Xin Sun

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EDUCATION

Massachusetts Institute of Technology	Cambridge, MA
Ph.D. Mathematics	2017
Peking University	Beijing, China
B.S. Mathematics	2011

EMPLOYMENT

University of Pennsylvania	Philadelphia, PA
Assistant Professor in Mathematics	7/2020-Present
University of Pennsylvania	Philadelphia, PA
Assistant Professor in Statistics and Data Science, secondary appointment	7/2022-Present
Institute for Advanced Study	Princeton, NJ
Member & Visitor	9/2022-7/2023
Columbia University	New York, NY
Simons Junior Fellow	7/2017-6/2020
Microsoft Research	Redmond, WA
Intern	5/2014-8/2014

HONORS AND AWARDS

Rollo Davidson Prize	2023
Penn Math Good Teaching Award	2021, 2022
National Science Foundation Career Award	2021-2026
Bernoulli Society New Researcher Award	2020
National Science Foundation Standard Grant: DMS-1811092, DMS-2027986	2018-2022
Junior Fellow, Simons Society of Fellows	2017-2020
Xiaosong Lin Award for Mathematics, Peking University	2011

PUBLICATIONS

1. **Probabilistic conformal blocks for Liouville CFT on the torus**, Promit Ghosal, Guillaume Remy, Xin Sun and Yi Sun. *Duke Math. J.*, accepted.

2. **Conformal welding of quantum disks**, Morris Ang, Nina Holden and Xin Sun. *Electronic Journal of Probability*, accepted.

3. **FZZ formula of boundary Liouville CFT via conformal welding**, Morris Ang, Guillaume Remy and Xin Sun. *Journal of the European Mathematical Society*, accepted.

4. **Integrability of SLE via conformal welding of random surfaces**, Morris Ang, Nina Holden and Xin Sun. *Communications on Pure and Applied Mathematics*, accepted.

5. **Percolation on triangulations: a bijective path to Liouville quantum gravity**, Olivier Bernardi, Nina Holden and Xin Sun. *Mem. Amer. Math. Soc.*, accepted.

6. **Mating of trees for random planar maps and Liouville quantum gravity: a survey**, Ewain Gwynne, Nina Holden and Xin Sun. *Panoramas et Synthèses*, accepted.

7. **Equivalence of Liouville measure and Gaussian free field**, Nathanael Berestycki, Scott Sheffield and Xin Sun. *Ann. Inst. Henri Poincaré Probab. Stat.*, accepted.

8. **Schnyder woods, SLE$_{16}$ and Liouville quantum gravity**, Yiting Li, Xin Sun and Samuel Watson. *Trans. Amer. Math. Soc.*, accepted.

9. **Convergence of uniform triangulations under the Cardy embedding**, Nina Holden and Xin Sun. *Acta Mathematica*, Vol. 230, No. 6, 93-203 (2023).

10. **Baxter permuton and Liouville quantum gravity**, Jacopo Borga, Nina Holden, Xin Sun and Pu Yu *Probab. Theory Relat. Fields* (2023).

11. **Brownian half-plane excursion and critical Liouville quantum gravity**, Juhan Aru, Nina Holden, Ellen Powell and Xin Sun. *Journal of the London Mathematical Society*, 107(1), 441-509 (2023).

12. **The SLE loop via conformal welding of quantum disks**, Morris Ang, Nina Holden and Xin Sun. *Electronic Journal of Probability*, (2023).

13. **Quantum triangles and imaginary geometry flow lines**, Morris Ang, Xin Sun, and Pu Yu. *ArXiv e-prints*, Nov 2022.

14. **Permutons, meanders, and SLE-decorated Liouville quantum gravity**, Jacopo Borga, Ewain Gwynne, and Xin Sun. *ArXiv e-prints*, July 2022.

15. **The moduli of annuli in random conformal geometry**, Morris Ang, Guillaume Remy and Xin Sun. *ArXiv e-prints*, March 2022.

16. **Natural parametrization of percolation interface and pivotal points**, Nina Holden, Xinyi Li and Xin Sun. *Ann. Inst. Henri Poincaré Probab. Stat.*, Vol. 58, No. 1, 7-25 (2022).

17. **Minkowski content of Brownian cut points**, Nina Holden, Greg Lawler, Xinyi Li and Xin Sun. *Ann. Inst. Henri Poincaré Probab. Stat.*, Vol. 58, No. 1, 455-488 (2022).

18. **Integrability of the conformal loop ensemble**, Morris Ang and Xin Sun. *ArXiv e-prints*, June 2021.

19. **Liouville dynamical percolation**, Christophe Garban, Nina Holden, Avelio Sepúlveda and Xin Sun. *Probab. Theory Relat. Fields* (2021).

20. **Joint scaling limit of site percolation on random triangulations in the metric and peanosphere sense**, Ewain Gwynne, Nina Holden and Xin Sun. *Electronic Journal of Probability*, Vol. 26, 1-58, (2021).

21. **Volume of metric balls in Liouville quantum gravity**, Morris Ang, Hugo Falconet and Xin Sun. *Electronic Journal of Probability*, 25 (2020), no. 169, 1-50.

22. **Scaling limit of large triangulations of polygons**, Marie Albenque, Nina Holden and Xin Sun. *Electronic Journal of Probability*, 25 (2020), no. 135, 1-43.

23. **Weak LQG metrics and Liouville first passage percolation**, Julien Dubédat, Hugo Falconet, Ewain Gwynne, Joshua Pfeffer and Xin Sun. *Probab. Theory Relat. Fields*, Vol. 178, 369âĂŞ436 (2020).

24. **A mating-of-trees approach for graph distances in random planar maps**, Ewain Gwynne, Nina Holden and Xin Sun. *Probab. Theory Relat. Fields*, Vol. 177, 1043âĂŞ1102 (2020).

25. **Induced graphs of uniform spanning forests**, Russell Lyons, Yuval Peres, and Xin Sun. *Ann. Inst. Henri Poincaré Probab. Stat.*, Vol. 56, No. 4, 2732-2744 (2020).

26. **Occupation measure of random walks and wired spanning forests in balls of Cayley graphs**, Russell Lyons, Yuval Peres, Xin Sun and Tianyi Zheng. *Annales de la Faculté des Sciences de Toulouse*, (2020) no. 1, pp. 97-109.

27. **Four-dimensional loop-erased random walk**, Gregory Lawler, Xin Sun and Wei Wu. *Annals of Probability*, Vol. 47, No. 6, 3866-3910 (2019).

28. **A distance exponent for Liouville quantum gravity**, Ewain Gwynne, Nina Holden and Xin Sun. *Probab. Theory Relat. Fields*, Vol. 173, 931-997 (2019).

29. **Scaling limits for the critical Fortuin-Kasteleyn model on a random planar map I: cone times**, Ewain Gwynne, Cheng Mao and Xin Sun. *Ann. Inst. Henri Poincaré Probab. Stat.*, Vol. 55, No. 1, 1-60 (2019).

30. **Random planar geometry through the lens of uniform spanning tree**, Xin Sun. *Bernoulli News*, Vol. 26, No. 2, 10-13 (2019).

31. **Almost sure multifractal spectrum of SLE**, Ewain Gwynne, Jason Miller and Xin Sun. *Duke Math. J.*, Vol. 167, No. 6, 1099-1237 (2018).

32. **SLE as a mating of trees in Euclidean geometry**, Nina Holden and Xin Sun. *Commun. Math. Phys.*, 364, 171-201 (2018).

33. **Negative moments for Gaussian multiplicative chaos on fractal sets**, Christophe Garban, Nina Holden, Avelio Sepúlveda and Xin Sun. *Electronic Communications in Probability*, 23 (2018), no. 100, 1-10.

34. **Brownian motion correlation in the peanosphere for $\kappa > 8$**, Ewain Gwynne, Nina Holden, Jason Miller and Xin Sun. *Ann. Inst. Henri Poincaré Probab. Stat.*, Vol. 53, No. 4, 1866-1889 (2017).

35. **Two perspectives of the unit area quantum sphere and their equivalence**, Juhan Aru, Yichao Huang and Xin Sun. *Commun. Math. Phys.*, 356, 261-283 (2017).

36. **Deep Learning with Coherent Nanophotonic Circuits**, Yichen Shen, Nicholas C. Harris, Scott Skirlo, Mihika Prabhu, Tom Baehr-Jones, Micheal Hochberg, Xin Sun, Shijie Zhao, Hugo Larochelle, Dirk Englund and Marin Soljačić. *Nature Photonics*. Vol. 11, Issue 7, 441-446 (2017).

37. **Scaling limits for the critical Fortuin-Kasteleyn model on a random planar map II: local estimates and empty reduced word exponent**, Ewain Gwynne and Xin Sun. *Electronic Journal of Probability*, 22 (2017), no. 45, 1-56.

38. **Fractional Gaussian field: a survey**, Asad Lodhia, Scott Sheffield, Xin Sun and Samuel Watson. *Probability Surveys*, Vol. 13 (2016), 1-56.

39. **Sandpiles and unicycles on random planar maps**, David Wilson and Xin Sun. *Electronic Communications in Probability*, 21 (2016), no. 57, 1-12.

40. **Joint scaling limit of a bipolar-oriented triangulation and its dual in the peanosphere sense**, Ewain Gwynne, Nina Holden and Xin Sun. *ArXiv e-prints*, Mar 2016.

41. **On fluctuations for random band Toeplitz matrices**, Yiting Li and Xin Sun. *Random Matrices: Theory and Applications*, Vol. 4, No.2 (2015).

42. **Scaling limits for the critical Fortuin-Kasteleyn model on a random planar map III: finite volume case**, Ewain Gwynne and Xin Sun. *ArXiv e-prints*, Oct 2015.

43. **Ergodicity of the Airy line ensemble**, Ivan Corwin and Xin Sun. *Electronic Communications in Probability*, 19 (2014), no. 49, 1-11.

44. **Uniform spanning forest and the bi-Laplacian Gaussian field**, Xin Sun and Wei Wu. *ArXiv e-prints*, Dec 2013.

45. **Fluctuations of eigenvalues for random Toeplitz and related matrices**, Dangzheng Liu, Xin Sun and Zhengdong Wang. *Electronic Journal of Probability*, 17 (2012), no. 95, 1-22.

46. **A note on eigenvalues of random block Toeplitz matrices with slowly growing bandwidth**, Yiting Li, Dangzheng Liu, Xin Sun and Zhengdong Wang. *Statistics and Probability Letters*, 08/2011; 81 (12).

ADVISING AND MENTORING

Doctoral Advising:

Da Wu (2020 - present),   Shengjing Xu (2022 - present).

Master Thesis Mentoring :

Yuxuan Lin (2022 - present).

Undergraduate Research Mentoring:

Maxmillian Tjauw (2022 Spring),   Yanlin Zhao (2013 Summer).

PROFESSIONAL SERVICE

Reviewer for:

ALEA, Ann. Inst. Henri Poincaré Probab. Stat., Ann. Inst. Henri Poincaré D, Ann. of Math., Ann. Probab., Comm. Math. Phys., Duke Math. J., ESAIM: P&S, Forum Math. Sigma, Int. Math. Res. Not, Invent. Math., J. Funct. Anal., MathSciNet, Mem. Amer. Math. Soc., PMP, Proc. London Math. Soc., Probab. Theory Related Fields, Scientific Reports, Trans. Amer. Math. Soc.

Co-organizer for:

Random geometry and statistical physics workshop at University of Pennsylvania (10/2022).
Penn/Temple Probability Seminar (9/2021 - Present).
Random geometry and statistical physics online seminar (9/2020 - Present).
Integrability in Conformal Probability workshop (10/2021)
Columbia Probability Seminar (9/2017-6/2020), Columbia-Princeton Probability Day (4/2018).

Committee member/Panelist for:

Review panels for National Science Foundation (twice in 2021, once in 2022).
Dissertation defense committee for Jiaming Xia (2022); Mateo Wirth (2021).
Tutorial committee for *Seminar on Stochastic Processes* (2021).

INVITED CONFERENCE TALKS

Quantization Day 3.0, online	12/2022
Midwest Probability Colloquium, Northwestern	10/2022
MSRI Workshop: the Analysis and Geometry Of Random Spaces, Berkeley	04/2022
Worshop: Integrability in conformal probability, online	10/2021
Bernoulli-IMS 10th World Congress in Probability and Statistics, online	7/2021
AMS Fall Eastern Sectional Meeting, online	10/2020
Plenary talk at *Bernoulli-IMS One World Symposium*, online	8/2020
AMS Fall Eastern Sectional Meeting, Binghamton University	10/2019
Stochastic process and their applications 2019, Northwestern University	7/2019
Minicourse at *Probability and quantum field theory*, Porquerolle, France	6/2019
Young Mathematician Forum, Peking University	6/2019
Applied Mathematics and Statistics Youth Forum, Peking University	12/2018
Amir Dembo's Birthday Conference, Stanford University	12/2018
Columbia-Princeton Probability Day, Columbia University	4/2018
SLE, GFF and LQG in NYC, Columbia University	3/2017
Workshop on Recent Developments in SLE, Mittag-Leffler Institute	6/2016
Annual Graduate Student Math Conference in Analysis, Brown University	2/2016
Peking University Youth Probability Forum, Peking University	7/2015
Seymour Sherman Lecture and Conference, Indiana University	5/2015
Workshop on Conformally Invariant Scaling Limits, Cambridge University	1/2015

INVITED SEMINAR TALKS

Rutgers Geometry/Topology Seminar	3/2023
Princeton Mathematical Physics Seminar	3/2023
Probability and City Seminar, New York University	3/2023
Yale Math Colloquium	1/2023
Western Hemisphere Colloquium on Geometry and Physics, online	1/2023
LA Probability Forum, University of Southern California	12/2022

Caltech Math Colloquium	11/2022
IAS Probability Seminar	9/2022
Stanford Probability Seminar	5/2022
Yale Math Colloquium	03/2022
HU Berlin/MPIM Bonn Algebra, Geometry & Physics Seminar, online	01/2022
MSU Analysis and PDE Seminar, online	11/2021
Chicago Probability Seminar	10/2021
School of Mathematical Science Colloquium, Peking University, online	6/2021
Duke Probability Seminar, online	4/2021
THU-PKU-BNU Joint Probability Webinar	10/2020
KU Probability and Statistics Seminar, online	4/2020
Perimeter Institute Mathematical Physics Seminar, online	2/2020
Northwestern Probability Seminar	12/2019
Penn Probability Seminar	11/2019
UCSD Math Colloquium	11/2019
Olivier Club, Cornell University	11/2019
University of Washington Rainwater Seminar	10/2019
Peking University Probability Seminar	6/2019
Chicago Probability Seminar	5/2019
Cornell Probability Seminar	4/2019
Stanford Probability Seminar	4/2019
Berkeley Probability Seminar	4/2019
UCSD Probability Seminar	2/2019
Penn/Temple Probability Seminar	2/2019
Peking University Probability Seminar	12/2018
MIT Probability Seminar	10/2018
CUNY Probability Seminar	10/2018
ETH Zurich: Seminar on Stochastic Processes	11/2017
Lyon Probability Seminar	11/2017
Indiana Probability Seminar	10/2017
Brandeis Every Topic Seminar	3/2017
Stanford Probability Seminar	1/2017
Michigan State University Probability Seminar	12/2016
ETH Zurich: ITS Talks in Theoretical Sciences	11/2016
University of British Columbia Probability Seminar	11/2016
NYU Probability and Mathematical Physics Seminar	10/2016
Brown Discrete Math Seminar	4/2016
Columbia Probability Seminar	4/2016
Northwestern Analysis Seminar	11/2015
Chicago Probability and Statistical Physics Seminar	11/2015
MIT Probability Seminar	11/2015
Harvard Random Matrix and Probability Seminar	9/2015

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