

# Alan Pearl

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## Personal Statement

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Postdoctoral researcher in Astrophysics, seeking to bring my wide skillset to a career in AI and machine learning development. I have over 8 years of experience in scientific software development, algorithm derivation and implementation, big data analysis, relational database queries, Bayesian inference, machine learning, and data visualization. I am the lead developer of many open-source software projects, e.g. 🌐 [diffopt](#), 🌐 [diffmahnet](#), 🌐 [galtab](#), 🌐 [JaxTabCorr](#), and 🌐 [mocksurvey](#).

## Experience

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**Postdoctoral Researcher** **Sep 2023 - Present**

*Argonne National Laboratory, Lemont, IL*

- Developed generative models of galaxy populations using neural networks, allowing my team to perform cosmological inference without requiring a million-CPU-hour simulation per evaluation
- Parallelized parameter optimization on distributed GPU clusters, utilizing our high-performance computing resources, enabling nearly limitless scalability of our models and up to 100x faster training times

**Graduate Student Researcher / Teaching Assistant** **Sep 2017 - Aug 2023**

*University of Pittsburgh, Pittsburgh, PA*

- Generated galaxy data catalogs through machine learning and developed new spatial clustering statistics that produced some of the most significant evidence to date of galaxy assembly bias
- Clear communication: Led recitations for various courses and advised an undergraduate research project

## Education

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**University of Pittsburgh** – Pittsburgh, PA **2017 - 2023**

*Ph.D. Physics – Thesis: Illuminating and Tabulating the Galaxy-Halo Connection* *Summer 2023*

*M.S. Physics, GPA: 3.89* *Dec 2018*

**Rensselaer Polytechnic Institute** – Troy, NY **2013 - 2017**

*B.S. Physics, magna cum laude, GPA: 3.75* *May 2017*

## Technical Skills

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**Primary Language:** Python (*over 8 years of scientific software development*)  
**Python Packages:** NumPy, Jax, Pandas, mpi4py, Scikit-Learn, TensorFlow, SpaCy, LangChain  
**Secondary Languages:** C++, C#, Cython, MATLAB, HTML, SQL, Mathematica, IDL  
**Operating Systems:** Windows (with WSL), Linux (Ubuntu), AWS Courses  
**Other tools:** Slurm, Git, GitHub CI, VS Code, Docker, DVC, debuggers (gdb, pdb)

## First-Author and Advisee Publications

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**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

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Andrew Hearin ✉ [ahearin@anl.gov](mailto:ahearin@anl.gov) – current supervisor at Argonne National Laboratory