

FAN YANG

PERSONAL INFORMATION

Statistics Department, The Wharton School
University of Pennsylvania
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ACADEMIC POSITIONS

University of Pennsylvania
Postdoctoral Researcher, Department of Statistics
Mentor: Jian Ding

Philadelphia, PA
Aug 2019-current

EDUCATION

University of California, Los Angeles
PhD, Department of Mathematics
Advisor: Jun Yin
Thesis: Local laws of random matrices and their applications.

Los Angeles, CA
June 2019

The Chinese University of Hong Kong
PhD in Physics, Department of Physics
Advisor: Ren-Bao Liu
Thesis: Berry phases of quantum trajectories in semiconductors under strong terahertz fields.

Hong Kong
July 2014

Tsinghua University
Bachelor in Engineering Mechanics

Beijing, China
July 2009

RESEARCH INTERESTS

Probability theory and Statistics, Mathematical physics, Statistical physics;
Random matrix theory and its applications;
Quantum mechanics and Condensed matter physics.

PUBLICATIONS & PREPRINTS

Probability and random matrix theory

1. *Delocalization of random band matrices in dimension two and higher* (with Jun Yin). In preparation.
2. *Spiked separable covariance matrices and principal components* (with Xiukai Ding). Preprint, arXiv:1905.13060 (2019).
3. *Edge universality of separable covariance matrices*. Preprint, arXiv:1809.04572 (2018).
4. *Random band matrices in the delocalized phase, III: Averaging fluctuations* (with Jun Yin). Preprint, arXiv:1807.02447 (2018).
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. *Convergence of eigenvector empirical spectral distribution of sample covariance matrices* (with Haokai Xi and Jun Yin). To appear *Annals of Statistics*, arXiv:1705.03954 (2017).
7. *The smallest singular value of deformed random rectangular matrices*. Preprint, arXiv:1702.04050 (2017).
8. *A necessary and sufficient condition for edge universality at the largest singular values of covariance matrices* (with Xiukai 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. 64, 77pp.

Quantum physics

10. *Geometric diffusion of quantum trajectories* (With Ren-Bao Liu). *Scientific Reports* 5, 12109 (2015).
11. *Nonlinear optical response induced by non-Abelian Berry curvature in time-reversal-invariant insulators* (With Ren-Bao Liu). *Phys. Rev. B* 90, 245205 (2014).
12. *Terahertz electron-Hole recollisions in GaAs/AlGaAs quantum wells: robustness to scattering by optical phonons and thermal fluctuations* (With H. Banks, B. Zaks, S. Mack, A. C. Gossard, R. Liu, and M. S. Sherwin). *Phys. Rev. Lett.* 111, 267402 (2013).
13. *Giant Faraday rotation induced by the Berry phase in bilayer graphene under strong terahertz fields* (With Xiaodong Xu and Ren-Bao Liu). *New J. Phys.*, Vol. 16, 043014 (2014).
14. *Berry phases of quantum trajectories of optically excited electron-hole pairs in semiconductors under strong terahertz fields* (With Ren-Bao Liu). *New J. Phys.*, Vol. 15, 115005 (2013).

Fluid mechanics

15. *A note on the definition of fractional derivatives applied in rheology* (With Ke-Qin Zhu). *Acta Mech. Sin.*, Vol. 27, 866-876 (2011).
16. *On the definition of fractional derivatives in rheology* (With Ke-Qin Zhu). *Theor. Appl. Mech. Lett.*, Vol. 1, 012007 (2011).
17. *Can we obtain a fractional Lorenz system from a physical problem?* (With Ke-Qin Zhu). *Chin. Phys. Lett.*, Vol. 27, 124701 (2010).
18. *Generalized Lorenz equation derived from thermal convection of viscoelastic fluids in a loop* (With Ke-Qin Zhu). *Chin. Phys. Lett.*, Vol. 27, 034601 (2010).

TALKS

- Penn/Temple Probability Seminar, University of Pennsylvania (March 2019).
- Probability and Financial Mathematics Seminar, Pennsylvania State University (January 2018).
- Columbia/Courant joint probability seminar (November 2018).
- Probability seminar, University of California, Irvine (November 2018).
- Random Matrices Seminar, Institute for Pure & Applied Mathematics, UCLA (June 2018).
- Participating Seminar in Functional Analysis, UCLA (November 2017).
- Graduate Probability seminar, UW-Madison (January 2017).
- Graduate Probability seminar, UW-Madison (April 2016).
- CLEO: 2013 - Laser Science to Photonic Applications, San Jose, CA (June 2013).
- Seminar at the Institute for Terahertz Science and Technology, UCSB (March 2013).
- APS March Meeting 2013, Baltimore, Maryland (March 2013).
- APS March Meeting 2012, Boston, Massachusetts (March 2012).
- 15th annual conference of Beijing Society of Mechanics (best paper), Beijing (January 2009).

CONFERENCES ATTENDED

- Northeast Probability Seminar 2018, Courant Institute of Mathematical Sciences (November 2018).
- AMS Fall Central Sectional Meeting 2018, University of Michigan, Ann Arbor (October 2018).

- The 40th Midwest Probability Colloquium, Northwestern University (October 2018).
- IPAM Workshop: Random Matrices and Free Probability Theory, UCLA (May 2018).
- PCMI Summer Session 2017: Random Matrices, Utah (June 2017).
- Michigan Summer School on Random Matrices, University of Michigan-Ann Arbor (June 2016).

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

| | |
|---|--------------------|
| Teaching assistant, UCLA, MATH 174E: Mathematics of Finance | <i>2019 Spring</i> |
| Teaching assistant, UCLA, MATH 171: Stochastic Processes | <i>2019 Winter</i> |
| Teaching assistant, UCLA, MATH 170A: Probability Theory | <i>2019 Winter</i> |
| Teaching assistant, UCLA, MATH 275A: Probability Theory (graduate) | <i>2018 Fall</i> |
| Teaching assistant, UCLA, MATH 170A: Probability Theory | <i>2018 Fall</i> |
| Teaching assistant, UCLA, MATH 170E: Introduction to Probability and Statistics | <i>2018 Spring</i> |
| Teaching assistant, UCLA, MATH 32A: Calculus of Several Variables | <i>2018 Winter</i> |
| Teaching assistant, UCLA, MATH 31A: Differential and Integral Calculus | <i>2017 Fall</i> |
| Teaching assistant, UW-Madison, MATH 234: Calculus - Functions of Several Variables | <i>2016 Fall</i> |
| Teaching assistant, UW-Madison, MATH 211: Calculus, UW-Madison | <i>2016 Spring</i> |
| Teaching assistant, UW-Madison, MATH 234: Calculus - Functions of Several Variables | <i>2015 Fall</i> |
| Teaching assistant, UW-Madison, MATH 222: Calculus and Analytic Geometry II | <i>2015 Spring</i> |
| Teaching assistant, UW-Madison, MATH 222: Calculus and Analytic Geometry II | <i>2014 Fall</i> |

SERVICE

Article referee for Chinese Physics Letters, Canadian Journal of Physics, Annales de l'Institut Henri Poincaré, Annals of Applied Probability.

RELEVANT SKILLS

- Languages: Chinese, English
- Programming: C, Fortran, Matlab