

Li-Cheng Tsai

Curriculum Vitae

Department of Mathematics, Columbia University
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POSITIONS

Columbia University, August 2016–
Junior Fellow of the Simons Society of Fellows
Postdoctoral Research Scientist

EDUCATION

Stanford University
Ph.D. Mathematics, June 2016
Thesis advisor: Amir Dembo
Academia Sinica, Taipei, Taiwan
Research Trainee, 2010–2011
Mentor: Tai-Ping Liu
National Taiwan University
B.S. Physics, minor in Mathematics, June 2009

AWARDS

2017 NSF grants: [DMS-1712575](#)
2016 Junior Fellow, Simons Society of Fellows
2015 Graduate Fellow, Kavli Institute for Theoretical Physics

RESEARCH INTERESTS

Asymptotic behaviors of interacting particle systems, with a focus on their interplay between partial differential equations, stochastic partial differential equations, and integrability.

PUBLICATIONS

- 2018 [19] Li-Cheng Tsai. Exact lower tail large deviations of the KPZ equation. *Submitted*. [arXiv:1809.03410](#)
- [18] Hao Shen and Li-Cheng Tsai. Stochastic Telegraph Equation Limit for the Stochastic Six Vertex Model. *Submitted*. [arXiv:1807.04678](#)
- [17] Ivan Corwin and Li-Cheng Tsai. SPDE Limit of Weakly Inhomogeneous ASEP. *Submitted*. [arXiv:1806.09682](#)

- [16] Ivan Corwin, Promit Ghosal, Alexandre Krajenbrink, Pierre Le Doussal, and Li-Cheng Tsai. Coulomb-gas electrostatics controls large fluctuations of the KPZ equation. *Phys. Rev. Lett.* **121**, 060201
- [15] Ivan Corwin, Promit Ghosal, Hao Shen, and Li-Cheng Tsai. Stochastic PDE Limit of the Six Vertex Model. *Submitted*. [*arXiv:1803.08120*](#)
- [14] Yu Gu and Li-Cheng Tsai. Another look into the Wong-Zakai Theorem for Stochastic Heat Equation. *Submitted*. [*arXiv:1803.08120*](#)
- [13] Li-Cheng Tsai. Stationary Distributions of the Atlas Model. *Electron. C. Probab.* **23** (10)
- [12] Ivan Corwin and Hao Shen. ASEP(q, j) converges to the KPZ equation. *Ann. Inst. Henri Poincaré (B) Probab. Stat.* **54**(2) 995-1012
- [11] Wenpin Tang and Li-Cheng Tsai. Optimal Surviving Strategy for Drifted Brownian Motions with Absorption. *Ann. Prob.* **46**(3) 1597-1650
- 2017 [10] Stefano Olla and Li-Cheng Tsai. Exceedingly Large Deviations of the Totally Asymmetric Exclusion Process. *Submitted*. [*arXiv:1708.07052*](#)
- [9] Amir Dembo and Li-Cheng Tsai. The Criticality of a Randomly-Driven Front. *Submitted*. [*arXiv:1705.10017*](#)
- [8] Andrey Sarantsev and Li-Cheng Tsai. Stationary Gap Distributions for Infinite Systems of Competing Brownian Particles. *Electron. J. Probab.* **22** (56)
- [7] Amir Dembo and Li-Cheng Tsai. Equilibrium Fluctuation of the Atlas Model. *Ann. Prob.* **45**(6B) 4529-4560
- [6] Ivan Corwin and Li-Cheng Tsai. KPZ equation limit of higher-spin exclusion processes. *Ann. Prob.* **45**(3) 1771-1798
- 2016 [5] Li-Cheng Tsai. Infinite Dimensional Stochastic Differential Equations for Dyson's Model. *Probab. Theory Related Fields* **166**(3)801-850
- [4] Amir Dembo and Li-Cheng Tsai. Weakly Asymmetric Non-Simple Exclusion Process and the Kardar-Parisi-Zhang Equation. *Comm. Math. Phys.* **341**(1)219-261
- 2014 [3] Hung-Wen Kuo, Tai-Ping Liu, and Li-Cheng Tsai. Equilibrating effects of boundary and collision in rarefied gases. *Comm. Math. Phys.*, **328**(2)421-480
- 2013 [2] Hung-Wen Kuo, Tai-Ping Liu, and Li-Cheng Tsai. Free Molecular Flow with Boundary Effect. *Comm. Math. Phys.*, **318**(2)375-409
- 2011 [1] Li-Cheng Tsai. Viscous Shock Propagation with Boundary Effect. *Bull. Inst. Math. Acad. Sin. (N.S.)* **6**(1)1-25

INVITED TALKS

- 2018 Probability Seminar, Cornell University, October
- New Trends in Stochastic Analysis, AMSS, Beijing, September
- Interacting Particle Systems and Parabolic PDEs, Banff, August
- Integrable probability focus research group, MIT, May

- Probability Seminar, the City University of New York, March
- Probability Seminar, University of Virginia, February
- Applied Math Seminar, Stanford University, January
- 2017 Probability Seminar, University of Minnesota, December
- Mathematical Congress of the Americas, Montreal, Canada, July
- Probability Seminar, University of Toronto, April
- Probability Seminar, Duke University, March
- 2016 Probability Seminar, Brown University, October
- Columbi-Courant Probability Seminar, NYU, October
- Probability Seminar, University of Washington, April
- Probability Seminar, Northwestern University, April
- 2015 Probability Seminar, Stanford University, November
- Probability Seminar, Kyushu University, Japan, November
- Stochastic Analysis on Large Scale Interacting Systems, RIMS, Japan, October
- Random Matrix and Probability Theory Seminar, Harvard University, September
- Probability Seminar, Columbia University, September
- Stochastic Portfolio Theory and related topics, May
- 2014 Probability Seminar, Princeton University, November
- Probability Seminar, Columbia University, November
- Stochastic Integrable Systems Reading Seminar, University of Warwick, June
- 2013 Combinatorial Representation Theory Seminar, Stanford University, November
- Student Probability/PDE Seminar, UC Berkeley, March

CONFERENCES

- 2018 New Trends in Stochastic Analysis, Beijing, China
- Interacting Particle Systems and Parabolic PDEs, Banff, Canada
- International Congress on Mathematical Physics, Montreal, Canada
- Integrable probability focus research group, MIT
- 2017 Mathematical Congress of the Americas, Montreal, Canada
- 2016 Quantum integrable systems, conformal field theories and stochastic processes, Institut d'Études Scientifiques de Cargèse, France
- New approaches to non-equilibrium and random systems: KPZ integrability, universality, applications and experiments, Kavli Institute for Theoretical Physics, Santa Barbara
- 2015 Stochastic Analysis on Large Scale Interacting Systems, RIMS, Japan, October
- Stochastic Analysis: Around the KPZ Universality Class, Oberwolfach, Germany
- Seminar on Stochastic Processes, University of California, San Diego

TEACHING EXPERIENCE

Columbia University

Lecturer, Calculus II, Fall 2017

Overall assessment of the effectiveness of the instructor: 4.0/5

Stanford University

Section Leader, ODE with Linear Algebra, Winter 2015

Section Leader, Calculus (accelerated), Winter 2014

Section Leader, Calculus (accelerated), Fall 2012

REFEREE SERVICE

Referee, Annals of Applied Probability

Referee, Probability Surveys

Referee, Probability Theory and Related Fields