

EDUCATION

Arizona State University

8/22-TBD

PhD in Astrophysics

Advisor: Sara Walker, NSF Fellow

University of Wisconsin-Madison

9/18-5/22

Bachelor of Science in Physics and Mathematics

GPA of 3.837/4.0.

RESEARCH EXPERIENCE

Primary Graduate Student Project

8/22-TBD

ASU: Search for Laws of Motion in Assembly Space

Developing an algorithm to calculate the assembly paths of strings. Formalizing assembly theory. Studying populations of strings, like peptides or natural language, to search for general laws of motion/evolution.

Secondary Graduate Student Project

11/22-TBD

ASU: Testing the Born Rule

If the probabilistic nature of quantum measurement occurs because we are sampling from an ensemble of otherwise indistinguishable ‘micro-micro-states’, then the size of this ensemble dictates the units in which possible probabilities are partitioned. By precision measurement, one can place a lower bound on the size of such a ‘micro-micro-state’ ensemble.

Undergraduate Researcher

1/20-9/22

UW-Madison Observational Cosmology Lab: NASA’s EXCLAIM Mission

Modeled the optical system of NASA’s EXperiment for Cryogenic Large-Aperture Intensity Mapping (EXCLAIM), a balloon-borne microwave telescope. Installed Computer Simulation Technology, CST, on UW-Madison’s Center for High Throughput Computing, which is now used by multiple campus researchers. Performed electromagnetic simulations and diffractive analysis using CST and the python package Poppy.

Undergraduate Researcher

3/19-8/22

UW-Madison Observational Cosmology Lab: Tianlai Pathfinder Array

Simulated Tianlai single dishes to test the impact of mechanical components on the beam pattern. Created assays of the interferometer’s data classifying radio frequency interference and other systematics. Lead the Tianlai Periodicity Search (TPS): a novel untargeted search for astronomical radio sources with periods ranging from minutes to hours. TPS used more than 200 days of data taken on the North celestial pole, and was the first experiment of its kind.

Summer Intern

5/19-8/19

Arecibo Observatory: Single-Pulse Analysis of Millisecond Pulsars

Observed the millisecond pulsars J1022+1001 and J1713+0747 with the late 305 meter telescope in Arecibo, Puerto Rico. Developed and performed statistical single pulse analyses of the pulsars to study their stability.

Undergraduate Researcher

9/18-5/19

UW-Madison Baum Lab, Origin of Life Project

Ran experiments that mimic the chemistry of early Earth to replicate the origin of life. Imaged chemical growths using a Scanning Electron Microscope (SEM). Created MATLAB population simulations to model the data.

PUBLICATIONS

“Single-Pulse Studies of Three Millisecond-Pulsars” Palliyaguru, N. T., Perera, B. B. P., McLaughlin, M. A., et al. 2023, MNRAS doi:10.1093/mnras/stad194

“Experiment for Cryogenic Large-Aperture Intensity Mapping: Instrument design”, JATIS, Switzer, E., et al. 2021

“The Tianlai Dish Pathfinder Array: design, operation and performance of a prototype transit radio interferometer”, MNRAS, Wu, F., et al. 2021, arXiv:2011.05946

“Modeling the Optical System of NASA’s EXCLAIM Mission”, Proceedings of the Wisconsin Space Conference, Siebert, G., et al. 2022

“Optical design of the EXperiment for Cryogenic Large-Aperture Intensity Mapping (EXCLAIM)”, SPIE Conference Proceeding, Essinger-Hileman, T., Oxholm, T., Siebert, G., et al. 2020, arXiv:2012.10481

“Overview and status of EXCLAIM, the experiment for cryogenic large-aperture intensity mapping”, SPIE Conference Proceeding, Cataldo, G., et al. 2020, arxiv:2101.11734

ACADEMIC AWARDS AND SCHOLARSHIPS

NSF Graduate Research Fellowship (2022, \$138,000): Recognizes and supports outstanding graduate students in STEM disciplines.

Goldwater Scholarship (2021, \$7,500): One of 409 selected nationally based on scientific, mathematic, and engineering achievement.

Astronaut Scholarship (2021, \$15,000): One of 60 scholars selected nationally, primarily on the basis of graduate-level research achievement.

Wisconsin Space Grant Consortium Research Grant (2021, \$4,000): Awards research support to create and implement a research study of the student’s design.

Hilldale Undergraduate/Faculty Research Fellowship (2021, \$3,000): Research Fellowship to support undergraduate research done in collaboration with UW-Madison faculty.

Hagengruber Scholarship (2021, \$2,000) Awarded to an undergraduate Wisconsin resident that shows exceptional promise for a future in physics.

Wisconsin Space Grant Consortium Scholarship (2021, \$2,000): Awarded to outstanding undergraduate students who are pursuing space-related studies.

Liebenberg Family Research Award (2020, \$3,000): Awarded annually based on merit to a junior majoring in Physics.

Henry and Eleanor Firminhac Physics Award (2019, \$2,000): Awarded for quality of physics course work and financial need.

Kemper K. Knapp Scholarship (2018): Awarded to incoming freshman based on academic merit.

Arnold P. Stamm Scholarship (2018): Awarded to top students of graduating class.

Manawa Lodge Scholarship (2018): Awarded based on academic merit.