

Sudeep Senivarapu

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EDUCATION

University of Texas at Austin

B.S. Computational Biology | GPA: 4.0/4.0

Austin, TX

Expected May 2030

RESEARCH EXPERIENCE

Mantis AI · MIT CSAIL / Kellis Lab

Machine Learning Research Intern

Cambridge, MA (Remote)

Oct. 2025 – Jan. 2026

- Built transformer-based protein-protein interaction models for drug discovery pipelines; resolved sequence modeling bottlenecks and shipped PRs improving throughput, benchmark performance, and test coverage.

Azad Bioinformatics Lab, University of North Texas

Undergraduate Researcher

Denton, TX

Oct. 2024 – Present

- Developed ESM-3 Attention-MIL proteome classifier for bacterial pathogenicity prediction (**AUROC 0.961, 90% acc., Macro F1 0.900** on 40-organism held-out test); trained on TACC Lonestar6 with gated attention, AdamW + cosine LR, AMP mixed precision, and stratified 5-fold CV.
- Co-authored *Methods in Molecular Biology* (Springer Nature) book chapter on reproducible ML-based pathogenicity classification (in press).

DIAMOND Bioinformatics

Co-Founder & Lead Researcher

Denton, TX

Aug. 2024 – Oct. 2025

- Developed patent-pending causal DL framework for voice-based Parkinson's detection (**97.4% acc., AUC-ROC 0.99**); presented at BMES 2025 (oral & poster) and Rice360; covered by *New Scientist* and *BBC Science Focus*.

PUBLICATIONS & PRESENTATIONS

Senivarapu S.* et al. "Causal Interpretability in Deep Learning for Parkinson's Voice Detection." *PJIR*, 2025; BMES 2025 oral & poster; Rice360 poster. (*equal contrib.)

Senivarapu S.* et al. "Symbolic Regression for MPA Dosage Prediction in Kidney Transplant Recipients." *medRxiv*, 2024. (*equal contrib.)

Senivarapu S. et al. "Protocol for Pathogenicity Classification from Bacterial Genomes via ML." *Methods in Molecular Biology*, Springer Nature (in press).

PROJECTS

CABT: Transformer BCI Decoder | TensorFlow 2, RoPE, GeGLU, Intracortical Arrays

2025 – Present

- Designed transformer decoder for intracortical handwriting BCI targeting CER improvement over Willett et al. 2021 GRU baseline; architecture features temporal patch embedding, RoPE attention, GeGLU FFN, LayerScale, and stochastic depth; ported TF1.15 codebase to TF2/Keras on Apple Silicon (M4).

EEGTrust | PyTorch, Spatiotemporal GNNs, Neurosymbolic AI

Aug. 2025

- Dual-head spatiotemporal GNN for pediatric seizure detection; **>0.90 F1** on TUH/CHB-MIT benchmarks with neurosymbolic explainers for clinical interpretability; open-sourced with pretrained weights.

ECG Arrhythmia Classifier | PyTorch, 1D CNN-LSTM, Wavelet DSP

Mar. 2025

- End-to-end ECG pipeline with R-peak detection, wavelet denoising, and HRV feature extraction; CNN-LSTM classifier with morphology-aware augmentation for rare-class precision on imbalanced arrhythmia data.

TECHNICAL SKILLS

Languages: Python, R, SQL, Bash **ML / DL:** PyTorch, TensorFlow, scikit-learn, Hugging Face, ESM-2/3, XGBoost

Bioinformatics: BioPython, BV-BRC, protein language models, k-mer analysis, sequence alignment

Methods: Causal inference, symbolic regression, GNNs, transformers, CNNs, LSTMs, Attention-MIL

BCI / Neuro: Intracortical array decoding, EEG signal processing, spatiotemporal modeling

Tools: Docker, Git, GitHub Actions, Slurm/TACC, Linux, NumPy, Pandas

HONORS & AWARDS

BMES 2025 Oral & Poster | Rice360 Poster | Julian C. Stanley Scholarship | UNT Research Fund | International Logic Olympiad: Gold | International Biology Battle: Gold, 8th Place Globally | DECA State Champion