

# Yiqiao Zhong

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## Academic positions

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| <b>University of Wisconsin–Madison</b>                                      | Madison, Wisconsin            |
| • <i>Assistant professor, Department of Statistics</i>                      | <i>Aug. 2022 – present</i>    |
| <i>School of Computer, Data, and Information Sciences</i>                   |                               |
| <b>Stanford University</b>  | Stanford, California          |
| • <i>Postdoc in Dept. of Statistics and Dept. of Electrical Engineering</i> | <i>Sep. 2019 – present</i>    |
| <i>Advisor: Prof. Andrea Montanari, Prof. David Donoho</i>                  |                               |
| <b>Princeton University</b>   | Princeton, New Jersey         |
| • <i>Teaching assistant and research assistant</i>                          | <i>Sep. 2015 – July. 2018</i> |

## Education

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| <b>Princeton University</b>  | Princeton, New Jersey         |
| • <i>Ph.D. from Dept. of Operations Research and Financial Engineering</i>                       | <i>Sep. 2014 – Sep. 2019</i>  |
| <i>Advisor: Prof. Jianqing Fan</i>   |                               |
| – GPA: 3.95/4  |                               |
| – Funded by Dodds Fellowship (top 1%)  |                               |
| <b>Peking University</b>   | Beijing, China                |
| • <i>Bachelor of Science in Mathematics</i>  | <i>Sep. 2010 – July. 2014</i> |
| – GPA: 3.9/4.0; Top 5%; Graduated with honors  |                               |
| – Enrolled in <i>Applied Mathematics Program for Elite Students</i> , advised by Prof. Weinan E. |                               |

## Research Interests

- **Deep learning theory and algorithms**  
Over-parametrization, interpolating models, gradient descent algorithms, generalization errors.
- **Low-rank structure recovery**  
Network analysis, factor models, matrix completion, principal component analysis under spiked model.
- **Nonconvex optimization**  
Synchronization problems, pairwise measurement data, semidefinite relaxation.

## Publications and research papers (Google Scholar Link)

- Montanari, A, Zhong, Y. and Zhou, K. (2022+)  
Tractability from overparametrization: The example of the negative perceptron,  
*Preprint*. <https://arxiv.org/abs/2110.15824>
- Montanari, A and Zhong, Y. (2022)  
The Interpolation Phase Transition in Neural Networks: Memorization and Generalization under Lazy Training,  
*Annals of Statistics*, to appear, 2022. <http://arxiv.org/abs/2007.12826>
- Fan, J. Cong, M. and Zhong, Y. (2021)  
A Selective Overview of Deep Learning,  
*Statistical Science*, 36.2 264 – 290, May 2021.  
<https://doi.org/10.1214/20-STS783>
- Fan, J. Wang, K. Zhong, Y. Zhu, Z. (2021)  
Robust High Dimensional Factor Models with Applications to Statistical Machine Learning,  
*Statistical Science*. 36.2: 303–327, May 2021.  
<https://doi.org/10.1214/20-STS785>

- Abbe, E. Fan, J. Wang, K. Zhong, Y. (2020)  
Entrywise Eigenvector Analysis of Random Matrices with Low Expected Rank,  
*Annals of Statistics* 48.3: 1452.  
<https://doi.org/10.1214/19-aos1854>
- Avery, J. J., Starck, J., Zhong, Y., Avery, J. D., & Cooper, J. (2020)  
Is your own team is against you: Implicit and explicit attitudes in criminal defense.  
*The Journal of Social Psychology*: 1-17.  
<https://doi.org/10.1080/00224545.2020.1845593>
- Zhong, Y. and Boumal, N. (2018)  
Near-optimal Bounds For Phase Synchronization,  
*SIAM Journal on Optimization*, 28.2: 989-1016, 2018.  
<https://epubs.siam.org/doi/abs/10.1137/17M1122025>  
Received **2018 SIAM Student Paper Prize** ([news link](#)).
- Fan, J. Wang, W. and Zhong, Y. (2018)  
An  $\ell_\infty$  Eigenvector Perturbation Bound and Its Application to Robust Covariance Estimation,  
*Journal of Machine Learning Research*; 18(207): 1-42, 2018.  
<http://www.jmlr.org/papers/volume18/16-140/16-140.pdf>
- Fan, J. Wang, W. and Zhong, Y. (2018)  
Robust Covariance Estimation for Approximate Factor Models,  
*Journal of Econometrics*, 208.1: 5-22.  
<https://doi.org/10.1016/j.jeconom.2018.09.003>
- Fan, J. Zhong, Y. (2018+)  
Optimal Subspace Estimation Using Overidentifying Vectors via Generalized Method of Moments,  
*Preprint*. <https://arxiv.org/abs/1805.02826>
- Zhong, Y. (2017+)  
Eigenvector Under Random Perturbation: A Nonasymptotic Rayleigh-Schrödinger Theory,  
*Preprint*. <http://arxiv.org/abs/1702.00139>
- Jin, C. Wang, Z. Huang, J. Zhong, Y. and Wang, L. (2016)  
Differentially Private Data Releasing for Smooth Queries with Synthetic Database Output,  
*Journal of Machine Learning Research*, 17(51):1-42, 2016.  
<http://jmlr.org/papers/volume17/14-388/14-388.pdf>

## Teaching Experience

Instructor at UW-Madison:

- STAT 709: Mathematical Statistics (Fall 2022).

Co-instructor at Stanford University:

- STATS 385: Analyses of Deep Learning (Fall 2019).

Teaching Assistant for various courses at Princeton University:

- ORF 307: Optimization (Spring 2018);
- ORF 245: Fundamentals of Statistics (Spring 2017, Fall 2017);
- ORF 411: Operations and Information Engineering (Fall 2016);
- ORF 360: Decision Modeling in Business Analytics (Spring 2016);
- ORF 527: Stochastic Calculus (Spring 2016);

- ORF 524: Statistical Theory and Methods (Fall 2015).

## Honors and Funds

- Research funded by Simons Collaboration on the Theoretical Foundations of Deep Learning ([link](#)), 2020–present.
- Best Poster Award on Optimization Algorithms, Princeton, Sep 2018.
- SIAM Student Paper Prize, 2018 SIAM Annual Meeting, July 2018.
- SIAM Student Travel Award, July 2018.
- Graduate School Dodd Fellowship (top 1%), Princeton University, 2018–2019.
- The School of Engineering and Applied Science Travel Fund, Princeton University, Nov 2017.
- First Year Fellowship in Natural Sciences and Engineering, Princeton University, Sep 2014.
- National Innovation Funding, government research funding for undergraduate students in China, Sep 2013.
- Bronze medal, Shing-Tung Yau’s College Student Mathematics Contests, probability and statistics, individual contest, top 7 in China, Aug 2013.
- Silver medal, Shing-Tung Yau’s College Student Mathematics Contests, team contest, top 4 in China, Aug 2013.

## Invited Talks

- “Interpolation Phase Transition in Neural Networks: Memorization and Generalization under NT model”, IST colloquium, Stanford University, Sep 2021; Wilks Statistics Seminar, Princeton University, Oct 2021; Neyman Statistics Seminar, UC Berkeley, Oct 2021.
- “A modern statistical perspective on spectral methods and beyond”, Department of Statistics, Harvard University, MA, Mar 2019; Department of Statistics, University of Cambridge, Jan 2019; UC San Diego, Department of Mathematics, Dec 2018.
- “Near-optimal bounds for phase synchronization” , INFORMS annual meeting, CA, Oct 2021; SIAM Annual Meeting, Portland, OR, July 2018.  
–Poster presented at Princeton Day of Optimization, Princeton, Sep 2018.
- “Spectral algorithm without trimming or cleaning works for exact recovery in SBM” , Joint Mathematics Meetings, San Diego, Jan 2018.  
–Poster presented at UCLA Workshop on Deep Learning Techniques, Los Angeles, Feb 2018.
- “Near-optimal bounds for phase synchronization” , IDeAS seminar, The Program in Applied and Computational Mathematics, Princeton University, May 2017.
- “ $\ell_\infty$  eigenvector Perturbation and Robust Covariance Estimation” (poster title), Workshop on Networks, Random Graphs and Statistics, Columbia University, May 2016.

## Professional Services

- Co-organized Princeton Wilks Statistics Seminars, August 2017 – May 2018.
- Reviewer for *Proceedings of the National Academy of Sciences*.
- Reviewer for *Nature Communications*.
- Reviewer for *Annals of Statistics*.
- Reviewer for *SIAM Journal on Optimization*.
- Reviewer for *Journal of the American Statistical Association*.

- Reviewer for *IEEE Transactions on Information Theory*.
- Reviewer for *Journal of Machine Learning Research*.
- Reviewer for *Biometrika*.
- Reviewer for *Electronic Journal of Statistics*.
- Reviewer for *Annals of Applied Probability*.
- Reviewer for *NeurIPS, ICML, AISTATS, COLT, ALT* Conferences.
- Reviewer for *Journal of Econometrics*.