

# Nabarun Deb

## Curriculum Vitae/Resume

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

## Education

- 2022- **Postdoctoral fellow**, University of British Columbia, Vancouver, Canada
  - Department of Mathematics (under the Kantorovich Initiative)
  - Supervised by Dr. Young-Heon Kim, Dr. Soumik Pal, and Dr. Geoffrey Schiebinger
- 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

- Bhattacharya, S., **Deb, N.**, Mukherjee, S. (2022+). LDP for Inhomogeneous U-Statistics (Status: Submitted). See <https://arxiv.org/pdf/2212.03944.pdf>
- 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>
- Audy, A., **Deb, N.**, Nandy, S. (2021+). 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*; Submitted). 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: **"Accepted"** 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

- 2023 (Invited Talk) Pacific Institute for the Mathematical Sciences (PIMS) Postdoctoral Fellow Seminar, February (2023)  
Title: *Optimal Transport in Statistics and Pitman efficient multivariate distribution-free testing*
- 2022 (Invited Talk) Computational and Methodological Statistics, December (2022)  
Title: *Optimal Transport in Statistics and Pitman efficient multivariate distribution-free testing*
- 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, $\LaTeX$ , HTML, Macromedia Flash	Programming Languages	BASIC, JAVA, C, C++
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## Teaching experience

- 2023 Instructor for "Integral Calculus with Applications" at UBC, Vancouver
- 2019 Qualifying Exams workshop (Theoretical Statistics) for Ph.D. students, Summer 2019
- 2017-2022 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/conferences: (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 Theory and Practice, (7) Bernoulli, (8) IEEE Transactions on Information Theory, (9) Journal of the Royal Statistical Society: Series B, (10) Markov Processes and Related Fields, (11) Artificial Intelligence and Statistics (AISTATS), (12) Journal of Computational and Graphical Statistics, (13) Journal of Machine Learning Research, (14) Annual Conference on Learning Theory, and (15) Statistica Sinica.
- 2022-23 Co-organizer of the Kantorovich Initiative Seminar series
- 2022- Organized session on “Optimal transport — Recent theoretical advances” in Computational and Methodological Statistics (2022) conference

## Miscellaneous information

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

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