Alan Pearl

Manchester, CT alannpearl@outlook.com AlanPearl alannpearl https://alanpearl.github.io

Personal Statement

Physics Ph.D. Researcher and AI Trainer with over 9 years of experience developing scientific software, including machine learning, generative deep learning, distributed training, and data analysis. Lead developer of numerous open-source tools and first author of peer-reviewed publications in the domains of astrophysics and data science.

Experience

Physics AI Trainer **Jun 2025 – Present**
Handshake AI *Remote*

- Created and reviewed physics prompts to provide high-quality training data that improved AI models' ability to solve and explain physics problems
- Provided expert feedback through RLHF, significantly improved the accuracy of AI's physics reasoning

Postdoctoral Researcher – Applied Machine Learning in Astrophysics **Sep 2023 – Aug 2025**
Argonne National Laboratory *Lemont, IL*

- Built generative neural-network models of galaxy populations using JAX and MPI on terabyte-scale datasets containing millions of galaxies, enabling more accurate cosmological inference for downstream research
- Parallelized model training and parameter optimization across distributed GPU clusters with MPI and CUDA, achieving a $100\times$ reduction in training time and enabling scalable analysis of large galaxy datasets
- Developed and maintained open-source Python packages (e.g., diffopt, diffmahnet, galtab), delivering reusable ML and big-data analysis tools that accelerated research workflows for various astrophysics projects

Education

University of Pittsburgh – Pittsburgh, PA **Sep 2017 – Aug 2023**
Ph.D. Physics – Thesis: Illuminating and Tabulating the Galaxy-Halo Connection *Aug 2023*
M.S. Physics, GPA: 3.89 *Dec 2018*

Rensselaer Polytechnic Institute – Troy, NY **Sep 2013 – May 2017**
B.S. Physics, magna cum laude, GPA: 3.75 *May 2017*

Technical Skills

ML & Distributed Training:	JAX, TensorFlow, Scikit-Learn, MPI, Slurm, PBS
Programming Languages:	Python (*9+ years*), C++, C#, Cython, SQL, MATLAB, IDL
Python Packages:	NumPy, Pandas, mpi4py, SpaCy, LangChain, Matplotlib, SciPy
Cloud & DevOps:	AWS SageMaker Certified, Docker, GitHub CI/CD
Other Tools:	VS Code, LaTeX, Debuggers (gdb, pdb), Linux (Ubuntu), Windows WSL

First-Author and Advisee Publications

Dec 2024	**Pearl, Alan N.**; Beltz-Mohrmann, Gillian D.; Hearin, Andrew P. 2024, JOSS, 9 (104), 7522.
Mar 2024	**Pearl, Alan N.**; Zentner, Andrew R.; Newman, Jeffrey A.; et al. 2024, ApJ, 963, 116
Jan 2024	Steel, Cecilia; **Pearl, Alan N.**; Kaushal, Yasha; Bezanson, Rachel 2024, RNAAS, 8, 16
Feb 2022	**Pearl, Alan N.**; Bezanson, Rachel; Zentner, Andrew R.; et al. 2022, ApJ, 925, 180P
Oct 2017	**Pearl, Alan N.**; Newberg, Heidi Jo; Carlin, Jeffrey L.; Smith, R. Fiona 2017, ApJ 847, 123P

Professional Reference

Andrew Hearin ahearin@anl.gov – supervisor at Argonne National Laboratory