leibniz Graduate Student, Germany — Aug 2015

14. Graduate Student Travel Award from Graduate Studies, UC Davis	May 2015
15. Travel Awards, AMS Sectional Meetings, Lansing, MI	Mar 2015
16. Travel Awards, ICCHA 5, Vanderbilt University, TN	May 2014
17. Block Grant Fellowship in Mathematics, UC Davis, CA	2012-2014
18. National Scholarship (Awarded to top 1% students), Fudan University, Shanghai, China	2010, 2011

PRESENTATIONS **Conference Talks:**

1. The 9th ICIAM, Valencia, Spain	July 2019
2. International Conference of Chinese Mathematicians, Beijing	June 2019
3. SIAM Conference on Dynamical Systems, Snowbird, Utah	May 2019
4. Conference on Big Data and Information Analytics, Houston, TX	Dec 2018
5. Canadian Mathematical Society Winter Meeting, Vancouver, Canada	Dec 2018
6. ICCHA 7, Nashville, TN	May 2018
7. SIAM-SEA Conference, Chapel Hill, NC	Mar 2018
8. Special Session on Nonconvex Optimization, Asilomar, CA	Nov 2017
9. The International Linear Algebra Society (ILAS 2017), Ames, IA	Jul 2017
10. Foundation of Computational Mathematics (FOCM), Barcelona, Spain	Jul 2017
11. SIAM Annual Meeting, Pittsburgh, PA	Jul 2017
12. SampTA 2017, Tallin, Estonia	Jul 2017
13. SIAM Conference on Optimization, Vancouver, Canada	May 2017
14. Special Session on "Bilinear Inverse Problems", Asilomar, CA	Nov 2016
15. Applied Harmonic Analysis, Massive Data Sets, Machine Learning, and Signal Processing, BIRS-Affiliated Mathematics Research Centre, Casa Mathematica Oaxaca (CMO), Mexico	Oct 2016
16. SIAM Minisymposium at Joint Mathematical Meeting, Seattle, WA	Jan 2016
17. The 8th ICIAM, Beijing, China	Aug 2015
18. SPARS 15, Cambridge, UK	Jul 2015
19. IEEE Communication Theory Workshop 2015, Orange County, CA	May 2015
20. American Mathematical Society Sectional Meetings, Lansing, MI	Mar 2015
21. Bay Area Scientific Computing Day, Stanford University, CA	Dec 2014

Seminar Talks:

22. Seminar on Mathematics of Data and Decisions, UC Davis	May 2019
23. Seminar on Applied Mathematics, University of Chicago	Apr 2019
24. Seminar on Applied Mathematics, Georgia Tech	Apr 2019
25. Seminar on Applied Mathematics, SUNY Albany	Apr 2019
26. Seminar on Applied Mathematics, Rensselaer Polytechnic Institute	Mar 2019
27. Data Science Seminar, NYU Shanghai	Feb 2019
28. Mathematics Colloquium, Purdue University	Feb 2019
29. Applied Mathematics Colloquium, UC Los Angeles	Jan 2019
30. Seminar on Applied Mathematics, Hong Kong University	Jan 2019
31. Seminar at Fudan University, Shanghai, China	Jan 2019

32. Seminar on Math and Data, New York University	Dec 2018
33. Seminar on Applied Mathematics, Yale University, CT	Oct 2018
34. Seminar on Data Sciences, HKUST, Hong Kong	Aug 2018
35. Seminar at the Norbert Wiener Center, University of Maryland, MD	Apr 2018
36. Seminar at CIMS, New York University	Nov 2017
37. Seminar on Applied Mathematics, UC Davis	May 2017
38. Seminar at Fudan University, Shanghai, China	Sep 2016
39. Seminar at Technical University of Munich, Germany,	Sep 2016
40. Seminar on Applied Mathematics, HKUST, Hong Kong	Sep 2015

Poster Presentations:

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

ACADEMIC SUPERVISION

1. Jason B. Weitze (Undergraduate at NYU)

2. Ruitu Xu (M.S. student at Courant Institute, NYU)

3. Jiahao Ren (Undergraduate at NYU)

SERVICES

Referee for the following journals:

1. Acta Applicandae Mathematicae

2. Advances in Computational Mathematics

3. Applied and Computational Harmonic Analysis

4. Communications on Pure and Applied Mathematics

5. IEEE Journal of Selected Topics in Signal Processing

6. IEEE Signal Processing Letters

7. IEEE Transactions on Computational Imaging

8. IEEE Transactions on Information Theory

9. IEEE Transactions on Pattern Analysis and Machine Intelligence

10. IEEE Transactions on Signal Processing

11. IEEE Transactions on Vehicular Technology

12. IEEE Transactions on Wireless Communications

13. IEEE Wireless Communications Letters

14. Information and Inference: A Journal of the IMA

15. Journal of Mathematical Imaging and Vision

16. Mathematics of Computation

17. SIAM Journal on Imaging Sciences

18. SIAM Journal on Mathematics of Data Science

19. SIAM Journal on Optimization

Referee for the following conference proceedings:

20. ACM-SIAM Symposium on Discrete Algorithms (SODA 2019)

21. International Conference on Latent Variable Analysis and Signal Separation (LVA/ICA 2018)

22. International Conference on Learning Theory (COLT 2018)

23. Sampling Theory and Applications (SampTA 2015, 2017, 2019)

24. Signal Processing with Adaptive Sparse Structured Representations (SPARS 2017, 2019)

TEACHING EXPERIENCE

Instructor:

1. MATH-SHU 234: The Mathematics of Statistics and Data Science, Part 1
   (UA, NYU Shanghai, 19 Students)   Fall 2019

2. DS-GA 1002: Probability and Statistics for Data Science
   (GA, Master Program in Data Science, 130 students)   Fall 2018

3. MATH-UA 0211: Math for Economics (UA, NYU, 125 students)   Fall 2018

4. MATH-GA 2840: Graphs and Networks (GA, NYU)
   (Co-instruct with Prof. Afonso S. Bandeira, 25 students)   Spring 2018

5. MATH-UA 0211: Math for Economics (UA, NYU, 102 students)   Fall 2017

6. MAT 180: Mathematical Algorithms for AI and Big Data Analysis
   Guest speaker on spectral clustering (UA, UC Davis, 60 students)   Spring 2017

7. MAT 21C: Calculus for Science and Engineering
   (UA, 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