Felipe Parodi

fparodi@upenn.edu | felipe-parodi.github.io | github.com/felipe-parodi | Google Scholar

Research Focus

Computational neuroscientist and machine-learning researcher studying representations in biological and artificial systems. I build multimodal research pipelines, evaluate model internals with interventions and ablations, and use neural decoding and representation analysis to understand how high-dimensional systems encode perception, context, and behavior.

Education

University of Pennsylvania — Philadelphia, PA
Ph.D. in Neuroscience, Computational Neuroscience Initiative — *2026*
Thesis: *Applications of deep learning for primate neuroethology*; co-advised by Konrad Kording and Michael Platt.

University of Miami — Coral Gables, FL
B.S. in Neuroscience — *2019*

Vector Institute — Toronto, ON
Deep Learning and Reinforcement Learning Summer School — *2024*

Technical Skills

Programming: Python, PyTorch, NumPy, SciPy, scikit-learn, pandas, MATLAB, Git, Linux, HPC/GPU workflows.
Machine learning: mechanistic interpretability, transformers, vision transformers, representation analysis, causal ablations/interventions, probing, model-internals analysis, computer vision, multimodal models, pose estimation, detection/tracking, model evaluation.
Quantitative methods: neural decoding, population analyses, GLMs/regression, dimensionality reduction, signal processing, statistics, time-series analysis, reproducible scientific computing.

Research Experience

Wharton Neuroscience Initiative / Platt Lab — Philadelphia, PA
Postdoctoral Researcher — *2026–Present*

- Develop AI systems for understanding human and animal behavior in real-world settings, with emphasis on perception, social inference, representation analysis, and behavior.
- Study how internal representations in neural and artificial systems support context-dependent behavior across naturalistic data.

University of Pennsylvania — Philadelphia, PA
Ph.D. Researcher — *2020–2026*

- Built large-scale multimodal pipelines for natural social behavior in macaques, combining wireless neural recordings, 3D pose estimation, computer vision, and statistical modeling.
- Developed analyses for behavioral-state decoding, neural representation analysis, and ecological validation of social perception signals.
- Used population decoding, dimensionality reduction, and statistical modeling to relate neural activity to spatial context, social behavior, and latent behavioral state.

Google — Remote / Mountain View, CA
Data Science Research Intern — *2024*

- Co-developed a Python research-engineering library combining large language models and human annotation to scale generative-AI music evaluation.
- Designed reusable evaluation workflows adopted in production for high-throughput model assessment.

Colossal Biosciences — Remote
Machine Learning for Conservation, Contract — *2024*

- Developed an end-to-end deep learning pipeline for wild elephant detection, individual recognition, and social behavior characterization from aerial drone data.
- Piloted the system with Save the Elephants for applied conservation workflows.

Selected Research Projects

Mechanistic Interpretability of Vision Transformers — 2026

- Studied register-token function in DINO vision transformers, showing that zero-ablation can overstate content dependence and that intervention design can change conclusions about model internals.

Biological and Artificial Representation Analysis 2020–Present

- Use neural decoding, dimensionality reduction, representational similarity analysis, and multimodal behavioral modeling to study how high-dimensional systems encode social context and action.

Multimodal Model Evaluation 2024–Present

- Built evaluation and annotation pipelines for LLM-assisted music evaluation, VLM-based medical attention decoding, and computer-vision systems operating on naturalistic behavioral data.

Selected Publications

- **Parodi, F.**, et al. "Zero-Ablation Overstates Register Content Dependence in DINO Vision Transformers." arXiv (2026).
- **Parodi, F.**, et al. "Mid-superior temporal sulcus encodes spatial context and behavioral state in freely moving macaques." bioRxiv (2026).
- **Parodi, F.**, et al. "PrimateFace: A Machine Learning Resource for Automated Face Analysis in Human and Non-human Primates." bioRxiv (2025).
- **Parodi, F.**, Kording, K. P., and Platt, M. L. "Primate neuroethology: a new synthesis." *Trends in Cognitive Sciences* (2025).
- Segado, M., **Parodi, F.**, et al. "Grounding Intelligence in Movement." arXiv (2025).
- Testard†, C., Tremblay†, S., **Parodi, F.**, et al. "Neural signatures of natural behaviour in socializing macaques." *Nature*, 628(8007), 381–390 (2024).
- **Parodi, F.**, et al. "Vision-language Models for Decoding Provider Attention During Neonatal Resuscitation." CVPR Workshop (2024).

† denotes shared authorship. Additional publications available on Google Scholar.

Open-Source Software

- **PrimateFace**: cross-species primate face benchmark and toolkit for detection, tracking, and automated comparative face analysis.
- **solo_mSTS_parodi2026**: reproducible analysis code for neural population analyses of macaque mSTS during natural behavior.
- **neogaze**: semantic gaze decoder for neonatal resuscitation videos using SAM2 and vision-language models; achieved 91% zero-shot and 98%+ fine-tuned classification.
- **neuralbasis_socialmonkeys**: analysis code for Testard†, Tremblay†, **Parodi**, et al. (*Nature*, 2024), including behavioral decoding and social-interaction analyses.
- **awesome-computational-primatology**: curated resource at the intersection of deep learning, computer vision, and non-human primate research.

Selected Honors

Penn AI Fellow, University of Pennsylvania (2026); Gemini Academic Program Award, Google Cloud (2025); NeurIPS Travel Award, BrainBody Foundation Models Workshop (2025); NRSA T32 NIDCD-NIH Training Grant in Audition and Communication (2021–2023); William Fontaine Fellow, University of Pennsylvania (2020–2026).

Service and Teaching

Reviewer: HOW Vision Interpretability Workshop; *Annals of the New York Academy of Sciences*; Cosyne; *International Journal of Computer Vision*; CV4Animals Workshop, CVPR; *Neuron*. Teaching: AI for Science Workshop; Neuroethology; Statistics for Biologists; Deep Learning for Data Science.