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

[28] Yier Lin and Li-Cheng Tsai. Spacetime limit shapes of the KPZ equation in the upper tails. *arXiv:2304.14380*

[27] Li-Cheng Tsai. High moments of the SHE in the clustering regimes. *arXiv:2304.14375*

[26] Yier Lin and Li-Cheng Tsai. A lower-tail limit in the weak noise theory. *arXiv:2210.05629*

[25] Jeremy Quastel and Li-Cheng Tsai. Hydrodynamic large deviations of TASEP. *arXiv:2104.04444*

Published / To appear

2023 [24] Li-Cheng Tsai. Integrability in the weak noise theory. To appear in Transactions of the AMS. *arXiv:2204.00614*

[23] Pierre Yves Gaudreau Lamarre, Yier Lin, and Li-Cheng Tsai. KPZ equation with a small noise, deep upper tail and limit shape. *Probab. Theory Related Fields 185 885–920, 2023*

2022 [22] Li-Cheng Tsai. Exact lower tail large deviations of the KPZ equation. *Duke Math. J. 171(9) 1879-1922, 2022*

2021 [21] Li-Cheng Tsai. Exact lower tail large deviations of the KPZ equation. *Duke Math. J. 171(9) 1879-1922, 2022*

[20] Yier Lin and Li-Cheng Tsai. Short time large deviations of the KPZ equation. *Comm. Math. Phys. 386(1), 359-393, 2021*

[19] 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*

[18] 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 colllision 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

University of Utah

2023 Calculus II

2022 Introduction to probability (undergraduate and master-degree)

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