

Cameron Ryan

perceptrons.org · github.com/cryanwashere · linkedin.com/in/cameron-ryan-7b043a229 · Google Scholar

Education

Northeastern University

Expected May 2027

B.S. in Mathematics and Physics

GPA: 3.9

Relevant coursework: Linear Algebra, Graph Theory, Advanced Probability and Statistics, Real Analysis, Modern Physics, Advanced Group Theory, Quantum Mechanics, Electricity and Magnetism I, Thermodynamics and Statistical Mechanics, Classical Dynamics, Topology, Mathematical and Computational Problem Solving Methods for Physics, Fourier Series and PDEs, Statistics and Stochastic Processes, Machine Learning and Statistical Learning Theory I

Research Experience

Lawrence Livermore National Laboratory

Summer 2026

Research Intern (Mentor: Shusen Liu)

- Investigated whether neural network latent spaces possess intrinsic geometry that can be used to align them without any anchor supervision.
- Developed *Hyperspherical Geodesic Alignment* for unsupervised latent space alignment; accepted to the NeurReps Workshop at NeurIPS 2026. Preprint available on arXiv. [\[arXiv\]](#)

University of Rochester Laboratory for Laser Energetics

2025 – 2026

Research Intern (Mentor: Shuai Zhang)

Rochester, NY

- Researched classification of material phases from atomic coordinates using neural networks.
- Replicated prior results on Dynamic Graph Convolutional Neural Networks (DGCNNs) for phase classification, then developed a modified DGCNN with better test accuracy.
- Invented the Gaussian Kernel (GK) architecture, achieving significant performance gains over baseline DGCNN approaches, and studied the hyperparameter scaling of GK models.
- Presented a poster at the IFE-SURE Symposium (Aug 2025) and a talk to the LLE AI/ML group (Feb 2026).
- Expecting to publish paper on Gaussian Kernel method; preprint withheld pending LLE Review and Release (details available on request).

University of Rochester Laboratory for Laser Energetics

Summer 2022

Research Intern (Mentor: Richard Kidder)

Rochester, NY

- Researched methods of managing applications with containers to support scientific computing projects and collaboration with other labs; authored a project report.

Publications & Presentations

- **C. Ryan**, *Unsupervised Latent Space Alignment with Hyperspherical Geodesic Alignment*. Preprint, August 2026. [\[arXiv\]](#)
- *High Pressure Material Phase Classification with Gaussian Kernel Neural Networks*. Poster, IFE-SURE Symposium, August 2026.
- *Machine Learning Material Phase Identification*. Poster, IFE-SURE Symposium, August 2025.
- *Machine Learning Material Phase Identification*. Presentation, LLE AI/ML Group, February 2026.

Academic Projects

Perceptron Learning Capacity Experiments

Apr 2026

Final project for *Mathematical and Computational Problem Solving Methods for Physics* (Prof. Armen Stepanyants). Ran experiments on the learning capacity of perceptrons and compared results with known analytical results from early research in the field.

Applied Math Capstone: Reinforcement Learning in Minecraft

Jan 2026

Team research project (advisor: Prof. Lee Peng Lee) evaluating the efficacy of reinforcement learning methods for Minecraft, including Reinforcement Learning from Human Feedback, Proximal Policy Optimization, and Soft Actor-Critic.

Software Projects

Naturify (iOS app) [[App Store](#)] Sep 2023 – Present
Trained a visual transformer in PyTorch on an Nvidia A100 GPU to identify 10,000 species of plants, animals, and fungi from photos; trained a second model to predict nearby species from latitude/longitude. Built the inference backend and website.

Wikipedia Search Engine [[GitLab](#)] Jun 2024 – Present
Search engine over Wikipedia that embeds text and images with open-source CLIP models, stored and queried through a vector database, with all components containerized in Docker. Includes a web crawler written in Rust.

Floral: JAX Neural Network Library [[GitHub](#)] Jan 2023 – Present
Python library built on JAX for creating, training, and saving neural networks through a clean API; published on PyPI.

Additional iOS Apps 2021 – 2023
Image Garden (semantic search over a photo library using CLIP), **Earth Explore** (bird identification from calls with a neural network), and **wordLab** (note-taking with AI-powered querying).

Other Projects

Stock Prediction Neural Network (predicts a normal distribution over future returns); **Apartment Stock Exchange** (currency and security exchange with a full order book); **DNA File Encoder** (C program encoding arbitrary files as DNA sequences); **CameronOS** (bootloader and screen driver in C and assembly).

Technical Skills

Languages: Python, C, Rust, Assembly

Machine Learning: PyTorch, JAX, CLIP/embedding models, vision transformers, graph neural networks, reinforcement learning

Tools & Systems: Docker, vector databases, Git, iOS app development, backend/inference servers

Areas: Latent space geometry, theoretical physics, information retrieval, systems architecture