

Elias Taira

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Education

B.S. Astrophysics Michigan State University

GPA: Major 3.92, Cumulative 3.96

May 2024

B.S. Data Science Michigan State University

GPA: Major 4.0, Cumulative 3.96

May 2024

Research Experience

Circumgalactic Medium (CGM) Simulation

- REU Participant / Undergraduate Research Assistant under Prof. Brian O'Shea
- Aided in the development of software designed to simulate environment of the region surrounding galaxies (a.k.a. the CGM)
- Learned numerical simulation techniques utilized in galaxy formation simulation code

May 2022 – June 2023, August 2023 – Present

Machine Learning to Predict Gamma Ray Burst Redshifts (SULI)

- SULI Intern under Prof. Maria Giovanna Dainotti, Prof. Greg Madejski and Prof. Vahe Petrosian
- Built a machine learning algorithm in R to predict the redshifts of gamma ray bursts (GRBs) detected by the Neil Gehrels Swift Telescope using properties extracted from GRB X-ray lightcurves
- Began and submitted research paper to The Astrophysical Journal during course of 10-week internship

June 2023 – December 2023

Deep Underground Neutrino Experiment (DUNE)

- Undergraduate Research Assistant under Prof. Kendall Mahn
- Cherenkov Light Simulation: Led the development of a light simulation software in Python to emulate the environment inside an experimental neutrino detector
- Detector Calibration: Assisted in the creation of test devices for portions of a neutrino detector calibration module

May 2021 – December 2021

Simplifying Proton Particle Accelerator Designs

- Worked under Prof. Yue Hao
- Participated in research involving the construction of simple proton particle accelerators for cancer treatment
- Analyzed the limits of the potential dimensions of the simplified accelerator by altering various aspects of the accelerator (i.e. the length of a certain component, the strength of magnetic fields, etc.)

September 2020 - May 2021

AP Capstone

- Participated in a research course focused on learning how to conduct research as well as write papers based on said research
- Learned how to properly analyze peer-reviewed articles as well as how to construct literature reviews centered around a given topic
- Independently conducted research on the pollution of a nearby body of water
- Authored a research paper based on the findings of the analysis

August 2017 - May 2020

Publications

Dainotti, M. G., Taira, E., Wang, E., Lehman, E., Narendra, A., Pollo, A., Madejski, G. M., Petrosian, V., Bogdan, M., Dey, A., & Bhardwaj, S. (2024). Inferring the redshift of more than 150 grbs with a machine-learning ensemble model. The Astrophysical Journal Supplement Series, 271(1), 22.
<https://iopscience.iop.org/article/10.3847/1538-4365/ad1aaf>

Presentations

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| University Undergraduate and Research Arts Forum (UURAF) <ul style="list-style-type: none">Presented research completed during school year (continuing CGM Simulation work) in poster-presentation format | April 2023 |
| Mid-Michigan Symposium for Undergraduate Research Experiences <ul style="list-style-type: none">Shared work accomplished during summer REU (on CGM Simulation) in poster-presentation format | July 2022 |
| University Undergraduate and Research Arts Forum (UURAF) <ul style="list-style-type: none">Presented work on DUNE activities in the form of a poster presentation in a campus-wide event | April 2022 |
| DUNE Collaboration Meeting <ul style="list-style-type: none">Discussed work on light simulation software for all 300+ members of the DUNE collaboration in a virtual presentation | October 2021 |
| Physics & Astronomy Research Experiences w/ Drew Scholars (PAREDS) <ul style="list-style-type: none">Gave virtual talk on DUNE work for MSU students and faculty | August 2021 |
| University Undergraduate and Research Arts Forum (UURAF) <ul style="list-style-type: none">Gave virtual presentation about particle accelerator design research for a campus-wide event | April 2021 |

Programming Experience

Python (4 years)
R/R Studio (3 years)
C++ (1 year)
Git/Github (4 years)
Linux (3 years)

Leadership Experience

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| Society of Physics Students (SPS) E-board member – President <ul style="list-style-type: none">Establish club directivesOrganized semi-weekly meetings with MSU faculty giving talks about their researchWorked with Astronomy club to organize fall welcome event for new/current club membersAided treasurer in creation / approval of yearly budgetAssisted in organizing | August 2023 – May 2024 |
| Student Advisory Council <ul style="list-style-type: none">Worked alongside other undergraduate and graduate students to advise the board of directors at MSU of issues and initiatives that are taking place on campus | August 2023- May 2024 |
| Society of Physics Students (SPS) E-board member – Treasurer <ul style="list-style-type: none">Managed club financesCollaborated with president to create / approve a yearly budget proposalWorked with other e-board members to organize events | August 2022 – June 2023 |

Teaching Experience

Undergraduate Learning Assistant, Astrophysics

January 2022 – May 2024

- Worked with Prof. Joey Rodriguez to assist in the management of a 50-student, major-requirement course in observational astronomy
- Attended weekly labs and helped answer any questions the students may have on certain procedures they may have been having trouble with
- Held a weekly office hour to aid students with any issues they may be having with any course material
- Graded lab reports from each lab

Undergraduate Learning Assistant, Intro Astronomy

August 2022 - December 2022

- Sole assistant to Prof. Ali Ghorbanpour in a class section of 108 students
- Held 2 weekly office hours to assist students with course material
- Graded semi-weekly assignments from students

Undergraduate Learning Assistant, Intro Astronomy

August 2021 - December 2021

- The sole assistant to Prof. Abigail Stevens of whom was managing a 112-student class
- Worked with students to work out any issues they had with the course material, or class structure
- Graded weekly essay assignments from each student

Scholarships / Awards

Herbert T. Graham Scholarship

March 2024

- Given to high achieving students majoring in chemistry mathematics or physics (\$2550)

Lawrence W. Hantel Endowed Fellowship Fund

December 2021

- Awarded to outstanding students that are involved with research in physics or astronomy (\$1400)

Honors Distinction Scholarship

January 2020

- Provided to exceptional students among the Honors College (\$20,000)