

# ALEC S. ZABEL-MENA

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## EDUCATION

**Universtiy of Puerto Rico**, at Río Piedras  
*Master of Science in Pure Mathematics*

August 2022 – December 2025 (Expected)

**Universtiy of Puerto Rico**, at Río Piedras  
*Bachelor of Science in Pure Mathematics*  
*Minor in Cybersecurity*

August 2016 – June 2022

## CAREER OBJECTIVE

To become an academic researcher and professor. Aiming to research both pure and applied mathematics; specifically research in algebraic geometry, coding theory, and other areas of discrete mathematics.

## RESEARCH INTERESTS

- Commutative Algebra
- Algebraic Geometry
- Finite Fields
- Graph theory, and Combinatorics
- Matroid theory
- Category Theory and Type Theory

## PUBLICATIONS

1. Agrinoni, C.A., Janwa, H., Zabel-Mena, A.S. *Absolute Irreducibility of Generalized Trinomials Defined by APN Functions of The Form  $g(x) = x^{2^e} + h(x)$  over  $\mathbb{F}_{2^s}$* . Springer Proceedings in Mathematics & Statistics, (To be submitted). 2025.

## TALKS, SEMINARS, AND COLLOQUIUMS

1. Zabel-Mena, A.S., Janwa, H. Agrinoni, C.A. *Absolute Irreducibility of Generalized Trinomials Defined by APN Functions of The Form  $g(x) = x^i + h(x)$  over  $\mathbb{F}_{2^s}$*  (Contributed Talk). 56<sup>th</sup> Southeastern International Conference on Combinatorics, Graph Theory, & Computing (SEICCGTC), Boca Raton, Florida. 2025.
2. Zabel-Mena, A.S., Janwa, H. Agrinoni, C.A. *Absolute Irreducibility of Generalized Trinomials Defined by APN Functions of The Form  $g(x) = x^i + h(x)$  over  $\mathbb{F}_{2^s}$*  (Contributed Talk). 40<sup>th</sup> Seminario Interuniversitario de Investigación en Ciencias Matemáticas (SIDIM), Ponce P.R. 2025.
3. Zabel-Mena, A.S., Janwa, H. Agrinoni, C.A. *An Efficient Implementation and Analysis Of Zeta Functions Of APN Curves and Their Protograph LDPC Codes* (Contributed Talk). 39<sup>th</sup> Seminario Interuniversitario de Investigación en Ciencias Matemáticas (SIDIM), Humacao P.R. 2024.
4. Zabel-Mena, A.S., Janwa, H. Agrinoni, C.A. *An Efficient Implementation and Analysis Of Zeta Functions Of APN Curves and Their Protograph LDPC Codes* (Poster Session). Forward Research and Innovation Summit, San Juan P.R. 2023.

## GRANTS AND AWARDS

**PR Space Grant Fellowship and Scholarship Program**, NASA  
Grant No. 80NSSC20M0052

August 2024 – May 2025

**Research Assitanship**, NASA  
Grant No. 80NSSC20M0052

January 2024 – May 2024

**Research Assitanship**, NASA  
Grant No. 80NSSC20M0052

August 2023 – December 2023

## TEACHING

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<b>Proyecto Tutorías DECEP</b> University of Puerto Rico, Río Piedras Mathematics tutor	2020-2021
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.	
<b>Self-Employed</b> Mathematics tutor	2019-2021
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.	

## AFFILIATIONS

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<b>Consejo General de Estudiantes (UPRRP)</b> Representante ante el Consejo de Estudios Graduados e Investigación	August 2024 – May 2025
<b>Consejo de Estudiantes de Ciencias Naturales (UPRRP)</b> Representante ante el Decanato de Estudios Graduados e Investigación	August 2024 – May 2025
<b>Asociación Estudiantil de Matemáticas (AeMAT)</b> Treasurer Post yet to be assumed.	2019 – Present August 2025 – May 2026
Treasurer	August 2022 – May 2024
<b>Asociación de Estudiantes de Ciencias de Computos (AECC)</b>	2019 – Present
<b>Lembrança Negra Capoeira</b> Corda Crua-Verde	2017 – 2019
<b>Senzala Capoeira (Sou Capoeira)</b> Corda Crua-Laranja	2019 – Present

## SKILLS

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<b>Languages</b>
English
Spanish
Portuguese
<b>Software</b>
L <sup>A</sup> T <sub>E</sub> X
C programming

Python programming language

SAGE mathematics Software

linux

nix