Zachary Pricz

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Education

University of California, Berkeley Aug. 2023 - Dec. 2025
B.S. in Electrical Engineering and Computer Sciences *GPA: 3.85*

Work Experience

ML Engineer Intern | MRSL Real-Time Systems Laboratory, Inc. Jun. 2025 – Aug. 2025

- Developed and trained a custom loss function CNN for RF spectrogram classification, achieving **85%+** testing accuracy across diverse SNR levels; model adopted by full-time engineers for deployment in RF anomaly detection.
- Built an end-to-end signal preprocessing pipeline (STFT, normalization, AWGN augmentation) to transform raw IQ data into model-ready spectrograms, enabling automated training on new signal environments without manual feature engineering.
- Benchmarked CNN against autoencoder baseline, demonstrating an average **10%** accuracy improvement that informed the team's architecture selection for the production system.
- Implemented a real-time IQ sample PUB/SUB system using ZeroMQ, enabling live inference on streaming RF data and validating model performance under operational conditions.

Deep Learning Researcher | UCSF Berkeley Ganguly Lab Sep. 2024 – Jun. 2025

- Optimized CNN architectures for ECoG signal classification in robotic prosthetics, achieving a **10%** accuracy improvement that established a new performance baseline adopted by subsequent researchers on the project.
- Redesigned the lab's data pipeline and storage formats, reducing model training time by **50%** and enabling faster experimental iteration across the research team.
- Identified decision boundary drift in brain-signal classifiers by analyzing embedding space shifts over time, producing diagnostic visualizations now used by the lab to monitor model degradation in non-stationary neural data.

Projects

Instrumental Goal Interpretability | *Llama 3.1, PyTorch, Hugging Face, Transformers* Oct. 2025 – Dec. 2025

- Investigated the mechanistic interpretability of **Llama 3.1 8B** by training linear probes on residual stream activations to identify and validate internal representations of instrumental goal pursuit.
- Developed an automated experimental pipeline to generate contrastive synthetic datasets and implemented an **LLM-as-a-judge** evaluation framework to quantify the shift in model agency and behavior.
- Validated causal role of internal representations through activation steering with **LDA**, achieving a significant **26.8%** reduction in instrumental goal pursuit (Instruct) and **18.2%** (Base) while maintaining fluency.

NeRF : Neural Residence Fields | *Pytorch, OpenCV, Python* Oct. 2025 – Nov. 2025

- Developed a Neural Radiance Field (NeRF) model in PyTorch, implementing ray sampling, MLP-based scene representation, and volumetric rendering to synthesize photorealistic novel views from multi-view images.
- Optimized 3D reconstruction fidelity by tuning network hyperparameters and positional encoding, improving training convergence and achieving high-quality novel view synthesis validated by **PSNR** metrics.
- Engineered an end-to-end 3D capture pipeline, utilizing OpenCV for camera calibration and pose estimation to successfully train and render NeRF models on custom-captured 3D object scans.

Poolbot | *Robotics, OpenCV, ROS* Aug. 2024 – Dec. 2024

- Led the development of motion control algorithms for a Sawyer 6-DOF robotic manipulator, enabling precise linear trajectory navigation and achieving shot accuracy of over **95%** in a pool game.
- Implemented object detection and localization using OpenCV, mapping ball positions from the camera frame to the robot's base frame with a positional error of less than **2 cm**, ensuring accurate target alignment.
- Spearheaded controls development, completing the project ahead of schedule while mentoring peers on trajectory planning techniques.

Skills

Software: Python, C/C++, Pytorch, Hugging Face, OpenCV, AWS, MLFlow, DVC, scikit-learn, ROS2, SQL, GNU Radio, Docker
Developer Tools: Git, Claude Code, VS Code, Linux, Code Wiki, Valgrind
Relevant Coursework: Deep Neural Networks, Natural Language Processing, Machine Learning, Optimization Models in Engineering, Computer Vision & Computational Photography, Operating Systems & System Programming, Robotics, Signals & Systems, Designing Information Devices & Systems