

ALEC S. ZABEL-MENA

azabelmena.wordpress.com

EDUCATION

BS	Pure Mathematics Minor in Cybersecurity University of Puerto Rico, Río Piedras	August 2016 - Present
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RESEARCH EXPERIENCE

Puerto Rico Louis Stokes Alliance for Minority Participation	
University of Puerto Rico	August 2021 - Present

- Researching APN functions and the classification of certain 2-error correcting cyclic codes for use in cryptography and coding theory.
- Mentored by Professor Heeralal Janwa, Ph.D.

RESEARCH WORK

The General Linear Group: Finding 2×2 Representations of Finite Groups	
University of Puerto Rico	April, 2020

- Final project for the second undergraduate seminar in mathematics (MATE3170). Research the general linear group on 2×2 matrices and representations of well known groups using these matrices.
- Worked under the supervision of Professor Raúl Figueroa, Ph.D.

Matroid Theory	
University of Puerto Rico	November, 2019

- Final project for the first undergraduate seminar in mathematics (MATE3070). Gave a survey of the field of Matroid theory, and its applications in Graph theory, Topology, and Algorithm Design.
- Worked under the supervision of Professor Iván Cardona, Ph.D.

Algebraic Codes over Elliptic and Hermitian Curves	
University of Puerto Rico	May, 2019

- Research paper, and final project of the Introduction to Coding Theory course. Studied and found algebraic geometric codes using elliptic and Hermitian curves for use in coding theory and cryptography.
- Worked under the supervision of Professor Heeralal Janwa, Ph.D.

RESEARCH INTERESTS

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| <ul style="list-style-type: none">• Group Theory• Finite Fields• Algebraic Geometry and the study of algebraic curves• Topology and its use in other areas of mathematics | <ul style="list-style-type: none">• Graph theory, Matroid theory, and Combinatorics• Algorithm Design for use in computer science and computational mathematics• Cybersecurity research and normalizing a culture that is privacy and security oriented |
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- Post-Quantum error correcting codes
- Post-Quantum implementations of cryptographic algorithms

TEACHING AND MENTORING EXPERIENCE

Proyecto Tutorías DECEP

2020-2021

University of Puerto Rico, Río Piedras

Mathematics tutor

- Conducted assessments to identify the educational needs of my students and developed individualized learning plans.
- Tasked with providing tutoring services to seven high school students for 10 hours a week in the subjects of Algebra and Pre-Calculus.

Self-Employed

2019-2021

Mathematics tutor

- Evaluated students learning styles and provided appropriate techniques for maximizing understanding and minimizing frustration.
- Simplified math concepts while coaching students to think critically when problem solving; eventually introducing them to axiomatic systems within mathematics.
- Provided tutoring one-on-one to five highschool students in the subjects of Algebra, Pre-Calculus, and geometry for two times a week, at two hours for each session.

PUBLICATIONS.

Works in Preperation

Janwa, H. Zabel-Mena A. *APN Functions, and Classifying 2-Error-Correcting Cyclic Codes*. unpublished.

HONORS AND AWARDS

Dean's List

2016 - 2021

MEMBERSHIPS AND AFFILIATIONS

Asociación de Estudiantes de Matemáticas (AeMAT)

2019-Present

Senzala Capoeira

2016 - 2019

PROFESSIONAL DEVELOPMENT

Webinars

- Going Down the Cyber Security Rabbit Hole February 2022

Conferences attended as spectator

- Interuniversity Seminar on Mathematical Sciences Research (SIDIM) February 2022

SKILLS

• Languages

- English: Native
- Spanish: Native

- Portuguese: Basic (A2)

- **Software**

- Excel
- \LaTeX
- Knowledge of UNIX-like systems and the commandline to streamline workflow and automate repetitive tasks.
- Privacy and Security Oriented
- **C/C++**
 - Used **C++** to implement a polynomial root finding algorithm in order to find the number of points on a given rational surface.
- **SAGE**
 - Used **SAGE** to find elliptic curves that attained the Hasse-Weil bound.