

Eliza Diggins

COMPUTATIONAL ASTROPHYSICIST
MATHEMATICIAN

RESEARCH EXPERTISE / EXPERIENCE

- Apr. 2022 – Present: **Dept. of Physics & Astronomy**
 - Produce N-Body / hydrodynamic simulations of galaxy clusters and their collisions to understand the behavior of the inter-cluster plasma (ICM) and dark matter.
 - Constrain dynamical inferences on galaxy clusters to better understand cosmological discrepancies.
 - Research alternative explanations of dark matter and the role that galaxy clusters can play in testing those theories.
 - Advisor: Dr. Dan Wik
- Mar. 2022 – Present: **School of Dentistry (Weller Lab)**
 - Study the significance of trade-mediated pathogens (TMPs) using computational simulations.
 - Produced a novel algorithm for trade-network reconstruction from trade databases.
 - Understand the role of climate change and drought induced susceptibility on emergent TMPs and the potential public health ramifications of such an event.
 - Advisor: Dr. Melodie L. Weller
- Jan. 2021 – Nov. 2021: **Dept. of Mathematics**
 - Modeled the transport of COVID-19 virions in the human respiratory system using computational models.
 - Wrote a numerical model using fractal geometry to produce numerically tenable models of the respiratory system.
 - Advisor: Dr. Fred Adler

EDUCATION

2024 – (presumed) – University of Utah - **Honors BS in Physics**
(Emphasis in astrophysics)

- GPA: 4.0
- Thesis: *Galaxy Clusters as Probes of MOND-like Theories of Gravity*
 - Advisor: Dr. Dan Wik, University of Utah.

2024 – (presumed) – University of Utah - **BS in Applied Mathematics**

- GPA: 4.0

2020 – Hillcrest High School - **International Baccalaureate Diploma**

- GPA: 4.0

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.

CONTACT

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<https://github.com/Eliza-Diggins>

Salt Lake City, Utah

Awards

Goldwater Scholarship

The Barry Goldwater Scholarship and Excellence in Education Foundation (2023)

Continuing Undergraduate Award

University of Utah Department of Physics and Astronomy (2023)

Thomas J. Parmley Scholarship

University of Utah Department of Physics and Astronomy (2023)

Undergraduate Research of the Year

University of Utah Office of Undergrad. Research

Ltd. Governor's Service Award

State of Utah, Commission on Service and Volunteerism

Funds / Grants

Undergrad. Research

Opportunity

Program

Fall 2022, Renewed for Spring 2023

Wilkes Center Climate Scholar

Q2 2023 – Q2 2024

CHPC Computation Allocation

Awarded to facilitate work with Dr. Dan Wik.

SKILLS

- Computational mathematics and physics, including supercomputing infrastructure, HPC, and package design.
- Cross disciplinary communication, collaboration, and depth of knowledge.
- Instructional communication including significant teaching background.
- Mathematical modeling in physics and biology.
- Diversity focused approaches in science, community, and beyond.
- Crisis management and suicide prevention.
- Small group facilitation.

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.

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.

