



Mayukh Deb

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Education

Georgia Institute of Technology

*Aug 2024 – Present**PhD Student - Cognition and Brain Science - Murtylab - PI: Ratan Murty*

- Building brain-inspired algorithms to improve Language and Vision models (see: [toponets](#))
- Training self-supervised vision models on egocentric video data captured on the [Meta Aria research kit](#)
- Exploring ways to build more efficient vision models through structured sparsity and recurrent inference
- Figuring out ways to *control* where different capabilities emerge in vision models

Experience

Student Researcher @ Google Deepmind

June 2026 – Present

- Working on video perception with [João Carreira](#)

Research Engineer @ Aleph-Alpha

Nov 2021 – May 2023

- Led their Trustworthy AI project and built [AtMan](#)
- AtMan was the foundation behind Aleph-Alpha's "explain" API for LLMs
- Also worked on building multimodal search-engines.

Research Intern @ MIT Brain + Cognitive Sciences

*May 2023 - Dec 2023*Worked with [Dr. Nancy Kanwisher's](#) lab on 2 projects:

- Inducing brain-like topographic structure in transformers (eventually led to [toponets](#))
- Training data-constrained vision models on fMRI data

Research Engineer @ Eden.Art

Dec 2023 – Aug 2024

- Implemented tools like Textual Inversion, IP-Adapters and ZipLoRA into production.
- Built flexible pipelines to fine-tune diffusion models (SDXL, SD3) quickly on user data

Intern @ RunwayML

Jan 2021 – Feb 2021

- Implemented, optimized (1.4x speedup) and dockerized pipelines for optical-flow (RAFT) and video frame interpolation (RIFE) models to be used in Runway's video editing tool.

Google Summer of Code @ INCF

May 2020 – Aug 2020

- Worked with [OpenWorm](#) to train models to extract metadata from microscopic videos/images embryos
- Also mentored two contributors in GSoC 2023.

Publications (Google Scholar)

TopoNets (ICLR 2025 Spotlight → [toponets.github.io](#))

Jan 2025

Mayukh Deb, Mainak Deb, N. Apurva Ratan Murty

Inducing topographic structure in Vision and Language models (GPTs). Yielded brain-like functional organization, lower dimensionality, and efficiency through structured pruning.

Featured by [College of Sciences News @ Georgia Tech](#)

AtMan (NeurIPS 2023 + featured in [Scientific American](#))

Jan 2023

Mayukh Deb*, Björn Deiseroth*, Samuel Weinbach* et al. (* = equal contribution)

Causally trace and explain LLM outputs without gradients. Works on anything with attention. Foundation behind [Aleph-Alpha's Explain functionality](#)

DORA (ICLR 2023 Trustworthy ML workshop + TMLR)

June 2022

Kiril Bykov, Mayukh Deb, Klaus Robert Müller et al.

Clustering neurons and detecting spurious outlier features with [feature-vis](#).

CONFORM: A Project to Create Crowd-Sourced Open Neuroscience fMRI Foundation Models ([NeurIPS 2025 Workshop](#))

Nov 2025

Benjamin Lahner, Andrew Luo, Jacob Prince **Mayukh Deb**, Leila Webhe, Aude Oliva, N. Apurva Ratan Murty, Michael J. Tarr et al.

A proposal for a crowd-sourced fMRI foundation model that integrates large-scale data aggregation, generative denoising, and meta-learning to overcome current limits in human neuroimaging.

MOSAIC: A Scalable Framework for fMRI dataset aggregation and modeling of human vision ([preprint](#) + [webpage](#) + [python library](#))

Nov 2025

Benjamin Lahner, **Mayukh Deb**, Aude Oliva, N. Apurva Ratan Murty

MOSAIC is composed of eight large-scale vision fMRI datasets totaling 93 subjects, 430,007 fMRI-stimulus pairs, and 162,839 naturalistic and artificial stimuli. It enables large-scale pre-training of Vision models on human fMRI data.

End-to-end Topographic Auditory models Replicate Signatures of the Human Auditory Cortex ([ArXiv preprint](#), under review)

Sep 2025

Haider Al-Tahan, **Mayukh Deb**, Jenelle Feather, N. Apurva Ratan Murty

The first end-to-end topographic deep neural networks for audition. Showed signatures like tonotopic maps, Music and Speech selectivity, etc while preserving model performance.

Talks

Vision Sciences Society, 2026 satellite event ([abstract](#))

May 2026

Vision Sciences Society, 2025 ([abstract](#), [YouTube video](#))

May 2025

ICLR 2025 ([recorded talk](#))

April 2025

Open Source (over 125k installs on pip)

[TopoLoss](#) - 4k downloads

- Induce topographic structure in pytorch models during training with this loss function
- Works on both Linear and Conv layers
- Core codebase behind [toponets](#) and the corresponding [pre-trained vision and language models](#)

[torch-dreams](#) - 61k downloads

- A highly flexible framework to do [feature visualization](#) on pytorch models

[MOSAIC](#) - 9k downloads

- Python package to efficiently load one of the largest fMRI datasets ([Lahner et al.](#))

[Eden](#) - 10k downloads

- Single python decorator to convert a python function into a hosted endpoint with queuing (celery)
- Foundational pet-project which eventually led to [eden.art](#)

[DevoLearn](#) - 39k downloads

- Trained models to segment embryo data from microscope
- Outcome of [Google Summer of Code, 2020](#) and then taken forward by other students in the next years

[tgtqdm](#) 1k downloads

- Drop-in replacement for `tqdm` to log progress via telegram

[druta](#) 1k downloads

- A fast video dataset format for Pytorch
- Multiple orders of magnitude faster than other frameworks like [decord](#)

More projects can be found on my github profile: github.com/mayukhdeb

Technologies

Languages: Python and a little bit of CUDA – I just learn whatever is required

Frameworks: PyTorch, NumPy, einops, Pandas

Tools: SLURM