

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

Preprint

- 2018 [19] Li-Cheng Tsai. Exact lower tail large deviations of the KPZ equation. [arXiv:1809.03410](#)
[18] Ivan Corwin, Promit Ghosal, Hao Shen, and Li-Cheng Tsai. Stochastic PDE Limit of the Six Vertex Model. [arXiv:1803.08120](#)
[17] Ivan Corwin and Li-Cheng Tsai. SPDE Limit of Weakly Inhomogeneous ASEP. [arXiv:1806.09682](#)

Published/to appear

- 2019 [16] Yu Gu and Li-Cheng Tsai. Another look into the Wong-Zakai Theorem for Stochastic Heat Equation. *To appear in Ann. Appl. Probab.* [arXiv:1803.08120](#)
- [15] Hao Shen and Li-Cheng Tsai. Stochastic Telegraph Equation Limit for the Stochastic Six Vertex Model. *transaction of AMS* 147(6) 2685–2705, 2019
- [14] Stefano Olla and Li-Cheng Tsai. Exceedingly Large Deviations of the Totally Asymmetric Exclusion Process. *Electron. J. Probab.* 24 (16), 2019
- [13] Amir Dembo and Li-Cheng Tsai. Criticality of a Randomly-Driven Front. *Arch. Rational Mech. Anal.* (first online)
- 2018 [12] 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
- [11] Li-Cheng Tsai. Stationary Distributions of the Atlas Model. *Electron. C. Probab.* 23 (10), 2018
- [10] Ivan Corwin and Hao Shen. ASEP(q, j) converges to the KPZ equation. *Ann. Inst. Henri Poincaré (B) Probab. Stat.* 54(2) 995-1012
- [9] Wenpin Tang and Li-Cheng Tsai. Optimal Surviving Strategy for Drifted Brownian Motions with Absorption. *Ann. Prob.* 46(3) 1597-1650
- 2017 [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, University of Toronto, October
 Probability Seminar, University of Utah, October
 Probability Seminar, UC San Diego, October
 Probability Seminar, UC Irvine, October

- Probability Seminar, University of Washington, October
- Probability Seminar, UC Davis University, October
- Probability Seminar, Cornell University, October
- New Trends in Stochastic Analysis, Chinese Academy of Science, 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, 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 Student Probability/PDE Seminar, UC Berkeley, March

CONFERENCES

- 2018 New Trends in Stochastic Analysis, Beijing
- Interacting Particle Systems and Parabolic PDEs, Banff
- International Congress on Mathematical Physics, Montreal
- Integrable probability focus research group, MIT
- 2017 Mathematical Congress of the Americas, Montreal
- 2016 Quantum integrable systems, conformal field theories and stochastic processes, Institut d'Études Scientifiques de Cargèse, Corsica
- 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, Kyoto
Stochastic Analysis: Around the KPZ Universality Class, Oberwolfach
Seminar on Stochastic Processes, UC 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