SHREYAS WAGHE

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EDUCATION

University of Massachusetts Amherst **Amherst, MA**
Bachelor of Science in Computer Science and Applied Mathematics, Minor in Economics Sep 2021 – May 2025

- **Honors**: Dean's List (Fall 2021 - Spring 2023), GPA 3.96/4.00
- **Courses**: Algorithms & Data Structures, Numerical Methods & Analysis, Combinatorial Optimization, ML & AI, Algorithmic Game Theory & Fairness, Dynamics & Chaos, Data Science, Stochastic Processes, Computational Biology

EXPERIENCE

UMass Amherst Computer Science - Fair and Explainable Decision-Making Lab **Amherst, MA**
Undergraduate Researcher - Fair Machine Learning & Computational Mathematics Dec 2022 – Present

- **Research, develop, and analyze numerical schemes** to optimize "Power Mean Objectives" in Theoretical Fair ML.
- **Implement efficient and modular code to test empirical performance of devised schemes**, and compare against established convex optimization theory for model training in Fair PAC-Learning, a novel Fair ML framework.

UMass Amherst Physics - Machta Research Group **Amherst, MA**
Undergraduate Researcher - Statistical & Computational Physics Aug 2023 – Present

- **Study Population Annealing and Parallel Tempering** – state-of-the-art Monte-Carlo based methods for optimizing free energy landscapes in Spin Glass simulations – **and implement them for High Performance Computing.**
- **Develop and research variations of these methods to solve Hard problems** in Computer Science and Physics.

Brown University Computer Science - PALM Research Lab **Providence, RI**
Undergraduate Research Fellow - Generative Modeling Jun 2023 – Aug 2023

- **Researched and implemented mathematical frameworks for Generative Modeling** – culminated in the study of DecisionDiffuser, a generative model for flexible offline Reinforcement Learning.
- **Presented posters** titled "Generative Modeling using Diffusion - from the Ground Up" at the Leadership Alliance National Symposium (LANS) 2023, and the Brown University Summer Research Symposium 2023.

UMass Amherst - Departments of Mathematics, Computer Science & Physics **Amherst, MA**
Teaching Assistant - Various Subjects Sep 2022 – Present

- **Computational Physics** (Phy 281), **Artificial Intelligence** (CS 383), **Pre-Calculus** (various Math 100-127)
- Lecture administration, Review Sessions, Office Hours for classes of size 25-200.

PROJECTS

Optimizing Truck Deliveries using Linear Programming
Math 456, UMass Amherst Oct 2021 – Dec 2021

- Optimized truck deliveries for a food bank using a LP formulation of vehicle routing. Reduced operational hours by 68%.

Topological Data Analysis for Biological Systems
Math 396 Independent Study, UMass Amherst Feb 2022 – May 2022

- Implemented Topological DA methods to analyze cell clustering simulations, understand tissue formation quantitatively.

Age Friendliness of Book Summaries
CS 490A, UMass Amherst Nov 2022 – Dec 2022

- Analyzed textual data, built SVM prediction models to classify age-friendliness of natural language book summaries.

Time Dynamic Network Flows
Math 697C, UMass Amherst Apr 2023 – May 2023

- Delivered a mini-lecture on optimizing temporal network flows with algorithmic and theoretical motivations & applications.

SKILLS, LANGUAGES, INTERESTS

- **Languages**: English (Native), Marathi (Native), Hindi (Bilingual/Native)
- **Programming**: Python, SQL, PostgreSQL, MATLAB, Java, Javascript, C++/C, Julia
- **Mathematical Skills**: Numerical Algorithms, Simulations, Mathematical Programming, Mathematical Modeling
- **Technologies**: Jupyter Notebooks, Linux/Bash, Latex, NumPy, SciPy, Pandas, GPU/CUDA, Pytorch, JAX, nltk, Gurobi
- **Activities**: SIAM Student Member, UMass CICS Peer Mentor
- **Honors**: NSF Undergraduate Research Fellow, The Leadership Alliance (TLA) Research Scholar
- **Interests**: Computational Mathematics, Data Science & Theoretical Computer Science, Machine Learning, Numerics

This document was last updated on 10-02-2023. Hyperlinks provided with titles where relevant.