Srikar Mutnuri

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Summary

Research centers on modeling causal interactions and information transfer in high-dimensional, dynamic systems using GNNs, time-series analysis, and large-scale agent-based simulations.

Education

University of Virginia, Charlottesville, USA *Fall 24 –*
Doctor of Philosophy (Computer Science - Biocomplexity Institute)
Graph Networks, Brain Dynamics, Agent-based Models, Simulations, Contagion Spread
Advisor: **Madhav Marathe**

University of Southern California, Los Angeles, USA *Fall 21 – 23*
Master of Science (Electrical Engineering)
Haptic Design, Graph Signal Processing, Causal Learning, Optimization, Epidemics
Advisors: **Peter Beerel**, **Heather Culbertson**, **Ajitesh Srivastava**

Gitam Deemed University, Visakhapatnam, India *Fall 12 – 16*
Bachelor of Technology (Electronics and Communication Engineering)

Research Experience

Graduate Research Assistant, **University of Virginia** *Fall 24 –*
Brain causal network dynamics, wildfire contagion models, LLM knowledge graphs, agentic models

Graduate Research Assistant **University of Southern California** *Summer 22 – 23*
Synthetic data generation using UE4 for wildfire tracking, haptic interface design for VR, real-time pose detection in video streams

Publications

Selected Peer-Reviewed Papers [Google Scholar]
"Dynamic Causal Network Representations of Resting-State EEG for Cross-Task Prediction"
Srikar Mutnuri, Aniruddha Adiga, and others
In preparation, 2025

"Causal Analysis of Graph Signals for Brain Effectome Inference" [link]
Srikar Mutnuri, Aniruddha Adiga, and others
Asilomar Conference on Signals, Systems, & Computers, Pacific Grove, USA, October 2025

"Dynamics-Based Feature Augmentation of Graph Neural Networks for Variant Emergence Prediction" [link]
Majd Al Aawar, **Srikar Mutnuri**, and others
AAAI Conference on Artificial Intelligence, Philadelphia, USA, February 2025

"FireFly: A Synthetic Dataset for Ember Detection in Wildfire" [link]
Yue Hu, Xinan Ye, Yifei Liu, Souvik Kundu, Gourav Datta, **Srikar Mutnuri**, and others
AI + HADR Workshop, ICCV, Paris, France, October 2023

Posters and Other Work
GSP Workshop '25: "Causal Analysis of Graph Signals for Brain Effectome Inference" [link]
UVA Brain Retreat '25: "Learning Brain Structure through Causal Analysis of Graph Signals"
UVA CS Research Symposium '24: "Delay Prediction for COVID-19 Variant Emergence with GNNs" [link]
USC EE Research Festival '22: "Synthetic Dataset for Wildfire Detection" [link]
Unpublished: "Dense Magnet Array for MR Fluid-Based Fingertip Haptics Interface" [link]

Teaching

UVA CS4971, Capstone Practicum *Fall 25*
Teaching Assistant for Prof. **Mark Sherriff**. [webpage]

USC CSCI526, Advanced Mobile Devices and Games *Fall 22 – 23*
Course Producer for Prof. **Scott Easley**

USC CSCI420 Computer Graphics *Fall 22*
Course Producer for Prof. **Andrew Nealen**

Projects ($\alpha - \beta$)

"Predicting Political Poll Responses Using LLMs Fine-tuned On YouTube Data" *Fall 24*
Anders Gyllenhoff, **Srikar Mutnuri**, Joseph Okeno-Storms, Benjamin Pusch
CS6501 Natural Language Processing, UVA

"Modeling Responses on Social Media Posts" *Fall 24*
Anders Gyllenhoff, Stephanie Johnson, **Srikar Mutnuri**, Benjamin Pusch
CS6501 Computational Behavior Modelling, UVA

"Agent Based Network Models to Predict Influenza-Like-Illnesses" *Spring 23*
Amrith Coumaran, **Srikar Mutnuri**, Hans Walker
EE638 Applications of Machine Learning for Medical Data, USC

Service

Organization
Infrastructure Co-chair for the 4^{th} Learning on Graphs Conference, Phoenix, USA (2025)

Reviewer
Committee: IEEE SPS Multimedia Signal Processing Technical Committee
Conferences & Workshops: NeurIPS, ICML, ICCV, KDD, CVPR, ACL

Departmental/School Service
Academic Committee Member, UVERS 2025 [webpage]

Work Experience

Research Associate, **University of Southern California** *2023 – 2024*

- Worked on research into the use of networks, graphs, and dynamic models for epidemiology
- Built a custom MLOps pipeline to automate the train-test workflows, released a configurable template for use across multiple projects
- Researched the use of stochastic models and physics-informed neural networks in improving prediction accuracy

Sr. Software Engineer - Immersive Tech, **Tata Consultancy Services** *2016 – 2021*

- Designed and optimized ETL pipelines, frameworks, and architectures to accelerate cross-platform game & XR app performance
- Collaborated with TCS Research Labs to conceptualize and build applications for user studies
- Improved data migration speeds by building automated big-data ingestion frameworks on top of Hadoop stack

Skills

Engineering: Python, C/C++, C#, Java, Spark, SQL, MATLAB, Slurm, Bash, Git, CUDA, TensorFlow, PyTorch, SciPy, scikit-learn, Hugging Face, LoRA, PEFT, Docker, Terraform, AWS, GCP, Unity, Unreal Engine, LaTeX

Research: Optimization, graph neural networks, causal inference, large-scale simulations, time-to-event modeling, dynamical systems, information flow, algorithm design, generative modeling, transfer learning, test-time adaptation, reinforcement learning