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

RESEARCH EXPERIENCE

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

– My thesis aims to understand the evolution and nature of extragalactic dust and its effects on galaxy evolution. 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.

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), a group of students who use ground-based telescopes to conduct observations of transiting exoplanets. I spearheaded STEPUP's involvement 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

– **PITT PACC Fellowship**, University of Pittsburgh, Spring 2024
– **Outstanding Oral Presentation**, University of Pittsburgh Grad Expo, 2024
– **Arts and Sciences Predoctoral Fellowship**, University of Pittsburgh, Summer 2021
– **NASA Pennsylvania Space Grant Consortium**, University of Pittsburgh Department of Physics & Astronomy, 2017, 2018, 2019, 2020

PUBLICATIONS

5. *Dust Evolution in Simulated Multi-phase Galactic Outflows*
Richie, H. M. Schneider, E. E. (*submitted to ApJ*) 2025, 10.48550/arXiv.2505.11734

4. *Resolution Dependence of Cloud–Wind Simulations*
Leary, H. J. Schneider, E. E. **Richie, H. M.** 2024, RNAAS, 8, 286, DOI:10.3847/2515-5172/ad9256

3. *JWST MIRI and NIRCam observations of NGC 891 and its circumgalactic medium*
Chastenet, J. De Looze, I. Relano, M. Dale, D. A. Williams, T. G. Bianchi, S. Xilouris, E. M. Baes, M. Bolatto, A. D. Boyer, M. L. Casasola, V. Clark, C. J. R. Fraternali, F. Fritz, J. Galliano, F. Glover, S. C. O. Gordon, K. D. Hirashita, H. Kennicutt, R. Nagamine, K. Kirchschlager, F. Klessen, R. F. Koch, E. W. Levy,

R. C. McCallum, L. Madden, S. McLeod, A. F. Meidt, S. E. Mosenkov, A. V. **Richie, H. M.** Saintonge, A. Sandstrom, K. M. Schneider, E. E. Sivkova, E. E. Smith, J. D. T. Smith, M. W. L. van der Wel, A. Walch, S. Walter, F. Wood, K. 2024, A&A, 690, A348, DOI:10.1051/0004-6361/202451033

2. *Dust Survival in Galactic Winds*
Richie, H. M. Schneider, E. E. Abruzzo, M. W. Torrey, P., ApJ, 2024, 974, 81-99, DOI:10.3847/1538-4357/ad6a1c

1. *Disk Instabilities Caused the 2018 Outburst of AG Draconis*
Richie, H. M. Wood-Vasey, W. M. Coban, L., 2020, JAAVSO, 48, 21-27, DOI:10.48550/arXiv.1912.01681

TECHNICAL & PROFESSIONAL SKILLS

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

PROFESSIONAL DEVELOPMENT

- **Kavli Summer Program in Astrophysics** (KSPA) 2025, Charlottesville, VA, USA
- **International High Performance Computing Summer School** (IHPCSS) 2024, Kobe, Japan
- **Argonne Training Program for Extreme Scale Computing** (ATPESC) 2023, Chicago, IL, USA

SELECTED PRESENTATIONS

- **Invited Talk**, Indiana University Bloomington Astronomy Tea Talk, Bloomington, IN, USA, 2025
- **Poster**, Evolution of Dust and Gas throughout Cosmic Time, Hiroshima, Japan, 2024
- **Poster**, Oak Ridge Leadership Computing Facility User Meeting, Knoxville, TN, USA, 2024
- **Contributed Talk**, The Physics and Impact of Astrophysical Dust: from Star Formation Through Cosmology, Aspen, CO, USA, 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, USA, 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, USA, 2020
- **Poster**, 235th Meeting of the American Astronomical Society, Honolulu, HI, USA, 2020
- **Poster**, The 2019 Quadrennial Physics Congress (PhysCon), Providence, RI, USA, 2019
- **Poster**, Emerging Researchers in Exoplanet Science V, Cornell University, NY, USA, 2019
- **Poster**, Emerging Researchers in Exoplanet Science IV, The Pennsylvania State University, PA, USA, 2018

TEACHING

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 ∼100 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.

- *Python Basics*, **Session Leader**, AstroPGH-TAMU Python Boot Camp, Pittsburgh, PA 2024
- *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

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

Talks

- *Plum Senior High School Career Day*, **Speaker**, Pittsburgh, PA 2024, 2025
- *Astrophysicist for a Day*, **Panelist**, Pittsburgh, PA 2023
- *Astronomy on Tap Pittsburgh*, **Speaker**, Pittsburgh, PA 2023
- *The Ellis School Science 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*, **Co-host**, University of Pittsburgh, Dept. Physics & Astronomy, 2025 – present
- *Astronomy on Tap Pittsburgh*, **Organizer**, University of Pittsburgh, Dept. Physics & Astronomy, 2023 – 2025

Mentorship

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