# Zhipeng Liu

Department of Mathematics
University of Kansas
526 Snow Hall
1460 Jayhawk Blvd. Lawrence, KS 66045

Phone: (785) 864 3018
Email: zhipeng@ku.edu
https://zhipengliu.ku.edu

**Education**

Ph.D. Mathematics, University of Michigan, 2014

M.S. Mathematics, Peking University, 2008

B.A. Mathematics, Peking University, 2004

**Professional experience**

Associate Professor, Department of Mathematics, University of Kansas, 2021-

(Interim) Associate Chair & Director of Undergraduate Studies, Department of Mathematics, University of Kansas, (2022-2023) 2023-

Research member, Mathematical Sciences Research Institute (MSRI), October 2021.

Assistant Professor, Department of Mathematics, University of Kansas, 2017-2021.

Courant Instructor, Courant Institute of Mathematical Sciences, New York University, 2014-2017.

**In Preparation**

1. Random melting skew Young diagram.

2. Pinched-up periodic KPZ fixed point, with Jinho Baik

3. A conditional law of the KPZ fixed point, with Ray Zhang

**Submitted**

1. A conditional scaling limit of the KPZ fixed point with height tending to infinity at one location (with Yizao Wang), arXiv:2208.12215.

**Publications**

1. When the geodesic becomes rigid in the directed landscape, *Electron. Commun. Probab.*, 27: 1-13, 2022.

2. One point distribution of the geodesic in directed last passage percolation, *Probab. Theory Related Fields*, 184: 425-491, 2022.

3. Limiting one-point distribution of periodic TASEP (with Jinho Baik and Guilherme Silva), *Ann. Inst. H. Poincaré B.* Volume 81, Number 1, 248–302, 2022.

4. Multi-point distribution of TASEP, 63 pages, *Ann. Probab*, Volume 50, Number 4, 1255–1321, 2022.

5. Multi-point distribution of periodic TASEP with general initial conditions (with Jinho Baik), *Probab. Theory Relat. Fields*, 179:1047–1144, 2021.

6. Integral formulas of ASEP and q-TAZRP on a ring (with Axel Saenz and Dong Wang), *Commun. Math. Phys*, 379: 261–325, 2020.

7. Multipoint distribution of periodic TASEP (with Jinho Baik), *J. Amer. Math. Soc.*, Volume 32, Number 3, 609–674, 2019.

8. Height fluctuations of stationary TASEP on a ring in relaxation time scale, *Ann. Inst. H. Poincaré B.* Volume 54, Number 2, 1031–1057, 2018.

9. TASEP on a ring in sub-relaxation time scale (with Jinho Baik), *J. Stat. Phys* 165(6), 1051–2085, 2016.

10. Fluctuations of TASEP on a ring in relaxation time scale (with Jinho Baik), *Comm. Pure Appl. Math.*, Vol. 71, Issue 4, 0747–0813, 2018.

11. Fluctuations of TASEP and LPP with general initial data (with Ivan Corwin and Dong Wang), *Ann. Appl. Probab.*, Vol. 26, Number 4, 2030–2082, 2016.

12. On the average of the Airy process and its time reversal (with Jinho Baik), *Elect. Comm. in Probab.*, 18, no.89, 1–10, 2013.

13. Discrete Toeplitz/Hankel determinants and the width of non-intersecting processes (with Jinho Baik), *Int. Math. Res. Not.*, Vol. 2014, Issue 20, 5737–5768, 2014.

**Dissertation**

Discrete Toeplitz determinants and their applications, May 2014.

**Grants**

Department endowment funds, $30,000, 2023-2026.

NSF DMS-2246683, $296,885, Jul 2023 - Jun 2026 ("Highly Recommended" category).

NSF DMS-1953687, $168,627, Jul 2020 - Jun 2024 ("Highly Recommended" category).

Simons Collaboration Grant No. 637861, $42,000, Sep 2019 - Aug 2024 (Only awarded $8,400 due to receiving the NSF grant.)

KU New Faculty Research Grants, $8,000, May 2018 - May 2021.

KU Start up funding, $30,000, Aug 2017 - Jun 2021.

**Honors and Awards**

Max Wells Teaching Award, 2022-2023
Gold Medal in $41^{st}$ International Mathematical Olympaid (IMO), 2000

**Teaching experience**

- University of Kansas

| | |
|---|---|
| Fall 2023 | Math 866: Stochastic Process II |
| Spring 2023 | Math 728: Statistical Theory |
| | Math 993: Readings in Mathematics |
| Fall 2022 | Math 727: Probability Theory |
| | Math 993: Readings in Mathematics |
| Spring 2022 | Math 526: Applied Mathematical Statistics I |
| | Math 993: Readings in Mathematics |
| Fall 2021 | Math 526: Applied Mathematical Statistics I (2 sections) |
| | Math 993: Readings in Mathematics |
| Summer 2021 | Math 993: Readings in Mathematics |
| Spring 2021 | Math 526: Applied Mathematical Statistics I |
| | Math 993: Readings in Mathematics |
| Fall 2020 | Math 220: Applied differential equations (2 sections) |
| Spring 2020 | Math 728: Statistical Theory |
| Fall 2019 | Math 526: Applied Mathematical Statistics I |
| | Math 866: Stochastic Process II |
| Spring 2019 | Math 996: Integrable Probability |

| | |
|---|---|
| | Math 699: Directed Reading |
| Fall 2018 | Math 727: Probability Theory |
| Summer 2018 | Math 699: Directed Reading |
| Spring 2018 | Math 526: Applied Mathematical Statistics I |
| Fall 2017 | Math 526: Applied Mathematical Statistics I |

- New York University
  Fall 2014 Discrete Math, Spring 2015 Discrete Math, Fall 2015 Linear Algebra,
  Spring 2016 Discrete Math, Fall 2016 Calculus I, Spring 2017 Linear Algebra
- University of Michigan
  Fall 2008 Math Lab, Fall 2009 Math 105: Data, Functions, and Graphs
  Winter 2012 Math 115: Calculus I, Fall 2012 Math Lab

**Organizing conference**

Organizer of a contributed session "Kardar-Parisi-Zhang universality class: properties and limit theorems" in the 42nd conference on Stochastic Processes and their Applications, 6/27/2022-7/1/2022, hybrid (international).

**Conference talks**

10/2/2023-10/6/2023, The Asymmetric Simple Exclusion Process, Simons Center for Geometry and Physics, Stony Brook University.

8/2/2023-8/5/2023, PKU Mathematics Forum. Beijing, China.

7/10/2023-7/14/2023, Probability and Algebra: New Expressions in Mathematics. Texas A&M University.

4/29/2023-5/1/2023, The Second International Conference for Chinese Young Probability Scholars, hybrid, Xiangtan, Hunan, China.

4/15/2023, 2023 AMS Spring Central Sectional Meeting, Cincinnati, OH.

6/30/2022, 42nd conference on Stochastic Processes and their applications, hybrid.

6/27/2022, 2022 Annual Meeting of the Institute of Mathematical Statistics, London.

5/9/2022, Random Matrix EurAsia, Institute for Mathematical Sciences, National University of Singapore.

10/19/2021, MSRI workshop "Integrable structures in random matrix theory and beyond", MSRI, Berkeley.

10/1/2021, The First International Conference for Chinese Young Probability Scholars, hybrid, Xiangtan, Hunan, China.

7/27/2018, XIX International Congress on Mathematical Physics (contributed talk), Montréal.

6/14/2018, Hangzhou Conference of Probability and Statistics, Zhejiang University.

5/18/2018, Integrable Probability Boston Conference, MIT.

4/14/2018, AMS sectional meeting, Vanderbilt University.

11/4/2017, AMS sectional meeting, UC Riverside.

6/25/2017, PCMI summer sessions, Park City, Utah.

11/18/2016, 15th Northeast Probability Seminar, Baruch Colelge CUNY.

9/15/2016, Cargèse school on Quantum integrable systems, conformal field theories and stochastic processes, Institut d'Études Scientifiques de Cargèse, France.

5/10/2016, Frontier probability days, University of Utah.

3/1/2016, KITP program "New approaches to non-equilibrium and random systems: KPZ integrability, universality, applications and experiments", UCSB.

11/15/2015, AMS sectional meeting, Rutgers University.

6/2/2015, 13th International Symposium on Orthogonal Polynomials, Special Functions and Applications, NIST, Gaithersburg, MD.

11/21/2014, 13th Northeast Probability Seminar, Columbia University.

**Seminar/colloquium talks**

3/16/2023, Hua Luogeng Youth Forum in Applied Mathematics, Institute of Applied Mathematics, Chinese Academy of Science.

3/13/2023, integrable systems and random matrix theory seminar, University of Michigan.

3/4/2023, probability seminar, Zhejiang University.

4/27/2022, probability seminar, University of Maryland.

3/7/2022, analysis seminar, University of Wyoming.

2/4/2022, stochastic seminar, University of Utah, online.

2/3/2022, probability seminar, University of Wisconsin (Madison), online.

10/11/2021, probability seminar, University of Washington (Seattle), online.

9/22/2021, Probability and Statistics seminar, University of Kansas, online.

9/21/2021, Random Matrix Theory seminar, KTH Royal Institute of Technology, online.

9/19/2021, probability seminar, Zhejiang University, online.

10/23/2020, probability seminar, Durham University, online.

10/19/2020, analysis seminar, University of Oklahoma, online.

3/13/2020, probability seminar, NYU (canceled)

5/16/2019, probability seminar, Wuhan University.

9/17/2018, probability seminar, University of Michigan.

6/4/2018, frontier research lecture series, University of Science and Technology of China.

3/19/2018, probability seminar, University of Toronto.

10/4/2017, probability and statistics seminar, University of Kansas.

4/26/2017, probability and statistics seminar, University of Kansas.

4/12/2017, probability seminar, University of Virginia.

3/20/2017, probability and computational finance seminar, Carnegie Mellon University.

1/31/2017, colloquium, University of Kansas.

1/18/2017, mathematical physics and probability seminar, University of Arizona.

12/2/2016, probability seminar, University of Cincinnati.

12/16/2016, NYC Integrable Probability Working Group, Columbia University.

11/30/2016, colloquium, Purdue University.

11/21/2016, probability seminar, University of Minnesota.

12/11/2015, probability and mathematical physics seminar, New York University.

10/3/2014, NYU Courant Instructor Day, New York University.

**Academic visits**

10/01/2021-11/02/2021 Research member, MSRI, Berkeley, CA

6/17/2019-6/20/2019 University of Michigan

5/25/2019-5/27/2019 Zhejiang University

5/20/2018-6/2/2018 Columbia University

7/20/2015-7/22/2015 University of Michigan

**Department/University Services**

- Associate Chair & Director of Undergraduate Studies (7/1/2023-now)
- Interim Associate Chair & Director of Undergraduate Studies (7/1/2022-6/30/2023)
- Chairing the Teaching Faculty Evaluation Committee (2022-2023)
- Chairing the Teaching Awards Committee (2022-2023)
- Chairing the Lower division Committee of Undergraduate Studies (2022-2023)
- Chairing Transfer Credit Evaluation Committee (2022-2023)
- Chairing the Panels for Academic Misconduct (2022-2023)
- Chaired the Putnam competition committee at KU (2019 Fall-2022 Spring): Coordinated the online Putnam competition and providing training sessions.
- Organizing the probability and statistics seminar at KU (since 2018 Fall).
- Supervising two PhD students.
- On the PhD committees for Yiying Cheng, Raul Bolanos, Amanda Wilkens, Sefika Kuzgun, Yuchen Liao (University of Michigan), Mehmet Yenisey, Nick Ma, Panqiu Xia, Yanhao Cui, Bhargobiyoti Saikia, Arturo Jaramillo Gil, Wenjun Ma, Hongjuan Zhou.
- Representative for the math department at the STEM Learning Center (until 2020 fall when it is closed): Organized and participated in various local events to advertise and recruit students.
- Participated in KU Mathematics and Statistics Awareness Month (MSAM) events: Proposed problems for KU MSAM math competition, visited the Governor Laura Kelly for proclamation for the MSAM.
- Services in various committees at the department: Chair Search Committee, Tenure-Track Assistant Professor Search Committee in Combinatorics, Kansas Collegiate Math Competition committee, teaching award committee, honor committee for undergraduates, computer advisory committee, etc.

**Scholarly Services**

Proposal reviewer for KU Research Grant Opportunity (KU Research GO) program.

Proposal reviewer for Science and Technology Facilities Council, UKRI (United Kingdom Research and Innovation).

Panelist of NSF (National Science Foundation).

Reviewer for:

Adv. in Appl. Math. (Advances in Applied Mathematics)

ALEA Lat. Am. J. Probab. Math. Stat. (ALEA-Latin American Journal of Probability and Mathematical Statistics)

AMJCU (Applied Mathematics-A Journal of Chinese Universities)

Ann. Appl. Probab (Annals of Applied Probability)

Ann. Inst. H. Poincaré B. (Annales de l′Institut Henri Poincaré)

Ann. Probab (Annals of Probability)

Electron. J. Probab. (Electronic Journal of Probability)

J. Phys. A (Journal of Physics A: Mathematical and Theoretical)

J. Stat. Phys (Journal of Statistical Physics)

Math. Phys. Anal. Geom. (Mathematical Physics, Analysis and Geometry)

Probab. Theory Related Fields (Probability Theory and Related Fields)

SciPost Physics

SIGMA Symmetry Integrability Geom. Methods Appl. (Symmetry, Integrability and Geometry: Methods and Applications).

Reviewer for MathSciNet.