Department of Statistics and Data Science
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Abhinav Chakraborty

PROFILE

Diligent and result-driven Ph.D. student in Statistics and Data Science, proficient in statistics, quantitative data analysis, probability, mathematics, and statistical theory and modeling. Experienced in conducting insightful research in high dimensional statistics and machine learning, particularly in multiple testing, variable selection, dimension reduction, double machine learning, distributed estimation, differential privacy, non-parametric and semi-parametric inference.

EDUCATION

2020–2025 **Doctor of Philosophy in Statistics**, The Wharton School, University of Pennsylvania. GPA **4.0**.

2018–2020 **Master of Statistics**, Indian Statistical Institute. **Specialization: Probability**. Grade: 94.9%.
Ranked 1 in M.Stat, passed in First Division with Distinction

2015–2018 **Bachelor of Statistics (Honours)**, Indian Statistical Institute. Grade: 86.5%.
Ranked 1 in B.Stat, Passed in First Division with Distinction.

PUBLICATIONS AND RESEARCH

2023 **Optimal Federated Learning for Non-parametric Estimation in Distributed Privacy Setting**
(Submitted to the **Annals of Statistics**) [Slides] [Technical Report]
Abhinav Chakraborty, Lasse Vuursteen, Tony Cai

2023 **Distributed Privacy - Multinomial Estimation and Inference** [Technical Report]
Abhinav Chakraborty, Tony Cai

2023 **Optimal private high-dimensional distributed testing** [In preparation]
Abhinav Chakraborty, Lasse Vuursteen, Tony Cai

2023 **Confidence bands for multidimensional Isotonic regression** [Technical Report]
Abhinav Chakraborty, Sabyasachi Chatterjee

2023 **Locally Private Community Detection in Mixed Membership Stochastic Block Models**
Abhinav Chakraborty, Sayak Chatterjee, Sagnik Nandy [Technical Report]

2022 **Optimal Differentially Private Ranking from Pairwise Comparisons**
(Submitted to **Journal of the American Statistical Association (JASA)**) [Technical Report]
Abhinav Chakraborty, Yichen Wang, Tony Cai

2022 **Minimax Optimal Estimation in Mixed Differential Privacy Setting** [Technical Report]
Abhinav Chakraborty, Tony Cai

2022 **Differentially Private Estimation in Ising Model** (Accepted at **AISTATS 2024**) [Technical Report]
Abhinav Chakraborty, Anirban Chatterjee, Abhinandan Dalal

2021 **Reconciling model-X and doubly robust approaches to conditional independence testing**
(Accepted with minor revision at **Annals of Statistics**) [Preprint]
Ziang Niu*, Abhinav Chakraborty*, Oliver Dukes, Eugene Katsevich (*equal contribution)

2020 **High dimensional PCA: a new model selection criterion** [Preprint]
Abhinav Chakraborty, Soumendu Sundar Mukherjee, Arijit Chakrabarti

INTERNSHIPS

2019 **Optimal Transport in Statistics**, with Prof. Bodhisattva Sen at Columbia University [Report]
Studied Parametric Estimation using Wasserstein Distance and multivariate Monge-Kantorovich Depth, Quantiles and Ranks

2018 **Skin Lesion Classification for Melanoma Detection**, with Prof. Jian Kang and Prof. Eunjee Lee at University of Michigan
Developed a skin lesion classification model using biomedical images, employing feature extraction, PCA, and stacking of various classifiers.

2017 **Form and Performance Analytics for Large Scale Online Assessments** at TCS ion [Slides]
Investigated questions like effect of time elapsed on accuracy and the suitability of test papers.

PROJECTS

2019 **Document Clustering:** Performed genre identification of English songs from their lyrics using **Latent Semantic Analysis**, **Probabilistic LSA**, and **Latent Dirichlet allocation**. [Slides] [Report]

2018 **Inflation Perception & Expectation** Studied people's **inflation** perceptions and expectations. Conducted a survey, performed **data analysis**, and compared results with Reserve Bank of India's inflation rates. [Slides] [Report]

2018 **Lag estimation in Paleoclimatic data:** Estimated the lag between two **time-series data** (namely temperature and CO_2 concentrations) in the Vostok ice core data using **Kernel-Matched Registration**. [Slides] [Report]

2017 **Data Obfuscation:** Developed techniques for obfuscating dataset identities while retaining distributional data aspects using **randomized response** and **noise addition** methods.

2017 **Wireless Sensor Networks:** Analyzed **time-series data** across spatial domains from numerous wireless sensors and used the model for **anomalous node detection**.

2016 **Handwriting Recognition:** Developed and applied a novel **Offline Handwriting Character Recognition algorithm** to real-world data to achieve significant accuracy. [Report]

AWARDS AND HONORS

2022 **George James Term Award**, *for the 2022 IMS Annual Meeting*.

2020 **ISI Alumni Association J.K. Ghosh Memorial Gold Medal**, *Top scorer in M.Stat program*.

2020 **PCM Gold Medal**, *Outstanding M.Stat student for best Master's Dissertation*.

2018 **ISI Alumni Association Mrs. M. R. Iyer Memorial Gold Medal**, *Top scorer in B.Stat program*.

2018 **Nikhilesh Bhattacharya Gold Medal**, *Highest marks in Statistics for B.Stat (Hons.) Program*.

2015 **INSPIRE Scholarship**, *Awarded to top 1% students in Indian School Certificate (ISC) Examination*.

2013 *Qualified for* **Indian National Mathematics Olympiad (INMO) 2014** *as a top-30 candidate in the Regional Mathematics Olympiad (RMO).*

TALKS

2023 **PhD Student Seminar**, University of Pennsylvania on *Optimal Distributed Private Estimators* [Slides]

2022 **IMS Annual Meeting**, London, UK on *High Dimensional PCA* [Slides]

2020 **P.C. Mahalanobis Gold Medal Presentation**, Indian Statistical Institute, on *Model Selection in High Dimensional PCA* [Slides]

2018 **D. Basu Memorial Presentation**, Indian Statistical Institute, on *MCMC Methods in Bayesian Inference* [Slides]

TEACHING

2021–23 **Teaching Assistant**: The Wharton School, The University of Pennsylvania, Philadelphia

Courses: STAT 4300 (Introduction to Probability), STAT 971 (Introduction to Linear Statistics), STAT 520 (Applied Econometrics)

SKILLS

Quantitative: Data Analytics, Machine Learning, Algorithms, Stochastic Calculus, Multivariate Statistical Analysis, Privacy, Causal Inference, Applied Probability, Bayesian Inference, Time-Series Analysis.

Software and Programming: R, Python, LaTeX. Familiar with Java and MATLAB.

Soft Skills: Strong analytical and problem-solving abilities, Effective communicator and presenter, Strategic thinker, Team player.