FAN YANG

Homepage: https://sites.google.com/view/fyangupenn/home

PERSONAL INFORMATION

Department of Statistics and Data Science
The Wharton School, University of Pennsylvania
265 South 37th Street
Philadelphia, PA 19104

Email: fyang75@wharton.upenn.edu
Phone: (608) 358 8891

ACADEMIC POSITIONS

University of Pennsylvania — *Philadelphia, PA*
Postdoctoral Researcher, Department of Statistics and Data Science — *Aug 2019–current*
Mentor: Jian Ding

EDUCATION

University of California, Los Angeles — *Los Angeles, CA*
Ph.D. in Mathematics, Department of Mathematics — *June 2019*
Advisor: Jun Yin

The Chinese University of Hong Kong — *Hong Kong*
Ph.D. in Physics, Department of Physics — *July 2014*
Advisor: Ren-Bao Liu

Tsinghua University — *Beijing, China*
Bachelor — *July 2009*

PUBLICATIONS

1. *How to reduce dimension with PCA and random projections?*
Fan Yang, Sifan Liu, Edgar Dobriban and David P. Woodruff. IEEE Transactions on Information Theory, Vol. 67 (2021): pp 8154-8189.

2. *Spiked separable covariance matrices and principal components.*
With Xiucai Ding. Annals of Statistics, Vol. 49 (2021): pp 1113-1138.

3. *Convergence of eigenvector empirical spectral distribution of sample covariance matrices.*
With Haokai Xi and Jun Yin. Annals of Statistics, Vol. 48 (2020): pp 953-982.

4. *Random band matrices in the delocalized phase, III: Averaging fluctuations.*
With Jun Yin. Probability Theory and Related Fields, Vol. 179 (2021): pp 451–540.

5. *Random band matrices in the delocalized phase, II: Generalized resolvent estimates.*
With Paul Bourgade, Horng-Tzer Yau and Jun Yin. Journal of Statistical Physics, Vol. 174 (2019): pp 1189-1221.

6. *Sample canonical correlation coefficients of high-dimensional random vectors: local law and Tracy-Widom limit.*
Random Matrices: Theory and Applications (2021). Preprint, arXiv:2002.09643.

7. *Edge universality of separable covariance matrices.*
Electronic Journal of Probability, Vol. 24 (2019): paper no. 123, 57 pp.

8. *A necessary and sufficient condition for edge universality at the largest singular values of covariance matrices.*
With Xiucai Ding. Annals of Applied Probability, Vol. 28 (2018): pp 1679-1738.

9. *Local circular law for the product of a deterministic matrix with a random matrix.*
With Haokai Xi and Jun Yin. Electronic Journal of Probability, Vol. 22 (2017): paper no. 60, 77 pp.

10. *Geometric diffusion of quantum trajectories.*
Fan Yang and Ren-Bao Liu. Scientific Reports, Vol. 5 (2015): 12109.

11. *Nonlinear optical response induced by non-Abelian Berry curvature in time-reversal-invariant insulators.*
Fan Yang and Ren-Bao Liu. Physical Review B, Vol. 90 (2014): 245205.

12. *Giant Faraday rotation induced by the Berry phase in bilayer graphene under strong terahertz fields.*
Fan Yang, Xiaodong Xu and Ren-Bao Liu. New Journal of Physics, Vol. 16 (2014): 043014.

13. *Terahertz electron-Hole recollisions in GaAs/AlGaAs quantum wells: robustness to scattering by optical phonons and thermal fluctuations.*
Hunter Banks, Ben Zaks, **Fan Yang**, Shawn Mack, Arthur C. Gossard, Renbao Liu and Mark S. Sherwin. Physical Review Letters, Vol. 111 (2013): 267402.

14. *Berry phases of quantum trajectories of optically excited electron-hole pairs in semiconductors under strong terahertz fields.*
Fan Yang and Ren-Bao Liu. New Journal of Physics, Vol. 15 (2013): 115005.

15. *A note on the definition of fractional derivatives applied in rheology.*
Fan Yang and Ke-Qin Zhu. Acta Mechanica Sinica, Vol. 27 (2011): pp 866-876.

16. *On the definition of fractional derivatives in rheology.*
Fan Yang and Ke-Qin Zhu. Theoretical and Applied Mechanics Letters: Vol. 1 (2011): 012007.

17. *Can we obtain a fractional Lorenz system from a physical problem?*
Fan Yang and Ke-Qin Zhu. Chinese Physics Letters, Vol. 27 (2010): 124701.

18. *Generalized Lorenz equation derived from thermal convection of viscoelastic fluids in a loop.*
Fan Yang and Ke-Qin Zhu. Chinese Physics Letters, Vol. 27 (2010): 034601.

PREPRINTS

1. *Delocalization and quantum diffusion of random band matrices in high dimensions II: T-expansion.*
With Horng-Tzer Yau and Jun Yin. Preprint, arXiv:2107.05795. Submitted.

2. *Delocalization and quantum diffusion of random band matrices in high dimensions I: Self-energy renormalization.*
With Horng-Tzer Yau and Jun Yin. Preprint, arXiv:2104.12048. Submitted.

3. *Limiting distribution of the sample canonical correlation coefficients of high-dimensional random vectors.*
Preprint, arXiv:2103.08014. Under revision at Electronic Journal of Probability.

4. *Sample canonical correlation coefficients of high-dimensional random vectors with finite rank correlations.*
With Zongming Ma. Preprint, arXiv:2102.03297. Submitted.

5. *Analysis of information transfer from heterogeneous sources via precise high-dimensional asymptotics.*
Fan Yang, Hongyang R. Zhang, Sen Wu, Weijie J. Su and Christopher Ré. Preprint, arXiv:2010.11750. Under revision at Annals of Statistics.

6. *Edge statistics of large dimensional deformed rectangular matrices.*
With Xiucai Ding. Preprint, arXiv:2009.00389. Submitted.

7. *Tracy-Widom distribution for the edge eigenvalues of Gram type random matrices.*
With Xiucai Ding. Preprint, arXiv:2008.04166. Under revision at IEEE Transactions on Information Theory.

8. *Linear spectral statistics of eigenvectors of anisotropic sample covariance matrices.*
Preprint, arXiv:2005.00999. Submitted.

9. *Optimally weighted PCA for high-dimensional heteroscedastic data.*
David Hong, **Fan Yang**, Jeffrey A. Fessler and Laura Balzano. Preprint, arXiv:1810.12862. Submitted.

10. *The smallest singular value of deformed random rectangular matrices.*
Preprint, arXiv:1702.04050.

TALKS

- Random Matrix Theory Seminar, KTH Royal Institute of Technology (April 2022).
- Statistics and Finance Seminar, University of Science and Technology of China (November 2021).
- Statistics Seminar, Australian National University (October 2021).
- The First International Conference for Chinese Young Probability Scholars (October 2021).
- Penn/Temple Probability Seminar, University of Pennsylvania (September 2021).
- Structured Random Matrices in Down Under: New Developments and Applications (July 2021).
- Statistics Seminar, University of Southern California (April 2021).
- Statistics Seminar, University of California, Davis (March 2021).
- Northeast Probability Seminar 2020 (November 2020).
- Penn/Temple Probability Seminar, University of Pennsylvania (March 2019).
- Probability and Financial Mathematics Seminar, Pennsylvania State University (January 2019).
- Columbia/Courant Joint Probability Seminar (November 2018).
- Probability Seminar, University of California, Irvine (November 2018).
- Northeast Probability Seminar 2018 (November 2018).
- Random Matrices Seminar, Institute for Pure & Applied Mathematics, UCLA (June 2018).
- Participating Seminar in Functional Analysis, UCLA (November 2017).
- Graduate Probability Seminar, University of Wisconsin-Madison (January 2017).
- Graduate Probability Seminar, University of Wisconsin-Madison (April 2016).
- Graduate Applied Mathematics Seminar, University of Wisconsin-Madison (March 2016).
- 2013 "Mainland China, Taiwan and Hong Kong" Academic Forum for Quantum Materials, Peking University (September 2013).
- CLEO: 2013 - Laser Science to Photonic Applications, San Jose (June 2013).
- Physics Seminar, Institute for Terahertz Science and Technology, UCSB (March 2013).
- APS March Meeting 2013, Baltimore (March 2013).
- APS March Meeting 2012, Boston (March 2012).

- 15th Annual Conference of Beijing Society of Mechanics (best paper), Beijing (January 2009).

HONORS AND AWARDS

- Horn-Moez Prize Award (UCLA) *June 2018*
- Hong Kong PhD Fellowship (CUHK) *August 2012–July 2014*
- Chen-Ning Yang Scholarship (CUHK) *April 2012*
- Award of Excellent Undergraduate thesis (Tsinghua) *July 2009*
- National Scholarship (Tsinghua) *November 2008*

TEACHING EXPERIENCE

Instructor, University of Pennsylvania, STAT 433: Stochastic Processes *2020 Spring*

Teaching assistant, UCLA, MATH 174E: Mathematics of Finance *2019 Spring*

Teaching assistant, UCLA, MATH 171: Stochastic Processes *2019 Winter*

Teaching assistant, UCLA, MATH 170A: Probability Theory *2019 Winter*

Teaching assistant, UCLA, MATH 275A: Probability Theory (Graduate) *2018 Fall*

Teaching assistant, UCLA, MATH 170A: Probability Theory *2018 Fall*

Teaching assistant, UCLA, MATH 170E: Introduction to Probability and Statistics *2018 Spring*

Teaching assistant, UCLA, MATH 32A: Calculus of Several Variables *2018 Winter*

Teaching assistant, UCLA, MATH 31A: Differential and Integral Calculus *2017 Fall*

Teaching assistant, UW-Madison, MATH 234: Calculus - Functions of Several Variables *2016 Fall*

Teaching assistant, UW-Madison, MATH 211: Calculus *2016 Spring*

Teaching assistant, UW-Madison, MATH 234: Calculus - Functions of Several Variables *2015 Fall*

Teaching assistant, UW-Madison, MATH 222: Calculus and Analytic Geometry II *2015 Spring*

Teaching assistant, UW-Madison, MATH 222: Calculus and Analytic Geometry II *2014 Fall*

SERVICE

- Referee for Annals of Applied Probability, Annals of Probability, Annals of Statistics, Annales de l'Institut Henri Poincaré, Annales Henri Poincaré, Communications in Mathematical Physics, IEEE Transactions on Information Theory, Journal of the American Statistical Association, Journal of Business & Economic Statistics, Journal of Machine Learning Research, Journal of Theoretical Probability, Journal of Statistical Planning and Inference, Machine Learning, Mathematics, SIAM Journal on Mathematics of Data Science, Statistics and Probability Letters, Chinese Physics Letters, Canadian Journal of Physics.
- Co-organizer of Penn/Temple Probability Seminar (2019 Fall–current).
- Master thesis mentor at University of Pennsylvania (2021 Spring).