Vinam Arora

Philadelphia, PA | vinam.dev | vinam@seas.upenn.edu | Google Scholar | LinkedIn | +1-(470)-301-1348

Bio: Third-year Machine Learning PhD student at the University of Pennsylvania, developing Self-Supervised Learning methods with applications in neuroscience and timeseries. Background in chip-design and digital signal processing.

Education

University of Pennsylvania Jul '25 - ongoing
PhD in Computer and Information Science, *advised by Dr. Eva Dyer*

Georgia Institute of Technology Aug '22 - Jun '25
Master of Science in Electrical and Computer Engineering
PhD in Electrical and Computer Engineering *(transferred to UPenn after 3rd semester)*

Indian Institute of Technology, Roorkee Jul '15 - May '19
Bachelor of Technology in Electronics and Communication Engineering

Research Experience

Graduate Researcher Jan '23 - ongoing
NerDS Lab (University of Pennsylvania & Georgia Tech | advised by Dr. Eva Dyer)

- Developing *Self-Supervised Learning* methods and large-scale Transformer models for multi-modal data, with applications in neuroscience, timeseries, and graphs. (NeurIPS 2025, ICLR 2025, TMLR 2025, NeurIPS 2023)
- Developing `torch_brain`, an open-source library for deep-learning on brain data with highly efficient data and training pipelines.
- Working on improving positional embeddings for Graph Transformers. (NeurIPS Workshop 2025)

Visiting Scientist Jun - Jul '25
Allen Insitute for Neural Dynamics (Seattle, WA | advised by Dr. Josh Siegle)

- Explored SSL methods for classifying neuron types in the mouse Striatum.

Industry Experience

Microarchitecture Intern Jun - Aug '23
Rivos Inc. (Mountain View, CA)

- Designed interconnect-traffic and power management units for a machine learning accelerator.

Digital Chip Design Engineer Jul '19 - Jul '22
Texas Instruments (Bangalore, India)

- Led R&D efforts for digital signal processing in cellular ADCs; resulted in 3 production designs and 2 patents.

Publications

Vinam Arora, Divyansha Lachi, Ian J. Knight, Mehdi Azabou, Cole L. Hurwitz, Blake A. Richards, Josh H. Siegle, Eva L. Dyer. "Know Thyself by Knowing Others: Learning Neuron Identity from Population Context" *NeurIPS (2025)*

Vinam Arora*, Divyansha Lachi*, Shivashriganesh P. Mahato, Mehdi Azabou, Zihao Chen, Eva L Dyer. "Exploiting All Laplacian Eigenvectors for Node Classification with Graph Transformers" *New Perspectives in Graph ML Workshop, NeurIPS (2025)*

Ian J. Knight, **Vinam Arora**, Mehdi Azabou, Zihao Chen, Eva L. Dyer. "Unified Pretraining on Mixed Optophysiology and Electrophysiology Data Across Brain Regions" *Foundation Models for the Brain and Body Workshop, NeurIPS (2025)*

Divyansha Lachi, Mehdi Azabou, **Vinam Arora**, Eva L. Dyer. "GraphFM: A generalist graph transformer that learns transferable representations across diverse domains " *TMLR (2025)*

Mehdi Azabou*, Krystal X. Pan*, **Vinam Arora**, Ian J. Knight, Eva L. Dyer, Blake A. Richards. "Multi-session, multi-task neural decoding from distinct cell-types and brain regions" *ICLR (2025)*

Divyansha Lachi, Mahmoud Mohammadi, Joe Meyer, **Vinam Arora**, Tom Palczewski, Eva L. Dyer. "RGP: A Cross-Attention based Graph Transformer for Relational Deep Learning" *Learning on Graphs (2025)*

Mehdi Azabou, **Vinam Arora**, Venkataramana Ganesh, Ximeng Mao, Santosh Nachimuthu, Michael Mendelson, Blake A. Richards, Matthew G. Perich, Guillaume Lajoie, Eva L. Dyer. "A Unified, Scalable Framework for Neural Population Decoding" *NeurIPS (2023)*

Abstracts

Vinam Arora, Divyansha Lachi, Ian J. Knight, Mehdi Azabou, Cole L. Hurwitz, Blake A. Richards, Josh H. Siegle, Eva L. Dyer. "NuCLR: Zero-Shot Inference of Cell-Types and Brain Regions from Population Activity" *COSYNE 2026*

Mehdi Azabou, **Vinam Arora**, Milo Sobral, Laura Suarez, Nanda Krishna, Avery Ryoo, Ximeng Mao, Shivashriganesh P. Mahato, Alexandre Andre, Liam Paninski, Guillaume Lajoie, Blake Richards, Eva Dyer. "An Open-Source Ecosystem for Models of Multi-Modal Brain and Body Data" *Demo at BrainBodyFM Workshop, NeurIPS (2025)*

Anna Lakunina, **Vinam Arora**, Cole Hurwitz, Michelle Olsen, Eva L Dyer, Karel Svoboda, Josh H Siegle. "A ground truth dataset for electrophysiology-based cell type classification in the basal ganglia and midbrain" *Society for Neuroscience (2025)*

Divyansha Lachi, Mahmoud Mohammadi, Joe Meyer, **Vinam Arora**, Tom Palczewski, Eva L Dyer. "RGP: A Cross Attention based Graph Transformer for Relational Deep Learning" *Stanford Graph Learning Workshop (2025)*

Vinam Arora*, Divyansha Lachi*, Mehdi Azabou, Eva L Dyer. "Leveraging Perceiver IO and Relative Position Encodings for Enhanced Node Classification" *SIAM Conference on Mathematics of Data Science (MDS24), Mini-symposium: New Frontiers of Graph Machine Learning (2024)*

Mehdi Azabou, **Vinam Arora**, Patrick Mineault, Venkataramana Ganesh, Ximeng Mao, Santosh Nachimuthu, Michael Mendelson, Blake A Richards, Matthew G Perich, Guillaume Lajoie, Eva L Dyer. "Large-scale pretraining on neural data allows for transfer across subjects, tasks and species" *COSYNE (2024)*

Talks

"*Know Thyself by Knowing Others: Learning Neuron Identity from Population Context.*" Frontier Models for Neuroscience and Behavior Working Group, **ARNI, Columbia University** (Aug 27, 2025)

"*Large-Scale Deep Learning in Neuroscience with* `torch_brain`*,* `brainsets`*, and* `temporaldata`." NeuroData25 Workshop, **Georgia Tech** (April 11, 2025)

"*An Introduction to Self-Supervised Learning.*" Machine Learning in Biosciences, **Georgia Tech** (Oct 29, 2024)

"*Introduction to ARM Cortex M4 Development Platform.*" Embedded Systems Design Workshop, **Indian Institute of Technology, Roorkee** (Nov, 2018)

Awards and Achievements

2025 **NeurIPS Scholar Award** *NeurIPS*
2025 **Top Reviewer Award** *NeurIPS*
2021 **Debugging Champion Award** *Texas Instruments*
2020 **Budding Talent Award** *Texas Instruments*

Patents

Nagarajan Viswanathan, Himanshu Varshney, **Vinam Arora**, Charls Babu, Srinivas Kumar Naru. "Auxiliary ADC based calibration for non-linearity correction of ADC" *US Patent 11784660B2 (2023)*

Vinam Arora, Srinivas Naru. "Numerically-controlled oscillator with dithered coarse & fine splitter" *US Patent 11496124B1 (2022)*

Technical Skills

Advanced: Python, PyTorch, Git, Jupyter, Matplotlib, Linux, LaTeX, SystemVerilog, Adobe Illustrator.
Intermediate: C, CUDA, Javascript/Typescript, React, Matlab