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 EXPERIENCE

APN Functions, and Classifying 2-Error-Correcting Cyclic Codes
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
University of Puerto Rico **August 2022 - Present**

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

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.**