

# ROBERT CADDY

📍 Peyton Hall, 4 Ivy Lane, Princeton University, Princeton, NJ 08544 📞 (765)-586-8882

✉ rcaddy@princeton.edu 🖥 robertcaddy.com 🌐 github.com/bcaddy 📄 robertcaddy1 🆔 0000-0002-4475-3181

## EDUCATION

<b>University of Pittsburgh, PA</b> <i>Ph.D. Physics</i>	2018 - 2024
<b>Bowling Green State University, OH</b> <i>M.S. Physics</i>	2016 - 2018
<b>Purdue University, IN</b> <i>B.S. Honors Physics Major, Astronomy Minor</i>	2012 - 2016

## TECHNICAL & PROFESSIONAL SKILLS

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

## EXPERIENCE

<b>Research Software Engineer II</b> <i>University of Pittsburgh, Pittsburgh, PA</i>	2024 - Present
<ul style="list-style-type: none"><li>– Developed and optimized scientific codes in collaboration with Astrophysics research groups, specializing GPU accelerate codes in computational Astrophysics.</li><li>– Worked with researches to expand the capabilities of Iseult, a visualization code for Particle-in-Cell simulations. Added several key new features and updated the code to comply with best practices.</li></ul>	
<b>Ph.D. Candidate</b> <i>University of Pittsburgh, Pittsburgh, PA</i>	2018 - 2024
<ul style="list-style-type: none"><li>– Expanded <a href="#">Cholla</a>, a massively parallel GPU-accelerated code for simulating astrophysical fluid dynamics to include magnetic fields (magnetohydrodynamics/MHD) using state of the art methods.</li><li>– Collaborated with the Frontier Center for Accelerated Application Readiness (CAAR) program to optimize Cholla to run on exascale supercomputers, namely Frontier.</li><li>– Established and executed a robust testing framework for Cholla, employing GoogleTest with custom extensions to ensure software reliability and quality.</li><li>– Led multiple initiatives to promote scientific software best practices within the Cholla development team, fostering excellence in software engineering standards.</li></ul>	
<b>Masters Student</b> <i>Bowling Green State University, Bowling Green, OH</i>	2016 - 2018
<ul style="list-style-type: none"><li>– Conducted <a href="#">original thesis research</a> into the properties of symbiotic star V1835 Aql, and other stars in the same field, with Professor Andrew Layden as advisor.</li><li>– Determined the properties of variable star systems through image and data analysis in Python.</li></ul>	
<b>Undergraduate Research Assistant</b> <i>Purdue University, West Lafayette, IN</i>	2015 - 2016
<ul style="list-style-type: none"><li>– Built an experimental optics system to observe the effect of various chemotherapy drugs on cancer tumors.</li><li>– Reduced experimental data analysis and archiving time from ~10 hours to ~30 minutes.</li></ul>	

## HONORS & AWARDS

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- **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

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### 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

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- *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](https://doi.org/10.3847/1538-4357/ad464a), arXiv:[2402.05240](https://arxiv.org/abs/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](https://doi.org/10.1088/1538-3873/ac8f6f), arXiv:[2209.11251](https://arxiv.org/abs/2209.11251)

## CONTINUING EDUCATION

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- **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