ALEC S. ZABEL-MENA

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EDUCATION

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

RESEARCH GRANTS, SCHOLARSHOPS AND AWARDS

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

- 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.

NASA PR Space Grant Fellowships and Scholarship Program
University of Puerto Rico   **August 2022 - Present**

- **NASA PR Space Grant No. 80NSSC20M0052**

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

- Group Theory
- Finite Fields
- Algebraic Geometry and the study of algebraic curves
- Topology and its use in other areas of mathematics

- 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

- Post-Quantum error correcting codes

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 Preparation
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 Ciencieas de Computos (AECC)	**2022 - Present**
Asociación de Estudiantes de Matemáticas (AeMAT)	**2019-2020**
Senzala Capoeira	**2016 - 2020**

PROFESSIONAL DEVELOPMENT

Conferences Given

- Junior Technical Meeting (JTM)   **June 2022 Webinars**

  - Going Down the Cyber Security Rabbit Hole   **February 2022**
    Dr. José Ortiz Ubarri, University of Puerto Rico

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.**