ROBERT 'BOB' CADDY

Department of Physics and Astronomy
University of Pittsburgh
3941 O'Hara St
Pittsburgh, PA 15260

+1 (765)-586-8882
r.caddy@pitt.edu
robertcaddy.com
github.com/bcaddy
robertcaddy1
(US Citizen)

Research Interest: Evolution and dynamics of galaxies with a focus on computational methods

EDUCATION

University of Pittsburgh, Pittsburgh, PA 2018-Present
Ph.D. - Physics - Expected graduation 2024
Advisor: Dr. Evan Schneider

Bowling Green State University, Bowling Green, OH 2016-2018
M.S. - Physics
Thesis Title: *Time Series Photometery of the Symbiot Star V1835 Aql and New Variable Stars in Aquila*
Advisor: Dr. Andrew Layden

Purdue University, West Lafayette, IN 2012-2016
B.A. - Honors Physics, Astronomy minor. GPA: 3.40/4.00

EMPLOYMENT

Graduate Research Assistant, University of Pittsburgh, Pittsburgh, PA 2018-Present

- Expand Cholla, a massively parallel GPU-accelerated code for simulating astrophysical fluid dynamics to include magnetic fields (magnetohydrodynamics) using state of the art methods.
- Conduct research with Professor Evan Schneider into numerical modeling of galactic winds using the GPGPU code Cholla
- Develop, optimize, and expand Cholla to interface with next-generation exascale supercomputers such as Frontier.
- Collaborate with the Frontier Center for Accelerated Application Readiness (CAAR) program to optimize Cholla for Frontier, the world's first exascale computer and to improve the software stack on Frontier.
- Develop and implement a robust testing framework for Cholla utilizing existing frameworks with custom extensions for Cholla

Graduate Research Assistant, Bowling Green, OH 2016-2018

- Conducted original thesis research into the properties of symbiotic star V1835 Aql with Professor Andrew Layden as advisor

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

- Built an experimental two-channel dynamic digital holography system to investigate the time dependent effects of chemotherapy drugs on cancer tumors via biodynamic imaging.
- Improved efficiency & quality of large-scale (tens of terabytes) off-site data storage using HSI. Improved efficiency by a factor of 12.

FELLOWSHIPS AND AWARDS

Learning Beyond the Classroom Certificate, 2016
Presidential Scholarship, Purdue University, 2012-2016
Ascarelli Fellowship, Department of Physics and Astronomy, Purdue University, 2012
Eagle Scout, 2012

CONFERENCES AND PRESENTATIONS

- *GPU Accelerated Magnetohydrodynamics for Astrophysics & Testing for Exascale Codes*, International High Performance Computing Summer School (IHPCSS), *Poster Presentation*, June 2022
- *Time Series Photometry of the Symbiotic Binary V1835 Aql*, Ohio Academy of Sciences (OAS) Meeting, *Poster Presentation*, April 2018
- *Time Series Photometry of the Symbiotic Binary NSV 11749*, Canadian-American-Mexican (CAM) Graduate Student Conference, *Poster Presentation*, August 2017

PROFESSIONAL EXPERIENCE

Computional:

Langues: C++, Python, Fortran, Bash

Packages & API's: MPI, CUDA, OpenMP, OpenACC, Numpy, Pandas, Scipy, Matplotlib, Astropy

Software Tools: git, LaTeX, GCC, Make, HDF5, HSI, PBS/Slurm/LSF, DAOPHOT, IRAF, SQL, mySQL, GoogleTest

HPC Resources Used: Supercomputer clusters at Purdue University and the University of Pittsburgh, High performance storage systems at Purdue University, Oak Ridge National Lab Leadership Computing Facility systems including Summit, Spock, Crusher, and (upcoming) Frontier

Observing

PROMPT C1 & C5 at the Cerro Tololo Inter-American Observatory many nights observing the symbiotic star V1835 Aql

Service:

Member, Women and Minorities in Physics, University of Pittsburgh 2019-Current
President, Purdue Society of Physics Students (SPS), 2016
Member, Women in Physics, Purdue 2014-2016
APS - Conference for Undergraduate Women in Physics (Purdue University, 2015) - Volunteer

Professional Development:

- XSEDE HPC Workshop Series: Attended the MPI, OpenMP,Python & Performance, OpenACC, and Big Data & Machine Learning workshops
- 2020 OLCF User Meeting
- 2020 Frontier Center of Excellence (COE) Workshop, *invite only*
- 2020 Intel Developer Tools Workshop
- 2021 XSEDE Webinar: Performance Tuning and Single Processor Optimization
- 2021 Advanced Cyberinfrastructure Training for Modeling Physical Systems at Rensselaer Polytechnic Institute
- 2022 International High Performance Computing Summer School (IHPCSS), Second place in the programming challenge
- 2022 Argonne Training Program for Extreme Scale Computing (ATPESC)

Membership: AAS Member, APS Member

TEACHING

- University of Pittsburgh, 2018-2020:
  - Graduate Teaching Assistant for introductory physics and astronomy courses
  - Led 2-5 recitations per week with 20-50 students each. Sometimes wrote my own recitation assignments/problems depending on what the professor required
  - Grading recitation assignments, exams, labs, etc.
- Bowling Green State University, 2016-2018:
  - Graduate Teaching Assistant for introductory physics courses
  - Led 2-3 two hour labs per week of 20-30 students each
- Purdue University, 2013-2016:
  - Undergraduate Teaching Assistant for introductory physics courses. Helped graduate TAs teach 2-4 recitation and/or labs per week of 20-30 students each

SUBMITTED AND REFEREED PUBLICATIONS

⋆ - First or Second Author, Total Citations: n/a, h-index: n/a (*updated June 2020*)

1. ⋆ *Optical Time-series Photometry of the Symbiotic Nova V1835 Aquilae*
   Caddy, Robert V., Layden,Andrew C., Reichart, Daniel E., Haislip, Joshua B., Kouprianov, Vladimir V., Ivarsen, Kevin M., Moore, Justin P., LaCluyze, Aaron P., Linder, Tyler R., and Nysewander Melissa C., 2022 Publications of the Astronomical Society of the Pacific, Volume 134, Number 1039
   DOI: 10.1088/1538-3873/ac8f6f, arXiv:2209.11251