

Eliza Diggins

COMPUTATIONAL ASTROPHYSICIST – MATHEMATICIAN
MULTI-DISCIPLINARY SCIENTIST

POSITIONS

– **Research Scientist – U of U, Department of Physics and Astronomy**

- [April 2022 – Present, April 2023-April 2024 as a Parmley Scholar]
- o Produce N-Body / hydrodynamic simulations of galaxy clusters and their collisions to understand the behavior of the intra-cluster medium (ICM) and dark matter.
 - o Constrain observational and theoretical effects in clusters of galaxies to improve cosmological inference.
 - o Software development for analysis, and simulation of galaxy clusters.
 - o Author of [pyXMIP](#) and co-author of [cluster_generator](#).
 - o [Advisor](#): Dr. Daniel R. Wik

– **Research Scientist – U of U, School of Dentistry**

- [March 2022 – April 2023, Under Grad. Researcher]
[April 2023 – April 2024, Wilke's Scholar]
[May 2024 – Present, Data Science Lead]
- o Study the significance of trade-mediated pathogens (TMPs) using computational simulations.
 - o Produced a novel algorithm for trade-network reconstruction from trade databases.
 - o Coordinate data science team focused on using big-data solutions to study rare disease and auto-immune phenomenology.
 - o [Advisor](#): Dr. Melodie L. Weller

– **Undergraduate Researcher – U of U, Department of Mathematics**

- [January 2021-December 2021]
- o Modeled the transport of COVID-19 virions in the human respiratory system using computational models.
 - o Wrote a numerical model using fractal geometry to produce numerically tenable models of the respiratory system.
 - o [Advisor](#): Dr. Fred Adler

SERVICE, COMMUNITY, AND ADVOCACY

[May 2024 – Present] **Transgender Support Intern – Encircle SLC**

- Construct programming specific to the transgender community.
- Create processes to provide better linkage to care for vulnerable transgender adults.
- Gain additional experience with group facilitation and crisis de-escalation.

[Mar 2023 – Present] **Transgender Support Group Facilitator – Encircle SLC**

- Facilitate a weekly support group for transgender adults with particular focus on processing and support.
- Collaborate with staff and volunteers to expand and improve services.
- Incorporate crisis management and suicide prevention strategies.

SKILLS

High Performance Computing

Software Development

Mathematical Modeling

Science Communication

Collaborative Facilitation

Pedagogy

Package Dev.

Diversity Informed Teaching

CONTACT

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ABOUT ME

I'm a theoretical astrophysicist and mathematician at the University of Utah. My research is shared between the Department of Physics and Astronomy, where I study galaxy cluster dynamics and gravitational theory; and the School of Dentistry, where I work on mathematical models of trade-mediated pathogens in complex global trade networks.

EDUCATION

University of Utah – 2024
HBS Physics
GPA: 4.00 (*Suma Cum Laude*)
Thesis: *Constraining Modified Gravity Using Galaxy Clusters*
University of Utah – 2024
BS Applied Mathematics
GPA: 4.00 (*Suma Cum Laude*)
Hillcrest High School – 2020
International Baccalaureate
Diploma
GPA: 4.00

ETHOS

I believe in the inherent importance of scientific progress for its own sake and for the sake of the human endeavor. I am staunchly against isolationism in science and believe that science in both its practice and its implementation should be a diverse and inherently human affair. Diversity in science is important to me and, in my opinion, one of the most important things we can use to improve the productivity, communicativity, and impact of science on all scales.

SERVICE, COMMUNITY, AND ADVOCACY (Continued)

[Dec 2023 – Present] **Student Lecture Series (Chair + Founder) - U of U, Department of Physics and Astronomy**

- Coordinate student lectures in the department to improve student communication skills and pedagogical engagement.
- Strength 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.

[July 2019 – May 2023] **English as a Second Language Tutor – Guadalupe Schools**

- 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.

AWARDS AND RECOGNITIONS

- **2024 Alison Regan Library Thesis Award**

Awarded annually by the Marriot Library at the University of Utah to the best honors theses in science and in the humanities.

- **2024 Outstanding Senior Award**

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

- **2024 Gibson Senior Award**

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.

- **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**

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

- **2023 Thomas J. Parmley Scholarship**

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

- **2023 Continuing Undergraduate Award**

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**

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. Governors Award for Outstanding Community Service**

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

Presentations, Publications, and Lectures

Presentations

(T): talk, (P): Poster

- (T) Using Galaxy Clusters to Constrain Modified Gravity Theories.
Honor's Showcase – University of Utah, April 2024
Eliza C. Diggins, Daniel R. Wik.
- (P) Using Galaxy Clusters to Constrain Modified Gravity Theories.
American Physical Society April Meeting - Sacramento, California April 2024
Eliza C. Diggins, Daniel R. Wik.
- (P) Unraveling the Impact of COVID-19 on Sjogren's Disease: A Retrospective Cohort Analysis.
International Association for Dental Research Annual Conference - New Orleans, Louisiana March 2024
Eliza C. Diggins, Melodie L. Weller, Swetha Shankar.
- (T) Using Galaxy Clusters to Constrain Modified Gravity Theories.
American Physical Society (4 Corners Conference) - Logan Utah, Oct. 2023
Eliza C. Diggins, Daniel R. Wik. [Recipient of a speaking award for presentation]
- (P) The Harmony Project: Modeling the Epidemiology of Trade Mediated Pathogens in International Trade Networks.
American Society for Virology Conference - Athens, Georgia, Jun. 2023.
Eliza C. Diggins, Melodie L. Weller.
- (P) Constructing International Trade Networks to Predict the Origin of Trade Mediated Pathogens: The Harmony Project.
3i Initiative Conference - University of Utah, Feb. 2023.
Eliza C. Diggins, Melodie L. Weller.
- (P) International Trade Networks to Predict the Origin of Trade Mediated Pathogens: The Harmony Project.
SACNAS Utah conference - University of Utah, Apr. 2023.
Eliza C. Diggins, Melodie L. Weller.
- (P) International Trade Networks to Predict the Origin of Trade Mediated Pathogens: The Harmony Project.
Utah Conference on Undergraduate Research - University of Utah, Feb. 2023.
Eliza C. Diggins, Melodie L. Weller.
- (P) Tracing Trade Mediated Pathogens Through International Trade: The Harmony Project.
Math For All Conference, Salt Lake City - Utah. Feb. 2023
Eliza C. Diggins, Melodie L. Weller
- (P) International Trade Networks to Predict the Origin of Trade Mediated Pathogens: The Harmony Project.
Research on Capitol Hill, Utah, Jan. 2023.
Eliza C. Diggins, Melodie L. Weller.

Publications

- Constraining MOND Extensions in Galaxy Clusters. Eliza C. Diggins and Dr. Dan R. Wik. Manuscript undergoing internal review.
- Constraining Modified Gravity Using Galaxy Cluster Dynamics. Eliza C. Diggins, Dr. Daniel R. Wik.
 - o 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)

Lectures

- Chaos and the Three-Body Problem, Presented November 2021 and Published September 2022.
 - o <https://www.youtube.com/watch?v=mm3l4m8YsnM>
- 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.