

CONTACT INFORMATION

Wharton Statistics Department
University of Pennsylvania
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RESEARCH INTERESTS

Nonparametric Statistics, Inference on Networks, Learning Theory, Combinatorial Probability, Discrete and Computational Geometry.

EMPLOYMENT

- **Assistant Professor**, Department of Statistics, Wharton School, University of Pennsylvania, July 2016-present.
- **Research Intern, Microsoft Research, Redmond**, June 2014-September 2014.

EDUCATION

- **Doctor of Philosophy (Ph.D.)**, Department of Statistics, Stanford University, September 2011-June 2016.
Thesis Title: Power of Graph-Based Two-Sample Tests
Advisor: Prof. Persi Diaconis
- **Master of Statistics (M. Stat.)**, Indian Statistical Institute, July 2009-May 2011.
- **Bachelor of Statistics (B. Stat.)**, Indian Statistical Institute, July 2006-May 2009.

PREPRINTS

1. Somabha Mukherjee, Jaesung Son, and **Bhaswar B. Bhattacharya**, Phase transitions of the maximum likelihood estimates in the tensor Curie-Weiss model, [arXiv:2005.03631](#), 2020.
2. **Bhaswar B. Bhattacharya**, Xiao Fang, and Han Yan, Normal approximation and fourth Moment theorems for monochromatic triangles, [arXiv:2004.05732](#), 2020.
3. **Bhaswar B. Bhattacharya**, Sohom Bhattacharya, and Shirshendu Ganguly, Spectral edge in sparse random graphs: Upper and lower tail large deviations, [arXiv:2004.00611](#), 2020.
4. **Bhaswar B. Bhattacharya**, Somabha Mukherjee, and Sumit Mukherjee, Asymptotic distribution of Bernoulli quadratic forms, [arXiv:1912.12276](#), 2019.
5. Kwonsang Lee, **Bhaswar B. Bhattacharya**, Jing Qin, and Dylan S. Small, A nonparametric likelihood approach for inference in instrumental variable models, [arXiv:1605.03868v2](#), 2019.

PUBLICATIONS

6. Divyansh Agarwal, Somabha Mukherjee, **Bhaswar B. Bhattacharya**, and Nancy R. Zhang, Distribution-free multisample test based on optimal matching with applications to single cell genomics, *Journal of the American Statistical Association*, to appear, 2020.
7. Trambak Banerjee, **Bhaswar B. Bhattacharya**, and Gourab Mukherjee, A nearest-neighbor based nonparametric test for viral remodeling in heterogeneous single-cell proteomic data, *Annals of Applied Statistics*, to appear, 2020.
8. Soham Dan and **Bhaswar B. Bhattacharya**, Goodness-of-fit tests for inhomogeneous random graphs, *International Conference on Machine Learning (ICML)*, to appear, 2020.
9. **Bhaswar B. Bhattacharya**, Asymptotic distribution and detection thresholds for two-sample tests based on geometric graphs, *Annals of Statistics*, to appear, 2020.
10. Somabha Mukherjee and **Bhaswar B. Bhattacharya**, Replica symmetry in upper tails of mean-field hypergraphs, *Advances in Applied Mathematics*, Vol. 119, 102047, 2020.
11. **Bhaswar B. Bhattacharya** and Shirshendu Ganguly, Upper tails for edge eigenvalues of random graphs, *SIAM Journal on Discrete Mathematics*, Vol. 34 (2), 1069–1083, 2020.
12. **Bhaswar B. Bhattacharya**, Somabha Mukherjee, and Sumit Mukherjee, The second moment phenomenon for monochromatic subgraphs, *SIAM Journal on Discrete Mathematics*, Vol. 34 (1), 794–824, 2020.
13. **Bhaswar B. Bhattacharya**, Shirshendu Ganguly, Xuancheng Shao, and Yufei Zhao, Upper tail large deviations for arithmetic progressions in a random set, *International Mathematics Research Notices*, Vol. 2020 (1), 167–213, 2020.
14. **Bhaswar B. Bhattacharya** and Sumit Mukherjee, Limit theorems for monochromatic stars, *Random Structures and Algorithms*, Vol. 55 (4), 831–853, 2019.
15. Manjari Pradhan, **Bhaswar B. Bhattacharya**, Krishnendu Chakrabarty, and Bhargab B. Bhattacharya, Predicting X -sensitivity of circuit-inputs on test-coverage: A machine-learning approach, *IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (TCAD)*, Vol. 38 (12), 2343–2356, 2019.
16. Qingyuan Zhao, Dylan S. Small, and **Bhaswar B. Bhattacharya**, Sensitivity analysis for inverse probability weighting estimators via the percentile bootstrap, *Journal of the Royal Statistical Society, Series B*, Vol. 81 (4), 735–761, 2019.
17. **Bhaswar B. Bhattacharya**, A general asymptotic framework for distribution-free graph-based two-sample tests, *Journal of the Royal Statistical Society, Series B*, Vol. 81 (3), 575–602, 2019.
18. **Bhaswar B. Bhattacharya** and Sumit Mukherjee, Monochromatic subgraphs in randomly colored graphons, *European Journal of Combinatorics*, Vol. 81, 328–353, 2019.
19. Aritra Banik, **Bhaswar B. Bhattacharya**, Sandip Das, and Sreeja Das, The 1-dimensional discrete Voronoi game, *Operations Research Letters*, Vol. 47, 115–121, 2019.
20. **Bhaswar B. Bhattacharya** and Sumit Mukherjee, Inference in Ising models, *Bernoulli*, Vol. 24 (1), 493–525, 2018.
21. **Bhaswar B. Bhattacharya**, Shirshendu Ganguly, Eyal Lubetzky, and Yufei Zhao, Upper tails and independence polynomials in random graphs, *Advances in Mathematics*, Vol. 319, 313–347, 2017.

22. Aritra Banik, **Bhaswar B. Bhattacharya**, Sandip Das, and Satyaki Mukherjee, The discrete Voronoi game in \mathbb{R}^2 , *Computational Geometry: Theory and Applications*, Vol. 63, 53–62, 2017.
23. **Bhaswar B. Bhattacharya** and Sumit Mukherjee, Degree sequence of random permutation graphs, *Annals of Applied Probability*, Vol. 27 (1), 439–484, 2017.
24. **Bhaswar B. Bhattacharya**, Persi Diaconis, and Sumit Mukherjee, Universal poisson and normal limit theorems in graph coloring problems with connections to extremal combinatorics, *Annals of Applied Probability*, Vol. 27 (1), 337–394, 2017.
25. **Bhaswar B. Bhattacharya**, Collision times in multicolor urn models and sequential graph coloring with applications to discrete logarithms, *Annals of Applied Probability*, Vol. 26 (6), 3286–3318, 2016.
26. **Bhaswar B. Bhattacharya** and Subhabrata Sen, High temperature asymptotics of orthogonal mean-field spin glasses, *Journal of Statistical Physics*, Vol. 162 (1), 63–80, 2016.
27. Deepan Basu, Kinjal Basu, **Bhaswar B. Bhattacharya**, and Sandip Das, Almost empty monochromatic triangles in planar point sets, *Discrete Applied Mathematics*, Vol. 210, 207–213, 2016.
28. **Bhaswar B. Bhattacharya** and Gregory Valiant, Testing closeness with unequal sized samples, *Neural Information Processing System (NIPS)*, 2611–2619, 2015.
29. **Bhaswar B. Bhattacharya** and Sumit Mukherjee, Exact and asymptotic results on coarse Ricci curvature of graphs, *Discrete Mathematics*, Vol. 338, 23–42, 2015.
30. **Bhaswar B. Bhattacharya**, Sayantan Das, and Shirshendu Ganguly, Minimum-weight edge discriminator in hypergraphs, *Electronic Journal of Combinatorics*, Vol. 21 (3), #P3.18, 2014.
31. Aritra Banik, **Bhaswar B. Bhattacharya**, and Sandip Das, The minimum enclosing circle of a set of fixed points and a mobile point, *Computational Geometry: Theory and Applications*, Vol. 47 (9), 891–898, 2014.
32. Aritra Banik, **Bhaswar B. Bhattacharya**, and Sandip Das, Optimal strategies for the one-round discrete Voronoi game on a line, *Journal of Combinatorial Optimization*, Vol. 26, 655–669, 2013.
33. **Bhaswar B. Bhattacharya** and Sandip Das, On pseudo-convex partitions of a planar point set, *Discrete Mathematics*, Vol. 313 (21), 2401–2408, 2013.
34. **Bhaswar B. Bhattacharya** and Subhas C. Nandy, New variations of the maximum coverage facility location problem, *European Journal of Operational Research*, Vol. 224, 477–485, 2013.
35. **Bhaswar B. Bhattacharya** and Sandip Das, Disjoint empty convex pentagons in planar point sets, *Periodica Mathematica Hungarica*, Vol. 66 (1), 73–86, 2013.
36. Riddhipratim Basu, **Bhaswar B. Bhattacharya**, and Tanmoy Talukdar, The projection median of a set of points in \mathbb{R}^d , *Discrete and Computational Geometry*, Vol. 47 (2), 329–346, 2012.
37. **Bhaswar B. Bhattacharya** and Sandip Das, Holes or empty-pseudo-triangles in planar point sets, *Moscow Journal of Combinatorics and Number Theory*, Vol. 2 (1), 16–46, 2012.
38. **Bhaswar B. Bhattacharya** and Sandip Das, On the minimum size of a point set containing a 4-Hole and a disjoint 5-Hole, *Studia Scientiarum Mathematicarum Hungarica*, Vol. 48 (4), 445–457, 2011.
39. **Bhaswar B. Bhattacharya**, On the Fermat-Weber point of a polygonal chain and its generalizations, *Fundamenta Informaticae*, Vol. 107 (4), 331–343, 2011.

40. **Bhaswar B. Bhattacharya**, Maximizing Voronoi regions of a set of points enclosed in a circle with applications to facility location, *Journal of Mathematical Modelling and Algorithms*, Vol. 9 (4), 375–392, 2010.
41. **Bhaswar B. Bhattacharya** and Sandip Das, Geometric proof of a Ramsey-type result for disjoint empty convex polygons I and II, *Geombinatorics*, Vol. XX (1), 5–16, and Vol. XIX (4), 146–155, 2010.

TEACHING

- Fall 2019 (Wharton): Mathematical Statistics (STAT 970)
- Fall 2018 (Wharton): Statistical Inference (STAT 431/511), Mathematical Statistics (STAT 970)
- Fall 2017 (Wharton): Statistical Inference (STAT 431/511), Mathematical Statistics (STAT 970)
- Spring 2017 (Wharton): Seminar in Advanced Applications in Statistics (STAT 991)
- Fall 2016 (Wharton): Statistical Inference (STAT 431/511)
- Summer 2013 (Stanford): Qualifying Exams Workshop (STATS 302)

SEMINARS

S. S. Wilks Memorial Seminar in Statistics, Department of Operations Research and Financial Engineering, Princeton University (03/20), Department of Statistics, University of Michigan (02/20); Department of Statistics, University of Michigan (02/20); Department of Statistics, Rutgers University (09/19); Department of Computer Science, Indian Institute of Technology (IIT), Kharagpur (07/19); Department of Informatics, Kyushu University (06/19); Statistics and Mathematics Unit, Indian Statistical Institute (ISI), Kolkata (01/2019); National Institute of Science Education and Research (NISER), Bhubaneswar, India (01/2019); Probability Seminar, Department of Applied Mathematics, Brown University (09/18); Colloquium Seminar, Department of Mathematics, Lehigh University (09/18); Advanced Computing and Microelectronics Unit, Indian Statistical Institute (ISI), Kolkata (06/18); Probability Seminar, Department of Mathematics, Weizmann Institute of Science (05/18); Department of Statistical Science, Fox Business School, Temple University (03/18); Applied Probability and Risk Seminar, Department of Statistics and IEOR, Columbia University (04/17); Probability Seminar, Department of Mathematics, University of Minnesota (03/16); Department of Industrial Engineering and Operations Research, University of California, Berkeley (02/16); Department of Statistics, Purdue University (01/16); Department of Statistics, Cornell University (03/16); Department of Statistics, Wharton School, University of Pennsylvania (03/16); Department of Statistics, University of California, Davis (03/16); Probability Seminar, Department of Statistics, Stanford University (03/16); Microsoft Research, New England, Cambridge, Massachusetts (12/15); Probability Seminar, Department of Statistics, Stanford University (11/14); Applied Statistics Unit, Indian Statistical Institute (ISI), Kolkata, India (01/14).

CONFERENCE TALKS

Session on *Causal Inference*, Young Statistician Meet (YSM), Indian Statistical Institute, Kolkata (01/2020); Session on *Large Scale Inference and Applications*, Innovations in Data and Statistical Sciences (INDSTATS), Indian Institute of Technology, Mumbai (12/19); CombinaTexas Conference, Department of Mathematics, Texas A&M University (02/18); Session on *Recent Advances in the Analysis of Network Data*, IISA International Conference on Statistics, Hyderabad, India (12/17); Session on *Statistics and Machine Learning*, INFORMS Applied Probability Society

Conference, Northwestern University (07/17); Session on *Probability Theory and Networks*, IISA International Conference on Statistics, Portland, Oregon (08/16); NIPS *Workshop on Modelling and Inference for Dynamics on Complex Interaction Networks*, Montreal, Canada (12/15).

SOFTWARE

- Invited contribution to the **Wolfram Demonstration Project**: *Fermat-Weber Point of a Polygonal Chain*.

ADVISING

- Ph.D. Dissertation Advisor:
 - Somabha Mukherjee, Department of Statistics, The Wharton School, University of Pennsylvania, expected to graduate in 2021.
- Ph.D. Dissertation Committee: Kwonsang Lee (Applied Mathematics), Raiden Hasegawa, (Statistics), Cecilia Balocchi, (Statistics), Seth Neel, (Statistics), Weichen Zhou (Mathematics), Siyu Heng (Applied Mathematics), Kaitian Jin (Mathematics).

GRANT SUPPORT

- NIH-R01AI146129 (Co-Investigator): *An immune system for the city: a new paradigm for control of urban disease vectors*, 07/01/2019–06/30/2024 (Principal Investigators: Micheal Z. Levy and Valerie A. Paz-Soldan).

AWARDS

1. Awarded the inaugural *Probability Dissertation Award* by the Department of Statistics, Stanford University in 2016.
2. Awarded the *Sabyasachi Roy Memorial Gold Medal* for the best Master's thesis in the 2009-2011 M. Stat. program of Indian Statistical Institute, Kolkata, India.
3. Fellow of the *Kishore Vaigyanik Protsahan Yojana* (KVPY), 2008. This is a National Fellowship awarded by the Department of Science and Technology (DST), Govt. of India to undergraduate students.

REFERRING ACTIVITY

- JOURNALS: *Annals of Statistics*, *Biometrika*, *Journal of the American Statistical Association*, *International Mathematics Research Notices*, *Probability Theory and Related Fields*, *Annals of Applied Probability*, *Random Structures and Algorithms*, *Discrete Mathematics*, *Annals of the Institute of Henri Poincare: Series D*, *Discrete Applied Mathematics*, *Journal of High Energy Physics*, *Computational Geometry: Theory and Applications*, *Discrete and Computational Geometry*, *Theoretical Computer Science*, *Information Processing Letters*, *National Academy of Sciences, India Section A: Physical Sciences*.
- CONFERENCES: *Foundations of Computer Science* (FOCS), *Symposium on Theory of Computing* (STOC), *Symposium on Discrete Algorithms* (SODA), *Symposium on Theoretical Aspects of Computer Science* (STACS), *Conference on Learning Theory* (COLT), *Foundations of Software*

Technology and Theoretical Computer Science (FSTTCS), International Conference on Algorithms and Complexity (CIAC), Workshop on Algorithms and Computation (WALCOM).

UNIVERSITY SERVICE

- Statistics Department Ph.D. Admissions Committee, 2019, 2020.
- Member of the Vice Provost's Committee for Education Fellowship, 2018, 2019.
- Seminar Organizer: Department of Statistics, The Wharton School, University of Pennsylvania, 2016-2017.