

Dong Wang

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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

29. Dong Wang, Hard edge universality of Muttalib-Borodin ensembles with real parameter θ , <https://arxiv.org/abs/2312.14840>.
28. Dong Wang, Biorthogonal polynomials related to quantum transport theory of disordered wires, <https://arxiv.org/abs/2307.03720>.
27. Tom Claeys and Dong Wang, Universality for random matrices with equi-spaced external source: a case study of a biorthogonal ensemble, *J. Stat. Phys.*, 188 (2022) no. 2, paper no. 11, 28 pp.
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, *Comm. Math. Phys.*, 399 (2023), 1811–1855.
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 Percy 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, GEH1036/GEK1505, 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 Calculus, 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)

Professional Activities

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

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

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

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