

MATTHEW PORTMAN

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EDUCATION

Ph.D. Candidate in Computational Science **2017–Present**
University of California, Irvine/San Diego State University | Under Dr. Wayne Hayes

B.S. in Physics **2012–2016**
University of Texas at Dallas

RESEARCH

Research Assistant **2019–Present**
University of California, Irvine | Under Dr. Wayne Hayes

- Develop the [GalfitModule](#), an object-oriented, distributed framework to pipe results from spiral arm detection software, [SpArcFiRe](#), into [GALFIT](#) to automate morphological parameterization of spiral galaxies.
- Incorporate machine learning methods, regression and classification by [XGBoost](#), to optimize model success and classify results.
- [SpArcFiRe GitHub Repo](#).

Collaborator/URA Visiting Scholar **2021–2022**
Dark Energy Spectroscopic Instrument Collaboration | Under Dr. Antonella Palmese

- Identify transients from multi-messenger sources using [DESI](#) observations and correlate to confidence intervals of gravitational wave localization maps.
- Develop an automated identification and follow-up pipeline to process gravitational wave events.
- [DESIhub Time Domain GitHub Repo](#)

Graduate Research Intern **2021, 2022**
Lawrence Livermore National Lab | Advised by Drs. Pete Anninos & Rob Hoffman

- Simulate hyper-accretion inflow onto the surface of neutron stars from a companion star using [COSMOS++](#) to predict observational signature.
- Implement software engineering practices to minimize simulation latency for distributed computation via MPI and Slurm.

HIGHLIGHTED AWARDS

LSSTC Data Science Fellowship (DSFP) **2021–2023**
DSFP Fellow | Northwestern University
Granted to supplement data science and ML instruction for Astronomy.

URA Visiting Scholars Program **2021-2022**
Visiting Scholar | Fermilab
Granted to perform collaborative research with Fermilab.

DTEI Summer Fellowship **2020**
DTEI Fellow | University of California, Irvine
Granted for supplemental pedagogical and teaching instruction.

Graduate G-STEM Fellowship. **2017–2019**
G-STEM Fellow | San Diego State University
Granted to provide mentorship and research opportunities.

HIGHLIGHTED PUBLICATIONS

Articles

M. Portman, S. Mesforoush, and W. Hayes (Sept. 2023). "A re-assessment of SpArcFiRe's performance on toy spiral galaxies". In: *Monthly Notices of the Royal Astronomical Society* 526.1, pp. 830–835. doi: [10.1093/mnras/stad2810](https://doi.org/10.1093/mnras/stad2810).

M. Portman and W. Hayes (2023). "Automated Multi-Component Fitting of Light Models to Observations of Spiral Galaxies". In preparation.

M. Portman and A. Palmese (2023). "A Method to Perform Gravitational Wave Transient Follow-up with DESI". In preparation.

Posters

M. Portman and A. Palmese (2021). "Identifying Optical Counterparts From Follow-Up Of Gravitational Wave Events". Sustainable Horizons Institute Sustainable Research Pathways (SHI-SRP) Workshop, Virtual.

M. Portman (2021). "Automated Multi-Component Fitting of Light Models to Observations of Spiral Galaxies". [ACCESS #17](#).

ADDITIONAL PROJECTS

Core Mass Fraction Inference 2022

Hack Day, LSSTC DSFP Session 16. | Northwestern University

- Infer core mass fraction of the moon using gravitation data via statistical inference.
- [GitHub Repo](#).

Simulate Observations of Spiral Galaxies 2022

Hack Day, LSSTC DSFP Session 14. | University of Arizona

- Used an autoencoder neural network to simulate observations of spiral galaxies.
- [GitHub Repo](#).

Smoothed Particle Hydrodynamics for Compact Stars 2018

Parallel Computing and PDE Classes | San Diego State University

- Simulated a compact star utilizing SPH and integrated parallel processing via CUDA.
- [GitHub Repo](#)

Burgers' Equation in 2D 2017

Computational Science Seminar | San Diego State University

- Modeled the propagation of a 2D Gaussian waveform using Burger's equation by finite differencing methods and Mimetic operators.
- [GitHub Repo](#)

WORK EXPERIENCE

Teaching Assistant – Intro to Coding 2019–Present

University of California, Irvine | Irvine, CA

- Teach and develop interactive coding assignments in Python.

Adjunct Faculty – Mathematics 2017

Collin County Community College | McKinney, TX

PROGRAMMING LANGUAGES

Python
Linux/Bash
MATLAB
C++
Fortran

OpenMP
MPI
Slurm
IDL
L^AT_EX