Joshua B. Hill

University of California, Irvine
Fredrick Reines Hall
Irvine, California, 92617
joshuaboydhill@gmail.com

Research Interests

Topics: Self Interacting Dark Matter, Sub-halo Substructure, Galaxy Formation, Cosmology, Galaxy-Halo Connection, and Large Scale Structure.

Methods: Theoretical Modeling, Numerical Simulations, Machine Learning.

Education

- University of California, Irvine • PhD, Physics with a Concentration in Astronomy and Astrophysics • Fall 2025 • Current
- University of Utah • B.S., Physics with a Concentration in Astronomy and Astrophysics & Mathematics Minor • Spring 2024

Honors and Awards

- Undergraduate Research Scholar • May 2024
- Paul Gilbert Outstanding Undergraduate Research Award in Astronomy and Astrophysics • May 2023
- Undergraduate Research Opportunity Program (UROP) • January 2022 and August 2022

Publications

- **Joshua B. Hill**; Yao-Yuan Mao, 2024, *The Impact of Galaxy-Halo Size Relations on Galaxy Clustering Signals*, Open Journal of Astrophysics, 9 pages, 7 figures, arXiv:2411.13484.
- Marc L. Whiting*; **Joshua B. Hill***; Benjamin Bromley; Scott Kenyon, 2023, *A Catalog of Nearby Accelerating Star Candidates in Gaia DR3*, Astronomical Journal, 14 pages, 6 figures, 3 tables. Catalog available with publication; doi:10.3847/1538-3881/acc526
  - *Co-First Authors

Technical Skills

Coding languages and packages: Python, NumPy, Matplotlib, Pandas, database query (SQL), astropy, Scikit-learn, Maple, Latex

Relevant Courses Taken

Notable upper-division and graduate courses I got an A in:

- Physics 3730, Computing in Physics I, Statistics, Linux command line, Python, Latex, Maple
- Physics 4410, Classical Physics I, *Stephan T. Thornton and Jerry B. Marion, Classical Dynamics of Particles and Systems, fifth edition*
- Physics 4420, Classical Physics II, *David J. Griffiths, Introduction to Electrodynamics, fourth edition*
- Physics 4080, Cosmology, *Barbara Ryden, Introduction to cosmology, second edition*
- Physics 4090, Stellar Astrophysics, *O. R. Pols, Stellar Structure and Evolution*
- Physics 4760, Thermal and Statistical Physics, *Daniel V. Schroeder, An Introduction to Thermal Physics*
- Physics 5210, Gravitation, *James B. Hartle, Gravity*
- Math 5010, Probability, *David F. Anderson, Timo Seppölöinen, and Benedeck Valkó, Introduction to Probability*
- Physics 5570, Galaxies, *Peter Schneider, Extragalactic Astronomy and Cosmology, second edition*

Appointments and Research Experience

Post-Baccalaureate Researcher • Ekta Patel, University of Utah • Spring 2025

- Created a pipeline for identifying potential satellite galaxies of the Large Magellanic Cloud, using orbital modeling and statistical analysis.

Undergraduate Researcher • Yao-Yuan Mao, University of Utah • Summer 2023 to Fall 2024

- Used theoretical modeling and numerical simulation methods to understand a model that predicts how dark matter halos determine the half-light radius of galaxies.

Undergraduate Researcher • Ben Bromley, University of Utah • Spring 2022 to Spring 2023

- Used machine learning methods to create a catalog of accelerating stars. Collaboration was vital for the completion of this project.

Conferences

- Attendee • Dark, Hot, Warm, and Fuzzy Matter In Space and Time (DHWFEST) at University of Utah • July 2024
- Speaker • Undergraduate Research Symposium • April 2024
- Poster Presenter • Center for Science and Mathematics Education (CSME) Symposium at University of Utah • April 2023
- Speaker • Utah Conference on Undergraduate Research, Contributed • February 2023

Teaching Experience

Teaching Assistant • University of Utah, • Fall 2024

- Physics 3010, Intermediate Mechanics, *John R. Taylor, Classical Mechanics*, Graded Homework, Quizzes, and Labs, facilitate small group discussions, and hold office hours.

Learning Assistant • University of Utah • Spring 2023 and Spring 2024

- Physics 3010, Intermediate Mechanics, *John R. Taylor, Classical Mechanics*, Facilitate small group discussions, and hold office hours.

Learning Assistant • University of Utah • Fall 2023

- Astro 3070, Introduction to Astrophysics, *Barbara Ryden and Bradly M. Peterson, Introduction to Astrophysics*, Facilitate small group discussions, and hold office hours.