Xinyi Li 李欣意

Assistant Professor

Beijing International Center for Mathematical Research

Peking University

Address	**Personal Information**
Huaixinyuan 75101-2, Peking University,	Born on: 24, August, 1988
5 Yiheyuan Rd.,	Place of Birth: Chengdu, China
Beijing 100871, China	Citizenship: Chinese
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Website: `http://faculty.bicmr.pku.edu.cn/~xinyili/`	

Research Interests: Probability theory; random fractal; random geometry.

Education and Employment

2019 - **Assistant Professor**, BICMR, Peking University, Beijing, China.

2016 - 2019 **L. E. Dickson Instructor**, Department of Mathematics, the University of Chicago, Chicago, USA.

2012 - 2016 **Dr. sc. ETH Zurich**, Department of Mathematics, ETH Zurich, Switzerland, under supervision of **Prof. Alain-Sol Sznitman**. Title of thesis: *On large deviations and disconnection for random walk and random interlacements.*

2011 - 2012 **M. Sc. in Mathematics**, Paris Dauphine University, France, as laureate of Paris Graduate School of Mathematical Sciences.

2007 - 2011 **B. Sc. in Mathematics**, Peking University, Beijing, China.

Works initiated or completed after 2019

X. Li, J. Shi and Q. Xu. Large deviations of cover time of tori in dimensions $d \geq 3$.
Preprint, available at arXiv:2411.16398, 34 pages, 2 figures.

Y. Gao, **X. Li**, Y. Li, R. Liu, X. Liu. A boundary Harnack principle and its application to analyticity of 3D Brownian intersection exponents.
Preprint, available at arXiv:2411.14921, 49 pages, 5 figures.

X. Li, Y. Liu and Y. Wang. Sharp asymptotics of disconnection time of large cylinders by simple and biased random walk. *Preprint*, available at arXiv:2409.17900, 88 pages.

C. Hao, **X. Li**, I. Okada and Y. Zheng. Favorite sites for simple random walk in two and more dimensions. *Preprint*, available at arXiv:2409.00995, 46 pages, 3 figures.

S. Hernandez-Torres, **X. Li** and D. Shiraishi. Sharp one-point estimates and Minkowski content for the scaling limit of three-dimensional loop-erased random walk.
Preprint, available at arXiv:2403.07256, 50 pages.

Y. Gao, P. Panov, **X. Li** and D. Shiraishi. The scaling limit of the occupation measure of random walk cut points. *Preprint*, available at arXiv:2310.09592, 57 pages, 12 figures.

X. Li and D. Shiraishi. Convergence of three-dimensional loop-erased random walk in the natural parametrization. *Probab. Theory Relat. Fields*, 2024.

Y. Chang, H. Du and **X. Li**. Percolation threshold for metric graph loop soup.
Bernoulli, **30**(4):3324–3333, 2024.

H. Du, Y. Gao, **X. Li** and Z. Zhuang. Sharp asymptotics for arm probabilities in critical planar percolation. *Comm. Math. Phys.*, **405**(182), 2024.

X. Li and Z. Zhuang. On large deviations and intersection of random interlacements.
Bernoulli, **30**(3):2102–2126, 2024.

G. Cai and **X. Li**. On natural measures of SLE- and CLE-related random fractals.
Ann. Inst. H. Poincaré Probab. Stat., **60**(4):2297–2327, 2024.

X. Li and D. Shiraishi. The Hölder continuity of the scaling limit of three-dimensional loop-erased random walk. *Electron. J. Probab.*, 27:1–37, 2022.

N. Holden, G. Lawler, **X. Li** and X. Sun. Minkowski content of Brownian cut points.
Ann. Inst. Henri Poincaré, Probab. Stat. **58**(1):455-488, 2022.

N. Holden, **X. Li** and X. Sun. Natural parametrization of percolation interface and pivotal points. *Ann. Inst. Henri Poincaré, Probab. Stat.*, **58**(1):7-25, 2022.

Y. Gao, **X. Li** and W. Qian. Multiple points on the boundaries of Brownian loop-soup clusters. *Preprint*, available at arXiv:2205.11468, 55 pages, 12 figures.

X. Li and R. Liu. The intermediate level-sets of the four-dimensional membrane model. *Preprint*, available at arXiv:2205.03621, 22 pages.

X. Li and Y. Liu. Sharpness of phase transition for Voronoi percolation in hyperbolic space. *Preprint*, available at arXiv:2111.07276, 11 pages.

X. Li. Percolative properties of Brownian interlacements and its vacant set. *J. Theor. Probab.*, **33**:1855–1893, 2020.

X. Li and D. Shiraishi. One-point function estimates for loop-erased random walk in three dimensions. *Electron. J. Probab.*, **24**(111):1–46, 2019.

Works in preparation

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.*

Y. Gao, **X. Li**, R. Liu, X. Liu and D. Shiraishi. Convergence of the frontier of planar random walk in natural parametrization. *In preparation.*

G. Cai, **X. Li**, D. Shiraishi and A. Xia. The boosted loop-erased random walk: scaling limit, phase transitions and space-filling property. *In preparation.*

Works (before 2019)

M. Hilario, **X. Li** and P. Panov. Shape theorem and surface fluctuation for Poisson cylinders. *Electron. J. Probab.*, **24**(68):1–16, 2019.

X. Li. A lower bound for disconnection by simple random walk. *Ann. Probab.*, **45**(2):879–931, 2017.

X. Li and A.-S. Sznitman. Large deviations for occupation time profiles of random interlacements. *Probability Theory and Related Fields*, **161**(1-2):309–350, 2015.

X. Li and A.-S. Sznitman. A lower bound for disconnection by random interlacements. *Electronic Journal of Probability*, **19**(17):1–26, 2014.

Supervision of PhD Students

Numbers in brackets indicate year of (expected) graduation)

- Yifan Gao 高一帆 (Co-supervised with Fuxi Zhang, 2022, postdoc at CityUHK)
  Thesis title: *On fractal structures of two random sets.*

- Yu Liu 刘昱 (2025).

- Aoteng Xia 夏傲腾 (Co-supervised with Gang Tian, 2025).

- Gefei Cai 蔡格非 (2027).

- Runsheng Liu 刘润声 (2027).

- Xiangyi Liu 刘向益 (2029).

Supervision of Undergraduate Research

(Names of universities indicate current placement)

- Class of 2021：Zijie Zhuang 庄子杰 (UPenn)

- Class of 2022：Tiancheng He 何天成 (Geneva), Yuyang Feng 冯煜阳 (UChicago)

- Class of 2023：Hang Du 杜航 (MIT)

- Class of 2024：Yuanzheng Wang 汪元正 (MIT)

- Class of 2025：Yifan Li 李逸凡, Jialu Shi 施嘉禄, Qiheng Xu 徐启恒

Postdocs

- Tim Mesikepp (Joint with Zhiqiang Li and Wenyuan Yang, 2022-2024)

- Wenbo Li 李文博 (Joint with Zhiqiang Li and Wenyuan Yang, 2022-2025)

- Baoju Wu 吴保君 (Joint with Xin Sun, 2023-2025)

Teaching Experience at Peking University

- Advanced Probability 高等概率论: Fall 2020, Fall 2021, Fall 2022, Fall 2023.

- Probability Theory 概率论: Spring 2023, Spring 2024.

- Probability and Statistics B 概率统计 B: Spring 2021, Spring 2022.

- Topics in Stochastic Processes II 随机过程选讲 II: Spring 2020.

Selected Talks

12/2024		"Workshop on Probability and Mathematical Physics in Gimhae 2024", Busan, Korea
12/2024		"Geometry of Random Fields and Random Walk Clusters", Oberwolfach, Germany
07/2024		"Two-dimensional random geometry", Chicago, USA
05/2024		"Random Walks, Scaling Limits and Criticality", Herrsching, Germany
05/2024		NYU-Shanghai-Kyoto University Workshop on Probability, Kyoto, Japan
12/2023	*	"Random Interacting Systems, Scaling Limits, and Universality", Singapore
06/2023		"Random Conformal Geometry and Related Fields", Jeju, South Korea
10/2022	*	Mini-course on random interlacements, Chinese Academy of Science
05/2023		"Directions in aggregation processes", Haifa, Israel
05/2022	*	Beijing-Saint Petersburg Mathematics Colloquium
02/2022	*	"Random Geometry and Statistical Physics" Webinar
08/2021		Annual meeting in Probability Theory, Weihai, China.
07/2021	*	10th Bernoulli-IMS 10th World Congress, Seoul, Korea
01/2020		Mini-course on loop soups and loop-erased random walk, NUS, Singapore
12/2019		Probability Symposium, Yokohama, Japan
11/2019		Annual meeting of Chinese Mathematical Society, Foshan, China
07/2019		Seasonal Institute of Mathematical Society of Japan, Kyushu, Japan
08/2018		"Random Walks in Correlated and Dynamic Environments", College Station, USA
12/2015		CMS Winter Meeting, Montreal, Canada
06/2014		"School and Workshop on Random Interacting Systems", Bath, UK

An * indicates the talk is online.

Service

- Chief organizer of "Critical Exponents, Scaling Limits and Universality: Challenges from Statistical Physics", Shanghai (04/2025).

- Chief organizer of "Summer Probability Symposium", Beijing. (07/2024).

- Co-organizer of

  - "Random explorations", Chicago. (07/2026)

  - "Masterclass on Statistical Physics", Beijing. (03/2024)

  - "Fall School on Probability IV", Beijing. (12/2023)

  - "Fall School on Probability III", Beijing. (12/2023)

  - "Fall School on Probability II", Beijing. (11/2023)

  - "International Conference on Probability and Stochastic Analysis", Beijing. (10/2023)

  - "Fall School on Probability I" (10/2023), Beijing.

  - "Summer School on Applied Probability and Statistics", Beijing. (08/2023)

  - "Masterclass on random geometry", Beijing. (07/2023)

  - "Summer School on Probability", Beijing. (06/2023)

- Referee for the following journals: *J. Eur. Math. Soc.*, *Ann. Probab.*, *Comm. Math. Phys.*, *Ann. Inn. H. Poincaé, Probab. Stat.*, *Electron. J. Probab.* and *Stoch. Proc. Appl.*.

- Reviewer of *MathSciNet* of the American Mathematical Society.

- Advisor of Math Major Class 7 of 2026.

Languages

Chinese:	native
English:	fluent (written and spoken)
French:	intermediate (spoken) to fluent (written)
German:	intermediate (written and spoken)
Japanese:	intermediate (spoken and written)