

Education

PhD in Computer Science | University of Pennsylvania | GPA: 4.0 / 4.0 | Philadelphia, PA, US Aug 2019 - (Current)

Advisors: Sampath Kannan, Anindya De

B.E. (Hons) Computer Science | Birla Institute of Technology and Science (BITS) Pilani | GPA: 8.78 / 10 | Pilani, India Aug 2014 - Jan 2018

Experience

University of Pennsylvania | Graduate Research Assistant | Philadelphia, US Aug 2019 - present

- Designed Algorithms for problems in Fair Resource Allocation and Groupwise Optimal Online Decision Making, including the first efficient algorithm for groupwise optimal regret minimization against linear regressors.
- Developed an algorithm for finding Stackelberg Equilibria in Finitely Repeated Games.
- Identified and characterized optimal learning algorithms for playing repeated games.
- Developed algorithms and corresponding lower bounds for learning ultrametric trees using noisy experiments, with applications to phylogeny reconstruction.
- Organizer - [UPenn CS Theory Seminar](#) Aug 2022 - current

Indian Institute of Science (IISc) | Research Assistant | Bengaluru, India Jan 2018 - Jul 2019

- Worked on problems from computational fair division with Siddharth Barman
- Developed state of the art algorithms for envy-free cake cutting, envy-free rent division, and improved algorithms for allocations of indivisible goods under various criteria

Conduent Research | Summer Research Intern | Bengaluru, India May 2017 - Jul 2017

- Worked on Resource Allocation problems, and wrote modules implementing algorithms for these problems.
- Proved upper bounds on the efficiency of resource allocation with geometric constraints.

University of Pennsylvania | Teaching Assistant | Philadelphia, US

- Teaching assistant for Graduate Algorithms (Fall 20) ; Teaching assistant for Randomized Algorithms (Fall 21); Teaching assistant for Graduate Theory of Computation (Fall 22)

Research Interests and Skills

Research Interests Algorithmic Game Theory, Machine Learning Theory, Online Decision Making, Algorithms

Languages Python (scikit-learn, pandas, NumPy, SciPy), C, C++

Relevant Graduate Coursework Randomized Algorithms, Machine Learning, Game Theory in Machine Learning, Elements of Probability Theory, Algorithms for Big Data, Computational Learning Theory, Analysis of Boolean Functions, Advanced Complexity Theory, Advanced Analysis, Combinatorial Optimization

Working Papers

- [An Elementary Predictor Obtaining \$2\sqrt{T}\$ Distance to Calibration](#); With N. Collina, A. Roth, M. Shi .
- [Pareto-Optimal Algorithms for Learning in Games](#) ; With N. Collina, J. Schneider ; [Talk Slides](#) .

Publications

- [Oracle Efficient Algorithms for Groupwise Regret](#); With K. Acharya, S. Kannan, A. Roth, J. Ziani; in *International Conference on Learning Representations (ICLR)*, 2024.
- [Efficient Stackelberg Strategies for Finitely Repeated Games](#) ; With N. Collina, M. Kearns; in *AAMAS (Full Paper)* , 2023.
- [Reconstructing Ultrametric Trees from Noisy Experiments](#); With A. De, S. Kannan; in *Algorithmic Learning Theory (ALT)*, 2023.
- [Wealth Dynamics Over Generations: Analysis and Interventions](#); with K. Acharya, S. Kannan, A. Roth, J. Ziani; in *IEEE Conference on Secure and Trustworthy Machine Learning (SaTML)*, 2023.
- [Pipeline Interventions](#); with S. Kannan, A. Roth, J. Ziani; in **Mathematics of Operations Research** (Originally appeared in *Innovations in Theoretical Computer Science (ITCS)*, 2021).
- [Fully Polynomial Time Approximation Schemes for Fair Rent Division](#); with S. Barman and N. Rathi; in **Mathematics of Operations Research** (Originally appeared in ACM-SIAM Symposium on Discrete Algorithms (SODA) 19) .
- [Fair and Efficient Cake Cutting with Connected Pieces](#); with S. Barman, R. Kumar and N. Rathi; in *Web and Internet Economics (WINE)*, 2019.
- [Fair Division with a Secretive Agent](#); with S. Barman and N. Rathi; in *AAAI*, 2019.

Funding Awards

- [AWS AI for research in Trustworthy AI Funding Award - 2023](#)