
RESEARCH INTEREST

- Cosmology using gravitational waves
- Dynamics of compact astrophysical objects
- Black Hole Perturbation Theory

EDUCATION

- The Ohio State University (OSU)** Aug 2017-Present
Advisor: Christopher Hirata
- Doctorate in Physics, work in progress
- University of Hawai'i at Mānoa (UHM)** Aug. 2014 - May 2017
Advisor: Sarah Post
- Bachelors of Science in Physics, Magna Cum Laude
- Kamehameha High Schools, Kapālama Campus** 2014
High School Diploma

RESEARCH EXPERIENCE

- Graduate Research Assistant** Aug 2017-Present
OSU, Advisor: Christopher Hirata
- Analyzed resonant phenomena in relativistic three-body interactions as applied to extreme mass ratio inspirals (EMRIs)
 - Computed radiation profiles due to Hawking radiation around stationary black hole spacetimes
 - Developed statistical measures for the impact of circumgalactic dust on weak lensing surveys
 - Analyzed atomic transitions in escaping atmospheres of exoplanets and calculate emitted radiation profiles
 - Analyzed primordial black hole mass constraints using femtolensing and microlensing techniques in order to test possibility as a dark matter candidate
- Naval Research Enterprise Internship Program (NREIP) Summer Intern** May 2017 - Aug. 2017
Naval Research Laboratory (NRL), Advisors: Tanner Crowder and Keye Martins
- Studied String Theory, Quantum Field Theory on Curved Spacetime, and Loop Quantum Gravity and analyzed similarities between the theories
 - Applied methods of soliton analysis to General Relativity and analyzed the properties of the solitons in the Loop Quantum Gravity context
 - Analyzed topological nature of solitons and compared them to certain parameters in Loop Quantum Gravity
- Mathematical Physics Research Assistant** Feb. 2015 - May 2017
UHM, Advisor: Sarah Post
- Obtained external funding via Undergraduate Research Opportunity Program Grant
 - Developed solutions (exact and numeric) to non-linear partial differential equations relating to soliton dynamics and other non-linear mechanics
 - Generated computer simulations of soliton dynamics
 - Studied physical processes that can be modeled by systems of solitons
 - Presented results at University of Hawai'i and other academic conferences

PUBLICATIONS & PRESENTATIONS

- **Publication:** Silva, M., Hirata, C. *Dynamical perturbations around an extreme mass ratio inspiral near resonance*, arXiv:2207.07733.
- **Publication:** Silva, M., Hirata, C. *Effects of dust in circumgalactic haloes on cosmic shear power spectrum*, 2022 ApJ **933** 19.
- **Publication:** Kaluna, H., Neal, M., Silva, M., Trent, T. *A collective insight into the cultural and academic journeys of Native Hawaiians while pursuing careers in physics and astronomy*, arXiv: 2004.14136.

- **Presentation:** Silva, M, Trent, T., et al. *Special Session on Mauna Kea* American Astronomical Society Conference 235, Honolulu, HI, USA, 2020.
- **Publication:** Oklopčić, A., Silva, M., Montero-Camacho, P., Hirata, C. *Detecting Magnetic Fields in Exoplanets with Spectropolarimetry of the Helium Line at 1083 nm*, 2020 ApJ **890** 88.
- **Publication:** Montero-Camacho, P., Xiao, F., Vasquez, G., Silva, M., Hirata, C. *Revisiting constraints on asteroid-mass primordial black holes as dark matter candidates*, JCAP08(2019)031.
- **Poster:** Silva, M, Post, S. *Dynamics of Kinks and Lumps*, Society for Advancement of Chicanos/Hispanics and Native Americans in Science (SACNAS) STEM Conference, Long Beach, CA, USA, 2016.
- **Poster:** Silva, M, Post, S. *Mathematics and Applications of Solitons*, Undergraduate Research Opportunity Program (UROP) Conference, Honolulu, HI, USA, 2016.

EDUCATIONAL EXPERIENCE

Board of Director Nov. 2021 - Present
‘Ohana Kilo Hōkū

- Lead on mentorship program and organizing/discussing community outreach events

Educational Mentor May. 2021 - Present
‘Ohana Kilo Hōkū

- Mentor students and assist educators in developing astronomy and STEM focused curricula

Teaching Assistant Aug. 2018 - May 2019
OSU, Physics 1250-1251

- Teach introductory physics courses in Newtonian Mechanics, Electromagnetism, and Thermodynamics

Interferometry Project Leader Aug. 2018
OSU, NSF Funded Project: ASPIRE

- Develop and execute a comprehensive introduction to basic wave interferometry to high school girls
- Guide students in using oscilloscopes and radio equipment to execute wave experiments in order to observe wave interference effects

Math and Physics Tutor Sept. 2016 - July 2018
uAchieve Learning Center

- Assist middle school, high school, and college students with geometry, algebra, statistics, and calculus
- Develop lesson plans for each subject and modify according to student feedback

Learning Emporium Physics Tutor Mar. 2015 - May 2017
UHM, College of Natural Arts and Sciences

- Assisted students with undergraduate general physics and explaining how to carry out essential calculations in physics
- Develop lesson plans for each subject and modify according to student feedback

Math, Chemistry, and Physics Tutor Mar. 2015 - May 2017
UHM, Learning Assistance Center

- Tutored students in inorganic chemistry, classical mechanics, electromagnetism, modern physics, and vector calculus

TECHNICAL SKILLS

- Python, C, Gnuplot, Mathematica, Maple

- Operating Systems: LINUX, Windows

ACHIEVEMENTS

Hazel Brown Outstanding Teaching Award Teaching Assistant Award	Dec. 2019
Graduate Enrichment Fellowship Academic Grant	Aug. 2017
SACNAS Travel Scholarship Presentation Grant	June 2016
College of Natural Arts and Sciences Native Hawaiian Scholarship Academic Grant	June 2016
Vincent Z. Peterson Scholarship Academic Grant	June 2016
Ka Hikinia O Ka Lā Scholarship Academic Grant	June 2015 - June 2017
Undergraduate Research Opportunity Program (UROP) Grant Research Grant	Aug. 2015
Zecha Foundation Scholarship Academic Grant	Aug. 2015
University of Hawai'i Foundations Scholarship Academic Grant	May 2014

OTHER INTERESTS

- Strongman, Canoe Paddling