

Soham Jana

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Research interests

Theoretical and methodological aspects of high-dimensional statistics, mixture modeling, distance based estimators, neural networks.

Education

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| PhD. in Statistics and Data Science Yale University, New Haven, CT, USA Thesis: Learning non-parametric and high-dimensional distributions via information-theoretic methods Advisor: Prof. Yihong Wu | May 2022 |
| Master of Statistics (Hons.) (First class with distinction) Indian Statistical Institute, Kolkata, West Bengal, India Specialization: Theoretical Statistics Dissertation: Characterization of single-integral non-kernel divergences Advisor: Prof. Ayanendranath Basu | May 2017 |
| Bachelor of Statistics (Hons.) (First class with Distinction) Indian Statistical Institute, Kolkata, West Bengal, India | May 2015 |

Work experiences

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| University of Notre Dame, Notre Dame, IN, USA Assistant Professor, Department of Applied and Computational Mathematics and Statistics. | August 2024 – Current |
| Princeton University, Princeton, NJ, USA Postdoc, Department of Operations Research and Financial Engineering Hosts: Prof. Sanjeev Kulkarni and Prof. Jianqing Fan | June 2022 – July 2024 |
| Researcher, The First Republic Bank Research and Lifelong Learning Program | June 2022 – May 2023 |
| Lecturer | Spring 2023 and Fall 2023 |

Grants and awards

Professional Development

Kaneb Center Course Design Academy, University of Notre Dame
Award Amount: USD 5000

2024 – 2025

Preprints (“*”: Authors list not in alphabetical order)

1. Fan, J., Jana, S., Kulkarni, S., & Yin, Q. (2025). **Factor Informed Double Deep Learning For Average Treatment Effect Estimation**. arXiv preprint arXiv:2508.17136.
2. Chen, X.[†], Jana, S.[†], Metzler, C.A., Maleki, A. and Jalali, S.*, (2025). **Multilook Coherent Imaging: Theoretical Guarantees and Algorithms**. arXiv preprint arXiv:2505.23594. [†] Equal contributions.
3. Tang, S., Jana, S., & Fan, J. (2024). **Factor adjusted spectral clustering for mixture models**. arXiv preprint arXiv:2408.12564. Under major revision at the **Journal of American Statistical Association**.

Journal publications (“*”: Authors list not in alphabetical order)

1. Jana, S., Yang, K., & Kulkarni, S. (2025). **Adversarially robust clustering with optimality guarantees**. arXiv preprint arXiv:2306.09977. Accepted at the **IEEE Transactions on Information Theory**.
2. Jana, S., Polyanskiy, Y., & Wu, Y. (2025).* **Optimal empirical Bayes estimation for the Poisson model via minimum-distance methods, Information and Inference: A Journal of the IMA**, Volume 14, Issue 4, December 2025, iaaf027.
3. Jana, S., Fan, J., & Kulkarni, S. (2025).* **A provable initialization and robust clustering method for general mixture models** in **IEEE Transactions on Information Theory**, vol. 71, no. 9, pp. 7176-7207, Sept. 2025.
4. Jana, S., Li, H., Yamada, Y., & Lindenbaum, O. (2023). **Support recovery with Stochastic Gates: theory and application for linear models**. Elsevier Signal Processing (2023), 213, p.109193.
5. Han, Y., Jana, S., & Wu, Y. (2023). **Optimal Prediction of Markov Chains With and Without Spectral Gap**, in **IEEE Transactions on Information Theory**, vol. 69, no. 6, pp. 3920-3959, June 2023, doi: 10.1109/TIT.2023.3239508. (**Extended from the NeurIPS version with analysis of higher-order Markov chains and different loss functions**)
6. Jana, S. & Basu, A. (2019).* **A characterization of all single-integral, non-kernel divergence estimators**. **IEEE Transactions on Information Theory**, 65(12), 7976-7984.

Conference publications (“*”: Authors list not in alphabetical order)

1. Jana, S., Polyanskiy, Y., Teh, A. & Wu, Y. (2023). [Empirical Bayes via ERM and Rademacher complexities: the Poisson model](#). In Conference on Learning Theory 2023 Jul 15, PMLR 195:5199-5235.
2. Han, Y., Jana, S., & Wu, Y. (2021). [Optimal prediction of Markov chains with and without spectral gap](#). NeurIPS 2021.
3. Jana, S., Polyanskiy, & Wu, Y. (2020). [Extrapolating the profile of a finite population](#). In Conference on Learning Theory 2020 Jul 15 (pp. 2011-2033). PMLR.

Conferences and invited talks

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| Joint Statistical Meetings Nashville, TN, USA | August 2025 |
| IMS New Researchers Conference Nashville, TN, USA | July-August 2025 |
| International Webinar on Recent Trends in Statistical Theory and Applications Kerala, India | July 2025 |
| International Indian Statistical Association Lincoln, NEB, USA | June 2025 |
| International Indian Statistical Association Cochin, Kerala, India | December 2024 |
| Joint Statistical Meetings Portland, OR, USA | August 2024 |
| University of Notre Dame Statistics Department Seminar Notre Dame, IN, USA | February 2024 |
| University of Wisconsin-Madison Statistics Department Seminar Madison, WI, USA | February 2024 |
| University of Texas at Dallas Statistics Department Seminar Richardson, TX, USA | January 2024 |
| Indian Statistical Institute ISRU Department Seminar Kolkata, West Bengal, India | July 2023 |
| Conference on Learning Theory (COLT) Bangalore, Karnataka, India | July 2023 |
| Neural Information Processing systems (NeurIPS) Virtual | December 2021 |

Conference on Learning Theory (COLT)
Graz, Austria

July 2020

Teaching

University of Notre Dame

Introduction to probability (ACMS 30530) Fall 2024, Fall 2025

Modern Machine Learning Techniques with Application (ACMS 80870) Spring 2025

Princeton University

Probability and stochastic systems (ORF 309/ENG 309/MAT 380) Spring 2023

Statistical machine learning (ORF 570) Fall 2023

Professional activities

Paper reviewer

Annals of Statistics (3)

Journal of the American Statistical Association (1)

IEEE Transactions on Information Theory (8)

IEEE Wireless Communications Letters (1)

IEEE International Symposium on Information Theory (1)

Electronic Journal of Statistics (3)

Stat - an ISI Journal (1)

Algorithmic Learning Theory (7)

Bernoulli (1)

Statistica Sinica (1)

Journal of Statistical Planning and Inference (1)

Invited organizational duties at conferences

CFE-CMStatistics Conference December 2025

Session organizer: Recent advances in Causal Inference

Joint Statistical Meetings August 2025

Session chair: New Advances in Optimization Algorithms for Causal Discovery

Joint Statistical Meetings August 2024

Session chair: New Advances in Nonparametric Hypothesis Testing - Part I

Session chair: New Developments in Non-Euclidean Statistics

IEEE Conference on Information Sciences and Systems March 2024

Session chair: Machine learning and statistical inference

Community Service: Teaching at Math Circle, Notre Dame Spring 2025

Promoting STEM education among school children

Yale S&DS M.A. admission committee 2021

Reviewer: one of the committee members handling over
150 applications and making admission recommendations

Yale S&DS graduate reading group 2020
Co-organizer Scheduled talks and lead discussion sessions

Yale Women in Data Science (WiDS) workshop 2020
Served as a mentor for Yale undergrad students participating in the WiDS Datathon Challenge 2020

South Asian Graduate and Professional Association at Yale (SAGA) 2018 – 2021
Treasurer, core committee member and cultural committee head
Objective: organizing socio-cultural events to promote cultural exchanges at Yale

Other awards

INSPIRE Scholarship, Govt. of India 2012-2017

Indian National Mathematical Olympiad (INMO) merit certificate 2012
(For ranking among top 75 in INMO)