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Sayan Das

Employment

Sep 2023– **L.E. Dickson Instructor**, *Department of Mathematics*, University of Chicago, Illinois.

Education

2018–2023 **Ph.D. in Mathematics**, *Columbia University, New York*.
-Advisor: Ivan Corwin.

2016–2018 **Master of Statistics (M.Stat)**, *Indian Statistical Institute, Kolkata*.

2013-2016 **Bachelor of Statistics (B.Stat (Hons.))**, *Indian Statistical Institute, Kolkata*.

Research Interests

Directed Polymers, Large Deviations, Integrable Probability, Stochastic Partial Differential Equations, Permutations.

Publications and Preprints

21. **Solving marginals of the LDP for the directed landscape**, *Sayan Das and Li-Cheng Tsai*, Submitted, [arXiv].
20. **Upper tail large deviations of the directed landscape**, *Sayan Das, Duncan Dauvergne, and Bálint Virág*, Submitted, [arXiv].
19. **Convergence to stationary measures for the half-space log-gamma polymer**, *Sayan Das and Christian Serio*, Submitted, [arXiv].
18. **KPZ equation limit of random walks in random environments**, *Sayan Das, Hindy Drillick, and Shalin Parekh*, Submitted, [arXiv].
17. **The half-space log-gamma polymer in the bound phase**, *Sayan Das and Weitao Zhu*, Submitted, [arXiv].
16. **KPZ exponents for the half-space log-gamma polymer**, *Guillaume Barraquand, Ivan Corwin, and Sayan Das*, Submitted, [arXiv].
15. **Large deviations for the q-deformed polynuclear growth**, *Sayan Das, Yuchen Liao, and Matteo Mucciconi*, Submitted, [arXiv].
14. **KPZ equation limit of sticky Brownian motion**, *Sayan Das, Hindy Drillick, and Shalin Parekh*, Submitted, [arXiv].
13. **Long and short time laws of iterated logarithms for the KPZ fixed point**, *Sayan Das, Promit Ghosal, and Yier Lin*, Submitted, [arXiv].
12. **Localization of the continuum directed random polymer**, *Sayan Das and Weitao Zhu*, Submitted, [arXiv].
11. **Asymptotic distribution of random quadratic forms**, *Bhaswar B. Bhattacharya, Sayan Das, Somabha Mukherjee, and Sumit Mukherjee*, Submitted, [arXiv].
10. **Temporal Increments of the KPZ equation with general initial data**, *Sayan Das*, Submitted, [arXiv].
9. **Large deviation principle for random permutations**, *Jacopo Borga, Sayan Das, Sumit Mukherjee, and Peter Winkler*, International Mathematics Research Notices, Volume 2024, Issue 3, February 2024, Pages 2138–2191, [arXiv][Journal].
8. **A fourth moment phenomenon for asymptotic normality of monochromatic subgraphs**, *Sayan Das, Zoe Himwich and Nitya Mani*, Random Structures & Algorithms 63.4 (2023): 968-996., [arXiv][Journal].
7. **Short- and long-time path tightness of the continuum directed random polymer**, *Sayan Das and Weitao Zhu*, Ann. Inst. H. Poincaré Probab. Statist. 60(1): 343-372, Feb 2024, [arXiv][Journal].

6. **Law of iterated logarithms and fractal properties of the KPZ equation**, *Sayan Das and Promit Ghosal*, Ann. Probab. 51(3): 930-986 (May 2023), [arXiv][Journal].
5. **Large Deviations for Discrete β-ensembles**, *Sayan Das and Evgeni Dimitrov*, Journal of Functional Analysis Vol 283, Issue 1, [arXiv][Journal].
4. **Motif estimation in large graphs: The fourth moment phenomenon**, *Bhaswar B. Bhattacharya, Sayan Das, and Sumit Mukherjee*, Ann. Statist. 50(2): 987-1011, [arXiv][Journal].
3. **Upper-tail Large Deviation Principle for ASEP**, *Sayan Das and Weitao Zhu*, Electron. J. Probab. 27: 1-34 (2022), [arXiv][Journal].
2. **Fractional moments of the Stochastic Heat Equation**, *Sayan Das and Li-Cheng Tsai*, Ann. Inst. H. Poincaré Probab. Statist. 57 (2) 778-799, May 2021, [arXiv][Journal].
1. **Extremal process of the zero-average Gaussian free field for $d \geq 3$**, *Sayan Das, and Rajat Subhra Hazra*, Statistics & Probability Letters, 146, pp.42-49, [arXiv][Journal].

Invited Talks

Oct 2025 **Emerging Synergies between Stochastic Analysis and Statistical Mechanics**, *BIRS*, Canada.
Apr 2024 **Lehigh-Minnesota joint probability seminar**, *Online*.
Mar 2024 **University of Utah Stochastic Seminar**.
Mar 2024 **Penn / Temple Probability Seminar**.
Jan 2024 **Northwestern University Probability Seminar**.
Jan 2024 **Joint Mathematics Meetings**, *Special Session on Large Random Permutations*, San Francisco.
Nov 2023 **University of Michigan**.
Oct 2023 **University of Illinois**.
Aug 2023 **National University of Singapore Probability Seminar**.
Aug 2023 **Random Matrix days, Indian Statistical Institute**.
Apr 2023 **University of Chicago Probability Seminar**.
Jan 2023 **University of North Carolina Probability Seminar**.
Dec 2022 **UC Berkeley Probability Seminar**.
Dec 2022 **Stanford Probability Seminar**.
Nov 2022 **MIT Probability Seminar**.
Nov 2022 **University of Chicago Probability Seminar**.
Oct 2022 **KTH Random Matrix Theory Seminar**, *Online*.
Oct 2022 **Cornell University Probability Seminar**.
Sep 2022 **University of Toronto Probability Seminar**.
May 2022 **Probability and the City Seminar**, *Online*.
Mar 2022 **UC Berkeley Probability Seminar**, *Online*.
Mar 2022 **University of Wisconsin-Madison Probability Seminar**.
Mar 2022 **University of Utah Stochastic Seminar**.
Mar 2022 **Columbia Integrable Probability Seminar**, *Online*.
May 2021 **Columbia Princeton Probability Day 2021 (Short Talk)**, *Online*.
Feb 2021 **Columbia Integrable Probability Seminar**, *Online*.

Contributed Talks

Sep 2022 **Graduate Student Probability Conference**, *University of Wisconsin-Madison*.
Jun 2022 **Summer School in Probability**, *University of British Columbia*, Vancouver.
Oct 2021 **Program Associates Short Talk**, *MSRI*, Berkeley.
Nov 2020 **North East Probability Seminar 2020**, *Online*.
Aug 2020 **Bernoulli-IMS One World Symposium 2020**, *Online*.

Teaching and Teaching Assistantships

Instructor .

Winter 2024 **Mathematical Methods in the Physical Sciences I (2 sections)**, *University of Chicago*.
Fall 2023 **Mathematical Methods in the Physical Sciences II (2 sections)**, *University of Chicago*.
Spring 2021 **Calculus I**, *Columbia University*.
Summer 2020 **Calculus III**, *Columbia University*.

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Fall 2022 **Intro to Honors Mathematics**, *Columbia University*.
Spring 2022 **Undergraduate Probability**, *Columbia University*.
Fall 2020 **Calculus II**, *Columbia University*.
Spring 2020 **Honors Math II**, *Columbia University*.
Fall 2019 **Analysis and Probability I**, *Columbia University*.

Mentorship

Summer 2024 **Mentor in 'UChicago Math REU'**.
-**Students:** Shreyas Iyer (UChicago), Matthew Lys (UChicago)

Winter 2024 **Mentor in 'Association for Women in Mathematics (AWM) Mentor Network'**.
-**Student:** Ashna Jain (UMass Amherst)

Fall 2020 **Mentor in 'Twoples'**, *A Directed Reading Program for Math Undergraduates*.
-**Student:** Duncan Haystead (UC Berkeley)
-**Project Title:** The Moment Problem

Fall 2020 **Mentor in Columbia Directed Reading Program**.
-**Student:** Adiba Ejaz (Columbia)
-**Project Title:** Cover Time of a graph

Services

Organizer .

2023- **Co-organizer of UChicago Probability and Mathematical Physics Seminar**.
2020-21 **Co-organizer of Junior Integrable Probability Seminar**.
2020 **Organizer of Student Probability Seminar at Columbia**, *Spring 2020 - Fall 2020*.

Refereeing .

Annals of Probability, Random Structures & Algorithms, Electronic Journal of Probability, Communications in Mathematical Physics, Annals of Applied Probability, Duke Mathematical Journal, Journal of Statistical Physics.

Schools and Conferences Attended

Oct 2025 **Emerging Synergies between Stochastic Analysis and Statistical Mechanics Workshop**, *BIRS*, Canada.
Mar 2024 **KPZ meets KPZ Workshop**, *The Fields Institute*, Toronto.
Jan 2024 **Joint Mathematics Meetings**, *San Francisco*.
Jul 2022 **First-passage percolation and related models conference**, *Tata Institute of Fundamental Research*, Bangalore.
Jun 2022 **Summer School in Probability**, *University of British Columbia*, Vancouver.
Aug-Dec 2021 **Universality and Integrability in Random Matrix Theory and Interacting Particle Systems**, *MSRI*, Berkeley, CA.
Jul 2019 **Random Matrix Summer School**, *University of California, Los Angeles*, Los Angeles, CA.
Jun 2019 **11th Cornell Probability Summer School**, *Cornell University*, Ithaca, NY.
May-Jun 2019 **Virginia Integrable Probability Summer School**, *University of Virginia*, Charlottesville, VA.
Mar 2019 **AMS Spring Sectional Meeting**, *University of Hawai'i at Manoa*, Honolulu, HI.
Dec 2018 **Advances in Asymptotic Probability (in honor of Amir Dembo's 60th birthday)**, *Stanford University*, Stanford, CA.

Awards and Honours

2021-22 **Peter and Catherine Klein Fellowship**, *for academic qualifications and contributions*, Columbia University, New York.

2021 **Stephen Della Pietra Program Associate Fellowship**, MSRI, Berkeley.

2021 **Winner of Student Paper Competition**, *Statistical theory and methodology section*, International Indian Statistical Association Conference, 2021.

2020-21 **Peter and Catherine Klein Fellowship**, *for academic qualifications and contributions*, Columbia University, New York.

2019-20 **Carl B. Boyer Memorial Fellowship**, *for academic qualifications and contributions*, Columbia University, New York.

2018 **PCM Memorial Award**, *for academic performance in M.Stat Programme*, Indian Statistical Institute, Kolkata.

2017 **D.Basu Memorial Award**, *for academic performance in B.Stat Programme*, Indian Statistical Institute, Kolkata.

2013-2018 **INSPIRE Scholarship**, *Department of Science and Technology*, Govt. of India.

Technical skills

C, C++, Matlab, LaTeX, R, Mathematica, Geogebra

References

Ivan Corwin
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