Alan Pearl

Postdoctoral Appointee
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Work Experience

Sept 2023 - Present   Argonne National Laboratory, 9700 S Cass Ave, Lemont, IL 60439, United States
Cosmology Postdoctoral Appointee

Cosmological Physics and Advanced Computing (CPAC) Group

- Developing Python libraries in the differentiable, GPU-accelerated JAX framework
- Modeling the galaxy population expected to be observed by the Roman Space Telescope
- Pushing the limits of inferring assembly histories from galaxy spectroscopy

Education

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

June 2023   Physics Ph.D.
Dec 2018   Physics M.S.
Thesis Title: *Illuminating and Tabulating the Galaxy-Halo Connection*
Thesis Advisor: Andrew Zentner

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

May 2017   Physics B.S., *magna cum laude*

Fellowships & Awards

2020   **Arts & Sciences Graduate Fellowship**
Dept. of Physics and Astronomy, Pitt

2020   **Thomas-Lain Essay Contest**: Graduate Student Winner
Dept. of Physics and Astronomy, Pitt

2017   **Class of 1902 Research Prize**: For best research paper in graduating class
School of Science, RPI

Research Projects

2021 - 2023   Used DESI data and new statistical methods to place constraints on HOD models
Advisor: Profs. Andrew Zentner, Jeffrey Newman

2019 - 2021   Constructed and calibrated mock galaxy catalogs for the PFS collaboration
Advisor: Prof. Rachel Bezanson

2016 - 2017   Used LAMOST data to construct a map of bulk velocity of the Milky Way disk
Advisor: Prof. Heidi Newberg

First-Author Refereed Publications

2022   *CLIMBER: Galaxy-Halo Connection Constraints from Next-generation Surveys*

Pearl, Alan N.; Bezanson, Rachel; Zentner, Andrew R.; et al. 2022, ApJ, 925, 180P

2017 *A Map of the Local Velocity Substructure in the Milky Way Disk*
Pearl, Alan N.; Newberg, Heidi Jo; Carlin, Jeffrey L.; Smith, R. Fiona 2017, ApJ, 847, 123P

Co-Author Refereed Publications

2022 *DESI Survey Validation Spectra Reveal an Increasing Fraction of Recently Quenched Galaxies at $z \sim 1$*
Setton, David J.; Dey, Biprateep; Khullar, Gourav; Bezanson, Rachel; et al. 2022, arXiv.2212.05070

2022 *The Velocity Dispersion Function for Massive Quiescent and Star-Forming Galaxies at $0.6 < z \leq 1.0$*
Taylor, Lance; Bezanson, Rachel;, van der Wel, Arjen; **Pearl, Alan**; et al. 2022, ApJ, 939, 90T

2022 *The Prime Focus Spectrograph Galaxy Evolution Survey*
Green, Jenny; Bezanson, Rachel; Ouchi, Masami; Silverman, John; et al. 2022, arXiv.2206.14908

Non-refereed Publications

2023 Draft: *HOD Constraints from Counts-in-Cylinders in DESI SV3 BGS*
DESI project proposal slides: https://alanpearl.github.io/documents/galtab-paper.pdf

2021 *PFS Mock Catalogs and README Public Release* (https://alanpearl.github.io/#data)
PFS galaxy evolution mock catalogs, with methodological documentation

Software

 mocksurvey
Lead developer, Python package that creates mock galaxy catalogs using UniverseMachine

 JaxTabCorr
Lead developer, Python package for correlation functions (TabCorr), rewritten to be differentiable

 galtab
Lead developer, Python package for speeding up HOD model predictions via galaxy tabulation

 astropy/halotools
Contributor, Python package that provides a wide array of galaxy-halo connection models

Invited Talks

Jan 2023   Astro Seminar Series, University of Pittsburgh

March 2021   Astro Seminar Series, Tufts University

Oct 2020   Guest Lecture, Bridgewater State University

Conference and Workshop Presentations

Various Python Tutorials on Debugging, Data Structures, and NumPy
May 2023   AstroPGH Python Boot Camp 2020-23, University of Pittsburgh

Simulating Galaxies and Counting Cylinders
Oct 2022   Impossible Problems Interdisciplinary Seminar

Python Packaging Basics
July 2022   AstroPGH Summer Seminar Series, University of Pittsburgh

Counts-in-Cylinders and Mock Galaxy Catalogs
May 2022   Advances in Cosmology through Numerical Simulations, MIAPbP

CLIMBER Mock Catalogs: Optimizing HOD Constraints from Next-Generation Surveys

March 2022	Cosmic Cartography 2022, Kavli IPMU
	Mock Galaxy-Halo Constraints from Next-Generation MOS Surveys
May 2021	STScI Workshop: Multi-object Spectroscopy for Statistical Measures of Galaxy Evolution
	Fitting Models with MCMC
March 2021	McWilliams Software Development Series, Carnegie Mellon University
June 2020	AstroPGH Summer Seminar Series, University of Pittsburgh
	Poster: Local Velocity Substructure in the Milky Way Disk
Jan 2017	American Astronomical Society, 229th AAS Meeting, id.142.14

Broader Outreach Talks

July 2021	*The Connection Between Galaxies and Dark Matter* No-Jargon Talk Series, hosted by Women and Minorities in Physics at Pitt
Nov 2019	*Black Holes* Pittsburgh Astronomy on Tap Lecture
May 2017	*How to Become a Scientist – and Other Perks of Higher Education* Guest Lecture, North End Middle School, Waterbury, CT

Teaching Assistant Appointments

Spring 2020	*Physics 0111 – Introduction to Physics 2.* Instructor: Matteo Broccio **Recitation TA**, Undergraduate course, University of Pittsburgh
Fall 2019	*Mathematical Methods for Physics.* Instructor: Brian Batell **Grader**, Graduate/Undergraduate course, University of Pittsburgh
Summer 2018	*Stars, Galaxies, and the Cosmos.* Instructors: Zeynep Kalendar, Melanie Good **Recitation TA**, Undergraduate course, University of Pittsburgh
Spring 2018	*Galaxies and Cosmology.* Instructor: Jeffrey Newman **Grader**, Graduate/Undergraduate course, University of Pittsburgh
	Basics of Space Flight. Instructor: John Radzilowicz **Recitation TA**, Undergraduate course, University of Pittsburgh
Fall 2017	*Hubble to Stonehenge.* Instructor: Jeffrey Newman **Recitation TA**, Undergraduate course, University of Pittsburgh