

# Li-Cheng Tsai

## Curriculum Vitae

Department of Mathematics, Columbia University  
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<https://lc-tsai.github.io>

### 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 [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
- 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