Prannav Shankar

571-447-6969 | prannav.shankar@gmail.com | linkedin.com/in/prannav-s | github.com/prannav-s | Portfolio

Education

Duke University Durham, NC

Biomedical Engineering (B.S.E) & Computer Science (B.S) *August 2022 – May 2026*

- GPA: 3.828 (Dean's List with Distinction)
- Relevant Coursework: Linear Algebra, Multivariable Calculus, Differential Equations, Data Structures, Algorithms, Databases, Computer Architecture, Machine Learning, Generative AI for Protein Design, Data Science

Experience

Full-Stack SWE Intern Jun. 2025 – Aug. 2025

MITRE *McLean, VA*

- Reworked Flask Blueprint endpoints to integrate the Keycloak API for user management, replacing SQLAlchemy with API calls featuring built-in cascade deletions and fail-safes against manually inserted corrupt data
- Developed and refactored Flask endpoints for user-assignment and modal dialogs, enabling AJAX-driven add/remove workflows, JSON data fetch, and dynamic rendering of colored group tags without full-page reloads
- Optimized modal performance by consolidating data fetches, parallelizing API calls for 3× faster load times, and using targeted jQuery DOM insertions to cut follow-up loads from 10 seconds to instant
- Built a dynamic AJAX-driven selector component with jQuery change listeners to filter lists based on user input and persist state in Flask session, fetching relevant information from Keycloak based on selection
- Migrated data tracking from Keycloak to PostgreSQL via SQLAlchemy and Alembic migrations, removing obsolete tables and adding attributes for cascade deletes
- Delivered client-facing demo and deployed updates across 30+ compute cores, supporting thousands of users; Wrote migration script to aid in deployment and preserve data in phased out Postgres tables

Machine Learning Engineer Sep. 2023 – Feb. 2025

Duke University (MIT CSAIL and Princeton) *Durham, NC*

- Integrated GASTON into GLACIER to generate directed acyclic graphs (DAGs) from spatial omics data
- Reduced KNN model creation runtime from $O(N^2)$ to $O(N)$; implemented accuracy evaluation across k-values
- Built command-line functionality in Velorama for DAG creation from high-dimensional datasets
- Developed tools to extract and summarize key analysis results from completed DAG runs

Projects

Meal Mate | *React (Vite), Node.js, Express, MongoDB, Mongoose, Tailwind CSS, Clerk* Sep. 2025 – Present

- Built a full-stack meal and calorie tracker (MERN) with date-based routing, protected views, and responsive UI
- Implemented authentication/secure API access using Clerk; Express middleware enforces per-user data isolation
- Designed normalized Mongoose models for Days, Meals, and Foods with relational linking
- Developed API endpoints for creating, updating, and fetching meals and foods with real-time frontend updates
- Deployed frontend on Render (meal-tracker-lfqt.onrender.com) and configured backend on a cloud server

SAGEdiff | *PyTorch, Python, AlphaFold, UniProt, MMseqs2* Jan. 2025 – May 2025

- Built a discrete denoising diffusion transformer for species-conditioned protein sequence generation
- Used class-token conditioning and residue-level tokenization to capture species-specific constraints
- Trained models on curated UniProt datasets using masked cross-entropy loss and one-cycle LR scheduling
- Benchmarked against EvoDiff using Shannon Entropy, pLDDT, pTM, Edit Distance, and Jaccard Similarity
- Achieved higher sequence diversity and species clustering while maintaining comparable structural fidelity

GLACIER | *Python, Jupyter Notebooks* Jan. 2024 – Feb. 2025

- Built ML tools to extract features from spatial transcriptomics data and construct DAGs using Velorama
- Accelerated training using gradient clipping and learning rate scheduling
- Built functionality for analyzing ligand-receptor and gene–transcription factor interactions
- Research paper accepted to RECOMB-SEQ 2025 and under publication in iScience

Skills

Languages: Python, Java, C, SQL, JavaScript, HTML, CSS
Frameworks and Libraries: Flask, Django, React, Vite, SQLAlchemy, PyTorch, jQuery, DaisyUI
Tools and Databases: Git, Node.js, Express, Pandas, Numpy, Jupyter, MongoDB, PostgreSQL, SQLite