Emma Slack

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Education:

University of Texas at Arlington **(*expected)* May 2029**
Doctor of Philosophy, Applied Mathematics GPA: 4.0

Colorado State University Dec. 2023
Bachelors of Science, General Mathematics GPA: 4.0

Professional Experience:

Linear Algebra Grader, *Colorado State University* 8/2022-12/2023
Fort Collins, Colorado

- Coordinated grading efforts within a team of 4 individuals
- Composed rubrics for assignments and quizzes, and evaluated student performance and clarified concepts accordingly

Calculus Learning Assistant and Tutor, *Colorado State University* 1/2022 - 12/2023
Fort Collins, Colorado

- Explained class content in group tutoring, answered related questions and coached students on effective studying habits
- Motivated mathematical concepts in front of the class through demonstrations, practice problems, and review sessions

K-12 Mathematics Tutor, *Mathnasium of Highlands Ranch* 6/2022-8/2022
Highlands Ranch, Colorado

- Adapted learning plans for students based their needs and performance in prior lessons
- Guided groups of students individually through Mathnasium activity books

Research Projects:

NSF RTG Mathematics for Human Health, *University of Texas at Arlington*
Arlington, Texas

Modeling Risk of New-Onset Diabetes in Post-Cancer Patients 5/2025-Present
Advisors: Dr. Hristo Kojouharov, Dr. Souvik Roy

- Calculating risk scores of developing prediabetes using data from fitness trackers and continual glucose monitors for patients in remission from cancer

Optimal bacteriophage production using *E. coli* in batch, fed-batch, and continuous cultures 1/2025-Present
Advisors: Dr. Justyn Jaworski, Dr. Hristo Kojouharov, Dr. Christopher Kribs, Dr. Souvik Roy

- Optimizing bacteria production of M13 bacteriophage in *E. coli*

Modeling the Oropouche virus in Manaus, Brasil 11/2024-Present
Advisor: Dr. Christopher Kribs

- Constructing a compartmental model to describe the transfer of the Oropouche virus between vectors, sylvatic hosts, and human hosts

Nonstandard finite difference methods for Partial Differential Equations 10/2024-Present
Advisors: Dr. Hristo Kojouharov, Dr. Souvik Roy

- Formulating a novel nonstandard finite difference method for advection-diffusion equations

Modeling Competitive Cell Dynamics With YAP Hyperactivation 9/2024-9/2025
Advisors: Dr. Benito Chen-Charpentier, Dr. Hristo Kojouharov, Dr. Souvik Roy

- Developing, analyzing, and validating an ODE model to investigate competition between healthy and cancerous cells

DOE Science Undergraduate Laboratory Internship Program, *National Renewable Energy Laboratory*
Golden, Colorado

System-level failure analysis for floating wind farms 1/2024-6/2024
Advisor: Matthew Hall

- Developed algorithm to model cause-effect relationship of component failures and failure phenomena in floating offshore wind farm
- Measured average probabilities of inner-turbine and inter-turbine failure using Bayesian inference

Directed Research for Undergraduates in Mathematics and Statistics REU, *North Carolina State University*
Raleigh, North Carolina

Analyzing data from patients with pulmonary hypertension 6/2023-1/2024
Advisors: Dr. Mette Olufsen, Michelle Bartolo

- Quantified the uncertainty associated with various methods of modeling the pulmonary arteries

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Publications:

Slack, E, Gandhi, D, Roy, S, Kojouharov, HV, & Chen-Charpentier, B. (2025). Modeling Competitive Dynamics Between Healthy and Cancerous Liver Cells with Yes-Associated Protein (YAP) Hyperactivation. *Mathematics*, *13*(21), 3479. doi:10.3390/math13213479

Bartolo MA, Taylor-LaPole AM, Gandhi D, Johnson A, Li Y, **Slack E**, Stevens I, Turner ZG, Weigand JD, Puelz C, Husmeier D, Olufsen MS. Computational framework for the generation of one-dimensional vascular models accounting for uncertainty in networks extracted from medical images. *J Physiol*. 2024 July;602(16):3929-3954. doi: 10.1113/JP286193.

Olufsen MS, Bartolo MA, Hernandez-Cerdan P, Gandhi D, Johnson A, **Slack E**, Stevens I, Turner ZG. Importance of uncertainty in image segmentation in one-dimensional vascular network models. *8th International Conference on Computational & Mathematical Biomedical Engineering - CMBE Proceedings,* Volume 1, pg. 290-293. June 2024.

Presentations:

Modeling Competitive Cell Dynamics With YAP Hyperactivation, *Minisymposium Talk* 9/27/2025
SIAM Texas-Louisiana Sectional Meeting; Austin, Texas

Introduction to Nonstandard Finite Difference Methods, *Student Talk* 5/1/2025
Rice RTG Ranch Retreat; Houston, Texas

Failure Analysis of Floating Offshore Wind Farms, *Student Talk* 3/29/2025
MAA Texas Regional Conference; Prairie View, Texas

Lesion Removal and Image Segmentation, *AMS-PME Student Poster Session* 1/5/2024
Joint Mathematics Meeting; San Francisco, California

Classification and Features of Graphs, *AMS-PME Student Poster Session* 1/6/2023
Joint Mathematics Meeting; Boston, Massachusetts

Scholarships and Fellowships

Math Academic Excellence Scholarship	2025-Present
UTA Graduate School Travel Grant Award	2025
Early Graduate Research in Applied Mathematics (EaGR) Workshop Funding and Participation	2025
NSF Research Training Group for Mathematics for Human Health Fellowship	2024-Present
Michael & Wanda Ray Math Scholarship	2024-2025

Awards and Honors

Outstanding Undergraduate in Mathematics at CSU	2023
Putnam Exam (9 Point Score)	2023
DRUMS 3-Minute Thesis Winner	2023
College of Natural Sciences Dean's List	2021-2023
Certificate and Pin of Academic Achievement from the NRHH Chapter at CSU	2021-2022

Memberships

Society of Industrial and Applied Mathematics (SIAM), UT Arlington Chapter - Vice President (2025-Present)
Association for Women in Mathematics (AWM), UT Arlington Chapter - Member (2025-Present)
American Mathematical Society (AMS), UT Arlington Chapter - Secretary (2025), Member (2024-Present)