Anthony Polloreno, Ph.D.

Member of Technical Staff @ Essential.ai
Post-Doctoral Researcher @ CU Boulder
Ph.D. @ CU Boulder
Graduate Researcher @ Sandia National Laboratories
Software Engineer @ Rigetti Computing
B.A. @ U.C. Berkeley

Website: https://www.ampolloreno.com
Email: ampolloreno@gmail.com
Languages: Python, Julia, C++, Lisp, Mathematica
Frameworks: Jax, PyTorch, NumPy, pandas, SQLAlchemy, Docker, Kubernetes

Mathematically-oriented research and software engineer with over a decade of expertise in AI and physics across government, academia, and industry. Seeking roles involving the science, engineering, and characterization of information processing systems.

Education

2019 – 2023 Ph.D. in Physics, University of Colorado, Boulder
2012 – 2016 B.A. in Computer Science, Mathematics, and Physics, University of California, Berkeley

Awards: NASA Space Technology Graduate Research Opportunity (NSTGRO) Fellowship, QISE-NET Award (Cohort 4), C.U. Boulder Domestic Graduate Travel Grant, Pomerantz Physics Scholarship, U.C. Berkeley Regents' and Chancellor's Scholarship

Work Experience

Essential.ai

Member of Technical Staff 2024
Large-Scale Model Pretraining, Hyperparameter Optimization, Experiment Tracking, and Fine-Tuning for Advanced AI Systems.
Pretrained models from 2B to 8B parameters on custom datasets, achieving full cluster utilization across 720 v5p chips. Developed a custom database integrated with Kubernetes and MaxText to track experiments, replacing WandB. Conducted scaling experiments to optimize trade-offs between model size, tokens, and FLOPS.

JILA

Postdoctoral Associate 2023 – 2024
Machine Learning for Predictive Modeling and Analysis of Noise in Recurrent Neural Networks.
Developed ensemble approaches to simulate various ESN configurations and assessed performance under Gaussian noise. Implemented ML algorithms in Python using Jax framework on Amazon EC2 instances.

Sandia National Laboratories

Graduate Student Intern 2021 – 2023
Statistical Analysis and Characterization of Computational Errors.
Developed a theoretical framework for analyzing computational errors in Markov processes inspired by quantum computation. Created a general statistical technique for error characterization, increasing system size by 10x and speed by 100x.

JILA and University of Colorado, Boulder

Graduate Student 2019 – 2023
Characterization of Information Processing Devices.
Optimized QAOA on a neutral atom quantum computer, enabling 10x more qubits in Penning traps for quantum computation. Developed broadband sensing techniques for faster axion detection.

Rigetti Computing

Full Stack Software Engineer 2016 – 2019
Implemented machine learning algorithms using quantum processors, improving error rates on MNIST data. Maintained control software suite and optimized automated calibration routines, increasing efficiency significantly.

Sandia National Laboratories

Student Intern 2015 – 2016
Control Theory and Convex Optimization.
Applied optimal control theory to reduce errors on quantum logical gates by an order of magnitude. Demonstrated FPGA control reductions and improved simulability of controls.

Publications

1. Polloreno, A. (2023). Limits of Reservoir Computing.
2. Polloreno, A. (2023). Markov Processes in Quantum Computation.
3. Polloreno, A. (2023). Direct Randomized Benchmarking.
4. Polloreno, A. (2023). Opportunities in Quantum Optimization.
5. Polloreno, A. (2022). QAOA Enhancements.
6. Polloreno, A. (2022). Individual Error Analysis in Quantum Devices.

Patents

1. Modular Quantum Processing Systems, 2021.
2. Operating a Quantum Processor, 2020.