

Eliza Diggins

ASTROPHYSICIST / MATHEMATICIAN

PROFESSIONAL SUMMARY

I'm a theoretical astrophysicist and mathematician working on my Ph.D at the University of California Berkeley. My research interests broadly concern the dynamics of astrophysical systems and what they can tell us about fundamental physics. I use a mix of computational, analytic, and observational techniques to study these questions.

Research Website:
eliza-diggins.github.io

Email:
eliza.diggins@berkeley.edu

Github:
github.com/Eliza-Diggins

EDUCATION

Doctor of Philosophy in Astrophysics | 2025-2030 (In Progress)
University of California Berkeley – Berkeley, California

Honors Bachelor of Science (HBS) in Physics | 2020-2024
University of Utah – Salt Lake City, Utah

- GPA: 4.0 – (*Suma Cum Laude*)
- Thesis: *Constraining Modified Gravity Using Galaxy Clusters*. Advisor: Dr. Daniel R. Wik

Bachelor of Science (BS) in Applied Mathematics | 2020-2024
University of Utah – Salt Lake City, Utah

- GPA: 4.0 – (*Suma Cum Laude*)

RESEARCH POSITIONS

Research Scientist | April 2022 - July 2025
(April 2023 - April 2024 as a **Parmley Scholar**)
University of Utah Department of Physics and Astronomy

Worked as part of the X-ray astronomy group with Dr. Daniel R. Wik studying dynamical processes in galaxy clusters and their connection to fundamental physics and cosmology.

- Performed hydrodynamics + N-body simulations of galaxy cluster mergers in non-Newtonian gravity. Co-developer of the *cluster_generator* software.
- Initiated development of the *Pisces* library for astrophysical model generation and its corresponding geometry engine *Pisces-Geometry*.
- Studied dynamics of galaxy clusters in best-of-class cosmological simulations like *TNG-300* and *TNG-Cluster* to constrain observations with the *XRISM Observatory*.

Lab Technician | March 2022 - February 2025
(August 2022 - May 2023 as a **UROP Scholar**)
(May 2023 - May 2024 as a **Wilkes Climate Scholar**)
(May 2024 - February 2025 as the Lead Data Scientist)
University of Utah School of Dentistry – Weller Lab

Worked in the Weller Lab under Dr. Melodie L. Weller on mathematical modeling of epidemiological phenomena and big-data studies of rare disease epidemiology.

- Developed novel algorithms and mathematical methods for tracking and identification of trade mediated pathogens.
- Utilized machine learning and big-data methodologies to probe connections between rare disease and autoimmune conditions.
- Identified novel spikes in Hepatitis Delta prevalence using big-data surveys.
- Led the development and growth of a multidisciplinary data science team focused on the long-term integration of computational research.

Undergraduate Researcher | January 2021 - January 2022

University of Utah Department of Mathematics

Worked under Dr. Fred Adler to model SARS-COV-2 virion deposition in the human respiratory system.

- Modeled the transport of COVID-19 virions in the human respiratory system using computational models.
- Developed simplified models of human lungs for fluid dynamics computations.

SIGNIFICANT AWARDS / RECOGNITIONS

2025 Churchill Scholarship Alternate

- The Churchill scholarship is awarded annually to 16 outstanding scholars in the sciences. 4 Alternates are named. Winners are funded for 1 year of postgraduate study at Cambridge.

2024 Alison Regan Library Thesis Award (\$1,000)

- Awarded annually by the Marriot Library at the University of Utah to the best honors theses in science and in the humanities. Awarded for *Constraining Modified Gravity Using Galaxy Clusters*.

2024 Outstanding Senior Award (\$1,000)

- Awarded by the University of Utah Department of Physics and Astronomy to an outstanding graduating senior.

2024 Gibson Senior Award (\$1,000)

- Awarded by the University of Utah Department of Mathematics to the student with the highest graduating GPA.

2024 Rhodes Scholarship Finalist

- Awarded by the Rhodes Trust – District 13 for the honor of being named as a finalist for the Rhodes Scholarship.

2023 APS 4 Corners Speaker Award

- Awarded by the 4 Corners section of the American Physical Society for an outstanding oral presentation at the 2023 APS 4C conference.

2023 Goldwater Scholarship (\$7,500)

- Awarded by the Barry Goldwater Scholarship and Excellence in Education Foundation for outstanding career and research potential in physics.

2023 Thomas J. Parmley Scholarship (\$10,000)

- Awarded once annually by the University of Utah Department of Physics and Astronomy for outstanding undergraduate research.

2023 Continuing Undergraduate Award (\$1,000)

- Awarded by the University of Utah Department of Physics and Astronomy for outstanding performance in the classroom and in research.

2023 Undergraduate Researcher of the Year

- Awarded by the Office of Undergraduate Research at the University of Utah for work on the mathematical modeling of trade mediated pathogens.

2023 Wilkes Scholar (~\$15,000)

- Awarded by the Wilkes Climate Center at the University of Utah to fund work on the climate impacts on trade mediated pathogens.

July 2021 Ltd. Governor's Award for Outstanding Community Service

- Awarded for 2+ years of service at Guadalupe Schools teaching English as a second language

SERVICE, COMMUNITY, AND ADVOCACY

Program Coordinator | January 2025 - July 2025

(May 2024 - January 2025 as Processes Intern)

(March 2023 - May 2024 as Transgender Friendship Circle Facilitator)

Encircle SLC – Salt Lake City, Utah

- Responsible for program logistics, volunteer training, quality auditing, community outreach and other aspects of daily operations.
- Responsible for home safety, staff coordination, and guest management; including working with youth and young adults to provide safety and community.
- Developed programming and accommodations for neurodivergent guests.
- Provided community resources including crisis intervention, suicide evaluation, safety planning, and resource distribution for queer youth and young adults.
- Ran the transgender friendship circle, a peer support group from transgender adults. Additionally performed best-practices research and developed programming to optimize the group for its target demographic.

Staff Advisor for LGBTQ Social Club | August 2024 - May 2025

University of Utah – Salt Lake City, Utah

- Acted as an advisor to University of Utah students seeking to fill gaps in community support infrastructure following the closure of the LGBTQ resource center.
- Provided LGBTQ students with peer-support resources and community space through shared activities.

Student Lecture Series Chair | January 2024 - May 2024

University of Utah Department of Physics and Astronomy

- Coordinated student lectures in the department to improve student communication skills and pedagogical engagement.
- Strengthen departmental community and our shared love for physics by encouraging innovative, engaging, and entertaining lectures on subjects which are not traditionally seen in an undergraduate degree program.

English as a Second Language Tutor | July 2019 - May 2023

Guadalupe Schools – Salt Lake City, Utah

- Taught ESL in a small group tutoring environment under the supervision of an ESL specialist.
- Incorporated multifaceted pedagogical strategies into instruction.
- Focused on use-centric teaching to help clients reach language goals as quickly as possible.

SELECTED PUBLICATIONS

Constraining MOND Extensions in Galaxy Clusters. Eliza C. Diggins and Dr. Dan R. Wik. (Submitted)

Constraining Modified Gravity Using Galaxy Cluster Dynamics. Eliza C. Diggins, Dr. Daniel R. Wik.

- Honors thesis. Awarded Alison Regan Library Thesis Award as the best thesis in the sciences.

Unraveling the Impact of COVID-19 on Sjogren's Disease: A Retrospective Cohort Analysis. Eliza C. Diggins, Melodie L. Weller, Swetha Shankar. (Manuscript undergoing internal review)

Signals of Hormone Mediated Protective Factors in Sjogren's Disease. Eliza C. Diggins, Melodie L. Weller. (Manuscript undergoing internal review)

OUTREACH AND PUBLIC TALKS

Chaos and the Three-Body Problem

Presented November 2021 and Published September 2022.

The Philosophy of Science and Modified Newtonian Dynamics

Presented December 2022.

From Learning to Doing: The Philosophy of Science

Presented March 2024. University of Utah Department of Physics and Astronomy Student Lecture Series.

Modified Newtonian Dynamics

Presented May 2024 as part of the Astronomy of Tap (SLC) science outreach series.

Cosmological Test Kitchen: How to Make the Milky Way in a Box

Presented September 2024 as part of the Astronomy on Tap (SLC) science outreach series.

Cosmic Collisions: How Did We Get Here?

Presented March 2025 as part of the Astronomy on Tap (SLC) science outreach series.