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

Relevant Coursework

– Advanced Computational PDE
– Scientific Computing
– Parallel Computing
– Machine Learning
– Optimization

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 a program to pipe results from spiral arm detection software, SpArcFiRe, into GALFIT to automate galactic structure parameterization.
– Implement machine learning methods for error detection and correction.
– SpArcFiRe GitHub Repo.

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

– Identify transients from multi-messenger sources using DESI.
– Correlate transient events to confidence interval of gravitational wave localization maps.
– DESIhub Time Domain GitHub Repo

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

– Simulated hyper-accretion inflow onto the surface of neutron stars from a binary companion using COSMOS++ to predict observational (x-ray and gravitational wave) signature.
– Implemented numerical techniques to estimate equation of state of neutron star crust.

HIGHLIGHTED AWARDS

LSSTC Data Science Fellowship (DSFP)   **2021–Present**
DSFP Fellow | Northwestern University
Award granted to supplement data science instruction in Astronomy.

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

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

HIGHLIGHTED PUBLICATIONS

Articles

M. Portman, S. Mesforoush, and W. Hayes (2023). "A re-assessment of SpArcFiRe's performance on toy spiral galaxies". Under review.

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

Posters

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

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.

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	OpenMP
Linux/Bash	MPI
MATLAB	CUDA
C++	IDL
Fortran	LaTeX