

Yifan Gao

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Department of Mathematics, City University of Hong Kong

Employment

City University of Hong Kong

Postdoctoral fellow

Mentors: Pierre Nolin and Wei Qian

Hong Kong

2022 – present

Education

Peking University

Ph.D. in Probability and Statistics

Supervisors: Xinyi Li and Fuxi Zhang

Beijing

2017 – 2022

Sun Yat-sen University

B.S. in Statistics

Guangzhou

2013 – 2017

Research Interests

Statistical physics and random geometry: percolation theory, Gaussian free field, Brownian loop soup, Schramm–Loewner evolution.

Publications and Preprints

1. Y. Gao, X. Li, R. Liu, X. Liu and D. Shiraishi. Convergence in natural parametrization of random walk frontier. arXiv:2504.13743, 33 pages, 4 figures.
2. 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.
3. G. Cai and Y. Gao. Uniqueness of generalized conformal restriction measures and Malliavin-Kontsevich-Suhov measures for $c \in (0, 1]$. *Submitted*. arXiv:2502.05890, 20 pages.
4. 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. *Submitted*. arXiv:2411.14921, 49 pages, 5 figures.
5. 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.
6. 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.
7. Y. Gao, X. Li, P. Panov and D. Shiraishi. Scaling limit of the occupation measure of random walk cut points. *Submitted*. arXiv:2310.09592, 57 pages, 12 figures.
8. 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.
9. H. Du, Y. Gao, X. Li and Z. Zhuang. Sharp asymptotics for arm probabilities in critical planar percolation. *Comm. Math. Phys.*, 405(182), 2024.
10. 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.

Works in Preparation

1. G. Cai and Y. Gao. Malliavin-Kontsevich-Suhov measures on the disk and crossing probability for Brownian loop soup. *In preparation*.
2. Y. Gao, X. Li, R. Liu and W. Qian. On the non-existence of several random fractals of zero dimension derived from Brownian motion. *In preparation*.

Selected Scholarships and Awards

Award for Scientific Research, PKU

2020&2021

Principal Scholarship, PKU

2019

Outstanding Graduates Award, SYSU

2017

Talks

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