

Sharan Sahu

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Research interests

high-dimensional statistics, robust and stochastic optimization, reinforcement learning, language and diffusion models, sampling, differential privacy.

Education

- 2024 – Present **Cornell University** – Ithaca, NY
PhD in Statistics and Machine Learning
GPA: 4.100 / 4.000
Advisors: [Martin Wells](#), [Yuchen Wu](#)
- 2020 – 2024 **University of California, Berkeley** – Berkeley, CA
BA in Computer Science
GPA: 3.998 / 4.000
Advisors: [Iain Carmichael](#), [Ryan Tibshirani](#)

Awards

- 2025 G-Research Doctoral Fellowship
- 2024 Cornell University Graduate Fellowship
- 2023 UC Berkeley Department of Data, Society, and Computing Data Science Insights Award Winner
- 2022 Science, Mathematics, and Research For Transformation DoD Scholarship (SMART)
- 2020 Northrop Grumman Engineering Scholarship
- 2020 Lockheed Martin Engineering Scholarship
- 2019 Math Olympiad Program (MOP) Invitee
- 2019 USA Physics Olympiad (USAPhO) Qualifier
- 2018 USA Mathematics Olympiad (USAMO) Qualifier
- 2017 USA Junior Mathematics Olympiad (USAJMO) Qualifier

Publications and preprints

* denotes first author(s)

- 2026 **Provably Reliable Classifier Guidance via Cross-Entropy Control**
Sharan Sahu*, Arisina Banerjee*, Yuchen Wu
Submitted (COLT)
- 2026 **On the Provable Suboptimality of Momentum SGD in Nonstationary Stochastic Optimization**
Sharan Sahu*, Cameron J. Hogan*, Martin T. Wells
Submitted (ICML)

- 2025 **DRO–REBEL: Distributionally Robust Relative-Reward Regression for Fast and Efficient LLM Alignment**
Sharan Sahu*, Martin T. Wells
Submitted (JMLR)
- 2025 **Mixed Supervision Improves Performance As A Function Of Human Annotation Time For Nuclear Instance Segmentation**
Van Hovenga, Iain Carmichael, Sharan Sahu
Submitted (CVPR)
- 2025 **Towards Optimal Differentially Private Regret Bounds in Linear MDPs**
Sharan Sahu*
Preprint
- 2024 **WSIC: A Python Package To Facilitate Running Nuclear/Cellular Segmentation On Whole Slide Images**
Sharan Sahu*, Jerry Li, Van Hovenga, Kaitlin Smith, Neo Yin, Richard J. Chen, Iain Carmichael
In Preparation (JOSS)
- 2023 **Developing Multi-Dimensional Metrics for Precision, Recall, Fidelity, Diversity, and Authenticity in Evaluating Generative Networks Performance using Deep Perceptual Embeddings**
Sharan Sahu*, Daniel Flaherty, Abhishek Vinchure, Jonny Pei, Suya You
SPIE DCS

Invited Talks and Guest Lectures

- July 2025 **Beyond RNNs: An Introduction to Transformers and LLM Basics**
Cornell Tech (Break Through Tech AI Program)
- May 2025 **Towards Optimal Differentially Private Regret Bounds in Linear MDPs**
Cornell University (Statistics Graduate Society)
- February 2025 **The Machine Learning Problems Behind Large Language Models: Self-Supervision, Fine-Tuning, and Reinforcement Learning**
University of North Carolina, Chapel Hill (Computational Pathology Labs)
- August 2024 **Unlocking the Power of Databases: The Crucial Role of Theory and Indices in Scalable Vector Databases for Machine Learning**
Naval Postgraduate School (NPS)
- December 2023 **How Do Neural Networks Learn**
Naval Postgraduate School (NPS)
- October 2023 **Anchored Intelligence: Navigating the Waters of Machine Learning And Charting the Course to Augmented Decision-Making**
Naval Postgraduate School (NPS)

Conference Posters and Oral Presentations

DRO-REBEL: Distributionally Robust Relative-Reward Regression for Fast and Efficient LLM Alignment

September 2025

Cornell University Celebration of Statistics and Data Science

System Requirements Clustering with Machine Learning and Architecture Design

February 2025

Naval Applications of Machine Learning (NAML)

March 2024

Naval Applications of Machine Learning (NAML)

March 2023

Neptune Office of Naval Research (ONR) Conference

Developing Multi-Dimensional Metrics for Precision, Recall, Fidelity, Diversity, and Authenticity in Evaluating Generative Networks Performance using Deep Perceptual Embeddings

September 2022

DoD 6.1 Research Conference

Advancing Procedural Scene Synthesis through Enhanced Grammars and Gradient Policies in MetaSim

September 2021

UC Berkeley Data Science Conference

Using Machine Learning to Model and Discover New Catalysts To Address The Energy Challenges Posed by Climate Change

May 2021

UC Berkeley Data Science Conference

Teaching experience

Fall 2021

EECS 16A: Foundations of Signals, Dynamical Systems, and Information Processing

Served as an undergraduate course assistant for the EECS 16AB sequence, delivering foundational instruction in signal processing, control, circuit design, and machine learning with a strong emphasis on practical linear algebra applications. Facilitated both individual and group tutoring sessions, led EECS 16A review workshops, and supported over 50 students in lab settings by connecting theoretical concepts to hands-on implementation. Consistently recognized for teaching excellence, earning an average student rating of 4.9/5.0 for instructional quality, subject expertise, and proactive support.

Spring 2021

CS 61A: Structure and Interpretation of Computer Programs

Served as a undergraduate course assistant for the CS 61A series, covering software construction, machine operations, and programming abstraction using Python, Scheme, and SQL. Led weekly tutorials and bi-weekly labs focused on fundamental concepts such as recursion, induction, and data structures including trees and binary search trees. Prepared and delivered review sessions before exams, collaborated on the development of problem sets and assessments, and provided individualized support during office hours, contributing to measurable improvements in student performance.

Industry experience

- Summer 2026 **Microsoft Research**, Incoming Research Scientist Intern – Redmond, WA
Causality and Machine Learning
- 2023 - 2025 **167 Labs**, Cofounder and Lead Research Scientist – San Francisco, CA
Employee Self-Service AI Framework — Building an LLM-powered HR assistant using Multi-Modal RAG, API integrations, and personalized function calling for real-time policy, bonus, and paycheck insights.
- Summer 2023 **US Department of Defense (DoD)**, Data Science Intern – San Diego, CA
System Requirements Automation — Built ML models and full-stack tools for classifying military system requirements, saving \$1M and presenting to Pentagon and Marine Corps leadership.
- Summer 2022 **US Department of Defense (DoD)**, Software Engineering Intern – San Diego, CA
Defense ML & Cloud Systems — Built ML and cloud tools for EMF waveform classification, automated document parsing, and scalable resource management, boosting detection and efficiency across key pipelines.
- Summer 2021 **Novartis**, Product Data Science Intern – Chicago, IL
Operations & Forecasting Analytics — Delivered ML and statistical solutions for inventory forecasting, database optimization, and secure access control, driving \$1.5M in savings and boosting system efficiency and security.
- 2018 - 2020 **Northrop Grumman**, Software Engineering and Data Science Intern – Chicago, IL
Autonomous Systems Research — Developed ML models for sensor fusion and defect detection, combining filtering techniques and CNNs; published findings in a 20-page paper presented at Northrop Grumman's research conference.

Mentorship and service

- 2024 – Present **Cornell Statistics Graduate Society**, Vice President
Represented Ph.D. students in academic and departmental affairs, while organizing initiatives to support professional, social, and community development.

Skills

Programming

Proficient: Python, C++, C, Java
Familiar: R, Rust, C#, Go, Dart

Software

L^AT_EX, Git, Docker, PowerBI, Tableau, Spotfire, Qlik

Languages

English (native), Oriya (Advanced)

Coursework

Statistics: High dimensional statistics, asymptotic statistics, mean field asymptotics, mathematical statistics, nonparametric estimation, statistical computing, generalized linear models, empirical process theory, optimal transport, statistical learning theory

Mathematics: Real analysis, functional analysis, measure theoretic probability and martingale theory, robust and stochastic optimization, convex and variational analysis, differential manifolds, ring and group theory, random matrix theory, partial differential equations, linear algebra, topology and metric spaces

Machine Learning: Machine learning theory (PAC & PAC-Bayes, online convex optimization, stochastic bandits), reinforcement learning theory, deep learning and generative models, recommender and feedback systems, natural language processing, computer vision

Computer Science: Data structures and algorithms, operating systems, compilers, computer security, computer architecture, database systems, networking and internet protocols, parallel computing