

Mark Rhee

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EDUCATION

University of California, Berkeley | Berkeley, California

May 2028

B.A. in Applied Mathematics, intended double major in Computer Science | GPA: 4.0 / 4.0

Relevant Courses: Data Structures (A+), Structure & Interpretation of Programs (A+), Data Science (A+), Computer Architecture (A+), Honors Linear Algebra (A+), Discrete Mathematics (A+), Multivariable Calculus (A+), Mechanics and Relativity (A)

Activities: Math Dept. Directed Reading Program, Korean American Basketball Association (Officer), Computer Science Mentors

TECHNICAL SKILLS

Languages: Python, C, Java, SQL, LaTeX

Technologies: PyTorch, NumPy, JAX, Matplotlib, Git

Tools: Google Colab, Jupyter, Vim, VS Code, Unix CLI

EXPERIENCE

UC Berkeley Ajoy Lab | Berkeley, California

June 2025 - Present

Undergraduate Researcher

- Synthesized findings from 20+ papers on computer vision and prototype-based models to inform model design
- Applied interpretable machine learning to analyze chemical sensing data
- Adapting ProtoPNet and ProtoPool architectures for greater interpretability of predictions and increased trustworthiness

UC Berkeley EECS Department | Berkeley, California

September 2025 - Present

CS 61C Academic Intern

- Supported students in Computer Architecture course through office hours focused on labs and homework
- Provided one-on-one debugging and conceptual guidance on topics including caching, pipelining, and parallelism

PROJECTS

Spectral Learning Dynamics of Optimizers | Python, JAX, Matplotlib

August 2025 - Present

- Implemented experiments in JAX analyzing gradient descent vs. Muon on synthetic word embedding tasks
- Showed Muon converges significantly faster by learning singular vectors in parallel; validated results across multiple trials
- Collaborated with PhD student at UC Berkeley Redwood Center, providing insight into optimizer convergence dynamics

Generalization Capabilities of Neural Network Substructures | Python, PyTorch, Matplotlib

July 2025

- Implemented sparse subnetwork training framework in PyTorch to evaluate Zhang et al.'s *functional lottery ticket hypothesis* on the MNIST-1D dataset
- Automated large-scale retraining (8000+ iterations per model) and visualized results using reproducible pipelines

mrkdh16.github.io/markdown | Quartz, Obsidian, NPX

April 2025 - Present

- Maintaining a public blog synthesizing ideas across mathematics, physics, computer science, and philosophy
- Hosted with Github Pages, deployed with Obsidian and Quartz

NBA Shot Prediction | Python, NumPy, PyTorch

December 2024

- Built predictive models for NBA shot success using Kaggle shot log data (128k shots)
- Achieved 64% accuracy / 66% AUC with optimized neural nets (~15% improvement over existing models)

HONORS

Aime Qualifier

March 2024

- Top ~5% in AMC 12 (American Mathematics Competition)