Shreyas Waghe (he/him/his)
www.shreyasw.com; www.linkedin.com/in/shreyaswaghe
Email : swaghe@umass.edu
Mobile : 781-999-5232

Education

- **University of Massachusetts Amherst** Amherst, MA
  Bachelor of Science in Computer Science, Applied Mathematics; Economics Minor; GPA: 3.96 *May 2025*
  Coursework: Artificial Intelligence, Machine Learning, Natural Language Processing, Scientific Computing, Numerical Analysis, Combinatorial Optimization, Linear Algebra, Dynamical Systems, Stochastic Processes, Calculus, Differential Equations

Projects (GitHub Link)

- **Truck Routing for Optimal Deliveries** Optimization, Data Science - Python
  - **Operations Modeling**: Modelled the delivery operations of a food bank as a Vehicle Routing Problem. Constructed linear programs and their dual programs and analyze optimality conditions for truck routing.
  - **Data processing**: Collected geographical data from web APIs, and operational data from spreadsheets. Implemented optimization routines using Gurobi, and created visualizations for the data obtained from results.
  - **Data Insights**: Generated various insights from data for the food bank, such as efficient routes, and days of operation with fair assignment of each to drivers. Acheived a 68% reduction in the monthly days of operation required for current business, allowing the food bank to take on further operations.
- **Age-Friendliness of Book Summaries** Machine Learning, NLP - Python
  - **Data Creation**: Created a 1000 item dataset manually assigning 'age-friendliness' ratings (G, PG, PG-13, R) to Wikipedia book plot summaries with creation of annotation guidelines for the textual data.
  - **Prediction Model Implementation**: Performed data cleaning, created data visualizations, and used feature engineering to create usable data for building a Machine Learning model. Created and analyzed a supervised Ordinal Classification Model to predict age friendliness for the textual data.
- **Applications of Topological Data Analysis** Applied Math, Machine Learning - Julia
  - **Persistent Homology**: Studied persistent homology of data arising from biological systems viz cell clustering etc. Statistical Analysis of Homological features was performed for various shaped real and toy data. Extracted Machine Learnable features to predict formation of cell clusters.

Experience

- **Undergraduate Research Fellow** Providence, RI
  PALM Research Lab, ***Brown University*** *Jun. 2023 - Present*
  - **Independent Research**: Research on Diffusion Models and Generative Modelling techniques for efficient and flexible Reinforcement Learning for long term decision-making with limited knowledge of environments.
  - **Mathematical Machine Learning**: Research and Develop mathematically justified algorithms and schemes for multi-modal Machine Learning tasks.
- **Research Assistant** Amherst, MA
  Fair and Explainable Decision Making Lab, ***UMass Amherst*** *Dec. 2022 - Present*
  - **Experiments**: Perform mathematical analysis of established convex optimization methods, construct algorithms and conduct experiments on algorithm efficacy for optimization in Fair Machine Learning models.
  - **Code Implementation**: Implement modular and efficient Python code for research experiments in Python.
- **Teaching/Course Assistantships**: Math 100, 101 (Pre-Calculus), CS 383 (Artificial Intelligence) – **UMass**

Other

- **Awards and Honors**: Best Beginner Hack, Best Hardware(HackHer413, 2022); Dean's List Mentions(Fall 21-Spr.23)
- **Publications**: Efficiently Optimizing Power Mean Objectives in Fair ML (in-preparation)
- **Presentations**: "Flexible Planning as an Exercise in Generative Modelling"(Poster) - Leadership Alliance National Symposium (Hartford CT, 2023); Brown Summer Research Symposium (Providence RI, 2023)
- **Experience using**: Flask, Gurobi, LaTeX, Matplotlib, NumPy, Nltk, Pandas, SciPy, SQL, PostgreSQL, Scikit-Learn, Python3, Java, JavaScript, C, C++, PyTorch, TensorFlow
- **Memberships**: Fair and Explainable Decision Making Lab, Applied Math Seminar, Machta Research Group – UMass; PALM Lab, Visual Computing Group – Brown University; Society for Industrial and Applied Mathematics (SIAM)
- **Interests**: Many forms of Applied Math particularly related to modeling and understanding complex systems; Theoretical Machine Learning and Data Science, Quantitative Modeling