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Born: *November 26, 1979, Calcutta, India.*
Citizenship: *India*
Immigration status: *Permanent Resident in the US*

Employment

Sept 2013 onwards	Professor of Mathematics and Statistics, Stanford University.
Sept 2009 – Aug 2013	Associate Professor of Mathematics, Courant Institute, NYU.
July 2009 – June 2011	Associate Professor of Mathematics and Statistics, UC Berkeley. (On leave.)
July 2006 – June 2009	Assistant Professor of Statistics, UC Berkeley.
July 2005 – June 2006	Visiting Neyman Assistant Professor of Statistics, UC Berkeley.

Education

June 2005	Ph.D. in Statistics, Stanford University. Advisor: Persi Diaconis.
May 2002	Master of Statistics, Indian Statistical Institute, Kolkata.
May 2000	Bachelor of Statistics, Indian Statistical Institute, Kolkata.

Awards and honors

1. 2023 Fellow of the Royal Society.
2. 2020 Infosys Prize in Mathematical Sciences.
3. 2018 Fellow of the Institute of Mathematical Statistics.
4. 2014 Invited Talk at the International Congress of Mathematicians.
5. 2013 Line and Michel Loève International Prize in Probability.
6. 2013 Young Researcher Award from the International Indian Statistical Association.
7. 2012 IMS Medallion Lecture.
8. 2012 First recipient of the Doeblin Prize in Probability.
9. 2010 Rollo Davidson Prize, awarded by the Rollo Davidson Trustees, University of Cambridge.
10. 2008 Tweedie New Researcher Award, from the Institute of Mathematical Statistics.
11. 2007 Sloan Research Fellowship in Mathematics.

Editorial and other board memberships

1. Scientific Research Board of the American Institute of Mathematics, 2022 – 2025.
2. Scientific Advisory Committee of the Simons Laufer Mathematical Sciences Institute (formerly Mathematical Sciences Research Institute), 2022 – 2026.

3. Proceedings of the London Mathematical Society, 2023 onwards.
4. Annals of Applied Probability, 2022 onwards.
5. Communications in Mathematical Physics, 2019 onwards.
6. Sankhyā, Series A, 2012 – 2015.
7. Probability Theory and Related Fields, 2011 – 2015.
8. Annals of Probability, 2009 – 2014.
9. Annales de l'Institut Henri Poincaré (B), 2008 – 2013.

Notable lectures

1. Peter Whittle Lecture at the University of Cambridge, October 2023.
2. Keynote speaker at COLT 2023.
3. Plenary talk at the 15th Latin American Congress of Probability and Statistics, 2019.
4. Infosys-ICTS Ramanujan Lectures, 2019.
5. Invited speaker at the 16th Northeast Probability Seminar, 2017.
6. Invited lecturer at the Saint Flour Probability Summer School, 2015.
7. Plenary speaker at the Eastern Sectional meeting of the AMS, October 2014.
8. Invited speaker at the International Congress of Mathematicians (ICM 2014), Probability and Statistics Section, Seoul, 2014.
9. Charles River Lectures on Probability and Related Topics, 2014.
10. Invited lecturer at the Cornell Probability Summer School, 2012.
11. Invited speaker at the International Congress of Mathematical Physics (ICMP 2012), Aalborg, August 2012.
12. Institute of Mathematical Statistics Medallion Lecture, given at the IMS Annual Meeting/8th World Congress of Probability and Statistics, Istanbul, July 2012.
13. Plenary talk at Stochastic Processes and Applications (SPA 2009), Berlin, July 2009.
14. Plenary talk at Seminar on Stochastic Processes (SSP 2009), Stanford, March 2009.

Visiting positions

Academic year 2023-2024	Member at the School of Mathematics, Institute for Advanced Study, Princeton.
Sept 2012 – Aug 2013	Visiting Associate Professor of Mathematics and Statistics, Stanford University.
May 2008	Visiting Professor of Mathematics at Université de Toulouse, France.

Books

1. *Large Deviations for Random Graphs.* (Lecture notes for the 45th Saint Flour Probability Summer School, 2015.) Springer, Berlin-Heidelberg, 2017.
2. *Superconcentration and Related Topics.* Springer Monographs in Mathematics. Springer, Berlin-Heidelberg, 2014.

Preprints and submitted papers (available on arXiv)

1. Spin glass phase at zero temperature in the Edwards-Anderson model.
2. A survey of some recent developments in measures of association.
3. Estimating large causal polytree skeletons from small samples. (with Mathukumalli Vidyasagar)
4. An invariance principle for the 1D KPZ equation. (with Arka Adhikari)

5. Convergence of gradient descent for deep neural networks.
6. A state space for 3D Euclidean Yang–Mills theories. (with Sky Cao)
7. Universality of deterministic KPZ.
8. The $1/N$ expansion for $SO(N)$ lattice gauge theory at strong coupling. (with Jafar Jafarov)
9. High dimensional regression and matrix estimation without tuning parameters.
10. Prediction error of cross-validated Lasso. (with Jafar Jafarov)
11. On level sets of Gaussian fields. (with Amir Dembo and Jian Ding)
12. Stochastic solutions of the wave equation.
13. Assumptionless consistency of the Lasso.
14. Properties of Uniform Doubly Stochastic Matrices. (with Persi Diaconis and Allan Sly)
15. Disorder chaos and multiple valleys in spin glasses.
16. Chaos, concentration, and multiple valleys.
17. The Ghirlanda-Guerra identities without averaging.
18. A simple invariance theorem.
19. An error bound in the Sudakov-Fernique inequality.

Published or accepted papers

1. A random walk on the Rado graph. (with Persi Diaconis and Laurent Miclo) To appear in *Toeplitz Operators and Random Matrices,* in honor of Harold Widom. Edited by E. Basor, A. Böttcher, T. Ehrhardt, and C. A. Tracy. *Springer Nature, Switzerland.*
2. The Yang–Mills heat flow with random distributional initial data. (with Sky Cao) *Comm. Partial Diff. Eq.,* **48** no. 2, 209–251, 2023.
3. Existence of stationary ballistic deposition on the infinite lattice. *Random Structures and Algorithms,* **62** no. 3, 600–622, 2023.
4. Weak convergence of directed polymers to deterministic KPZ at high temperature. *Ann. de l'Institut Henri Poincaré Probab. Stat.,* **59** no. 2, 774–794, 2023.
5. Superconcentration in surface growth. *Random Structures and Algorithms,* **62**, 304–334, 2023.
6. Isomorphisms between random graphs. (with Persi Diaconis) *J. Combin. Theory, Ser. B.,* **160**, 144–162, 2023.
7. Local KPZ behavior under arbitrary scaling limits. *Comm. Math. Phys.,* **396** no. 3, 1277–1304, 2022.
8. Matrix completion with data-dependent missingness probabilities. (with Sohom Bhattacharya) *IEEE Trans. Inf. Theory.,* **68** no. 10, 6762–6773, 2022.
9. Convergence of deterministic growth models. (with Panagiotis E. Souganidis) *Arch. Rational Mech. Anal.,* **245** no. 2, 863–898, 2022.
10. A phase transition for repeated averages. (with Persi Diaconis, Allan Sly and Lingfu Zhang) *Ann. Probab.,* **50** no. 1, 1–17, 2022.
11. A new coefficient of correlation. *J. Amer. Statist. Assoc.,* **116** no. 536, 2009–2022, 2021.
12. A simple measure of conditional dependence. (with Mona Azadkia) *Ann. Statist.,* **49** no. 6, 3070–3102, 2021.
13. A probabilistic mechanism for quark confinement. *Comm. Math. Phys.* **385**, 1007–1039, 2021.
14. Average Gromov hyperbolicity and the Parisi ansatz. (with Leila Sloman) *Adv. Math.,* **376**, 107417, 2021.
15. A deterministic theory of low rank matrix completion. *IEEE Trans. Inf. Theory,* **66** no. 12, 8046–8055, 2020.

16. Speeding up Markov chains with deterministic jumps. (with Persi Diaconis) *Probab. Theory Related Fields,* (special issue in honor of Harry Kesten) **178** no. 3, 1193–1214, 2020.
17. Fluctuation lower bounds in planar random growth models. (with Erik Bates) *Ann. de l'Inst. Henri Poincaré Probab. Stat.,* **56** no. 4, 2406–2427, 2020.
18. Localization in Gaussian disordered systems at low temperature. (with Erik Bates) *Ann. Probab.,* **48** no. 6, 2755–2806, 2020.
19. Wilson loops in Ising lattice gauge theory. *Comm. Math. Phys.,* **377**, 307–340, 2020.
20. Constructing a solution of the $(2+1)$-dimensional KPZ equation. (with Alexander Dunlap) *Ann. Probab.,* **48** no. 2, 1014–1055, 2020.
21. The endpoint distribution of directed polymers. (with Erik Bates) *Ann. Probab.,* **48** no. 2, 817–871, 2020.
22. Localization in random geometric graphs with too many edges. (with Matan Harel) *Ann. Probab.,* **48** no. 2, 574–621, 2020.
23. Rigidity of the three-dimensional hierarchical Coulomb gas. *Probab. Theory Related Fields,* **175** no. 3, 1123–1176, 2019.
24. Proof of the path localization conjecture for directed polymers. *Comm. Math. Phys.,* **370**, 703–717, 2019.
25. A general method for lower bounds on fluctuations of random variables. *Ann. Probab.,* **47** no. 4, 2140–2171, 2019.
26. Yang–Mills for probabilists. In *Probability and Analysis in Interacting Physical Systems: In Honor of S. R. S. Varadhan, pp. 1–16,* Springer, Berlin, 2019.
27. Central limit theorem for the free energy of the random field Ising model. *J. Stat. Phys.,* **175**, 185–202, 2019.
28. Rigorous solution of strongly coupled $SO(N)$ lattice gauge theory in the large N limit. *Comm. Math. Phys.,* **366**, 203–268, 2019.
29. On the decay of correlations in the random field Ising model. *Comm. Math. Phys.,* **362** no. 1, 253–267, 2018.
30. Arbitrarily small perturbations of Dirichlet Laplacians are quantum unique ergodic. (with Jeffrey Galkowski) *J. Spectr. Theory.,* **8** no. 3, 909–947, 2018.
31. The sample size required in importance sampling. (with Persi Diaconis) *Ann. App. Probab.,* **28** no. 2, 1099–1135, 2018.
32. Discussion of the paper on "Concentration for (regularized) empirical risk minimization" by Sara van de Geer and Martin Wainwright. *Sankhya A,* **79** no. 2, 208–211, 2017.
33. A central limit theorem for a new statistic on permutations. (with Persi Diaconis) *Indian J. Pure App. Math.,* (special issue in honor of Prof. B. V. Rao) **48** no. 4, 561–573, 2017.
34. A note about the uniform distribution on the intersection of a simplex and a sphere. *J. Topol. Anal.,* **9** no. 4, 717–738, 2017.
35. Minimal spanning trees and Stein's method. (with Sanchayan Sen) *Ann. App. Probab.,* **27** no. 3, 1588–1645, 2017.
36. The leading term of the Yang-Mills free energy. *J. Funct. Anal.,* **271**, 2944–3005, 2016.
37. An introduction to large deviations for random graphs. *Bull. Amer. Math. Soc.,* **53** no. 4, 617–642, 2016.
38. Nonlinear large deviations. (with Amir Dembo) *Adv. Math.,* **299**, 396–450, 2016.
39. Absence of replica symmetry breaking in the random field Ising model. *Commun. Math. Phys.,* **337** no. 1, 93–102, 2015.

40. Matrix estimation by Universal Singular Value Thresholding. *Ann. Statist.,* **43** no. 1, 177–214, 2015.
41. A short survey of Stein's method. *Proceedings of ICM 2014,* Vol IV, 1–24, 2014.
42. A new perspective on least squares under convex constraint. *Ann. Statist.,* **42** no. 6, 2340–2381, 2014.
43. Fluctuations of the Bose-Einstein condensate. (with Persi Diaconis) *J. Phys. A: Math. Theor.,* **47**, 085201 (23pp), 2014.
44. Invariant measures and the soliton resolution conjecture. *Comm. Pure Appl. Math.,* **67** no. 11, 1737–1842, 2014.
45. Central limit theorem for first-passage percolation time across thin cylinders. (with Partha S. Dey) *Probab. Theory Related Fields,* **156** nos. 3-4, 613–663, 2013.
46. Random Overlap Structures: Properties and Applications to Spin Glasses. (with Louis-Pierre Arguin) *Probab. Theory Related Fields,* **156** nos. 1-2, 375–413, 2013.
47. The universal relation between scaling exponents in first-passage percolation. *Ann. Math. (2),* **177** no. 2, 663–697, 2013.
48. Estimating and Understanding Exponential Random Graph Models. (with Persi Diaconis) *Ann. Statist.,* **41** no. 5, 2428–2461, 2013.
49. Probabilistic methods for discrete nonlinear Schrödinger equations. (with Kay Kirkpatrick) *Comm. Pure Appl. Math.* **65** no. 5, 727–757, 2012.
50. Large deviations for random matrices. (with S. R. S. Varadhan) *Comm. Stoch. Analysis,* **6** no. 1, 1–13, 2012.
51. The missing log in large deviations for triangle counts. *Random Structures and Algorithms,* **40** no. 4, 437–451, 2012.
52. A new approach to strong embeddings. *Probab. Theory Related Fields,* **152**, 231–264, 2012.
53. Random multiplicative functions in short intervals. (with Kannan Soundararajan) *Int. Math. Res. Not.,* **2012** no. 3, 479–492, 2012.
54. A combinatorial analysis of interacting diffusions. (with Soumik Pal) *J. Theoret. Probab.,* **24**, 939–968, 2011.
55. Random graphs with a given degree sequence. (with Persi Diaconis and Allan Sly) *Ann. App. Probab.,* **21** no. 4, 1400–1435, 2011.
56. Exponential Approximation by Exchangeable Pairs and Spectral Graph Theory. (with Jason Fulman and Adrian Roellin) *ALEA*, **8**, 1–27, 2011.
57. Non-normal approximation by Stein's Method of Exchangeable Pairs with Application to the Curie-Weiss Model. (with Qi-Man Shao) *Ann. App. Probab.,* **21** no. 2, 464–483, 2011.
58. Spectral clustering and the high-dimensional Stochastic Block Model. (with Karl Rohe and Bin Yu) *Ann. Statist.,* **39** no. 4, 1878–1915, 2011.
59. The large deviation principle for the Erdős-Rényi random graph. (with S. R. S. Varadhan) *European J. Comb.,* **32** no. 7, 1000–1017, 2011.
60. Phase Transitions in Gravitational Allocation. (with Ron Peled, Yuval Peres and Dan Romik) *Geom. Funct. Anal.,* **20**, 870–917, 2010.
61. Applications of Stein's method for concentration inequalities. (with Partha S. Dey) *Ann. Probab.,* **38** no. 6, 2443–2485, 2010.
62. Gravitational allocation to Poisson points. (with Ron Peled, Yuval Peres, and Dan Romik) *Ann. Math. (2),* **172** no. 1, 617–671, 2010.
63. Spin glasses and Stein's method. *Probab. Theory Related Fields.,* **148** nos. 3–4, 567–600, 2010.

64. A phase transition behavior for Brownian motions interacting through their ranks. (with Soumik Pal) *Probab. Theory Related Fields,* **147**, 123–159, 2010.
65. Fluctuations of eigenvalues and second order Poincaré inequalities. *Probab. Theory Related Fields,* **143**, 1–40, 2009.
66. Central Limit Theorems for the Energy Density in the Sherrington-Kirkpatrick Model. (with Nicholas Crawford) *J. Statist. Phys.,* **137**, 639–666, 2009.
67. An observation about submatrices. (with Michel Ledoux) *Elec. Comm. Probab.,* **14**, 495–500, 2009.
68. Consistent estimates of deformed Gaussian random fields on the plane. (with Ethan Anderes) *Ann. Statist.,* **37** no. 5A, 2324–2350, 2009.
69. A new method of normal approximation. *Ann. Probab.,* **36**, no. 4, 1584–1610, 2008.
70. Multivariate normal approximation using exchangeable pairs. (with Elizabeth Meckes) *ALEA,* **4** 257–283, 2008.
71. Stein's method for concentration inequalities. *Probab. Theory Related Fields,* **138**, 305–321, 2007.
72. Estimation in spin glasses: A first step. *Ann. Statist.,* **35**, no. 5, 1931–1946, 2007.
73. Concentration of Haar measures, with an application to random matrices. *J. Funct. Anal.,* **245**, 379–389, 2007.
74. A generalization of the Lindeberg principle. *Ann. Probab.,* **34**, no. 6, 2061–2076, 2006.
75. Concentration inequalities with exchangeable pairs. *Ph.D. thesis.* Stanford University, 2005.
76. Exchangeable pairs and Poisson approximation. (with Persi Diaconis and Elizabeth Meckes) *Probab. Surv.*, **2**, 64–106, 2005.
77. A new method for bounding rates of convergence of empirical spectral distributions. (with Arup Bose) *J. Theoret. Probab.,* **17** no. 4, 1003–1019, 2004.
78. Limiting spectral distributions of large dimensional random matrices. (with Arup Bose and Sreela Gangyopadhyay) *J. Indian Statist. Assoc.,* **41** no. 2, 221–259, 2003.