

Education

The University of Texas at Austin (UT Austin), Austin, TX, USA

Ph.D. in Computer Science, School of Computer Science

2021

Advisor: Prof. Adam Klivans

Chennai Mathematical Institute (CMI), Chennai, India

M.Sc. in Computer Science

2016

B.Sc. (Hons.) in Mathematics and Computer Science

2014

Websites

Homepage

<https://sushrutk.github.io/>

Google Scholar

<https://scholar.google.com/citations?user=NW1g68AAAAJ&hl=en>

Research Interests

Machine Learning, Statistics, Theoretical Computer Science

Work Experience

The University of Wisconsin at Madison

Research Associate,

September 2021 - June 2024 (expected)

NSF-Computing Innovation Fellow 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.

Preprints/In preparation ¹

⁼ Indicates alphabetical ordering.

^{*} Indicates equal first-author contribution.

1. Batch List-Decodable Linear Regression via Higher Moments

Ilias Diakonikolas⁼, Daniel M. Kane⁼, **Sushrut Karmalkar**⁼, Sihan Liu⁼ and Thanasis Pitsas⁼

2. Robust Sparse Estimation for Gaussians with Optimal Error under Huber Contamination

Ilias Diakonikolas⁼, Daniel M. Kane⁼, **Sushrut Karmalkar**⁼, Ankit Pensia⁼ and Thanasis Pitsas⁼

3. Computational Effects of Monotone Adversaries in High-Dimensional Robust Statistics

Sushrut Karmalkar⁼, Ankit Pensia⁼ and Thanasis Pitsas⁼

¹All names are ordered alphabetically unless otherwise specified.

Publications²

⁼ Indicates alphabetical ordering.

^{*} Indicates equal first-author contribution.

1. **Multi-Model 3D Registration: Finding Multiple Moving Objects in Cluttered Point Clouds** ICRA 2024
David Jin, **Sushrut Karmalkar**, Harry Zhang and Luca Carlone
2. **First Order Stochastic Optimization with Oblivious Noise** NeurIPS 2023
Ilias Diakonikolas⁼, **Sushrut Karmalkar**⁼, Jongho Park⁼ and Christos Tzamos⁼
3. **Distribution-Independent Regression for Generalized Linear Models with Oblivious Corruptions** COLT 2023
Ilias Diakonikolas⁼, **Sushrut Karmalkar**⁼, Jongho Park⁼ and Christos Tzamos⁼
4. **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⁼
5. **Robust Sparse Mean Estimation via Sum of Squares** COLT 2022
Ilias Diakonikolas⁼, Daniel M. Kane⁼, **Sushrut Karmalkar**⁼, Ankit Pensia⁼ and Thanasis Pitsas⁼
6. **Fairness for Image Generation with Uncertain Sensitive Attributes** ICML 2021
Ajil Jalal^{*}, **Sushrut Karmalkar**^{*}, Jessica Hoffman^{*}, Alexandros Dimakis, Eric Price
7. **Optimal Sample Complexity for Compressed Sensing with Approximate Generative Priors** ICML 2021
Ajil Jalal, **Sushrut Karmalkar**, Alexandros Dimakis, Eric Price
8. **Approximation Schemes for ReLU Regression** COLT 2020
Ilias Diakonikolas⁼, Surbhi Goel⁼, **Sushrut Karmalkar**⁼, Adam Klivans⁼, Mahdi Soltanolkotabi⁼
9. **Superpolynomial Lower Bounds for Learning One-Layer Neural Networks using Gradient Descent** ICML 2020
Surbhi Goel⁼, Aravind Gollakota⁼, Zhihan Jin⁼, **Sushrut Karmalkar**⁼, Adam Klivans⁼
10. **Robustly Learning any Clusterable Mixture of Gaussians** FOCS 2020
Ilias Diakonikolas⁼, Samuel B. Hopkins⁼, Daniel Kane⁼, **Sushrut Karmalkar**⁼
Conference version merged with: Bakshi, Kothari. Outlier-Robust Clustering of Non-Spherical Mixtures.
11. **Lower Bounds for Compressed Sensing with Generative Models** ICML 2020
Akshay Kamath⁼, **Sushrut Karmalkar**⁼, Eric Price⁼
12. **List-decodable Linear Regression** NeurIPS 2019 (Spotlight)
Sushrut Karmalkar⁼, Adam Klivans⁼, Pravesh Kothari⁼
13. **Time/Accuracy Tradeoffs for Learning a ReLU with respect to Gaussian Marginals** NeurIPS 2019 (Spotlight)
Surbhi Goel⁼, **Sushrut Karmalkar**⁼, Adam Klivans⁼
14. **Outlier-Robust High-Dimensional Sparse Estimation via Iterative Filtering** NeurIPS 2019
Ilias Diakonikolas⁼, Daniel Kane⁼, **Sushrut Karmalkar**⁼, Eric Price⁼, Alistair Stewart⁼
15. **Compressed Sensing with Adversarial Sparse Noise via L1 Regression** SOSA 2019
Sushrut Karmalkar⁼, Eric Price⁼
16. **Fourier Entropy-Influence Conjecture for Random Linear Threshold Functions** LATIN 2018
Sourav Chakraborty⁼, **Sushrut Karmalkar**⁼, Srijita Kundu⁼, Satyanarayana V. Lokam⁼, Nitin Saurabh⁼
17. **Depth separation and weight-width trade-offs for sigmoidal neural networks** ICLR 2018, Workshop
Amit Deshpande⁼, Navin Goyal⁼, **Sushrut Karmalkar**⁼
18. **Robust Polynomial Regression up to the Information Theoretic Limit** FOCS 2017
Daniel Kane⁼, **Sushrut Karmalkar**⁼, Eric Price
19. **On Robust Concepts and Small Neural Nets** ICLR 2017, Workshop
Amit Deshpande, **Sushrut Karmalkar**⁼

Reviewing

COLT 2019, 2020, 2022 (Junior Program Committee member); ALT 2020, 2022; FOCS 2019; STOC 2020, 2022, 2023; ISIT 2019, 2021; ICLR 2019, 2022; ICML 2022

Teaching Experience

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|-----------------------------------------------------------------------------------------------|------------------------------|
| <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 |

²All names are alphabetical unless otherwise specified.

Programming Languages

Python (Intermediate), C++ (Beginner)

Honors and Scholarships

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|-------------------------------------------------------------------|-----------|
| NSF-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.

Organizer for the 'TRIPODS Postdoc Workshop' at TTIC, August 21-23, 2023.

References

Prof. Adam Klivans e-mail: klivans@cs.utexas.edu
Professor,
Department of Computer Science, The University of Texas at Austin.

Prof. Ilias Diakonikolas e-mail: ilias.diakonikolas@gmail.com
Sheldon B. Lubar professor,
Department of Computer Science, The University of Wisconsin-Madison.

Prof. Christos Tzamos e-mail: ctzamos@gmail.com
Associate Professor,
Department of Informatics and Telecommunications, National and Kapodistrian University of Athens.

Prof. Alex Dimakis e-mail: dimakis@austin.utexas.edu
Professor,
Chandra Department of Electrical and Computer Engineering, The University of Texas at Austin.

Prof. Luca Carlone e-mail: lcarlone@mit.edu
Leonardo Career Development Assistant Professor,
Department of Aeronautics and Astronautics, Massachusetts Institute of Technology.

Prof. Dana Moshkovitz³ e-mail: danama@cs.utexas.edu
Professor,
Department of Computer Science, The University of Texas at Austin.

³Teaching Recommendation