Dong Wang

School of Mathematical Sciences
University of Chinese Academy of Sciences
Beijing, China 100049

Email (research) wangdong@wangd-math.xyz
Email (other stuff) wangdong21@ucas.ac.cn
Homepage https://www.wangd-math.xyz/

Education

Ph.D. Mathematics, Brandeis University, 2008.

Advisor Mark Adler.

B.S. Mathematics, Peking University, 2003.

Work Experience

Associate Professor, School of Mathematical Sciences, University of Chinese Academy of Sciences, 2021–present.

Associate Professor, Department of Mathematics, National University of Singapore, 2020–2021.

Assistant Professor, Department of Mathematics, National University of Singapore, 2012–2020.

Post-Doc Assistant Professor, Department of Mathematics, University of Michigan, 2009–2012.

Postdoctoral Researcher, Institut de recherche en mathématique et physique (IRMP), Université catholique de Louvain, 2011, March–August.

Postdoctoral Fellow, Centre de Recherches Mathématiques (CRM), Université de Montréal, 2008–2009.

Teaching Assistant, Department of Mathematics, Brandeis University, 2003–2008.

Research

I am an analyst working on probability problems, and the proper term describing my research interest is “integrable probability”. My research focuses on random matrix theory and interacting particle systems. I am also interested in integrable systems, multiple orthogonal polynomials and Riemann-Hilbert problems related to random matrices.

Papers and Preprints

27. Tom Claeys and Dong Wang, Universality for random matrices with equi-spaced external source: a case study of a biorthogonal ensemble, `https://arxiv.org/abs/2202.03827`.

26. Dong Wang and Lun Zhang, A vector Riemann-Hilbert approach to the Muttalib-Borodin ensembles, *J. Funct. Anal.*, 282 (2022), no. 7, 109380, 84 pp.

25. Swapnil Yadav, Kazi Alam, Khandker Muttalib and Dong Wang, Non-monotonic confining potential and eigenvalue density transition for generalized random matrix model, *Phys. Rev. E*, 103 (2021), no. 4, 042137, 11 pp.

24. Zhigang Bao and Dong Wang, Eigenvector distribution in the critical regime of BBP transition, *Probab. Theory Related Fields*, 182 (2022), no. 1-2, 399–479.

23. Swapnil Yadav, Kazi Alam, Khandker Muttalib and Dong Wang, Generalized random matrix model with additional interactions, *J. Phys. A*, 53 (2020), no. 1, 015001, 15 pp.

22. Zhipeng Liu, Axel Saenz and Dong Wang, Integral formulas of ASEP and q-TAZRP on a ring, *Comm. Math. Phys.*, 379 (2020), 261–325.

21. Dang-Zheng Liu, Dong Wang and Yanhui Wang, Lyapunov exponent, universality and phase transition for products of random matrices, `https://arxiv.org/abs/1810.00433`.

20. Karl Liechty and Dong Wang, Asymptotics of free fermions in a quadratic well at finite temperature and the Moshe-Neuberger-Shapiro random matrix model, *Ann. Inst. Henri Poincaré Probab. Stat.*, 56 (2020), no. 2, 1072–1098.

19. Eunghyun Lee and Dong Wang, Distributions of a particle's position and their asymptotics in the q-deformed totally asymmetric zero range process with site dependent jumping rates, *Stochastic Process. Appl.*, 129 (2019), no. 5, 1795–1828.

18. Karl Liechty and Dong Wang, Nonintersecting Brownian bridges between reflecting or absorbing walls, *Adv. Math.*, 309 (2017), 155–208.

17. Tom Claeys, Arno B. J. Kuijlaars, Karl Liechty and Dong Wang, Propagation of singular behavior for Gaussian perturbations of random matrices, *Comm. Math. Phys.*, 362 (2018), no. 1, 1–54.

16. Karl Liechty and Dong Wang, Two Lax systems for the Painlevé II equation, and two related kernels in random matrix theory, *SIAM J. Math. Anal.*, 48 (2016), no. 5, 3618–3666.

15. Dong Wang and David Waugh, The transition probability of the q-TAZRP (q-Bosons) with inhomogeneous jump rates, *SIGMA* 12 (2016), 036, 16 pp, Contribution to the special issue on Asymptotics and Universality in Random Matrices, Random Growth Processes, Integrable Systems and Statistics in honor of Percy Deift and Craig Tracy.

14. Tom Claeys, Arno B. J. Kuijlaars and Dong Wang, Correlation kernels for sums and products of random matrices, *Random Matrices Theory Appl.*, 4 (2015), no. 4, 1550017, 31pp.

13. Peter J. Forrester and Dong Wang, Muttalib–Borodin ensembles in random matrix theory — realisations and correlation functions, *Electron. J. Probab.*, 22 (2017), paper no. 54, 43pp.

12. Dang-Zheng Liu, Dong Wang and Lun Zhang, Bulk and soft-edge universality for singular values of products of Ginibre random matrices, *Ann. Inst. Henri Poincaré Probab. Stat.*, 52 (2016), no. 4, 1734–1762.

11. Ivan Corwin, Zhipeng Liu and Dong Wang, Fluctuations of TASEP and LPP with general initial data, *Ann. Appl. Probab.*, 26 (2016), no. 4, 2030–2082.

10. Karl Liechty and Dong Wang, Nonintersecting Brownian motions on the unit circle, *Ann. Probab.*, 44 (2016), no. 2, 1134–1211.

9. Mark Adler, Pierre van Moerbeke and Dong Wang, Random matrix minor processes related to percolation theory, *Random Matrices Theory Appl.*, 2 (2014), no. 4, 135008, 72pp.

8. Tom Claeys and Dong Wang, Random matrices with equispaced external source, *Comm. Math. Phys.*, 328 (2014), no. 3, 1023–1077.

7. Jinho Baik and Dong Wang, On a relationship between high rank cases and rank one cases of Hermitian random matrix models with external source, *Random Matrix Theory, Interacting Particle Systems and Integrable Systems*, Edited by Percey Deift and Peter Forrester, MSRI Publications 65 (2014), Cambridge University Press, Cambridge, 25–38.

6. Jinho Baik and Dong Wang, On the largest eigenvalue of a Hermitian random matrix model with spiked external source II. Higher rank case, *Int. Math. Res. Not. IMRN*, (2013) no. 14, 3304–3370.

5. Dong Wang, The largest eigenvalue of real symmetric, Hermitian and Hermitian self-dual random matrix models with rank one external source, part I, *J. Stat. Phys.*, 146 (2012) no. 4, 719–761.

4. Jinho Baik and Dong Wang, On the largest eigenvalue of a Hermitian random matrix model with spiked external source I. Rank 1 case, *Int. Math. Res. Not. IMRN*, (2011) no. 22, 5164–5240.

3. Dong Wang, Random matrices with external source and KP τ functions, *J. Math. Phys.*, 50 (2009), no. 7, 073506, 10pp.

2. Dong Wang, The largest sample eigenvalue distribution in the rank 1 quaternionic spiked model of Wishart ensemble, *Ann. Probab.*, 37 (2009), no. 4, 1273–1328.

1. Dong Wang, A PDE for the multi-time joint probability of the Airy process, *Phys. D*, 238 (2009), no. 8, 819–833.

Dissertation

- Spiked Models in Wishart Ensemble.

Teaching

National University of Singapore

Living with Mathematics, MA4262, 2020/2021, Semester 2, (and a tutorial).

Measure and Integration, MA4262, 2020/2021, Semester 1, (and two tutorials).

Complex Analysis I, MA3111, 2019/2020 Semester 2, (and two tutorials).

Complex Analysis I, MA3111, 2019/2020 Semester 1, (and three tutorials).

Complex Analysis I, MA3111, 2018/2019 Semester 2, (and three tutorials).

Complex Analysis I, MA3111, 2018/2019 Semester 1, (and two tutorials).

Functional Analysis, MA4211, 2017/2018 Semester 2, (and a tutorial).

Measure and Integration, MA4262, 2017/2018, Semester 1, (and a tutorial).

Stochastic Processes I, MA3238/ST3236, 2016/2017, Semester 2, (and four tutorials).

Measure and Integration, MA4262, 2016/2017, Semester 1, (and a tutorial).

Stochastic Processes I, MA3238/ST3236, 2015/2016, Semester 2, (and five tutorials).

Probability Theory I, MA5259, 2015/2016 Semester 1.

Stochastic Processes I, MA3238/ST3236, 2014/2015 Semester 2, (and six tutorials).

Mathematical Analysis III, MA3209, 2014/2015 Semester 1, (and two tutorials).

Functional Analysis, MA4211, 2013/2014 Semester 2, (and a tutorial).

Mathematical Analysis III, MA3209, 2013/2014 Semester 1, (and two tutorials).

Topics in Random Matrix Theory, MA6252, 2012/2013 Semester 2.

Mathematical Analysis III, MA3209, 2012/2013 Semester 1, (and two tutorials).

University of Michigan

Multivariable Calculus, Math 217, Spring 2012,

Matrix Algebra, Math 417, Winter 2012 (two sections),

Integral Caculus, Math 116, Fall 2011 (two sections),

Differential Calculus, Math 115, Fall 2010 (two sections).

Differential Calculus, Math 115, Winter 2010 (two sections).

Differential Calculus, Math 115, Fall 2009 (two sections).

Brandeis University

Differential Calculus, Math 10a, Fall 2007.

Differential Calculus, Math 10a, Spring 2007.

Integral Calculus, Math 10b, Fall 2006.

Differential Calculus, Math 10a, Spring 2006.

Students mentored

Master students

David Waugh (NUS 2015)

Selected undergraduate students

Mark Ng Say-Yao (NUS Undergraduate Research Opportunities Programme in Science (UROPS), winner of 2015/16 CRISP award)

Conference and Seminar Presentations

Tsinghua-PKU-BNU Probability Webinar, Beijing Normal University, online, March 2021.

UniMelb-Bielefeld RMT Seminar, University of Melbourne, online, March 2021.

Maths Seminar, Fudan University, online, November 2020.

INDSTATS: Innovations in Data and Statistical Sciences, Indian Institute of Technology Bombay, Mumbai, India, December 2019.

IMS-China conference, Dalian University of Technology, Dalian, China, July 2019.

Topology and geometry seminar, National University of Singapore, Singapore, April 2019.

Workshop on random matrices, stochastic geometry and related topics, Institute for Mathematical Sciences, Singapore, March 2019.

Workshop on random matrices and related fields, Fudan University, Shanghai, China, January 2019.

Sums and products of random matrices, Universität Bielefeld, Bielefeld, Germany, August 2018.

The 5^{th} Institute of Mathematical Statistics Asia Pacific Rim Meeting (IMS-APRM), National University of Singapore, Singapore, June 2018.

Workshop on integrable systems and orthogonal polynomials, Fudan University, Shanghai, China, January 2018.

Working group in integrable systems, Tsinghua University, Beijing, China, December 2017.

Workshop on Stochastic Analysis and Random Matrices, University of Science and Technology of China, Hefei, China, December 2017.

Painlevé Equations and Applications: A Workshop in Memory of A. A. Kapaev, University of Michigan, Ann Arbor, USA, August 2017.

Random Matrices, EurAsia 2017, Fudan University, Shanghai, China, July 2017.

Workshop on Random Matrices, Hong Kong University, Hong Kong, China, June 2017.

International Conference on Special Functions: Theory, Computation, and Applications, City University of Hong Kong, Hong Kong, China, June 2017.

Probability Seminar, Peking University, Beijing, China, December 2016.

The 10^{th} ICSA International Conference on Global Growth of Modern Statistics in the 21^{st} Century, Shanghai Jiao Tong University, Shanghai, China, December 2016.

Random Product Matrices — New Developments and Applications, Universität Bielefeld, Bielefeld, Germany, August 2016.

Probability Forum, University of Science and Technology of China, Hefei, China, August 2016.

Random Matrices EurAsia 2016, University of Macau, Macau, July 2016.

The 7^{th} KIAS Conference on Statistical Physics, KIAS, Seoul, Korea, July 2016.

The 7^{th} Pacific Rim Conference on Mathematics, Seoul National University, Seoul, Korea, June 2016.

The 4^{th} Institute of Mathematical Statistics Asia Pacific Rim Meeting (IMS-APRM), The Chinese University of Hong Kong, Hong Kong, China, June 2016.

The 4^{th} International Conference on Nonlinear Waves: Theory and Applications, Tsinghua University, Beijing, China, June 2016.

Workshop associated to Master Lectures on the Current Topics in Mathematical Physics and Probability: Horng-Tzer Yau, Sanya, China, December 2015.

Orthogonal and Multiple Orthogonal Polynomials, Oaxaca, Mexico, August 2015.

10^{th} International ISAAC Congress, University of Macau, Macau, China, August 2015.

2015 Peking University Youth Probability Forum, Peking University, Beijing, China, July 2015.

2015 IMS-China International Conference on Statistics and Probability, Kunming, China, July 2015.

Probability Day, Institute for Mathematical Sciences, Singapore, September 2014.

30^{th} International Colloquium on Group Theoretical Methods in Physics, Ghent, Belgium, July 2014.

Random Matrix Theory: Foundations and Applications, Krakow, Poland, July 2014.

Seminar in Department of Mathematics, University of Macau, Macau, China, May 2014.

Sydney Random Matrix Theory Workshop, University of Sydney, Sydney, Australia, January

2014.

Probability Seminar, Peking University, Beijing, China, September 2013.

Workshop on Random Matrices and Applications, University of Michigan, Ann Arbor, USA, June 2013.

International Conferences on Approximation Theory and Applications, City University, Hong Kong, China, May 2013.

Probability Seminar, National University of Singapore, Singapore, April 2013.

Working Group in Integrable Systems, Tsinghua University, Beijing, China, December 2012.

Random Matrix Theory, Applications in Statistics, Institute for Mathematical Sciences, Singapore, Auguest 2012.

Working Group in Integrable Systems, Tsinghua University, Beijing, China, July 2012.

Probability Seminar, Michigan State University, Lansing, USA, April 2012.

Working Group in Integrable Systems and Random Matrix Theory, University of Michigan, Ann Arbor, USA, September 2011.

Random matrix theory and high-dimensional statistics, French-Chinese summer school, Changchun, China, July 2011.

Completely Integrable Systems and Applications, Erwin Schrödinger Institute, Vienna, Austria, July 2011.

Semiclassical Analysis Seminar, Katholieke Universiteit Leuven, Leuven, Belgium, March 2011.

Several Complex Variable Seminar, University of Michigan, Ann Arbor, USA, November 2010.

Toronto Probability Seminar, Fields Institute, Toronto, Canada, July 2010.

Workshop on Orthogonal Polynomials, Applications in Statistics and Stochastic Processes, Warwick University, Coventry, UK, July 2010.

Random Matrix and Probability Seminars, Harvard University, Cambridge, USA, April 2010.

Working Seminar in Random Matrix Theory, Peking University, Beijing, China, July 2009.

Working Seminar Mathematical Physics, Centre de Recherches Mathématiques, Montreal, Canada, April 2009.

Working Seminar Matrices aléatoires, processus aléatoires, systèmes intégrables, Centre de Recherches Mathématiques, Montreal, Canada, November 2008.

Conference on Random Matrices, Inverse Spectral Methods and Asymptotics, Banff International Research Station, Banff, Canada, October 2008.

Seminar Physique Mathématique, Centre de Recherches Mathématiques, Montreal, Canada, October 2008.

Working group in Integrable Systems and Asymptotics, University of Michigan, Ann Arbor, USA December 2007.

Conference on Random and Integrable Models in Mathematics and Physics (poster), Belgian Academy of Science, Brussels, Belgium, September 2007.

Professional Activities

Reviewer for
Mathematical Reviews, referee for *Acta Math.*, *Ann. Appl. Probab.*, *Ann. Inst. Henri Poincaré*, *Ann. Probab.*, *Constr. Approx.*, *Int. Math. Res. Not. IMRN*, *J. Stat. Phys.*, *J. Multivariate Anal.*, *Peking Math. J.*, *Phys. D*, *Punjab Univ. J. Math.*, *Random Matrices Theory Appl.*, *SIAM J. Matrix Anal. Appl.*, *SIGMA*, and *Statist. Probab. Lett.*.

Co-organizer of the workshop
Random Matrix EurAsia 2020, Institute for Mathematical Sciences, Singapore, May 2020.

Co-organizer of the workshop
Workshop on Stochastic Processes in Random Media, Institute for Mathematical Sciences, Singapore, May 2015.

Co-organizer of the seminar
Working Group in Integrable Systems and Random Matrix Theory, University of Michigan, 2011–2012.

Grants

Chinese NSFC grant (participant) 11871425

Singapore AcRF Tier 1 Grant R-146-000-262-114

Singapore AcRF Tier 1 Grant R-146-000-217-112

Start-up grant in National University of Singapore R-146-000-164-133

Last updated: February 14, 2022