Anderson Junsu Park

andersonjpark@berkeley.edu | +1 (510) 977-2944 | andersonjpark.com | Linkedin | Github

Education

University of California, Berkeley

Bachelor of Arts, Data Science & Physics

PROFESSIONAL EXPERIENCE

Engineering Research Intern (PyTorch, Quantum Computing, Optimization)

Ion Trap Group

- Developed ML optimization models in **PyTorch** to extract optimal laser control parameters from noisy quantum hardware data, improving fidelity of frequency-modulated quantum gates.
- Led and designed a thermal control system using laser heating and isolation techniques to achieve stable control of ion fluorescence at **500K**, allowing **robust** and **accurate** state initialization of trapped-ion quantum computers.
- Documented system architecture, methodology, and results in both a research poster and technical paper as part of the Berkeley Physics & Astronomy Undergraduate Research Scholars Program (BPURS).

Simulation Research Intern (C++, HPC, OpenMP, Compiler Integration) *Network for Neutrinos, Nuclear Astrophysics, and Symmetries*

- Developed high-performance C++ modules to simulate quantum kinetic equations, executed on UC Berkeley's Savio HPC cluster; optimized for memory efficiency and parallelism using OpenMP and numerical integration schemes.
- Designed and trained Python-based machine learning models to extract physical constants and key parameters from simulation output, improving the accuracy and interpretability of theoretical predictions using **Scikit-learn** and **SciPy**.
- Configured and deployed large-scale simulation jobs on HPC systems via remote access and job schedulers; performed file transfer, environment setup, and automated builds using Makefiles and HDF5, GSL, Fortran, OpenMP.

Data Engineering Lab Assistant (Python, Data Pipelines, CI/CD)

 $Lawrence \ Berkeley \ National \ Lab$

- Engineered thermal simulation workflows for silicon detector systems by integrating real-time heat sensor input to dynamically model and evaluate cooling performance, resulting in the replacement of the original waterflow system with an airflow-based design that allowed non-waterproof materials and reduced engineering costs by 70%.
- $\circ~$ Developed data pipelines using \mathbf{Python} for automated processing and visualization of temperature time-series data.
- $\circ~$ Maintained ${\bf CI/CD}$ pipelines using ${\bf GitHub}~{\bf Actions}$ and ${\bf pytest}$ for automated validation and deployment.

Selected Projects

XLA Graph Optimizer: Designed a graph-level optimizer using **XLA** to visualize and transform compute graphs from **PyTorch** models. Implemented pass-based graph rewrite rules for operator fusion, memory reuse, and kernel scheduling. (Summer 2024)

WordNet: Developed a NLP system using optimized data structures and DAG traversal techniques including multi-way lookup, cycle detection, and graph pruning to accelerate semantic queries and mirror graph scheduling in ML compilers. (Spring 2023)

RFC Word Count: Developed a multi-threaded distributed word frequency analyzer for 600K+ Enron emails using **Ray**, with parallel file parsing and stream-based processing optimized for memory constraints and run-time efficiency. (Summer 2022)

Titanic Survival: Built a modular ML pipeline to predict the survival of Titanic passengers using **logistic regression** and **decision trees**, with feature engineering, regularization, and evaluation through cross-validation and ROC-AUC. (Spring 2024)

Pacman AI: Developed Pacman's AI by implementing diverse AI algorithms including **A* search**, minimax & pruning, reinforcement learning, and **Bayesian networks** in a predefined framework for a school project.(Summer 2020)

Skills & Awards

Languages: Python, Java, C++, SQL, Bash

Libraries: NumPy, pandas, PySpark, Ray, TensorFlow, PyTorch, sk-learn, SciPy, Matplotlib, FastAPI, Graphviz

Tools & Systems: Git, GitHub Actions, Make, Linux, SSH, SLURM, HDF5, GSL, OpenMP, Fortran

Skills: Machine Learning, Data Visualization, CI/CD, HPC job scheduling, Data Pipeline Automation, Compiler Optimization Awards: Army Commendation Medal (US Army), Army Warrior Award (ROK Army)

Berkeley, CA Aug 2019 - Dec 2024

Berkeley, CA Feb 2020 - Sep 2020

Berkeley, CA Oct 2022 – Apr 2023

Berkeley, CA Aug 2022 – Dec 2024