Samuel Perales

Department of Mathematics
The University of Texas at Austin

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Education

The University of Texas at Austin — Fall 2018 - Present
B.S. in Mathematics — Expected 2022
GPA: 3.6
Coursework: Functional Analysis, Complex Analysis, PDEs,, Mathematical Modeling, Stochastic Processes, Numerical Methods, Differential Geometry, Topology, Algebraic Structures, Applied Statistics, Quantum Information Science, Software Design

Austin Community College — Spring 2017 - Spring 2018
Dual Enrollment through Hendrickson High School
GPA: 4.0
Coursework: Linear Algebra, Differential Equations, Multivariable Calculus

Research

Texas Experimental Geometry Lab — Spring 2021 - Present
Computational approaches to problems in geometric group theory.
Personal Article | Group Website

REU: Life Sciences, Arizona State University — Summer 2021
Agent-based modeling of in-nest social insect dynamics. Continuing related research through the Fall semester.
Personal Article | Technical Report

REU: Computational Imaging, Harvey Mudd College — Summer 2020
Implemented fourier ptychographic microscopy techniques to create a 3D-printed microscope.
Personal Article | Technical Report

Presentations

1) 'Can you hear the shape of a drum?' — December 2021
   Directed Reading Program Virtual Symposium - UT Austin
2) 'In-nest information flow analysis of social ant colonies' — October 2021
   SACNAS National Diversity in STEM (NDiSTEM) Digital Conference
3) 'Proof of Uniqueness for Gross-Pitaevskii Hierarchy via Board Games' — May 2021
   Undergraduate Research Forum - UT Austin
4) 'Spectral Theorem for Bounded Self-Adjoint Operators with Projection-Valued Measures' — December 2020
   Directed Reading Program Virtual Symposium - UT Austin
5) 'An Exploration of the Dynamics of Elliptic Curves' — May 2019
   Undergraduate Research Forum - UT Austin

Work Experience

Peer Tutor, The University of Texas at Austin — Spring 2019 - Spring 2021

Undergraduate Assistant, The University of Texas at Austin — Fall 2020 - Spring 2021

Helped run the Sanger Learning Center by training incoming tutors, responding to emails, and organizing events.

Activities

Directed Reading Program: Numerical Methods — Fall 2021

Finite element methods for estimating the spectrum of the laplacian on an arbitrary boundary.

Research Training Grant: Analysis — Spring 2021

Mathematical physics literature review of '*On the Uniqueness of Solutions to the Gross-Pitaevskii Hierarchy*'. Presented a poster at an undergraduate research forum.

Directed Reading Program: Spectral Theory — Fall 2020

Reading about the Spectral Theorem for bounded self-adjoint operators with projection-valued measures.

Freshman Research Initiative: Symmetry — Spring 2019

Research stream designed to introduce math undergraduates to the research process including reading articles and creating / presenting a poster at an undergraduate research forum.

SIAM Mentorship Program — Fall 2021

Applied mathematics mentorship with Dr. Tan Bui to work through concepts in inverse theory and deep learning.

Memberships

Math Club

Vice President — Spring 2020 - Present

Weekly math lectures and socials. I ran reading groups on graph theory and topics in computational mathematics.

Association for Women in Math — Fall 2020 - Present

Weekly meetings with advice for undergrads. Occasional lectures from female and non-binary professors.

Sunday Morning Math Group

Volunteer — Spring 2019 - Spring 2020

Worked with Austin middle and high schoolers biweekly on introductory undergraduate math topics.

Technical Skills

Software Development

Python (numpy, scipy, pandas, pickle, matplotlib, pytorch), MATLAB, R, Processing, Version Control, XCode, Swift, Firebase

Web Development

HTML, CSS, JavaScript, SQL, React, Bootstrap, p5.js