

# Zhipeng Liu

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

Phone: (785) 864 3018  
Email: [zhipeng@ku.edu](mailto:zhipeng@ku.edu)  
<https://zhipengliu.ku.edu>

## Education

Ph.D. Mathematics, University of Michigan, 2014  
M.A. Mathematics, Peking University, 2008  
B.S. Mathematics, Peking University, 2004

## Employment

Assistant Professor, Department of Mathematics, University of Kansas, 2017-current.  
Courant Instructor, Courant Institute of Mathematical Sciences, New York University, 2014-2017.

## Submitted

1. Limiting one-point distribution of periodic TASEP (with Jinho Baik and Guilherme Silva), 64 pages, arXiv:2008.07024.
2. Multi-time distribution of TASEP, 60 pages, arXiv:1907.09876.

## In revision

1. Multi-point distribution of periodic TASEP with general initial conditions (with Jinho Baik), 75 pages, arXiv.1912.10143.

## Publications

1. Integral formulas of ASEP and q-TAZRP on a ring (with Axel Saenz and Dong Wang), 59 pages, *Commun. Math. Phys.*, online first, 2020.
2. Multipoint distribution of periodic TASEP (with Jinho Baik), *J. Amer. Math. Soc.*, Volume 32, Number 3, 609-674, 2019.
3. Height fluctuations of stationary TASEP on a ring in relaxation time scale, *Ann. Inst. H. Poincaré B*. Volume 54, Number 2, 1031-1057, 2018.
4. TASEP on a ring in sub-relaxation time scale (with Jinho Baik), *J. Stat. Phys* 165(6), 1051-2085, 2016.
5. Fluctuations of TASEP on a ring in relaxation time scale (with Jinho Baik), *Comm. Pure Appl. Math.*, Vol. 71, Issue 4, 0747-0813, 2018.
6. 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.
7. On the average of the Airy process and its time reversal (with Jinho Baik), *Elect. Comm. in Probab.*, 18, no.89, 1-10, 2013.
8. 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

NSF DMS-1953687, \$168,627, Jul 2020 - Jun 2023

Simons Collaboration Grant No. 637861, \$42,000, Sep 2019 - Aug 2024 (Initially awarded to 2024 but ended in 2020 when I received the NSF grant.)

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

## Other funding

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

## Honors and Awards

Gold Medal in 41<sup>st</sup> International Mathematical Olympiad (IMO), 2000

## Teaching experience

- University of Kansas
  - 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.
- 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

## Conference talks

12/?/2020, Random Matrix EurAsia, Institute for Mathematical Sciences, National University of Singapore. (Invited.)

7/27/2018, XIX International Congress on Mathematical Physics (contributed talk), Montréal.  
*Multipoint distribution of periodic TASEP*

6/14/2018, Hangzhou Conference of Probability and Statistics, Zhejiang University.  
*Multipoint distribution of periodic TASEP*

5/18/2018, Integrable Probability Boston Conference, MIT.  
*Multipoint distribution of periodic TASEP with general initial condition*

4/14/2018, AMS sectional meeting, Vanderbilt University.  
*Multipoint distribution of periodic TASEP with general initial condition*

11/4/2017, AMS sectional meeting, UC Riverside.  
*Multipoint distribution of periodic TASEP*

6/25/2017, PCMI summer sessions, Park City, Utah.  
*TASEP on a ring in relaxation time scale*

11/18/2016, 15th Northeast Probability Seminar, Baruch College CUNY.  
*TASEP on a ring in relaxation time scale*

9/15/2016, Cargèse school on Quantum integrable systems, conformal field theories and stochastic processes, Institut d'Études Scientifiques de Cargèse, France.  
*Fluctuations of TASEP on a ring with flat and step initial conditions*

5/10/2016, Frontier probability days, University of Utah.  
*Fluctuations of TASEP on a ring in the relaxation time scale*

3/1/2016, KITP program "New approaches to non-equilibrium and random systems: KPZ integrability, universality, applications and experiments", UCSB.  
*One point fluctuations of periodic TASEP with step and flat initial conditions*

11/15/2015, AMS sectional meeting, Rutgers University. *Asymptotics in periodic TASEP with step initial condition*

6/2/2015, 13th International Symposium on Orthogonal Polynomials, Special Functions and Applications, NIST, Gaithersburg, MD.  
*Discrete Toeplitz determinants and their applications*

11/21/2014, 13th Northeast Probability Seminar, Columbia University.  
*Fluctuations of TASEP and LPP with general initial data*

#### **Seminar/colloquium talks**

5/16/2019, probability seminar, Wuhan University.  
*Multipoint distribution of periodic TASEP*

9/17/2018, probability seminar, University of Michigan.  
*Multipoint distribution of periodic TASEP with general initial condition*

6/4/2018, frontier research lecture series, University of Science and Technology of China.  
*Multipoint distribution of periodic TASEP*

3/19/2018, probability seminar, University of Toronto.  
*Multipoint distribution of periodic TASEP with general initial condition*

10/4/2017, probability and statistics seminar, University of Kansas.  
*Discrete Toeplitz determinants and their applications*

4/26/2017, probability and statistics seminar, University of Kansas.  
*Multipoint distribution of periodic TASEP*

4/12/2017, probability seminar, University of Virginia.  
*TASEP on a ring in relaxation time scale*

3/20/2017, probability and computational finance seminar, Carnegie Mellon University.  
*TASEP on a ring in relaxation time scale*

1/31/2017, colloquium, University of Kansas.  
*TASEP on a ring in relaxation time scale*

1/18/2017, mathematical physics and probability seminar, University of Arizona.  
*TASEP on a ring in relaxation time scale*

12/2/2016, probability seminar, University of Cincinnati.  
*TASEP on a ring in relaxation time scale*

12/16/2016, NYC Integrable Probability Working Group, Columbia University.  
*TASEP on a ring in relaxation time scale*

11/30/2016, colloquium, Purdue University.  
*TASEP on a ring in relaxation time scale*

11/21/2016, probability seminar, University of Minnesota.  
*TASEP on a ring in relaxation time scale*

12/11/2015, probability and mathematical physics seminar, New York University.  
*Asymptotics in periodic TASEP with step initial condition*

10/3/2014, NYU Courant Instructor Day, New York University.  
*Discrete Toeplitz determinants and their applications*

#### **Conferences/workshops attended (without giving talks)**

4/27/2020, online Conference on Statistical Mechanics, Integrable Systems and Probability.

6/3/2019, Virginia Integrable Probability Summer School.

7/20/2018, ICMP Young Researchers Symposium, Montréal.

10/27/2017, integrable probability group first FRG meeting, Columbia University.

6/17/2013, Workshop on random matrices and applications, University of Michigan.

6/18/2012, IMA workshop on advances in random matrix theory, University of Minnesota.

12/6/2010, MSRI workshop II on random matrix theory and its applications, MSRI, Berkeley.

9/13/2010, MSRI workshop I on random matrix theory and its applications, MSRI, Berkeley.

7/6/2010, workshop on orthogonal polynomials in probability theory, TAMU.

7/6/2009, workshop on random matrix theory, MSRI, Berkeley.

#### **Academic visits (without giving talks)**

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

#### **Hosting visitors at KU**

11/18/2019-11/22/2019, Guilherme Silva, University of Michigan

9/24/2019-9/26/2019, Xuan Wu, Columbia University

2/28/2019-3/2/2019, Leonid Petrov, University of Virginia

2/20/2019-2/22/2019, Sunder Sethuraman, University of Arizona

11/27/2018-11/29/2018, Yizao Wang, University of Cincinnati

10/10/2018-10/12/2018, Promit Ghosal, Columbia University

4/24/2018-4/28/2018, Axel Saenz, University of Virginia

11/15/2017-11/17/2017, Jinho Baik, University of Michigan

11/09/2017-11/11/2017 Guillaume Barraquand, Columbia University

### **Services at KU in the 2019-2020 academic year**

- Chair the Putnam competition committee: organizing the coaching sessions; coaching one session; coordinating the exam.
- Service on the committee of Kansas Collegiate Math Competition.
- Service in charge of STEM Learning Liaison for the math department.
- Organized the probability seminar at KU and invited four speakers from Columbia University, University of Michigan, University of Pennsylvania and Princeton University.
- Preliminary Exam Committee: Mehmet Yenisey.
- Preliminary Exam Committee: Sefika Kuzgun.
- Comprehensive Oral Exam Committee: Nick Ma.
- Comprehensive Oral Exam Committee: Yiyang Cheng.
- Comprehensive Oral Exam Committee: Panqiu Xia.
- Final Oral Exam Committee: Nick Ma.
- Final Oral Exam Committee: Panqiu Xia.
- Final Oral Exam Committee: Yanhao Cui.
- Representing the math department at the 3rd Annual Crimson and Blue Day majors fair.
- Service on Probability/Statistics Qualifying Exams each semester.

### **Services at KU in the 2018-2019 academic year**

- Service in Putnam competition committee and coaching one session.
- Service in charge of STEM Learning Liaison for the math department.
- Co-organized the probability seminar at KU and invited three speakers from Columbia University, University of Cincinnati and University of Arizona.
- Preliminary Exam Committee: Raul Bolanos Guerrero.
- Preliminary Exam Committee: Bhargobjyoti Saikia.
- Guest speaker for Math 145 classes: Relations between probability theory and integrals.
- Service in KU MSAM Math Competition committee: proposing exam problems
- Service in Undergraduate studies: Honors.
- Service on Probability/Statistics Qualifying Exams each semester.
- GTA evaluations for Benjamin Gershon and Wesley Perkins.
- Referee for students: Kai Dong and Ben Gershon.
- Volunteer for 2018 Sneak Peek Event: One-to-One meeting with students.
- Volunteer for 2019 Graduate recruitment event: Driving students from hotel to department.
- Math department table at the STEM Counseling for Success, KU Edwards: Organized the participation of our department, prepared handouts for high school teachers and potential students, spent half day at KU Edwards introducing our department.
- STEM recruiting at the First Robotics Competition (three events): Organizing the participation of our department, preparing handouts/gifts for potential students, inviting volunteers from our department.
- Proclamation for the Mathematics and Statistics Awareness Month: visiting the Governor Laura Kelly, March 29th.

### Services at KU in the 2017-2018 academic year

- Service in Putnam competition committee and coaching one session.
- Center for STEM Learning Liaison: One hour per-week committee meeting in Fall 2017. One hour bi-week committee meeting in Spring 2018.
- Co-organized the probability seminar at KU and invited three speakers from University of Michigan, Columbia University and University of Virginia.
- Volunteer for Math Awareness Month competition, 2018: Proctoring/grading/meeting/Awards ceremony.
- Volunteer for 2017 Sneak Peek Event: Driving students from hotel to department.
- Comprehensive Oral Exam Committee: Arturo Jaramillo Gil.
- Final Oral Exam Committee: Arturo Jaramillo Gil.
- Comprehensive Oral Exam Committee: Wenjun Ma.
- Final Oral Exam Committee: Wenjun Ma.
- Comprehensive Oral Exam Committee: Yanhao Cui.
- Comprehensive Oral Exam Committee: Hongjuan Zhou.
- Final Oral Exam Committee: Hongjuan Zhou.
- Math department table at the STEM Counseling for Success, KU Edwards: Organized the participation of our department, prepared handouts for high school teachers and potential students, spent half day at KU Edwards introducing our department.
- STEM recruiting at the First Robotics Competition, Kansas city: Organized the participation of our department, prepared handouts for potential students, spent half day at the competition in KC.
- Service on Probability/Statistics Qualifying Exams each semester: Grading and meetings.

### Scholarly Service

Reviewer for:

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

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)

Risk and Decision Analysis

SciPost Physics

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

Reviewer for MathSciNet.

**Other activities**

Served as an examination committee member of the 22nd and 23rd Chinese Mathematical Olympiad (CMO)<sup>1</sup> in 2007 and 2008.

Problem provider for the 22nd CMO in 2007, the China Team Selection Test for the 59th IMO in 2018 and the 60th IMO in 2019<sup>2</sup>.

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<sup>1</sup>CMO is the highest level of mathematical olympiad in China.

<sup>2</sup>China Team Selection Test is a combination of four exams which choose the China IMO team from the CMO medalists.