

Li-Cheng Tsai

Curriculum Vitae

Department of Mathematics
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POSITIONS

The University of Utah, 2022–
Tenure-track Assistant Professor of Mathematics
Rutgers University—New Brunswick, 2019–2022
Tenure-track 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, 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

2022 Sloan Research Fellowships
2020 Awardee, [Bernoulli Society New Researcher Award](#)
2016 Junior Fellow, Simons Society of Fellows

GRANTS

2022 NSF Grants \$225,000 for 3 years DMS-2153739
2022 Sloan Research Fellowships \$ 75,000 for 2 years
2017 NSF Grants \$149,111 for 3 years, extended to 5 years [DMS-1712575](#), [DMS-1953407](#)

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

- [25] Li-Cheng Tsai. Integrability in the weak noise theory. *arXiv:2204.00614*
- [24] Pierre Yves Gaudreau Lamarre, Yier Lin, and Li-Cheng Tsai. KPZ equation with a small noise, deep upper tail and limit shape. *arXiv:2106.13313*
- [23] Jeremy Quastel and Li-Cheng Tsai. Hydrodynamic large deviations of TASEP. *arXiv:2104.04444*

Published / To appear

- 2021 [22] Li-Cheng Tsai. Exact lower tail large deviations of the KPZ equation. *Duke Math. J.* 171(9) 1879-1922, 2022
- [21] Yier Lin and Li-Cheng Tsai. Short time large deviations of the KPZ equation. *Comm. Math. Phys.* 386(1), 359-393, 2021
- [20] Sayan Das and Li-Cheng Tsai. Fractional moments of the Stochastic Heat Equation. *Ann. Inst. Henri Poincaré (B) Probab. Stat.* 57(2) 9778-799, 2021
- [19] Yu Gu, Jeremy Quastel, and Li-Cheng Tsai. Moments of the 2D SHE at criticality. *Probability and Mathematical Physics* 2(1) 179-219, 2021
- 2020 [18] Ivan Corwin and Li-Cheng Tsai. SPDE Limit of Weakly Inhomogeneous ASEP. *Electron. J. Probab.* 25 1-55, 2020
- [17] Ivan Corwin, Promit Ghosal, Hao Shen, and Li-Cheng Tsai. Stochastic PDE Limit of the Six Vertex Model. *Comm. Math. Phys.*, 375, 1945–2038 (2020)
- 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*

EDITORIAL SERVICE

2022– Associate Editor, Journal of Statistical Physics

TEACHING EXPERIENCE

Rutgers University

- 2021 Theory of functions of real variables I (Math graduate)
- 2021 Linear algebra and applications (Engineering graduate)
- 2021 Introduction to stochastic processes (undergraduate)
- 2020 Linear algebra and applications (Engineering graduate)
- 2020 Differential equations for engineering and physics (undergraduate)
- 2019 Linear algebra and applications (Engineering graduate)

Columbia University

- 2017 Calculus II