

Jaehun Lee

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Research Interests

Probability, Statistics, Combinatorics, Mathematical Physics, Applications

random matrices, random graphs and related fields

Employment

University of Hong Kong (HKU)

Postdoctoral Fellow, Department of Mathematics, Mentor: Zhigang Bao
(Relocation due to the mentor, Zhigang Bao's relocation)

Feb 2025 – Current

City University of Hong Kong (CityU)

Postdoctoral Fellow, Department of Mathematics, Mentor: Yukun He
(Temporary relocation due to the mentor, Zhigang Bao's relocation)

Aug 2024 – Jan 2025

Hong Kong University of Science and Technology (HKUST)

Postdoctoral Fellow, Department of Mathematics, Mentor: Zhigang Bao

Sept 2022 – Jul 2024

Education

Korea Advanced Institute of Science and Technology (KAIST)

Ph.D. in Mathematical Sciences, Advisors: Paul Jung and Ji Oon Lee

2018–2022

M.S. in Mathematical Sciences, Advisor: Paul Jung

2016–2018

Gwangju Institute of Science and Technology (GIST)

B.S. in Physics

2011–2015

Publications

- [1] Phase transition for the bottom singular vector of rectangular random matrices, with Zhigang Bao and Xiaocong Xu, submitted.
Preprint – [arXiv:2409.01819](https://arxiv.org/abs/2409.01819)
- [2] Phase transition for the smallest eigenvalue of covariance matrices, with Zhigang Bao and Xiaocong Xu, *Probability Theory and Related Fields*, 2024.
DOI – [10.1007/s00440-024-01298-w](https://doi.org/10.1007/s00440-024-01298-w)
- [3] Extremal spectral behavior of weighted random d -regular graphs, with Kyeongsik Nam, *Annales de l'Institut Henri Poincaré, Probabilités et Statistiques*, to appear.
Preprint – [arXiv:2306.03479](https://arxiv.org/abs/2306.03479)
- [4] Higher order fluctuations of extremal eigenvalues of sparse random matrices, *Annales de l'Institut Henri Poincaré, Probabilités et Statistiques*, 2024.
DOI – [10.1214/23-AIHP1398](https://doi.org/10.1214/23-AIHP1398)
- [5] Noise sensitivity for the top eigenvector of a sparse random matrix, with Charles Bordenave, *Electronic Journal of Probability* 27, no. 49, 1–50, 2022.
DOI – [10.1214/22-EJP770](https://doi.org/10.1214/22-EJP770)

- [6] Delocalization and limiting spectral distribution of Erdős-Rényi graphs with constant expected degree, with Paul Jung, *Electronic Communications in Probability* 23, no. 92, 1–13, 2018.
DOI – [10.1214/18-ECP198](https://doi.org/10.1214/18-ECP198)

Talks

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| [1] Probability Summer School in Korea 2025, Sokcho
<i>Invited talk</i> | Jun 2025 |
| [2] Institute of Science and Technology Austria (ISTA)
<i>Invited talk</i> | Jan 2025 |
| [3] Probability and Statistical Physics, Tsinghua Sanya International Mathematics Forum (TSIMF)
<i>Invited talk</i> | Jan 2025 |
| [4] XX Brunel-Bielefeld Workshop on Random Matrix Theory, Brunel University London
<i>Poster presentation</i> | Dec 2024 |
| [5] HKMS-HKSIAM Joint Young Scholars Symposium, University of Hong Kong
<i>Invited talk</i> | Nov 2024 |
| [6] Bernoulli-IMS 11th World Congress in Probability and Statistics, Ruhr University Bochum
<i>Contributed talk</i> | Aug 2024 |
| [7] Bielefeld-Melbourne-Seoul Random Matrix Theory Seminar, Online
<i>Invited talk</i> | Feb 2024 |
| [8] Probability Workshop in Korea 2024, Sokcho
<i>Invited talk</i> | Jan 2024 |
| [9] 2024 Winter International Conference on Mathematics and Its Applications, Chungnam National Univeristy, Online
<i>Invited talk</i> | Jan 2024 |
| [10] GIST College Colloquium, Online
<i>Invited talk</i> | Nov 2023 |
| [11] Spring Meeting of the Korean Mathematical Society, Daejeon Convention Center, Daejeon
<i>Invited talk</i> | Apr 2023 |
| [12] Probability Workshop in Korea 2022, Jeongseon
<i>Invited talk</i> | Dec 2022 |
| [13] Conference in honour of Yan Fyodorov's 60th birthday (Random Matrices and Random Landscapes), Congressi Stefano Franscini, Ascona
<i>Poster presentation and short talk (Best Poster Award)</i> | Jul 2022 |
| [14] KAIST Math Graduate Seminar, Online
<i>Invited talk</i> | May 2022 |
| [15] Annual Meeting of the Korean Mathematical Society, Online
<i>Contributed talk</i> | Oct 2021 |

- [16] Connections and Introductory Workshop: Universality and Integrability
in Random Matrix Theory and Interacting Particle Systems Part 2, MSRI, Berkeley, Online Sept 2021
Participant presentation session
- [17] KL-SNU-KAIST Workshop on Stochastics, Online Dec 2020
Invited talk
- [18] Annual Meeting of the Korean Mathematical Society, Online Oct 2020
Contributed talk
- [19] Annual Meeting of the Korean Mathematical Society, Hongik University, Seoul Oct 2019
Contributed talk
- [20] Spring Meeting of the Korean Mathematical Society, Kyung Hee University, Seoul Apr 2018
Contributed talk

Teaching

HKUST

Course Instructor

Calculus II Spring 2024

KAIST

Teaching Assistant

Functional Analysis (voluntary) Fall 2020
Differential Equations and Applications, Analysis I Spring 2019
Introduction to Linear Algebra, Analysis II Fall 2018
Calculus II Spring 2018
Calculus II, Functional Analysis (voluntary) Fall 2017
Introduction to Linear Algebra, Analysis I Spring 2017
Introduction to Linear Algebra, Applied Mathematics and Modeling (voluntary) Fall 2016
Introduction to Linear Algebra, Linear Algebra Spring 2016

Other experience

Assistant, Bridge Program: College Mathematics (preliminaries) Jan 2019–Mar 2019
Counseling Assistant, KAIST Academic Counseling Center Sept 2019–Feb 2022

Honors

Research Travel Grant, HKUST 2023–2024
National Scholarship (Ph.D. support), KAIST 2018–2022
Kim Yeonghan Global Leader Fellowship, KAIST 2017–2018
National Scholarship (M.S. support), KAIST 2018–2022
Silver Medal (2nd field), Undergraduate Mathematics Competition, Korean Mathematical Society 2014

National Scholarship for Science and Engineering (B.S. support), Korea Student Aid Foundation	2011–2015
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Teaching awards

Outstanding Teaching Assistant, KAIST	Spring 2019
Outstanding Teaching Assistant, KAIST	Fall 2018
Outstanding Teaching Assistant, KAIST	Spring 2017
Outstanding Teaching Assistant, KAIST	Fall 2016

Service

Reviewer for *Ann. Probab.*, *Electron. Commun. Probab.* and *Bull. Korean Math. Soc.*.

Technical research personnel (alternative to military service, Sept 2019 –Aug 2022)

Academic Travel

Ramada Sokcho By Wyndham <i>Probability Summer School in Korea 2025</i>	Jun 2025
Institute of Science and Technology Austria (ISTA) <i>Invited Talk</i>	Jan 2025
Tsinghua Sanya International Mathematics Forum (TSIMF) <i>Probability and Statistical Physics</i>	Jan 2025
Brunel University London <i>XX Brunel-Bielefeld Workshop on Random Matrix Theory</i>	Dec 2024
Hausdorff Center for Mathematics, University of Bonn <i>Hausdorff School: Recent developments in disordered systems</i>	Sept 2024
Ruhr University Bochum <i>Bernoulli-IMS 11th World Congress in Probability and Statistics</i>	Aug 2024
Lotte Resort Sokcho <i>Probability Workshop in Korea 2024</i>	Jan 2024
Daejeon Convention Center <i>Spring Meeting of the Korean Mathematical Society</i>	Apr 2023
KAIST, Daejeon <i>Research stay</i>	Dec 2022
Jeongseon High1 Resort <i>Probability Workshop in Korea 2022</i>	Dec 2022
Congressi Stefano Franscini, Ascona <i>Conference in honour of Yan Fyodorov's 60th birthday (Random Matrices and Random Landscapes)</i>	July 2022
HKUST, Hong Kong <i>Research stay</i>	July 2022
Jeju Shinhwa World Marriott Resort <i>Conference in honor of S. R. S. Varadhan's 80th birthday</i>	Jun 2022
Centre International de Rencontres Mathématiques (CIRM), Marseille <i>Conference (Spectra, algorithms and random walks on random networks) and research stay</i>	Jan 2020
University of Michigan, Ann Arbor <i>Summer school on Random Matrices</i>	Jun 2018