Faye Castro - veo21@txstate.edu

EDUCATION

Texas State University, San Marcos, Texas, Expected Graduation: May 2027
Master of Science in Mathematics - Thesis Option

Texas State University, San Marcos, Texas, May 2025
Bachelor of Science of Mathematics

- Majors: Mathematics and Applied Mathematics
- Minors: Computer Science and Data Analytics
- Institution GPA: 3.5

PUBLICATIONS

On the Number of Closed Gaps of Discrete Periodic One-Dimensional Operators - May 2024
This paper is about the number of gaps that are gotten from one-dimensional Schrodinger operators and similar Jacobian matrixes.
`https://arxiv.org/abs/2308.12373`

RESEARCH EXPERIENCE

Logic@TXST Fellowship - Spring 2024-Present
An RA position at the logic@TXST program ran by Dr. Will Boney. Specifically, I studied Homotopy Type Theory and presented at the Logic@TXST seminar series.

Math REU at the University of Connecticut - Summer 2024
We looked at integrals over fractals with the goal of determining why data mining performs better than currently is predicted.

Idea Center (Independent Research) - Fall 2023- Spring 2025
This was an independent research project which through a systematic review analyzed how proof assistant software could be and if so, how to effectively use it in undergraduate level math courses.

Summer Research on Mathematical Physics - Summer 2023
With Dr. Fillman and another undergraduate researcher, we work on accurately determining the number of gaps in semi-periodic Schrödinger operators. This led to a paper being published the following spring.

PRESENTATIONS

"Don't you Dare talk Math to Me: Lessons From an REU"
REUs are ways for undergraduates to get a taste of doing academic research. This relaxed talk is about what an REU is, the application processes and a few lessons I learned doing the Math REU at the University of Connecticut.

Given as a Part of the Talk Math Me Me seminar series at Texas State University in November 2024.

"Singular Laplacian eigenmaps via Green's function"
Laplacian eigenmaps are prevalent in dimension reduction algorithms, yet the theory behind these eigenmaps remains insufficient to explain their accuracy. By considering the inverse Laplacian, we can fill in the gap in the current theory. Given at the Young Mathematicians Conference at the Ohio State University in August 2024.

"Evaluating The Potential Impact of Proof-Assisting Software On Problem Solving Skill Development"
Proof assisting software is starting to make big impacts on math research. Proofs are hard for a lot of students so how would using this software to teach students affect problem solving skills? This talks about the clash between the structure current problem-based classes and proof software. Given at the Undergraduate Research Comference at Texas State in April 2024.

"Okay, But What is a Proof?"
The four colors theorem was the first proof that relied on computers. Despite "solving" the theorem, it spawned a lot of discourse for both mathematicians and philosophers. This talk is about dissecting what are the qualities and the purpose of doing proofs. Given as a Part of the Talk Math Me Me seminar series at Texas State University in April 2024.

TEACHING EXPERIENCE

Instructor of Record Fall 2026-Present Ran two classes of Survey of Contemporary Math, creating lectures, exams and material to support students.

Calculus Lab Instructor - Fall 2024-Spring 2026
Ran various calculus labs, where I was responsible for making assignments, quizzes and grading. Additionally, helped students at optional events during the semester.

HONORS AND AWARDS

Undergraduate Recognition for Academic Excellence - Awarded 2023 and 2024
President's Honor Scholarship - Awarded 2021-2024
Dean's list - Awarded 4 of 6 Eligible Semesters

ORGANIZATIONS AND MEMBERSHIPS

Pi Mu Epsilon - Fall 2024-Present
Served as Liaison from Fall 2025-present
SUPER in Math - Spring 2024-Present
Mentee from Spring 2024-Spring 2025 and mentor from Fall 2025-Present
Association for Women in Mathematics - Fall 2024-Present

Texas State Marching Band - Fall 2021-2024
Served as color guard captain from Fall 2022-2024.