

DRON MONGIA

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SUMMARY

Applied Mathematics student at UC Berkeley with experience in programming and research. Interested in opportunities involving machine learning, finance, economics, and applied mathematics.

EDUCATION

University of California, Berkeley | Berkeley, CA | Bachelor of Science: *Applied Mathematics* May, 2027

- **GPA: 3.771; Major GPA: 3.854**
- **Relevant Coursework:** Fundamentals of Programming, Machine Learning, Real Analysis, Mathematical Economics
- **Dean's Honor Award:** Spring 2025, Fall 2024, Winter 2024, Fall 2023

RESEARCH EXPERIENCE

Polymath Jr. REU | *Machine Learning Research* | [Program Link](#) May, 2026 – August, 2026

- Collaborated with a team of undergraduate researchers and machine learning professors to study and implement state-of-the-art generative modeling methods, with a focus on drifting-based image generation.
- Investigated the mathematical foundations of generative models and translated theoretical ideas from recent research papers into working implementations and experiments.
- Learned to use modern machine learning tools like PyTorch/JAX, GPU computing, and quantitative image-generation metrics including FID and KID to aid in comprehensive experimentation and testing of models.

Directed Reading Program | *Mathematics Research* | [Program Link](#) September, 2025 – December, 2025

- Worked closely with a graduate student mentor over the course of a semester on an independent applied mathematics research project and paper.
- Learned the fundamentals of academic research reading and writing, including interpreting existing literature, structuring a paper, presenting mathematical arguments, and communicating results clearly to peers and mentors.
- Presented the completed project and research findings at the Berkeley Directed Reading Program end-of-semester presentation to the math department faculty.

SELECTED RESEARCH AND PROJECTS

Encoder-Free Drifting Models | *Machine Learning Project* | *Polymath REU* | [Project Link](#) August 2026

- Trained a three-step image generation model that turns random noise into an image sample in a single network call, reaching an FID error of 13.17 from an 83.65 starting point.
- Based on the drifting model architecture published in February 2026, the model removes the need for a pretrained encoder, a major conceptual issue with drifting.
- Trained on 50,000 images derived from the CIFAR-10 dataset, the model contains 37.7 million parameters and is able to generate interpretable sample images at evaluation.
- **Tools used:** PyTorch (model, training loop, capped gradient corrections) · clean-fid + torchvision (FID/KID, precision/recall) · CUDA on rented cloud GPU · NumPy/Matplotlib (ablation analysis, figures) · Git

Real Analysis with Filters | *Formal Applied Mathematics Paper* | *Berkeley DRP* | [Project Link](#) December 2025

- Reframed Real Analysis, a fundamental branch of mathematics, with Filters, a mathematical abstraction widely used in the Lean 4 programming language for formalization of limits and continuity.
- Documented the project in a well-written research paper, emphasizing clear presentation of technical concepts and results, and following standard practices for academic research and technical writing.
- **Tools used:** Lean 4 (definitions, theorem statements, proofs) · Mathlib (verified mathematics library) · LaTeX (paper writing and styling) · Git

Forecasting GDP | *Machine Learning and Economics Project* | *Independent* | [Project Link](#) September 2024

- Evaluated and compared the performance of several machine learning models to forecast U.S. GDP using historical macroeconomic data and economic indicators.
- Published the project and methodology as a technical article on towardsdatascience.com, explaining step-by-step the involvement and implementation of machine learning, mathematics, and macroeconomic forecasting.
- **Tools used:** Python (model implementation, data sourcing and cleaning) · Pandas (data organization and manipulation) · Matplotlib/Seaborn (model evaluations, visual demonstration, data analysis).

SKILLS

Languages & Frameworks: Python, Pandas - data organization. JAX, PyTorch, NumPy, SciPy - machine learning experiments.

Development Tools: Git, Linux/WSL, CUDA, VS Code - environment. Claude Code, Codex, MCP Servers - implementation.

Research Tools: Lean 4, Mathlib, LaTeX - theoretical confirmation. Matplotlib, Seaborn - visual demonstrations and presentation.