

Yifan Gao

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Employment

Westlake University

Assistant Professor

Hangzhou
2025 – present

City University of Hong Kong

Postdoctoral researcher

Hong Kong
2022 – 2025

Education

Peking University

Ph.D. in Probability and Statistics

Beijing
2017 – 2022

Supervisors: Xinyi Li and Fuxi Zhang

Sun Yat-sen University

B.S. in Statistics

Guangzhou
2013 – 2017

Research Interests

My research lies at the intersection of probability theory and mathematical physics, with a focus on statistical physics and random geometry, including Gaussian free field, Brownian loop soup, percolation, and Schramm-Loewner evolution.

Publications and Preprints

1. Y. Bi, Y. Gao, P. Nolin and W. Qian. Arm events in critical planar loop soups. arXiv:2509.25024, 20 pages, 3 figures.
2. Y. Gao, X. Li, R. Liu and W. Qian. Non-existence of several random fractals in the Brownian motion and the Brownian loop soup. arXiv:2507.20324, 46 pages, 7 figures.
3. Y. Gao, X. Li, R. Liu, X. Liu and D. Shiraishi. Convergence in natural parametrization of random walk frontier. *Sci. China Math.* (to appear), arXiv:2504.13743, 33 pages, 4 figures.
4. Y. Gao, P. Nolin and W. Qian. Up-to-constants estimates on four-arm events for simple conformal loop ensemble. arXiv:2504.06202, 36 pages, 12 figures.
5. G. Cai and Y. Gao. Uniqueness of generalized conformal restriction measures and Malliavin-Kontsevich-Suhov measures for $c \in (0, 1]$. *Ann. Probab.* (to appear), arXiv:2502.05890, 20 pages.
6. Y. Gao, X. Li, Y. Li, R. Liu and X. Liu. A boundary Harnack principle and its application to analyticity of 3D Brownian intersection exponents. arXiv:2411.14921, 49 pages, 5 figures.
7. Y. Gao, P. Nolin and W. Qian. Percolation of discrete GFF in dimension two II. Connectivity properties of two-sided level sets. arXiv:2409.16273, 71 pages, 8 figures.
8. Y. Gao, P. Nolin and W. Qian. Percolation of discrete GFF in dimension two I. Arm events in the random walk loop soup. arXiv:2409.16230, 50 pages, 5 figures.
9. Y. Gao, X. Li, P. Panov and D. Shiraishi. Scaling limit of the occupation measure of random walk cut points. arXiv:2310.09592, 57 pages, 12 figures.
10. Y. Gao, X. Li and W. Qian. Multiple points on the boundaries of Brownian loop-soup clusters. *Ann. Probab.* (to appear), arXiv:2205.11468, 55 pages, 12 figures.
11. H. Du, Y. Gao, X. Li and Z. Zhuang. Sharp asymptotics for arm probabilities in critical planar percolation. *Comm. Math. Phys.*, 405(182), 2024.
12. Y. Gao and F. Zhang. On the chemical distance exponent for the two-sided level set of the two-dimensional Gaussian free field. *ALEA Lat. Am. J. Probab. Math. Stat.*, 19(1):729–753, 2022.

Selected Scholarships and Awards

Award for Scientific Research, PKU

2020&2021

Principal Scholarship, PKU

2019

Outstanding Graduates Award, SYSU	2017
First Prize Scholarship, SYSU	2016

Talks

The 44th Conference on Stochastic Processes and their Applications, Wrocław, Poland	Jul 2025
The 9th National Conference on Probability Theory, Changsha	Jun 2025
First Math Workshop of CityUHK and the University of Edinburgh, CityU, Hong Kong	May 2025
Third China-Japan-Korea Joint Probability Workshop, RIMS, Kyoto University	May 2025
Percolation Today (online): Percolation of discrete GFF in dimension two	Feb 2025
Geometry of Random Fields and Random Walk Clusters: New Horizons, MFO, Germany	Dec 2024
Youth Probability Forum, Beijing Normal University at Zhuhai	Dec 2024
Random Interacting Systems, Scaling Limits, and Universality, National University of Singapore	Dec 2023
Discrete Probability and Related Problems, Sichuan University	Jun 2023
Topics on Loop Soups, HKUST	Apr 2023
Hong Kong Probability Seminar, HKUST	Feb 2023
THU-PKU-BNU Joint Probability Webinar (online)	Apr 2022
Probability Seminar (online), Universität zu Köln	Jan 2022
The First International Conference for Chinese Young Probability Scholars, Hunan	Oct 2021
Probability Seminar, Central South University	Sep 2021
Probability Seminar, Beijing Jiaotong University	May 2021
Masters Lectures, Tsinghua University	Dec 2020

Conference Attendance

Taiwan Probability Workshop 2024, Taipei	Jun 2024
International Conference on Probability and Stochastic Analysis, Peking University	Oct 2023
RIMS: Stochastic Processes and Related Fields, Kyoto	Sep 2023
Random Conformal Geometry and Related Fields in Jeju, Jeju Island	Jun 2023
42nd conference on Stochastic Processes and their Applications, Wuhan	Jun 2022
Workshop on Stochastic Analysis and Related fields, Wuhan	Jun 2021
12th Seasonal Institute of the Mathematical Society of Japan (MSJ-SI), Fukuoka	Aug 2019
The First China-Japan-Korea Probability Workshop, Beijing	May 2019
Applied Mathematics and Statistics Youth Forum, Peking University	Dec 2018
Branching Structures, the Fifth Bath-Beijing-Paris Meeting, Beijing	May 2018
International Conference on Spatial Probability and Statistical Physics, Beijing	Oct 2017

Summer Schools

2023 Fall School in Probability II, Peking University	Oct 2023
Summer School Series on Probability and Related Fields, Peking University	Jul 2023
11th Cornell Probability Summer School, Cornell University	Jun 2019
Virginia Integrable Probability Summer School, University of Virginia	May 2019