Drake Brown

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Education

PhD, Applied Mathematics **April 2029**
University of Utah *Salt Lake City, Utah*
- Graduate Coursework: Ordinary Differential Equations, Functional Analysis, and Numerical Analysis

BS, Applied & Computational Mathematics Emphasis (ACME), Computer Science Minor **April 2025**
Brigham Young University *Provo, Utah*
- Concentration: Data Science
- Major GPA: 4.00
- Relevant Coursework:

Advanced Deep Learning	Stochastic Differential Equations
Mathematics of Deep Learning	Linear and Nonlinear Analysis
Modeling with Uncertainty in Data	Algorithm Design and Optimization
Modeling with Dynamics and Control Theory	Advanced Programming Concepts

Skills

- Proficient in Python (PyTorch, Lightning, NumPy, Pandas), SQL, C++, Java, Rust
  - Geometric Deep Learning
  - Dynamic Optimization
  - Numerical Methods for PDEs
  - Data Structures
  - Fourier Analysis
  - Gaussian Quadrature
  - QR and Singular Value Decomposition
  - Numerical Linear Algebra

Experience

AWS Software Engineering Intern **June - August 2024, May 2025- Present**
API Gateway, Amazon *Denver, Colorado*
- Streamlined AWS ingress architecture by eliminating NGINX proxy layer, implementing direct traffic handling in Protocol Service for Private API invocation
- Developed and implemented an "Isolation Fleet" system, reducing customer latency from 2000 ms to 20 ms and improving successful transactions by 30% for over 300,000 accounts by mitigating DDoS attacks

Research Assistant Lead **February 2022 – April 2025**
Graph Neural Networks Lab *Provo, Utah*
- Invited talk at SIAM-NSS conference. Results later submitted to SIAM as “Connecting the performance of GNN architectures to the properties of training data”
- Parallel processed 200 Graph Neural Network models to generate 15,488,000 data points (PyTorch)

Air Force Research Intern **April – September 2023**
Self-Supervised Image Representation Learning Lab *Dayton, Ohio*
- Outperformed state of the art results in self-supervised image learning on STL10 and Cifar100 by 4%
- Implemented Momentum Learners such as BYOL or Google’s DINO

Relevant Projects

Class Projects in PyTorch, BYU **2025**
- Trained hundreds of reinforcement agents in parallel to model strategies in the Prisoner’s Dilemma
- Trained equivariant neural ODE to predict trajectories for 3 body problem
- Developed a Music Transformer to generate instrumental scores and interpolate between music genres

Private Project in PyTorch, BYU **2024**
- Developing a Causal Video Transformer to predict video frames (in progress)
- Created a context topic similarity search using sentence transformers (RoBERTa) for ancient texts