Sourav Sarkar

Curriculum Vitae

CONTACT INFORMATION

Department of Mathematics,
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Date of birth: 28 April, 1992
Citizenship: Indian.

RESEARCH INTERESTS

My research interests are in probability theory. I am particularly interested in *the random growth models that belong to the KPZ universality class*, *geometric properties of the KPZ fixed point and the relevant processes*, *last passage percolation*, *exclusion processes*, *competitive erosion*, *stable random fields*, *percolation theory*, *Coulomb gas* and *random walks on graphs*.

EMPLOYMENT

I am currently a Postdoctoral Fellow at the Department of Mathematics, University of Toronto from 2019. My supervisor is Prof. Bálint Virág.

EDUCATION

I. **Ph.D. in Statistics**, Department of Statistics, University of California, Berkeley. **2015-2019**.
Thesis: Last passage percolation and the Slow bond problem.
Advisor: Dr. Alan Hammond.

II. **Master of Statistics (M. Stat.)**, *Indian Statistical Institute, Kolkata*, **2013-2015**.

1. Total Percentage Score: 95.1% (*First Division with Distinction*).
2. Specialization: Mathematical Statistics and Probability.

III. **Bachelor of Statistics (B. Stat.) (Hons.)**, *Indian Statistical Institute, Kolkata*, **2010-2013**.

1. Total Percentage Score: 93.1% (*First Division with Distinction*)

ACADEMIC ACHIEVEMENTS, AWARDS AND HONOURS

- **The Outstanding Graduate Student Instructor Award** for excellence in teaching by a graduate student at University of California, Berkeley, in 2019.

- **The Michel and Line Loève Fellowship**, Department of Statistics, University of California, Berkeley, 2015-17.

- **ISIAA-Mrs. M.R. Iyer Memorial Gold Medal**, for outstanding performance in M.Stat., January 2016.

- **Debesh-Kamal Scholarship for Higher Studies Abroad**, Ramakrishna Mission Institute of Culture, India, 2015.

- **ISIAA-Mrs. M.R. Iyer Memorial Gold Medal**, for outstanding performance in B.Stat. (Hons.) undertaken during 2010-2013, January 2014

- **D. Basu Memorial Gold Medal** for outstanding presentation as well as best performance in B.Stat. (Hons.) Programme 2010-2013, Januray 2014

- **Nikhilesh Bhattacharya Memorial Gold Medal** for the best performance in Statistics in B.Stat. (Hons.) Programme 2010-2013, January 2014

- Successful in **Indian National Mathematical Olympiad (INMO)**, 2008 and attended the **International Mathematical Olympiad Training Camp (IMOTC)** conducted by the National Board for Higher Mathematics (NBHM) in 2008 and 2009.

- Awarded the **Kishore Vaigyanik Protsahan Yojana (KVPY) Fellowship** by the Department of Science and Technology (DST), Government of India, 2009-15.

- **Indian Academy of Sciences' Summer Research Fellowship**.

- The Telegraph School Awards for excellence - the **Madanlal Dhandhania Charitable Trust Award for Academic Excellence by a Student**, in August 2010.

PREPRINTS AND PUBLICATIONS

1. **Three-halves variation of geodesics in the directed landscape**.-with Duncan Dauvergne and Bálint Virág. Available at https://arxiv.org/abs/2010.12994.

2. **Convergence of exclusion processes and KPZ equation to the KPZ fixed point**.-with Jeremy Quastel. Available at https://arxiv.org/pdf/2008.06584.

3. **Brownian absolute continuity of the KPZ fixed point with arbitrary initial condition**.-with Bálint Virág. **Annals of Probability**, to appear. Available at https://arxiv.org/pdf/2002.08496.

4. **Ground states and hyperuniformity of the hierarchical Coulomb gas in all dimensions**.-with Shirshendu Ganguly. **Probab. Theory Related Fields**, 177(3-4):621-675, 2020. Also available at https://arxiv.org/abs/1904.05321.

5. **Stability of collision property of a graph**.-with Omer Angel and Yuval Peres. (Draft available on request).

6. **A note on the local weak limit of a sequence of expander graphs**. Available at https://arxiv.org/abs/1808.09073.

7. **Modulus of continuity for fluctuations and weight profiles in Poissonian last passage percolation**.-with Alan Hammond. **Electron. J. Probab.**, 25:Paper No. 29, 38, 2020. Also available at https://arxiv.org/abs/1804.07843.

8. **Last Passage Percolation and the Slow Bond Problem**. ProQuest LLC, Ann Arbor, MI, 2019. Thesis (Ph.D.)–University of California, Berkeley. Also available at https://www.math.toronto.edu/ssarkar/thesis.pdf.

9. **Formation of large-scale random structure by competitive erosion**.
- with Shirshendu Ganguly and Lionel Levine. **Annals of Probability**, 47(6):3649-3704, 2019. Also available at https://arxiv.org/abs/1711.11028.

10. **Invariant measures for TASEP with a slow bond**.
- with Riddhipratim Basu and Allan Sly. Available at https://arxiv.org/abs/1704.07799.

11. **Coalescence of geodesics in exactly solvable models of last passage percolation**.
- with Riddhipratim Basu and Allan Sly. **J. Math. Phys.**, 60(9): 093301, 22, 2019. Also available at https://arxiv.org/abs/1704.05219.

12. **A relative anti-concentration inequality**.
- with Manjunath Krishnapur. Available at https://arxiv.org/abs/1612.09045.

13. **Stable random fields indexed by finitely generated free groups**.
-with Parthanil Roy. **Annals of Probability**, 2018, Vol. 46, No. 5, 2680-2714. Also available at https://arxiv.org/abs/1608.03887.

- **North British Probability Seminar**, University of Edinburgh, November, 2020.
- **Bernoulli-IMS One World Symposium** August, 2020.
- **Integrable probability mini-workshop,** Online Open Probability School, June 2020.
- **UCLA Probability Seminar,** University of California Los Angeles, April 2019.
- **UToronto Probability Seminar,** University of Toronto, February 2019.
- **UC Davis Probability Seminar,** University of California Davis, November 2018.
- **Columbia Probability Seminar,** Columbia University, June 2018.
- **Cornell Probability Seminar**, Cornell University, March 2018.
- **UC Berkeley Probability Seminar,** University of California Berkeley, March 2018.
- **Stanford Probability Seminar**, Stanford University, February 2018.
- **Indo-Russian Meeting in Probability and Statistics**, Bangalore, India, January 2018.
- **PIMS Summer School 2017**, University of British Columbia, June 2017.
- **Bangalore Probability Seminar**, IISc, Bangalore, India, January 2017.
- **Probability Seminar**, ISI Kolkata, India, December 2016.
- **Bangalore Probability Seminar**, IISc, Bangalore, India, July 2015.
- **Prasanta Chandra Mahalanobis Memorial Lecture**, ISI Kolkata, India, July 2015.
- **D.Basu Memorial Lecture**, ISI Kolkata, India, December 2013.

RESEARCH VISITS

- **Microsoft Research, Redmond,** November 2018.
- **Columbia University** June 2018, visited Dr. Ivan Corwin.
- **Princeton University** March 2018, visited Dr. Allan Sly.
- **Microsoft Research, Redmond**, October 2017.
- **Princeton University** September 2017, visited Dr. Allan Sly.

TEACHING
EXPERIENCE

At University of Toronto, I have taught the following courses.

- MAT 137 Calculus, Fall-Winter 2020-2021 (course instructor).
- MAT 137 Calculus, Summer 2020 (course instructor and coordinator).
- MAT 137 Calculus, Fall-Winter 2019-2020 (course instructor).

At UC Berkeley, I have been a Graduate Student Instructor for the following courses. I received the **Outstanding Graduate Student Instructor Award** in 2019.

- Graduate Student Instructor for Stat 88, Spring 2019 (Probability and Mathematical Statistics in Data Science).
- Graduate Student Instructor for Stat 205A/C218A, Fall 2018 (first half of a graduate course in probability).

- Graduate Student Instructor for Stat 205B, Spring 2018 (second half of a graduate course in probability).

- Graduate Student Instructor for Stat 134, Fall 2016 (undergraduate course in probability).

- Graduate Student Instructor for Stat 134, Summer 2016 (undergraduate course in probability).

- Graduate Student Instructor for Stat 150, Fall 2015 (upper division course in Stochastic processes).

OTHER SKILLS
- Software packages: Matlab, R, Latex.

- Programming languages: C.

PROFESSIONAL ACTIVITIES

Co-organizer of the Probability seminar at Toronto, reviewer for Probability Theory and Related Fields and Annals of Probability.

REFERENCES

- Dr. Alan Hammond
  Professor,
  Departments of Mathematics and Statistics,
  University of California at Berkeley.
  Email: alanmh@stat.berkeley.edu

- Dr. Allan Sly
  Professor,
  Department of Mathematics,
  Princeton University.
  Email: asly@princeton.edu

- Dr. Asif Zaman
  Assistant Professor, Teaching stream,
  Department of Mathematics,
  University of Toronto.
  Email: zaman@math.toronto.edu

- Dr. Jeremy Quastel
  Professor,
  Department of Mathematics and Statistics,
  University of Toronto.
  Email: quastel@math.toronto.edu

- Dr. Bálint Virág
  Professor,
  Department of Mathematics and Statistics,
  University of Toronto.
  Email: balint@math.toronto.edu