

Shrinivas Sesadri

COMPUTATIONAL NEUROSCIENCE & ARTIFICIAL INTELLIGENCE

M.S. by Research, IIT Madras · advised by Prof. V. Srinivasa Chakravarthy
Previously Founding AI Engineer & Researcher at Neurogati

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PROFILE

I work on representations that carry structure — dynamics, prediction, geometry — rather than capacity alone. Current research is on oscillatory models of neural computation, where the dynamics rather than the weights alone carry the representation, tested against EEG and fMRI responses to naturalistic stimuli. Previously founding AI engineer at Neurogati, taking clinical measurement systems from research prototype to deployment in partner clinics.

EDUCATION

M.S. by Research, Computational Neuroscience

Jul. 2026 – Present

Indian Institute of Technology Madras

- Computational Neuroscience Lab, advised by Prof. V. Srinivasa Chakravarthy.
- Oscillatory and predictive models of neural computation; self-supervised objectives for spatial memory, extending prior grid-world navigation work.

B.Tech., Computer Science & Engineering

2021 – 2025

SASTRA Deemed University, Thanjavur

- CGPA: 7.62 / 10
- Relevant coursework: Natural Language Processing, Data Structures & Algorithms, Discrete Mathematics.

PUBLICATIONS & TALKS

Interactive Captioning of Medical Images

SASTRA Deemed University · 2024 · **Under review, Knowledge-Based Systems (Elsevier)**

- Medical-image captioning and visual question-answering system using multimodal models (BLIP, LLaVA) on PathVQA, MIMIC-CXR, and ChestX-ray14 to reduce diagnostic delay.

Are Pre-trained Deep Learning Models Sufficient for X-ray Image Analysis?

SASTRA Deemed University · 2025 · **Submitted, ICML-ALGO**

- Analysed the impact of data augmentation (CLAHE) and hyper-parameter tuning on VGG19, DarkNet19, and AlexNet for 14-category thorax-disease classification on ChestX-ray14, improving accuracy by ~10%.

Deep Oscillatory Neural Networks for EEG Signal Compression

Computational Neuroscience Lab, IIT Madras · 2026 · **Manuscript in preparation**

- Physics-grounded autoencoders built on Hopf oscillator dynamics, grounding representation learning in dynamical-systems theory.

Oscillatory Representation Learning for fMRI Encoding of Naturalistic Stimuli

Computational Neuroscience Lab, IIT Madras · 2026 · **Manuscript in preparation**

An Efficient LLM for the Indian Judicial System (IndicLegal-Mistral)

SASTRA Deemed University · 2025 · **Manuscript in preparation**

- Fine-tuned Mistral 7B Instruct v0.2 with LoRA adapters on domain-specific legal corpora for the Indian judicial system.

Graph Databases and Large Language Models for Grid-World Spatial Navigation

5th Annual Research Showcase, IIT Madras · 2024 · **Presented — poster**

RESEARCH & PROFESSIONAL EXPERIENCE

Founding AI Engineer & Researcher

Jun. 2025 – Jun. 2026

Neurogati — incubated at IIT Madras Research Park, Chennai

- Founding engineer on the AI team, building clinical measurement systems from research prototype through to deployment in partner clinics.
- **QuadisPD** — five-modality digital biomarker platform for Parkinson's disease covering gait, speech, tremor, handwriting, and decision-making. Built the vision and audio pipelines and a local-first mobile capture architecture for clinics with unreliable connectivity; now in clinical pilot testing.
- **StereoPose3D** — markerless 3D motion capture for physiotherapy, recovering metric joint positions from a calibrated stereo camera pair. Deployed and in ongoing use at a partner clinic.
- **Spatial navigation and memory** — extended prior grid-world graph work into a scene-graph memory system, pairing a Neo4j graph store with vision-language models so an agent could answer questions about an environment it had explored.

Research Intern, Spatial Navigation Team

May – Jul. 2024

Indian Institute of Technology Madras

- Built a system combining a Neo4j graph database, graph neural networks, and Llama 3 to navigate a grid world and answer queries about the environment; generated Cypher from natural language via dynamically tuned LangChain prompts, with Q-learning exploration to populate the graph.

Machine Learning Engineer Intern

Jun. – Jul. 2023

Bungee Tech — Remote

- Built a Transformer-based architecture with approximate KNN for large-scale retail product matching across 100M+ products, reaching 96% F1 on the WDC benchmark and 91% on an internal evaluation set.
- Processed a 5 TB dataset spanning 50+ attributes (titles, images, descriptions, size, UPC, model number).

SELECTED PROJECTS

Virtual Personal Assistant — Computational Neuroscience Lab, IIT Madras, 2024–2026

Multi-agent cognitive assistant on a dual-memory architecture, combining short- and long-term memory with spatial reasoning to plan and act across complex tasks.

Multi-View 3D Reconstruction + Super-Resolution — Kaggle competition, 2025

End-to-end pipeline pairing feed-forward reconstruction with detail enhancement and Gaussian-splat rendering, under a fixed compute budget.

Generating Music from Text — Independent research project, 2024

Reimplemented a MusicLM-style pipeline: MuLan joint audio–text embeddings, SoundStream codec, and w2v-BERT, on MusicCaps.

TECHNICAL SKILLS

ML & Deep Learning	PyTorch, JAX, Flax / Optax, Equinox, Hugging Face Transformers, PEFT / LoRA
Neural Data & Modeling	EEG, fMRI / BOLD encoding, MNE, nilearn, Dynamical Systems, Hopf Oscillators, SOMs
Agentic, LLM & Vision Models	LangChain, LangGraph, LangSmith, CrewAI, Ollama, OpenCV, MediaPipe, MMPose
Infrastructure & Web	Llama 3, Mistral 7B, BLIP, LLaVA, Graph Neural Networks, Q-Learning
	Python, Neo4j, AWS, Docker, Java, C++, Next.js, React, Three.js, Blender, Unreal Engine

CREATIVE & OTHER

Music	Classically trained pianist; Trinity College London Grade 8 in both Piano and Music Theory.
Visual Arts	Digital and traditional art, 3D environment design, photography. DeviantArt, ArtStation, Behance.
Writing & Activities	<i>Synchronized Chaos</i> technical blog; 3D Artist and Video Editor, E-Cell and VR Club, SASTRA.