

# HELENA M. RICHIE

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## EDUCATION

**University of Pittsburgh, PA** 2020 – Present  
*Ph.D. Physics*

**University of Pittsburgh, PA** 2016 – 2020  
*B.S. Physics & Astronomy (Honors), B.S. Mathematics, cum laude*

## RESEARCH EXPERIENCE

**Ph.D. Candidate** *University of Pittsburgh, Pittsburgh, PA* 2020 – Present  
*Advisor: Professor Evan Schneider*

- I am expanding **Cholla**, a massively parallel GPU-accelerated code for simulating astrophysical fluid dynamics, to include a model for astrophysical dust. I am using this dust model to investigate the co-evolution of dust and galaxies by creating high-resolution simulations of multi-phase galactic outflows. These simulations have shown that galactic outflows can explain the vast amounts of dust observed outside galaxies. My thesis aims to understand the evolution and nature of extragalactic dust.

**Undergraduate Research Assistant** *University of Pittsburgh, Pittsburgh, PA* 2017 – 2020  
*Advisor: Professor Michael Wood-Vasey*

- I was the lead undergraduate of the Survey of Transiting Extrasolar Planets at the University of Pittsburgh (STEPUP), which is a group of students that use ground-based telescopes to conduct observations of transiting exoplanets. I spearheaded STEPUP's participation in NASA's Transiting Exoplanet Survey Satellite (TESS) Follow-up Observing Program, where we conducted observations of newly detected exoplanets to rule out false-positive detections. I also developed a Python-based image analysis software to process STEPUP's data.

## HONORS & AWARDS

- **Outstanding Oral Presentation**, University of Pittsburgh Grad Expo, 2024
- **Honorable Mention**, University of Pittsburgh Mellon Fellowship, 2024
- **Arts and Sciences Summer Research Predoctoral Fellowship**, University of Pittsburgh, 2021
- **NASA Pennsylvania Space Grant Consortium**, University of Pittsburgh Department of Physics & Astronomy, 2017, 2018, 2019, 2020

## PUBLICATIONS

- **Richie, H. M.** Schneider, E. E. Abruzzo, M. W. Torrey, P., “Dust Survival in Galactic Winds,” *submitted to ApJ*, 2024, arXiv:[2403.03711](https://arxiv.org/abs/2403.03711)
- **Richie, H. M.** Wood-Vasey, W. M. Coban, L., “Disk Instabilities Caused the 2018 Outburst of AG Draconis,” 2020, *JAAVSO*, 48, 21-27, arXiv:[1912.01681](https://arxiv.org/abs/1912.01681)

## TECHNICAL & PROFESSIONAL SKILLS

<b>Programming Languages:</b>	C/C++, Python, Bash
<b>Packages &amp; APIs:</b>	CUDA, HIP, MPI, OpenMP, NumPy, Matplotlib
<b>Software Tools:</b>	Clang Tools, Make, HDF5, FITS, Slurm
<b>HPC Systems Used:</b>	OLCF: Summit, Andes, Crusher, & Frontier, ALCF: Theta, University Clusters
<b>Software Development:</b>	<a href="#">STEPUP Image Analysis</a> ( <i>primary code architect</i> ), <a href="#">Cholla</a> ( <i>developer</i> )

## PROFESSIONAL DEVELOPMENT

- **International High Performance Computing Summer School (IHPCSS)** 2024, Kobe, Japan
- **Argonne Training Program for Extreme Scale Computing (ATPESC)** 2023, Chicago, Illinois

## SELECTED PRESENTATIONS

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- **Contributed Talk**, The Physics and Impact of Astrophysical Dust: from Star Formation Through Cosmology, Aspen, CO 2024
- **Contributed Talk**, Illuminating the Dusty Universe: A Tribute to the Work of Bruce Draine, Florence, Italy 2023
- **Poster**, Oak Ridge Leadership Computing Facility User Meeting, Knoxville, TN, 2023
- **Poster**, IAU Symposium 377: Early Disk-Galaxy Formation, From JWST to the Milky Way, Kuala Lumpur, Malaysia, 2023
- **Invited Talk**, AAVSO 109th Annual Meeting, Virtual Event 2020
- **Contributed Talk**, Conference for Undergraduate Women in Physics, Carnegie Mellon University, PA 2020
- **Poster**, 235th Meeting of the American Astronomical Society, Honolulu, HI, 2020
- **Poster**, The 2019 Quadrennial Physics Congress (PhysCon) Providence, RI, 2019
- **Poster**, Emerging Researchers in Exoplanet Science V, Cornell University, NY, 2019
- **Poster**, Emerging Researchers in Exoplanet Science IV, The Pennsylvania State University, PA, 2018

## TEACHING

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### ASTRON 0089 Stars, Galaxies, and the Cosmos

Fall 2020, Spring 2021

- *Teaching Assistant*. Taught recitation, held office hours, proctored exams, and graded homework assignments and exams for ~ 80 – 120 students.

### ASTRON 1263 Techniques of Astronomy

Fall 2020

- *Teaching Assistant*. Assisted with labs, held office hours, and assisted with grading for all (~ 20) students.

### Tutorials

Developed and delivered tutorials ranging in length from one hour to multiple days.

- *Connecting Galaxy Morphology and Large-Scale Structure*, **Session Leader**, Astrophysicist for a Day, Pittsburgh, PA 2023
- *Advanced NumPy*, **Session Leader**, AstroPGH-TAMU Python Boot Camp, Pittsburgh, PA 2023
- *Introduction to Observational Astronomy and Transiting Extrasolar Planets*, **Provost Academy Leader**, University of Pittsburgh Provost Academy, Pittsburgh, PA 2019

## SERVICE

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### Organizations

- *Pitt Grad Workers Union Organizing Committee*, **Member**, University of Pittsburgh, 2023 – Present
- *Direct Action Coalition*, **Member**, University of Pittsburgh, Dept. Physics & Astronomy, 2023 – Present
- *Pitt Society of Physics Students*, **Member**, University of Pittsburgh, Dept. Physics & Astronomy, 2016 – 2020

## OUTREACH

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### Talks

- *Plum Senior High School Career Day*, **Speaker**, Pittsburgh, PA 2024
- *Astrophysicist for a Day*, **Panelist**, Pittsburgh, PA 2023
- *Astronomy on Tap Pittsburgh*, **Speaker**, Pittsburgh, PA 2023
- *The Ellis School Class Visits*, **Speaker**, Pittsburgh, PA 2023, 2024
- *Norwin Senior High School Science Alumni Day*, **Speaker**, Pittsburgh, PA 2017, 2018, 2019, 2021, 2022, 2023

### Organizations

- *Astronomy on Tap Pittsburgh*, **Organizer**, University of Pittsburgh, Dept. Physics & Astronomy, 2023 – Present

### Mentorship

- *American Physical Society Adopt-A-Physicist*, 2018, 2021, 2022, 2023
- *Pitt Society of Physics Students Mentoring sUpporting, and cOnnecting studeNts (MUON)*, 2019