**Paul S. Scotti, Ph.D**

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**EXPERIENCE & EDUCATION**

**Stability AI**  Nov. 2023 – Present

Head of NeuroAI, Principal Investigator of the MedARC Neuroimaging & AI Lab (<https://medarc.ai/fmri>)

Published in NeurIPS and ICML, reconstructing seen images from fMRI brain activity using contrastive learning and denoising diffusion models. Fine-tuned the Stable Diffusion XL model to attain SOTA unCLIP performance.

**Princeton Neuroscience Institute**

Visiting research scientist Nov. 2023 – Present

Postdoctoral research associate (PI: Dr. Ken Norman) Apr. 2022 – Nov. 2023

Collaborating with Princeton labs on open research AI projects, training a foundation model on large-scale brain data.

**GRANTS, FELLOWSHIPS, & AWARDS**

* Princeton Innovation Fund for New Industrial Collaborations ($250,000)
* NSF Graduate Research Fellowship ($102,000)
* OSU University Fellowship ($26,316)
* Luther Rice Undergraduate Research Fellowship

**PRESS**

* [Cognitive Revolution Podcast on mind reading](•https:/www.youtube.com/watch?v=7_BS8tuUoZY)
* [Established industrial partnership between Stability AI x Princeton University to support neuroAI](https://research.princeton.edu/news/brain-image-reconstruction-research-receives-funding-office-dean-research)
* [Our work mentioned in US Senate hearing on AI and Intellectual Property](https://www.judiciary.senate.gov/imo/media/doc/2023-07-12_pm_-_testimony_-_brooks.pdf)

**PUBLICATIONS / PROJECTS** (curated selection)

[MindEye2: Shared-Subject Models Enable fMRI-To-Image With 1 Hour of Data](https://medarc-ai.github.io/mindeye2/)

First-author publication in ICML 2024

* + SOTA performance in reconstruction of seen images from fMRI brain activity
  + Novel approach to shared-subject modeling enables high-quality results with 40x less training data
  + Fine-tuned Stable Diffusion XL to support SOTA unCLIP performance

[AI Alibis: Multi-Agent LLM Murder Mystery](https://ai-alibis.vercel.app/)

Short interactive browser game demonstrating how novel prompting techniques bypass the [pink elephant problem in LLMs](https://arxiv.org/abs/2402.07896)

[Reconstructing the Mind’s Eye: fMRI-to-Image with Contrastive Learning and Diffusion Priors](https://medarc-ai.github.io/mindeye)

First-author publication in NeurIPS 2023 (spotlight)

* + Novel soft contrastive loss inspired by knowledge distillation
  + Large-scale FAISS retrieval from brain embeddings to image embeddings nearest neighbor

[EduCortex: Browser-Based 3D Brain Visualization of fMRI Meta-Analysis Maps](https://paulscotti.github.io/educortex)

First-author publication in JOSE 2020

* + Browser-based visualization of human brain to help users understand brain anatomy and functional specialization

[Enhanced Inverted Encoding Modeling for Neural Reconstructions](https://www.biorxiv.org/content/10.1101/2021.05.22.445245v7)

* + Python package used for neuroimaging stimulus reconstructions ([PyPI](https://pypi.org/project/inverted-encoding/))

**SKILLS**

* Python, PyTorch
  + neural networks, large language models, denoising diffusion models, encoding/decoding models
  + multi-node / multi-gpu distributed training (DDP, FSDP, Deepspeed)
* HPC computing / cloud computing
  + Slurm HPCs, Amazon ECS, Microsoft Azure
  + created webdataset format large-scale datasets stored on AWS s3 to support large-scale model training
* Computational neuroimaging (fMRI and behavioral)
  + designing experiments, collecting data, pre-/post-processing; SPM, FSL, AFNI, Nipype, Freesurfer, Fmriprep
* Front-end web development (HTML, CSS, JavaScript, Node.js, React)