

# Nabarun Deb

## Curriculum Vitae/Resume

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📄 [nabarund.github.io/](https://nabarund.github.io/)

### Education

- 2017- **Doctor of Philosophy**, *Columbia University*, New York, USA
  - Department of Statistics
  - Supervised by *Dr. Bodhisattva Sen* and *Dr. Sumit Mukherjee*
- 2015-2017 **Master of Statistics (M. Stat)**, *Indian Statistical Institute*, Kolkata, India
  - Specialization: Theoretical Statistics
  - Dissertation under *Dr. Moulinath Banerjee*
  - First Division with Distinction
- 2012-15 **Bachelor of Statistics (B. Stat)(Hons)**, *Indian Statistical Institute*, Kolkata, India
  - First Division with Distinction

### Research Interests

- Nonparametric inference and testing
- Theory of optimal transport and its applications in statistics
- Kernel methods and  $k$ -nearest neighbor graphs
- Multiple hypotheses testing
- Network models and theory of dependent observations (Ising model, exponential random graph models, etc.)

### Papers

- Ghosh, A., **Deb, N.**, Karmakar, B., Sen, B. (2021+). Efficiency of Regression (Un)-Adjusted Rosenbaum's Rank-based Estimator in Randomized Experiments (Preprint). See <https://arxiv.org/pdf/2111.15524.pdf>
- **Deb, N.**, Ghosal, P., Sen, B. (2021+). Rates of Estimation of Optimal Transport Maps using Plug-in Estimators via Barycentric Projections (Status: **"Accepted"** at *Neural Information Processing Systems (NeurIPS) 2021*). See <https://arxiv.org/abs/2107.01718>
- Auddy, A.\*, **Deb, N.\***, Nandy, S.\* (2021+), (\* all authors are Ph.D. students and they contributed equally). Exact Detection Thresholds for Chatterjee's Correlation (Status: Submitted). See <https://arxiv.org/pdf/2104.15140.pdf>
- **Deb, N.**, Bhattacharya, B., Sen, B. (2021+). Efficiency Lower Bounds for Distribution-Free Hotelling-Type Two-Sample Tests Based on Optimal Transport (Status: "Reject with resubmission" at *Annals of Statistics*; to be resubmitted). See <https://arxiv.org/pdf/2104.01986.pdf>
- Huang, Z., **Deb, N.**, Sen, B. (2020+). Kernel Partial Correlation Coefficient – a Measure of Conditional Dependence. (Status: **"Accepted"** at *Journal of Machine Learning Research (JMLR)*). See <https://arxiv.org/pdf/2012.14804.pdf>
- **Deb, N.**, Mukherjee, R., Mukherjee, S., and Yuan, M. (2020+). Detecting Structured Signals in Ising Models. (Status: **"Major revision requested"** at *Annals of Applied Probability*). See <https://arxiv.org/pdf/2012.05784.pdf>

- **Deb, N.**, Ghosal, P., and Sen, B. (2020+). Measuring Association on Topological Spaces Using Kernels and Geometric Graphs. (Status: "Reject with resubmission" at *Annals of Statistics*; to be resubmitted). See <https://arxiv.org/pdf/2010.01768.pdf>
- **Deb, N.**, and Mukherjee, S. (2020+). Fluctuations in Mean-Field Ising Models. (Status: **"Accepted"** at *Annals of Applied Probability*). See <https://arxiv.org/pdf/2005.00710.pdf>
- **Deb, N.**, and Sen, B. (2019+). Multivariate Rank-based Distribution-free Nonparametric Testing using Measure Transportation. (Status: **"Accepted"** at *J. Amer. Statist. Assoc. (JASA)*). See <https://arxiv.org/pdf/1909.08733.pdf>
- **Deb, N.**, Saha, S., Guntuboyina, A., and Sen, B. (2018+). Two-component Mixture Model in the Presence of Covariates. (Status: **"Accepted"** at *J. Amer. Statist. Assoc. (JASA)*). See <https://arxiv.org/pdf/1810.07897.pdf>). Also see <https://cran.r-project.org/web/packages/NPMLEmix/index.html> for the **associated R package**

## Awards and Achievements

- 2019 *Minghui Yu Teaching Assistant Award* in the Statistics Department, Columbia University
- 2019 *Student Paper Competition winner* in the Theory & Methods section, *International Indian Statistical Association (IISA)*, Mumbai, India
- 2017 Nominated for the Prasanta Chandra Mahalanobis Gold medal for outstanding performance in the Master of Statistics Programme, Indian Statistical Institute, Kolkata, India  
-Awarded to the top 4 students in class
- 2012 An INMO *Indian National Mathematical Olympiad* merit certificate holder  
-Awarded to the top 75 students in the country
- 2012 A recipient of the award of Scholarship for Higher Education (SHE) under Innovation in Science Pursuit for Inspired Research *INSPIRE*  
-It is awarded to the top 1% students in the Indian School Certificate Examinations, 2012

## Talks, Conferences and Workshops

- 2022 (Invited Talk) Kantorovich Initiative Seminar Series, September 2022  
Title: *Effect of Dependence on the Convergence of Empirical Wasserstein Distance*
- 2022 (Invited Talk) Joint Statistical Meeting Session "On Recent Progress in Measuring Dependence and Conditional Dependence", August 2022  
Title: *Measuring Association on Topological Spaces Using Kernels and Geometric Graphs*
- 2022 (Invited Talk) Institute for Mathematical and Statistical Innovation (IMSI) Workshop on Applied Optimal Transport, May 2022  
Title: *Effect of Dependence on the Convergence of Empirical Wasserstein Distance*
- 2022 (Invited Talk) Kantorovich Initiative retreat, March 2022  
Title: *Optimal Transport in Statistics and Pitman efficient multivariate distribution-free testing*
- 2022 (Invited (Job) Talk) University of Wisconsin, February 2022  
Title: *Optimal Transport in Statistics and Pitman efficient multivariate distribution-free testing*
- 2022 (Invited (Job) Talk) University of California, San Diego, February 2022  
Title: *Optimal Transport in Statistics and Pitman efficient multivariate distribution-free testing*
- 2022 (Invited (Job) Talk) Cornell University, Operations Research and Information Engineering Department, February 2022  
Title: *Optimal Transport in Statistics and Pitman efficient multivariate distribution-free testing*

- 2022 (Invited (Job) Talk) University of Chicago, Booth School of Business, Econometrics and Statistics group, February 2022  
Title: *Optimal Transport in Statistics and Pitman efficient multivariate distribution-free testing*
- 2022 (Invited (Job) Talk) Purdue University, February 2022  
Title: *Optimal Transport in Statistics and Pitman efficient multivariate distribution-free testing*
- 2022 (Invited (Job) Talk) University of Illinois, Urbana Champaign, February 2022  
Title: *Optimal Transport in Statistics and Pitman efficient multivariate distribution-free testing*
- 2022 (Invited (Job) Talk) Stanford University for Stein's Fellow position, February 2022  
Title: *Optimal Transport in Statistics and Pitman efficient multivariate distribution-free testing*
- 2022 (Invited (Job) Talk) Rutgers University, February 2022  
Title: *Optimal Transport in Statistics and Pitman efficient multivariate distribution-free testing*
- 2022 (Invited (Job) Talk) University of California, Davis, January 2022  
Title: *Optimal Transport in Statistics and Pitman efficient multivariate distribution-free testing*
- 2022 (Invited (Job) Talk) University of Minnesota, January 2022  
Title: *Optimal Transport in Statistics and Pitman efficient multivariate distribution-free testing*
- 2022 (Invited (Job) Talk) University of North Carolina at Chapel Hill, January 2022  
Title: *Optimal Transport in Statistics and Pitman efficient multivariate distribution-free testing*
- 2022 (Invited (Job) Talk) Penn State University, January 2022  
Title: *Optimal Transport in Statistics and Pitman efficient multivariate distribution-free testing*
- 2022 (Invited (Job) Talk) University of Michigan, January 2022  
Title: *Optimal Transport in Statistics and Pitman efficient multivariate distribution-free testing*
- 2021 (Invited (Job) Talk) Texas A&M University, December 2021  
Title: *Optimal Transport in Statistics and Pitman efficient multivariate distribution-free testing*
- 2021 (Invited Talk) Indian Statistical Institute Stat-Math seminar, December 2021  
Title: *Fluctuations for Conditionally Centered Sums in Markov Random Fields*
- 2021 (Invited talk) 34<sup>th</sup> New England Statistics Symposium, October 2021  
Title: *Measuring Association/Conditional Association on Topological Spaces Using Kernels and Geometric Graphs*
- 2020 (Invited Talk) ETH Zurich, Young Data Science Researcher Seminar  
Title: *Measuring Association on Topological Spaces Using Kernels and Geometric Graphs*
- 2020 (Invited Talk) University of Berkeley, at the Berkeley-Columbia Meeting in Engineering and Statistics  
Title: *Multivariate Rank-based Distribution-free Nonparametric Testing using Measure Transportation*

- 2020 Participated in "Talking across fields", Stanford University — a conference in honor of Prof. Persi Diaconis
- 2019 (Invited Talk) International Indian Statistical Association (IISA) Conference, student paper award for Theory & Methods section  
Title: *Multivariate Rank-based Distribution-free Nonparametric Testing using Measure Transportation*
- 2019 (Talk) Joint Statistical Meeting, Denver, Colorado — contributed session  
Title: *Two-component Mixture Model in the Presence of Covariates*
- 2019 (Talk) Saint Flour Probability Summer School — student talk  
Title: *Fluctuations in Mean-Field Ising Models*
- 2019 (Talk) Minghui Conference, Columbia University.  
Title: *Fluctuations in Mean-Field Ising Models*
- 2018 Participated in the Banff International Research Station for Mathematical Innovation and Discovery (BIRS) Workshop on *Shape-Constrained Methods: Inference, Applications, and Practice*, Alberta, Canada
- 2017 (Invited Talk) Prasanta Chandra Mahalanobis memorial lecture, Indian Statistical Institute  
Title: *Change Point problems - detection and applications.*

## Technical expertise

Software Packages	R, Python, Matlab, Gurobi, Mathematica, Geogebra, $\text{\LaTeX}$ , HTML, Macromedia Flash	Programming Languages	BASIC, JAVA, C, C++
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## Teaching experience

- 2019 Qualifying Exams workshop (Theoretical Statistics) for Ph.D. students, Summer 2019
- 2017- Teaching assistant in the following courses:
1. Theoretical Statistics for first year Ph.D. students (2019 & 2020 & 2021 & 2022)
  2. Nonparametric statistics, both Masters and Undergrad levels (2018)
  3. Statistical Inference, Masters level (2017, 2018, 2019)
  4. Probability, Masters level (2017, 2018, 2019)
  5. Calculus-based Introduction to Statistics, Undergrad level (2020)
  6. Statistical Methods in Finance (2021)

## Professional Service

- 2019- Reviewer for the following journals: (1) Annals of Statistics, (2) Electronic Journal of Statistics, (3) Biometrika, (4) International Conference on Machine Learning (2020), (5) Insurance: Mathematics and Economics, (6) Journal of Statistical Planning and Inference, (7) Bernoulli, (8) IEEE Transactions on Information Theory, (9) Journal of the Royal Statistical Society: Series B, (10) Markov Processes and Related Fields, (11) AISTATS, and (12) Journal of Computational and Graphical Statistics

## Miscellaneous information

Communication Skills Fluent in speaking and writing English, Bengali, Hindi. Introductory French

Hobbies An avid sports lover, particularly interested in following cricket, lawn tennis and table tennis  
A voracious reader and poetry lover, I also love watching movies, listening to music and playing the synthesizer at leisure