AARADHYA PANDEY

Graduate student in Operations Research & Financial Engineering, Princeton University

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Graduate and Undergraduate Education

Princeton University (advised by Sanjeev Kulkarni and Arian Maleki) *Princeton*

PhD in ORFE with Gordon Wu fellowship: 'awarded to the most outstanding incoming doctoral students in engineering' Sep. 2021 - present

Indian Institute of Science (IISc) *Bangalore*

Bachelor of Science in mathematics with CGPA 9.6/10 : discipline rank 1, was awarded the institute gold medal. Sep. 2017 - Jun. 2021

Research Interests

My research interests are at the interface of probability theory, mathematical statistics, machine learning, and information theory with applications in (quantum) differential privacy, machine unlearning and spin glasses.

Publications and Preprints

[1] **Infinitely divisible privacy and beyond I: Resolution of the $s^2 = 2k$ conjecture**. Aaradhya Pandey, Arian Maleki, Sanjeev Kulkarni. arXiv:2512.00734

[2] **Gaussian certified unlearning in high dimensions: a hypothesis testing approach**. Aaradhya Pandey, Arnab Auddy, Haolin Zou, Arian Maleki, Sanjeev Kulkarni. arXiv:2510.13094 (submitted)

[3] **Exact recovery in Gaussian weighted stochastic block model and planted dense subgraphs: statistical and algorithmic thresholds**. Aaradhya Pandey, Sanjeev Kulkarni. arXiv:2402.12515 (submitted)

[4] **Community detection in the hypergraph stochastic block model and reconstruction on hypertrees**. Yuzhou Gu, Aaradhya Pandey. *Proceedings of the 37th Conference on Learning Theory*, PMLR 247:2166–2203. PDF | Proceedings

Projects in Preparation

[1] **Quantum f-differential privacy: a hypothesis testing approach**. Aaradhya Pandey, Arian Maleki, Sanjeev Kulkarni.

[2] **Quantum infinitely divisible states: a genuinely quantum phenomenon**. Aaradhya Pandey, Arian Maleki, Sanjeev Kulkarni.

[3] **Multivariate version of the Ghirlanda–Guerra identities and the matrix of spin correlations**. Aaradhya Pandey, Arian Maleki, Sanjeev Kulkarni.

Invited Talks and Presentations

May 2025	Gave a tutorial on Information theory and Differential privacy at TIFR CAM	*Bangalore*
May 2025	Presented my work on the Gaussian certified unlearning paper at IISc	*Bangalore*
Jan 2025	Presented my work on the Correlation matrix of spin glasses at IISc and TIFR CAM	*Bangalore*
Oct 2024	Presented my work on Stochastic block model papers at Michigan State University	*Michigan*
Feb 2024	Our joint work on Stochastic block model paper was presented at the Institute of Advanced Study	*Princeton*

Academic Service

Reviewing	For journals Information and Inference, Foundations of Computational Mathematics, IEEE Transactions	*Princeton*
Teaching	Undergraduate probability theory, statistics, game theory, networks, signals, and systems classes	*Princeton*
Organizing	Spanning over several semesters a student reading group in High dimensional Probability and Statistics	*Princeton*

Selected Coursework

Credited	Topics classes in High-dimensional probability (ORF 550, Grade A), Statistical machine learning (ORF 570, Grade A), Probabilistic methods (MAT 577, Grade A), Nonlinear models in econometrics (ECO 519, Grade A)	*Princeton*
Audited	Classes in Phase transitions (PHY 535), Combinatorial optimization (MAT 572), Computational methods (MAT 586), Discrete probability (MAT 589), Condensed matter (MAT 595), Statistical mechanics (MAT 597)	*Princeton*

Fellowships and Achievements

2021 – 2026	Gordon Wu fellow : Awarded to the most outstanding incoming doctoral students in engineering	*Princeton*
NET 2020	Cleared with an all-India rank 1 in the entrance exam for mathematics PhD programs in India	*India*
2017 – 2021	KVPY fellow : Prestigious fellowship program for Indian undergraduate students interested in science	*Bangalore*
IIT JEE 2017	Cleared with an all-India rank of 305 (1 million participants) for undergraduate admission at IITs	*India*
Summer 2020	DAAD WISE : Prestigious fellowship for a funded summer project in Germany	*Bonn*

References

- **Yuzhou Gu**, Data Science Faculty Fellow, New York University ✉ yuzhougu@nyu.edu
- **Arnab Auddy**, Assistant Professor of Statistics, Ohio State University ✉ auddy.1@osu.edu
- **Arian Maleki**, Professor of Statistics, Columbia University ✉ arian@stat.columbia.edu
- **Sanjeev Kulkarni**, William R. Kenan Jr. Professor of ECE and ORFE, Princeton University ✉ kulkarni@princeton.edu