

Eliza Diggins

COMPUTATIONAL ASTROPHYSICIST – MATHEMATICIAN
MULTI-DISCIPLINARY SCIENTIST

POSITIONS

– Parmley Fellow – Department of Physics and Astronomy

[April 2022 – Present]

- o Produce N-Body / hydrodynamic simulations of galaxy clusters and their collisions to understand the behavior of the inter-cluster plasma (ICM) and dark matter.
- o Constrain dynamical inferences on galaxy clusters to better understand cosmological discrepancies.
- o Research alternative explanations of dark matter and the role that galaxy clusters can play in testing those theories.
- o Advisor: Dr. Daniel R. Wik

– Wilkes Climate Scholar – University of Utah School of Dentistry

[March 2022-Present (Undergraduate researcher)]

[April 2023 – Present (Wilkes Scholar)]

- 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 Understand the role of climate change and drought induced susceptibility on emergent TMPs and the potential public health ramifications of such an event.
- o Advisor: Dr. Melodie L. Weller

– Undergraduate Researcher – 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

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.

Mar / April 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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Salt Lake City, Utah

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 (presumed)

GPA: 4.00

Thesis: *Constraining Modified Gravity Using Galaxy Clusters*

University of Utah – 2024

BS Applied Math. (presumed)

GPA: 4.00

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.

AWARDS AND RECOGNITIONS

- 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

- *Constructing 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.
- *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
- *Constructing 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.
- *Constructing 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.
- *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.
- *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.
- *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.

Publications

- *Constraining MOND Extensions in Galaxy Clusters*. Eliza C. Diggins and Dr. Dan R. Wik. Manuscript undergoing internal review.
- *The Harmony Project: The Mathematics of Trade-Mediated Pathogens*. Eliza C. Diggins, Melodie L. Weller. (Manuscript in early preparation stages)

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.