# Debanshi Misra

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## EDUCATION

**University of California, Los Angeles** **September 2023 – June 2026 (Intended)**

*B.S., Statistics and Data Science, Minor in Data Science Engineering* *Los Angeles, CA*

- GPA: **3.94/4.0**
- Relevant Coursework: Linear Algebra, Differential Equations, Multivariable Calculus, Probability, Monte Carlo Methods, Linear Models, Computing and Optimization, Data Structures & Algorithms, Data Analysis and Regression, Machine Learning, Statistical Programming in R
- Groups: Undergrad Math Student Association, ACM (AI Subdivision), DataRes Consulting, Bruin Sports Analytics (Consultant for UCLA Baseball team)

## RESEARCH EXPERIENCE

**Cedars Sinai Medical Center** **September 2024 – Present**

*Research Assistant - Artificial Intelligence Innovation (A2I) Lab* *Los Angeles, CA*

Optimization and Fairness:

- Developed and evaluated three reweighting strategies–equal, deterministic, and a Genetic-Algorithm driven approach–across 12 benchmark datasets, using Random Forest classifiers and hypervolume-based Pareto analysis to quantify fairness-performance trade-offs.
- Built a scalable optimization and transfer-learning framework for evolving sample weights on data subsets, reducing computational overhead by over 50% on HPC clusters while balancing predictive accuracy, AUROC, and fairness metrics (Demographic Parity Difference, subgroup FNR).
- Implemented rigorous statistical evaluation (Friedman tests, Wilcoxon rank-sum with Bonferroni correction) demonstrating that evolved weights yield significantly fairer and more accurate models than deterministic or equal-weight baselines.

Automated Machine Learning:

- Developing an evolutionary algorithm-based Automated Machine Learning model to study and control the balance between exploitation and exploration during model search and pipeline evolution.
- Implementing algorithms in Python to evolve machine learning pipelines, adjusting search-space exploration to prevent premature convergence while maintaining high model performance.
- Designed experiments to quantitatively measure trade-offs between exploration and exploitation in evolutionary optimization, beginning with single-model hyperparameter tuning and extending to CASH (Combined Algorithm Selection and Hyperparameter) optimization.

**University of Maryland, College Park** **June 2021 – August 2021**

*AI4ALL Student Researcher* *College Park, MD*

- Applied classical machine learning models (Naive Bayes, SVM, Logistic Regression) and deep learning architectures (RNN, LSTM) for large-scale sentiment prediction on 1.6M+ Twitter posts, achieving 86% accuracy with an LSTM model using GloVe embeddings.
- Engineered a comprehensive NLP preprocessing pipeline including tokenization, stopword removal, stemming, and feature extraction using TF–IDF and Bag-of-Words representations.
- Benchmarked and compared model architectures, analyzing performance trade-offs between classical and neural approaches, and diagnosing overfitting in deep networks.

**University of California, Santa Barbara** **June 2020 – July 2020**

*Student Researcher* *Santa Barbara, CA*

- Built and fine-tuned ResNet-18 classifiers for COVID-19, viral pneumonia, and healthy chest X-rays, using transfer learning and augmentation pipeline to achieve 91% accuracy on imbalanced clinical data.

- Improved model interpretability by applying Grad-CAM and Guided Backpropagation to highlight clinically meaningful lung regions associated with infection, strengthening diagnostic trustworthiness.
- Conducted extensive ablation studies on dataset composition, pretraining, and hyperparameters to analyze convergence behavior and test performance; disseminated results through a scientific manuscript and a presentation to an audience of 300+.

## PUBLICATIONS

- *Evolved Sample Weights for Bias Mitigation: Effectiveness Depends on Optimization Objectives*. Saini, A. K., Hernandez, J. G., Wong, E. F., **Misra, D**., & Moore, J. H. arXiv:2511.20909 (preprint) In submission to ACM *Journal on Responsible Computing*.

## OTHER EXPERIENCE

**PricewaterhouseCoopers** **June 2025 – August 2025**
*Data, Analytics, and AI Intern* *New York, NY*

- Designed and implemented a Responsible AI auditing framework evaluating fairness, transparency, and regulatory compliance in large-scale ML systems for a Fortune 500 client across 20+ global markets.
- Built statistical bias-detection methods in Python and engineered data-quality pipelines that improved representational integrity by 60%, strengthening fairness in model outputs.
- Translated analytical findings into governance artifacts (dashboards, reports, standardized documentation) to support responsible deployment, reproducibility, and future auditing of ML systems.

**Inference, Inc.** **June 2023 – August 2023**
*Statistician Intern* *Chesterbrook, PA*

- Built SAS/SQL pipelines for SDTM-compliant clinical trial datasets and automated QC workflows to improve reproducibility, outlier detection, and statistical validation.
- Conducted large-scale data validation (10K+ records/trial) to ensure compliance with FDA/CDISC standards and reduce downstream reporting errors.

**University of Pennsylvania** **July 2022 – Aug 2022**
*Management & Technology Summer Institute* *Philadelphia, PA*

- Built a crash-detection IoT system integrating sensor-driven firmware, mobile app functionality, and a backend alert pipeline; led a team of five through hardware, software, and API design.
- Developed real-time collision-detection logic from accelerometer/gyroscope data and engineered low-latency, fault-tolerant communication between device and mobile backend.
- Project overview: https://devpost.com/software/team-11-savus.

## TECHNICAL SKILLS

- Languages & Tools: C++, Python (NumPy, Pandas, PyTorch), R (ggplot2, shiny), SQL, SAS, GitHub, Linux, LaTeX, Alteryx, Power BI, Microsoft Office
- Statistical & ML Methods: Regression, Random Forests, Support Vector Machines, Regularization (Lasso, Ridge), Gradient Boosting, Principal Component Analysis, Maximum Likelihood Estimation

## AWARDS AND HONORS

- American Invitational Mathematics Examination (AIME) Qualifier
- UCLA Dean's Honors list
- National Merit Commended Scholar
- US Junior Squash National Ranking #45