Nikhil Parthasarathy

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Expertise

- Deep learning research (JAX / PyTorch)
- Large-scale multimodal learning (vision and language)
- self-supervised vision pretraining (image/video)
- Active learning and data curation
- Visual perception and computational neuroscience.

Work History

Jan 2024 – present — **Research Scientist,** Google DeepMind
- Core contributor to SoTA SigLIP 2 vision encoder release
- Co-led development of online (active) data curation techniques enabling SoTA distillation and 10x pretraining efficiency gains of multimodal image-text models.
- Improving vision capabilties of the next-generation Gemma model family.

Summer 2022 — **Research Scientist Intern,** Google DeepMind
- Developed novel self-supervised methods for pretraining robust and human-aligned vision encoders from large-scale natural video data.

2016-2017 — **Graduate Research Assistant,** Stanford Retinal Prosthesis Lab
- Co-created the first deep learning-based approach to reconstructing natural images from retinal ganglion cell responses for retinal prosthetic applications.

Summer 2016 — **Machine Learning Engineer,** Matroid Inc.
- Worked on full-stack engineering to build end-to-end pipelines for deep learning based classification on high-resolution videos and live-streams.

Education

2017 – 2023 — **Ph.D., New York University** in Neural Science (Advisor: Prof. Eero P. Simoncelli).
Thesis: *Towards Aligning Artificial and Biological Vision Systems With Self-Supervised Representation Learning*
Coursework: *Cellular Neuroscience, Sensory and Motor Systems, Visual Neuroscience*

2015 – 2017 — **M.S., Stanford University** in Computational and Mathematical Engineering (GPA: 3.7).
Coursework: *Information Theory, Cognitive Neuroscience, Theoretical Neuroscience, Numerical Linear Algebra, Numerical Optimization, Distributed Algorithms and Optimization*

2011 – 2015 — **B.S., Stanford University** in Electrical Engineering (GPA: 3.7)
Coursework: *Convex Optimization, Machine Learning, Representations and Algorithms for Computational Molecular Biology, Advanced Linear Algebra and Matrix Theory, Signal Processing*

Teaching

2018 — NYU Graduate Teaching Assistant for Math Tools for Neuroscience

Fall 2014,2015 — Lead Teaching Assistant for CS 229 (Machine Learning w/ Prof Andrew Ng)

Publications

1. M. Tschannen*, A. Gritsenko*, X. Wang*, M. F. Naeem*, I. Alabdulmohsin*, **N. Parthasarathy***, T. Evans*, L. Beyer*, Y. Xia, B. Mustafa, O. Hénaff, J. Harmsen, A. Steiner, and X. Zhai*, "Siglip 2: Multilingual vision-language encoders with improved semantic understanding, localization, and dense features," *Technical Report, arXiv preprint arXiv:2502.14786*, 2025.

2. V. Udandarao*, **N. Parthasarathy***, M. F. Naeem, T. Evans, S. Albanie, F. Tombari, Y. Xian, A. Tonioni, and O. J. Hénaff, "Active data curation effectively distills large-scale multimodal models," *IEEE/CVF Conference on Computer Vision and Pattern Recognition*, 2025.

3. T. Evans*, **N. Parthasarathy***, H. Merzic, and O. J. Henaff*, "Data curation via joint example selection further accelerates multimodal learning," *Advances in Neural Information Processing Systems, Track on Datasets and Benchmarks, **Spotlight Award***, 2024.

4. M. Kuoch, C.-N. Chou, **N. Parthasarathy**, J. Dapello, J. J. DiCarlo, H. Sompolinsky, and S. Chung, "Probing biological and artificial neural networks with task-dependent neural manifolds," *Conference on Parsimony and Learning*, pp. 395–418, 2024.

5. **N. Parthasarathy**, "Towards aligning artificial and biological vision systems with self-supervised representation learning," Ph.D. dissertation, New York University, 2024.

6. **N. Parthasarathy***, O. J. Hénaff, and E. P. Simoncelli, "Layerwise complexity-matched learning yields an improved model of cortical area v2," *Transactions on Machine Learning Research (TMLR), **Featured Certification***, 2024.

7. I. Balazevic*, D. Steiner*, **N. Parthasarathy**, R. Arandjelović, and O. Henaff*, "Towards in-context scene understanding," *Advances in Neural Information Processing Systems, **Spotlight Award***, vol. 36, pp. 63 758–63 778, 2023.

8. L. Duong, K. Bonnen, W. Broderick, P.-É. Fiquet, **N. Parthasarathy**, T. Yerxa, X. Zhao, and E. Simoncelli, "Plenoptic: A platform for synthesizing model-optimized visual stimuli," *Journal of Vision*, vol. 23, no. 9, pp. 5822–5822, 2023.

9. **N. Parthasarathy***, S. Eslami, J. Carreira, and O. Hénaff, "Self-supervised video pretraining yields robust and more human-aligned visual representations," *Advances in Neural Information Processing Systems*, vol. 36, pp. 65 743–65 765, 2023.

10. S. Koppula*, Y. Li, E. Shelhamer, A. Jaegle, **N. Parthasarathy**, R. Arandjelovic, J. Carreira, and O. Hénaff, "Where should i spend my flops? efficiency evaluations of visual pre-training methods," *Advances in Neural Information Processing Systems, Workshop on Self-Supervised Learning*, 2022.

11. **N. Parthasarathy** and E. P. Simoncelli, "Self-supervised learning of a biologically-inspired visual texture model," *Technical report, arXiv preprint arXiv:2006.16976*, 2020.

12. R. Feinman and **N. Parthasarathy**, "A linear systems theory of normalizing flows," *Technical report, arXiv preprint arXiv:1907.06496*, 2019.

13. J. R. Golden, C. Erickson-Davis, N. P. Cottaris, **N. Parthasarathy**, F. Rieke, D. H. Brainard, B. A. Wandell, and E. Chichilnisky, "Simulation of visual perception and learning with a retinal prosthesis," *Journal of neural engineering*, vol. 16, no. 2, p. 025 003, 2019.

14. **N. Parthasarathy***, E. Batty*, W. Falcon, T. Rutten, M. Rajpal, E. Chichilnisky, and L. Paninski, "Neural networks for efficient bayesian decoding of natural images from retinal neurons," *Advances in Neural Information Processing Systems, **Spotlight Award***, vol. 30, 2017.