

Hayden R. Foote

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TECHNICAL SKILLS

Programming Languages	Python, C, HTML & CSS, R, Matlab, LaTeX
High-Performance Computing	Numerical Simulations, Slurm, Parallelization/MPI, TB-scale data analysis
Data Analysis & Machine Learning	Pytorch, Tensorflow, Numpy, Pandas, Scipy, Matplotlib, K3D
Web App Development	Git/Github, Django, Docker, Nginx, Gunicorn, Ansible, SQLite, PostgreSQL

EDUCATION

University of Arizona	PhD in Astronomy & Astrophysics	Expected May 2026
University of Arizona	MS in Astronomy & Astrophysics	May 2023
University of Colorado Boulder	BA in Astronomy, <i>summa cum laude</i> , With Distinction	May 2020

EXPERIENCE

Doctoral Researcher , Department of Astrophysics, University of Arizona	August 2020 - Present
◆ Led a scientific research program to answer questions on the nature of dark matter, in collaboration with international teams of researchers.	
◆ Created and performed state-of-the-art numerical simulations on high-performance computing facilities, comparing galaxy interactions under three different models for dark matter physics.	
◆ Developed, used, and contributed to open-source Python software for the analysis and visualization of TB-scale simulation data.	
◆ Queried and analyzed three astronomical survey databases to statistically identify stars belonging to a destroyed low-mass galaxy in orbit about the Milky Way.	
◆ Communicated original scientific results through three first-author peer-reviewed journal articles, and ten presentations at seminars and international conferences.	

SOFTWARE ENGINEERING LEADERSHIP EXPERIENCE

Graduate Coordinator , TIMESTEP, University of Arizona	May 2025 - Present
◆ Designed and taught a curriculum on software engineering best-practices (version control, working on a team in an Agile environment, test-driven development, continuous integration/deployment, documentation, debugging, etc.) to a team of four undergraduate interns during weekly workshops.	
◆ Provided one-on-one mentoring support on professional development, teamwork, and software skills for student interns for the duration of the program.	

Teaching Assistant for ASTR400B <i>Theoretical Astrophysics</i> , University of Arizona	January - May 2023
◆ Created and delivered a lecture and in-class lab activity on git and Github to introduce students to version control best-practices.	
◆ Mentored and led code reviews for approximately 15 students during their final class projects to write original Python codes for analyzing simulations of galaxy interactions.	

PROJECTS

Course Project for ASTR 502 <i>Machine Learning</i>	Link to Repository
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Created, trained, and applied a convolutional neural network in the Tensorflow framework to find faint galaxies in astronomical survey data, reproducing the results of Tanoglidis et al. (2021).

<i>Obey the Testing Goat</i>, Book by Harry Percival	Link to Repository
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Developed and deployed a Django-based to-do list app on an AWS server using Docker and Ansible, following test-driven development practices.

FIRST-AUTHOR PUBLICATIONS

Foote, H. R. et al. (2025). *The Astrophysical Journal* 979, p. 171. DOI: [10.3847/1538-4357/ad9b89](https://doi.org/10.3847/1538-4357/ad9b89).

Foote, H. R. et al. (2023). *The Astrophysical Journal* 954, p. 163. DOI: [10.3847/1538-4357/ace533](https://doi.org/10.3847/1538-4357/ace533).

Foote, H. R. et al. (2020). *The Astrophysical Journal* 890, p. 175. DOI: [10.3847/1538-4357/ab6c66](https://doi.org/10.3847/1538-4357/ab6c66).