ALEC S. ZABEL-MENA

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EDUCATION

BS	Pure Mathematics, Minor in Cybersecurity	**August 2016 - June 2022**
	University of Puerto Rico, Río Piedras	
MS	Pure Mathematics	**August 2022 - Present**
	University of Puerto Rico, Río Piedras	

RESEARCH

An Efficient Implementation and Analysis of Zeta Functions of APN Curves and Their Protograph LDPC Codes for Space Applications
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.

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.

GRANTS AND AWARDS

Puerto Rico Louis Stokes Alliance for Minority Participation
University of Puerto Rico   **August 2021 - May 2022**

NASA PR Space Grant Fellowships and Scholarship Program (No. 80NSSC20M0052)
University of Puerto Rico   **August 2022 - May 2023**

NASA PR Research Assistantship (No. 80NSSC20M0052)
University of Puerto Rico   August 2023 - December 2023

RESEARCH INTERESTS

- Commutative Algebra
- Algebraic Geometry
- Finite Fields
- Topology and its use in other areas of mathematics
- Graph theory, Matroid theory, and Combinatorics
- Category Theory

- Algorithm Design for use in computer science and computational mathematics
- High Performance Computing
- Cybersecurity research and normalizing a culture that is privacy and security oriented
- Post-Quantum error correction

PUBLICATIONS

Works in Preparation

Janwa, H. Zabel-Mena, A. *An Efficient Implementation and Analysis of Zeta Functions of APN Curves and Their Protograph LDPC Codes for Space Applications.* unpublished.

PRESENTATIONS AND TALKS

- Zabel-Mena, Alec S., (2023, November 30). An Efficient Implementation and Analysis Of Zeta Functions Of APN Curves and Their Protograph LDPC Codes [poster session]. 2023 Forward Research Innovation Summit, San Juan, PR.

- Zabel-Mena, Alec S., (2022, April 09). An Efficient Implementation of Computing The Rational Points and Zeta-functions of Curves Associated with APN Monomials and Applications to Cyclic codes [minisymposium talk]. 55th ACS Junior Technical Meeting, Humacao, PR.

TEACHING AND MENTORING

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.

HONORS AND AWARDS

Dean's List   **2016 - 2021**

MEMBERSHIPS AND AFFILIATIONS

Asociación de Estudiantes de Ciencias de Computos (AECC)   **2022 - Present**
Asociación Estudiantil de Matemáticas (AeMAT)   **2019-Present**
    Treasurer
Lembrança Negra Capoeira   **2016 - 2018**
Senzala Capoeira   **2018 - Present**

SKILLS

- Languages
  - English
  - Spanish
  - Portuguese
- Software
  - Excel
  - LaTeX
  - Knowledge of UNIX-like systems and the commandline to streamline workflow and automate repetitive tasks
  - Privacy and Security Oriented
  - C programming
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