

Shivam Gupta

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| EDUCATION | University of Texas at Austin (UT Austin) Ph.D. in Computer Science (Advisor: Eric Price) | Aug 2018 – Present |
| | University of Illinois at Urbana-Champaign (UIUC) B.S. in Computer Science, Minor in Mathematics | May 2018 |
| INTERESTS | Diffusion Models, Statistics, Machine Learning, related topics | |
| EXPERIENCE | Massachusetts Institute of Technology Visiting Student (Host: Sam Hopkins) <ul style="list-style-type: none">Worked on proving sharper rates for high-probability mean estimation | Cambridge, MA Jun 2023 – Aug 2023 |
| | University of California, Berkeley Visiting Student Researcher <ul style="list-style-type: none">Developed theory for diffusion models, and wrote experiments to improve understandingDeveloped new mean and location estimation algorithms | Berkeley, CA Aug 2022 – May 2023 |
| | Sigma Computing, Inc. Research Intern <ul style="list-style-type: none">Worked on designing and implementing anomaly detection algorithms for various datasets | San Francisco, CA May 2022 – Aug 2022 |
| | University of Wisconsin, Madison Research Intern (Host: Ilias Diakonikolas) <ul style="list-style-type: none">Studied gradient descent algorithms to robustly estimate the mean of a high-dimensional GaussianWrote experiments for outlier-robust sparse estimation in Python and Numpy | Madison, WI May 2020 – Aug 2020 |
| | Jane Street Software Developer Intern <ul style="list-style-type: none">Wrote server code to employ state machine replication to send and receive data via RPCsDeveloped a market data parser in OCaml | New York, NY May 2016 – Aug 2016 |
| | Bloomberg L.P. R&D Intern <ul style="list-style-type: none">Developed real-time system for Bloomberg Terminal to track messages between services in C++ | New York, NY May 2015 – Aug 2015 |
| | Diffusion model for noisy training samples (with Eric Price) <ul style="list-style-type: none">Developing algorithm to sample clean images from a diffusion model trained on noisy data | Oct 2023 – Present |
| | Posterior Sampling for Diffusion models (with Eric Price, others) <ul style="list-style-type: none">Proving lower bounds and working on algorithms for posterior sampling for diffusion models given noisy linear measurements | Oct 2023 – Present |
| | 9. Beyond Catoni: Sharper Rates for Heavy-Tailed and Robust Mean Estimation Shivam Gupta, Samuel B. Hopkins, Eric Price <i>In preparation</i> | |
| | 8. Sample-Efficient Training for Diffusion Shivam Gupta, Aditya Parulekar, Eric Price, Zhiyang Xun <i>In submission</i> | |
| PAPERS | 7. Minimax-Optimal Location Estimation Shivam Gupta, Jasper C.H. Lee, Eric Price, Paul Valiant <i>Neural Information Processing Systems (NeurIPS) 2023</i> | |
| | 6. Finite-Sample Symmetric Mean Estimation with Fisher Information Rate Shivam Gupta, Jasper C.H. Lee, Eric Price <i>Conference on Learning Theory (COLT) 2023</i> | |
| | 5. High-dimensional Location Estimation via Norm Concentration for Subgamma Vectors Shivam Gupta, Jasper C.H. Lee, Eric Price <i>International Conference on Machine Learning (ICML) 2023</i> | |

4. **Finite-Sample Maximum Likelihood Estimation of Location**
Shivam Gupta, Jasper C.H. Lee, Eric Price, Paul Valiant
Neural Information Processing Systems (NeurIPS) 2022
3. **Outlier-Robust Sparse Estimation via Non-Convex Optimization**
Yu Cheng, Ilias Diakonikolas, Rong Ge, Shivam Gupta, Daniel Kane, Mahdi Soltanolkotabi
Neural Information Processing Systems (NeurIPS) 2022
2. **Sharp Constants in Uniformity Testing via the Huber Statistic**
Shivam Gupta, Eric Price
Conference on Learning Theory (COLT) 2022
1. **Nash Equilibrium Computation in Resource Allocation Games**
Shivam Gupta, Ruta Mehta
International Conference on Autonomous Agents and Multiagent Systems (AAMAS) 2018

SELECTED AWARDS

- C.W. Gear Outstanding Undergraduate Student Award 2018
- Horace and Kate King Wu International Undergraduate Scholarship 2018
- Illinois Engineering Achievement Scholarship 2017
- NTT Data, Inc., Scholarship 2015, 2016
- Franz Hohn and J.P. Nash Scholarship 2015 (for research in scientific computing)
- Perfect score in the Indian National Olympiad in Informatics, and selected as one of 26 students in India to attend the International Olympiad in Informatics training camp 2014
- ACM ICPC Mid-Central Regional: Team placed 6th in 2017, 4th in 2016
- Represented India in SEARCC Software Competition 2013, Colombo, Sri Lanka, and placed 3rd
- Placed 2nd in Dropbox Open programming contest 2015 at UIUC
- Won Bloomberg CodeCon Challenge and invited to CppCon 2015 in Bellevue, Washington
- Won 3Red Trading Tech Challenge in 2015 and 2016 and invited to Chicago

TALKS

- **Sample-Efficient Training for Diffusion** November 2023
IFML Workshop on Generative AI, UT Austin
- **A Finite-Sample Theory for Mean Estimation with Fisher Information Rate** October 2023
MIT Algorithms and Complexity Seminar
- **A Finite-Sample Theory for Mean Estimation with Fisher Information Rate** October 2023
CMU Theory Lunch
- **Finite-Sample Symmetric Mean Estimation with Fisher Information Rate** July 2023
Conference on Learning Theory, Bangalore, India

TEACHING

At UT Austin:

- *Teaching Assistant*, Sublinear Algorithms (CS 395T) Fall 2020
- *Teaching Assistant*, Introduction to Algorithms (CS 331) Spring 2019
- *Teaching Assistant*, Machine Learning (CS 395T) Summer 2019, Fall 2019
- *Teaching Assistant*, Elements of Data Analytics (CS 329E) Spring 2019
- *Teaching Assistant*, Elements of Computer Programming (CS 303E) Fall 2018

At UIUC:

- *Course Assistant*, Introduction to Algorithms (CS 374) Spring 2018
- *Grader*, Algorithms II (CS 473) Spring 2018

SKILLS

- *Languages*: C/C++, Python, Java, OCaml, Haskell, JavaScript
- *Software and Libraries*: NumPy, SciPy, PyTorch, Mathematica, \LaTeX

REVIEWING

SODA 2021, 2024; NeurIPS 2023; ITCS 2024; ALT 2024; ICLR 2024

RELEVANT COURSES

Probability and Stochastic Processes, Learning Theory, Coding Theory, Theoretical Statistics, Randomized Algorithms, Markov Chains and Mixing Time, Approximation Algorithms, Combinatorial Mathematics, Numerical Linear Algebra, Wireless Networking