

# Li-Cheng Tsai

## Curriculum Vitae

Department of Mathematics  
Rutgers University – New Brunswick  
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Piscataway, NJ 08854, USA

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### POSITIONS

Rutgers University – New Brunswick, 2019–  
Assistant Professor of Mathematics  
Columbia University, 2016–2019  
Junior Fellow of the Simons Society of Fellows  
Postdoctoral Research Scientist, Department of Mathematics  
Mentor: Ivan Corwin

### EDUCATION

Stanford University, 2011–2016  
Ph.D. Mathematics, June 2016  
Thesis advisor: Amir Dembo  
Academia Sinica (Taipei, Taiwan), 2010–2011  
Research Trainee, Institute of Mathematics  
Mentor: Tai-Ping Liu  
National Taiwan University, 2005–2009  
B.S. Physics, with minor in Mathematics, June 2009

### AWARDS

2020 Awardee, [Bernoulli Society New Researcher Award](#)  
2017 NSF Grants \$149,111 (DMS-1712575, DMS-1953407)  
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*

2019 [21] Sayan Das and Li-Cheng Tsai. Fractional moments of the Stochastic Heat Equation.  
[arXiv:1910.09271](#)

- [20] Yu Gu, Jeremy Quastel, and Li-Cheng Tsai. Moments of the 2D SHE at criticality *arXiv:1905.11310*
- 2018 [19] Li-Cheng Tsai. Exact lower tail large deviations of the KPZ equation. *arXiv:1809.03410*
- [18] Ivan Corwin and Li-Cheng Tsai. SPDE Limit of Weakly Inhomogeneous ASEP. *arXiv:1806.09682*
- Published / To appear*
- 2020 [17] Ivan Corwin, Promit Ghosal, Hao Shen, and Li-Cheng Tsai. Stochastic PDE Limit of the Six Vertex Model. *To appear in Comm. Math. Phys., 2020. arXiv:1803.08120*
- 2019 [16] Yu Gu and Li-Cheng Tsai. Another look into the Wong-Zakai Theorem for Stochastic Heat Equation. *Ann. Appl. Probab.* 29(5) 3037–3061, 2019
- [15] Hao Shen and Li-Cheng Tsai. Stochastic Telegraph Equation Limit for the Stochastic Six Vertex Model. *Proceedings 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) 1–71, 2019
- [13] Amir Dembo and Li-Cheng Tsai. Criticality of a Randomly-Driven Front. *Arch. Rational Mech. Anal.* 233(2) 643–699, 2019
- 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(6) 060201, 2018
- [11] Li-Cheng Tsai. Stationary Distributions of the Atlas Model. *Electron. C. Probab.* 23(10) 1–10, 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, 2018
- [9] Wenpin Tang and Li-Cheng Tsai. Optimal Surviving Strategy for Drifted Brownian Motions with Absorption. *Ann. Prob.* 46(3) 1597–1650, 2018
- 2017 [8] Andrey Sarantsev and Li-Cheng Tsai. Stationary Gap Distributions for Infinite Systems of Competing Brownian Particles. *Electron. J. Probab.* 22(56) 1–20, 2017
- [7] Amir Dembo and Li-Cheng Tsai. Equilibrium Fluctuation of the Atlas Model. *Ann. Prob.* 45(6B) 4529–4560, 2017
- [6] Ivan Corwin and Li-Cheng Tsai. KPZ equation limit of higher-spin exclusion processes. *Ann. Prob.* 45(3) 1771–1798, 2017
- 2016 [5] Li-Cheng Tsai. Infinite Dimensional Stochastic Differential Equations for Dyson’s Model. *Probab. Theory Related Fields* 166(3) 801–850, 2016
- [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, 2016
- 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, 2014
- 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, 2013

- 2011 [1] Li-Cheng Tsai. Viscous Shock Propagation with Boundary Effect. *Bull. Inst. Math. Acad. Sin. (N.S.)* 6(1) 1–25, 2011

## TEACHING EXPERIENCE

### *Rutgers University*

- 2020 Differential Equations for Engineering and Physics ongoing  
 2019 Linear Algebra and Applications 4.78/5 (teaching effectiveness)

### *Columbia University*

- 2017 Calculus II 4.0/5 (overall assessment of the effectiveness)

## INVITED TALKS

- 2020 Integrable Probability Summer School, Oxford, August  
 Bernoulli-IMS 10th World Congress in Probability and Statistics, July  
 Integrable Probability FRG meeting, Columbia University, March  
 2019 Probability Seminar, Columbia University, November  
 Mathematical Physics Seminar, Rutgers University, November  
 Probability Seminar, University of Rochester, November  
 Workshop: Singular SPDEs and Related Topics,  
 Hausdorff Institute of Mathematics, Germany, October  
 Probability Seminar, Temple University, October  
 Central AMS sectional meeting, Madison, September  
 The 12th Mathematical Society of Japan, Seasonal Institute, August  
 Department colloquium, Carnegie Mellon University, April  
 Probability and Analysis Seminar, Stony Brook University, March  
 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

- 2020 Integrable Probability Summer School, Oxford  
Bernoulli-IMS 10th World Congress in Probability and Statistics  
Integrable Probability FRG meeting, Columbia University, March
- 2019 Workshop: Singular SPDEs and Related Topics,  
Hausdorff Institute of Mathematics, Germany  
The 12th Mathematical Society of Japan, Seasonal Institute
- 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