

Education

The University of Texas at Austin (UT Austin), Austin, TX, USA
Ph.D. in Computer Science, School of Computer Science
Advisor: Prof. Adam Klivans

2021

Chennai Mathematical Institute (CMI), Chennai, India
M.Sc. in Computer Science
B.Sc. (Hons.) in Mathematics and Computer Science

2016

2014

Research Interests

Machine Learning, Statistics, Theoretical Computer Science

Work Experience

The University of Wisconsin at Madison

Research Associate,

September 2021 - September 2023 (expected)

Research Associate with Prof. Ilias Diakonikolas.

Simons Institute for the Theory of Computing, Berkeley

Long-term Visitor,

Fall 2021

Visiting postdoctoral fellow for the program on the “Computational Complexity of Statistical Inference”.

Institute of Advanced Study, Princeton

Visiting Student,

Fall 2019

Visiting graduate student for the “Special Year on Optimization, Statistics, and Theoretical Machine Learning”.

University of Southern California

Visiting Student,

Summer 2019

Worked on robustly clustering Gaussians with Prof. Ilias Diakonikolas and Dr. Samuel B. Hopkins and visited the Simons workshop on Deep Learning.

Microsoft Research, India

Research Intern,

Summer 2017

Worked on problems related to the concentration of fourier mass on low-degree fourier coefficients of boolean functions with Dr. Satya Lokam and on depth separation results for neural networks with Dr. Amit Deshpande.

Microsoft Research, India

Research Intern,

Summer 2015

Worked on problems related to threshold circuits and neural networks with Dr. Amit Deshpande.

Publications

- List-Decodable Sparse Mean Estimation via Difference-of-Pairs Filtering** (NeurIPS) 2022 (Oral)
Ilias Diakonikolas, Daniel M. Kane, Sushrut Karmalkar, Ankit Pensia and Thanasis Pitsas
- Robust Sparse Mean Estimation via Sum of Squares** COLT 2022
Ilias Diakonikolas, Daniel M. Kane, Sushrut Karmalkar, Ankit Pensia and Thanasis Pitsas
- Fairness for Image Generation with Uncertain Sensitive Attributes** ICML 2021
Ajil Jalal*, Sushrut Karmalkar*, Jessica Hoffman*¹, Alexandros Dimakis, Eric Price
- Optimal Sample Complexity for Compressed Sensing with Approximate Generative Priors** ICML 2021
Ajil Jalal, Sushrut Karmalkar, Alexandros Dimakis, Eric Price
- Approximation Schemes for ReLU Regression** COLT 2020
Ilias Diakonikolas, Surbhi Goel, Sushrut Karmalkar, Adam Klivans, Mahdi Soltanolkotabi
- Superpolynomial Lower Bounds for Learning One-Layer Neural Networks using Gradient Descent** ICML 2020
Surbhi Goel, Aravind Gollakota, Zhihan Jin, Sushrut Karmalkar, Adam Klivans

^{1*} indicates equal contribution

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| 7. Robustly Learning any Clusterable Mixture of Gaussians
Ilias Diakonikolas, Samuel B. Hopkins, Daniel Kane, Sushrut Karmalkar
<i>Conference version merged with: Bakshi, Kothari. Outlier-Robust Clustering of Non-Spherical Mixtures.</i> | FOCS 2020 |
| 8. Lower Bounds for Compressed Sensing with Generative Models
Akshay Kamath, Sushrut Karmalkar, Eric Price | ICML 2020 |
| 9. List-decodable Linear Regression
Sushrut Karmalkar, Adam Klivans, Pravesh Kothari | NeurIPS 2019 (Spotlight) |
| 10. Time/Accuracy Tradeoffs for Learning a ReLU with respect to Gaussian Marginals
Surbhi Goel, Sushrut Karmalkar, Adam Klivans | NeurIPS 2019 (Spotlight) |
| 11. Outlier-Robust High-Dimensional Sparse Estimation via Iterative Filtering
Ilias Diakonikolas, Daniel Kane, Sushrut Karmalkar, Eric Price, Alistair Stewart | NeurIPS 2019 |
| 12. Compressed Sensing with Adversarial Sparse Noise via L1 Regression
Sushrut Karmalkar, Eric Price | SOSA 2019 |
| 13. Fourier Entropy-Influence Conjecture for Random Linear Threshold Functions
Sourav Chakraborty, Sushrut Karmalkar, Srijita Kundu, Satyanarayana V. Lokam, Nitin Saurabh | LATIN 2018 |
| 14. Depth separation and weight-width trade-offs for sigmoidal neural networks
Amit Deshpande, Navin Goyal, Sushrut Karmalkar | ICLR 2018, Workshop |
| 15. Robust Polynomial Regression up to the Information Theoretic Limit
Daniel Kane, Sushrut Karmalkar, Eric Price | FOCS 2017 |
| 16. On Robust Concepts and Small Neural Nets
Amit Deshpande, Sushrut Karmalkar | ICLR 2017, Workshop |

Reviewing

ALT 2022, COLT 2019, 2020, 2022 (Junior Program Committee member); ALT 2020; FOCS 2019; STOC 2020, 2022; ISIT 2019, 2021; ICLR 2019, 2022

Teaching Experience

<i>CS311 Discrete Mathematics for Computer Science</i> , The University of Texas at Austin	Fall 2016, 2017, Spring 2017
<i>CS331 Algorithms</i> , The University of Texas at Austin	Spring 2016
<i>Design and Analysis of Algorithms</i> , Chennai Mathematical Institute (NPTEL MOOC Course)	Spring 2015
<i>Data Mining and Machine Learning</i> , Chennai Mathematical Institute	Fall 2013

Programming Languages

Python (Intermediate), C++ (Beginner)

Honors and Scholarships

Computing Innovation Postdoctoral Fellowship (2021-23)	CRA/NSF
Continuing Graduate Fellowship (2020-21)	UT Austin
Professional development award for conference travel (2018, 2019)	UT Austin
Graduate School Summer Fellowship (2018)	UT Austin
Scholarship for Master's students	CMI
Scholarship for Undergraduate students	CMI

Service

Served as an executive committee member on the Graduate Representative Association of Computer Sciences from 2017-2019.
Organizer for the reading group on 'Cryptographic Lower Bounds for Machine Learning Problems' during the program on the 'Computational Complexity of Statistical Inference' at the Simons Institute for the Theory of Computing in Fall 2021.