ROBERT CADDY

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EDUCATION

University of Pittsburgh, PA *2018 - 2024*
Ph.D. Physics

Bowling Green State University, OH *2016 - 2018*
M.S. Physics

Purdue University, IN *2012 - 2016*
B.S. Honors Physics Major, Astronomy Minor

TECHNICAL & PROFESSIONAL SKILLS

Programming Languages:	C++, Python, Fortran, Bash
Packages & APIs:	CUDA, HIP, GoogleTest, MPI, OpenMP, Numpy, Pandas, Scipy, Matplotlib
Software Tools:	Clang Tools, Make, HDF5, HSI, Slurm, Jenkins, Doxygen, Docker
HPC Systems Used:	OLCF: Frontier, Summit, Andes, & Crusher. ALCF: Theta. University Clusters

EXPERIENCE

Research Software Engineer II *2024 - Present*
University of Pittsburgh, Pittsburgh, PA

- Developed and optimized scientific codes in collaboration with Astrophysics research groups, specializing GPU accelerate codes in computational Astrophysics.
- Expanded and maintained Iseult, a visualization code for Particle-in-Cell simulations.

Ph.D. Candidate *2018 - 2024*
University of Pittsburgh, Pittsburgh, PA

- Expanded Cholla, a massively parallel GPU-accelerated code for simulating astrophysical fluid dynamics to include magnetic fields (magnetohydrodynamics/MHD) using state of the art methods.
- Collaborated with the Frontier Center for Accelerated Application Readiness (CAAR) program to optimize Cholla to run on exascale supercomputers, namely Frontier.
- Established and executed a robust testing framework for Cholla, employing GoogleTest with custom extensions to ensure software reliability and quality.
- Led multiple initiatives to promote scientific software best practices within the Cholla development team, fostering excellence in software engineering standards.

Masters Student *2016 - 2018*
Bowling Green State University, Bowling Green, OH

- Conducted original thesis research into the properties of symbiotic star V1835 Aql, and other stars in the same field, with Professor Andrew Layden as advisor.
- Determined the properties of variable star systems through image and data analysis in Python.

Undergraduate Research Assistant *2015 - 2016*
Purdue University, West Lafayette, IN

- Built an experimental optics system to observe the effect of various chemotherapy drugs on cancer tumors.
- Reduced experimental data analysis and archiving time from ∼10 hours to ∼30 minutes.

HONORS & AWARDS

- **Learning Beyond the Classroom Certificate**, Purdue University, 2016.
  - Required work experience, volunteer time, career training, and one significant activity – bicycling across the U.S. with Bike & Build to raise money and awareness for affordable housing.
- **Presidential Scholarship**, Purdue University, 2012.
- **Ascarelli Fellow**, Purdue University Department of Physics and Astronomy, 2012.
- **Eagle Scout**, 2012. Project: Designed and built sheds designed to withstand ice falling from nearby building.

SERVICE

Tutorials *2021 - 2023*

Developed and delivered tutorials ranging from 1 hour to half day.

- *Introduction to Python Data Types*, University of Pittsburgh, 2023
- *Scientific Software Best Practices*, University of Pittsburgh 2022, 2023
- *Introduction to Git, GitHub, and Git Workflows*, University of Pittsburgh, 2022
- *Organizing Your Dotfiles*, University of Pittsburgh, 2021

Teaching *2013 - 2020*

- Graduate Teaching Assistant for introductory physics labs, *University of Pittsburgh*, 2018-2020
- Graduate Teaching Assistant for introductory physics labs, *Bowling Green State University*, 2016-2018
- Undergraduate Teaching Assistant for introductory physics courses, *Purdue University*, 2013-2016

President, Purdue Society of Physics Students (SPS) *2015 - 2016*

Purdue University, West Lafayette, IN

- Tripled the number of active members and increased profits of the club store by ∼5x.
- Coordinated biweekly events and activities such as designing and constructing a weather balloon payload with SPS National funding, inviting guest speakers for special colloquia, and visiting Argonne National Lab.

PUBLICATIONS & SELECTED TALKS

- *Cholla-MHD: An Exascale-capable Magnetohydrodynamic Extension to the Cholla Astrophysical Simulation Code* **Caddy, R** & Schneider, E. 2024. The Astrophysical Journal, Volume 970 DOI: 10.3847/1538-4357/ad464a, arXiv:2402.05240
- **Caddy, R**. "Exascale MHD Simulations with Cholla." Santa Cruz Organization for Outreach in Physics (SCOOP), November 2023, University of California Santa Cruz. *Invited Talk*
- **Caddy, R**. "Exascale MHD Simulations with Cholla." Seminar, November 2023, NASA Goddard. *Invited Talk*
- **Caddy, R**. "Exascale MHD Simulations with Cholla." Center for Theory and Computation (CTC) Seminar, November 2023, University of Maryland. *Invited Talk*
- *Optical Time-series Photometry of the Symbiotic Nova V1835 Aquilae* **Caddy, R**, Layden. A, et al. 2022. Publications of the Astronomical Society of the Pacific, Volume 134, Number 1039 DOI: 10.1088/1538-3873/ac8f6f, arXiv:2209.11251

CONTINUING EDUCATION

- **ACM/IEEE Supercomputing (SC23)** Conference 2023
- **1st Annual Conference of the US Research Software Engineer Association (US-RSE'23)** Conference 2023
- **Practice and Experience in Advanced Research Computing (PEARC)** Conference 2023
- **Platform for Advanced Scientific Computing (PASC)** Conference 2023
- **Argonne Training Program for Extreme Scale Computing** (ATPESC) 2022
- **International High Performance Computing Summer School** (IHPCSS) 2022,
  Second place in the programming challenge