

Contact Information

Mathematical Sciences Building, Office 609
Department of Mathematics, Purdue University

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🔗 ejpaboncanceled.github.io

Education & Academic Background

Doctor of Philosophy in Mathematics

Purdue University, West Lafayette, Indiana

Expected June 2029

Bachelor of Science in Pure Mathematics (*Magna Cum Laude*)

June 2023

Minor in Applied Mathematics for Science and Engineering

University of Puerto Rico, Mayagüez Campus (UPRM), Mayagüez, Puerto Rico

Research Experience

Research Intern in Generative AI

May 2023–August 2023

MIT Lincoln Laboratory Summer Research Program (GEM Fellowship Employer Sponsor)

Group 39, Division 3, MIT Lincoln Laboratory, Massachusetts Institute of Technology

Unsupervised Network-Based behavior Inference from human Action Sequences (UNBIAS)

Supervised by: Dr. Sam Polk & Dr. Mabel Ramírez, MIT Lincoln Laboratory

- Developed mathematical algorithms for autoencoders with LSTM architecture.
- Identified the autoencoder that minimized the loss function.
- Optimized silhouette score and utilized K-medoids, PCA and other clustering techniques for encoded space analysis.

Research Assistant in Number Theory

August 2019–December 2022

Puerto Rico Louis Stokes Alliance for Minority Participation

Department of Mathematical Sciences, University of Puerto Rico, Mayagüez Campus

Properties of $\tau_{(n)}$ -primes

Supervised by: Prof. Reyes M. Ortiz Albino, University of Puerto Rico at Mayagüez

- Research based on the theory of generalized factorizations in integral domains.
- Generalized the notion of complete residue systems for $\tau_{(2)}$ -primes, $\tau_{(3)}$ -primes and $\tau_{(6)}$ -primes.
- Extended the Euler totient function to the notion of equivalence classes modulo a $\tau_{(n)}$ -prime.

Research Assistant in Combinatorics

June 2022–August 2022

Summer@ICERM 2022: Computational Combinatorics

Institute for Computational and Experimental Research in Mathematics, Brown University

Permutation Invariant Parking Assortments

Supervised by: Prof. Pamela E. Harris, University of Wisconsin-Milwaukee

- Enumerative Combinatorics research focused on the study of generalizations of parking functions.
- Characterized when the car length vector \vec{q} is minimally invariant (the case when the all-ones sequence is the only invariant parking assortment).
- Characterized the form of the family of 2-tuple and 3-tuple parking assortments.

Research Assistant in Algebraic Coding Theory

June 2021–August 2021

NSF REU in Combinatorics, Probability and Algebraic Coding Theory

East Tennessee State University & University of Puerto Rico at Ponce

Improving the Dimension Bound of Hermitian-Lifted Codes

Supervised by: Prof. Fernando Piñero González, University of Puerto Rico at Ponce

- Algebraic Geometry research focused on the study of Hermitian-Lifted Codes.
- Developed a formula that improved the counting of good recoverable functions.
- Improved the bound rate of the code from 0.007 to 0.1.

Improving the Minimum Distance Bound of Trace Goppa Codes

Supervised by: Prof. Fernando Piñero González, University of Puerto Rico at Ponce

- Finite Fields research focused on the development of Goppa codes.
 - Worked with Goppa matrices by using quadratic extensions and cubic extensions over finite fields.
 - Improved the minimum distance bound of norm and trace Goppa polynomials.
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Projects

Project in Mathematical Optimization applied to Biotechnology

June 2023–July 2023

MIT Lincoln Laboratory Summer Research Program

2023 MIT Lincoln Laboratory Intern Innovative Idea Challenge (I³C)

SKINS: Skin-growth boosting and Intra-absorptive Solution bandages

Supervised by: Ryan Burrow and Ashok Kumar, MIT Lincoln Laboratory

- Biotech research proposal submitted to the 2023 edition of the MIT Lincoln Laboratory I³C.
 - Proposed a hydrogel bandage with accelerated wound healing and anti-scarring properties based on the combination of Sodium Carboxymethyl Cellulose, BMM and Aloe vera.
 - Estimated the materials cost and approximate bandage size to optimize the medicine amount.
 - Analyzed statistics and compared performance of materials with standard antibiotics.
 - Ranked Top 3 out of a total of 28 submitted proposals in the competition.
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Awards and Merits

Fellowships, Scholarships and Prizes

2023 National GEM Consortium PhD Science Fellowship

August 2023–May 2024

- Purdue University Department of Mathematics Sponsorship

August 2023–May 2024

- MIT Lincoln Laboratory Employer Sponsorship

December 2022

2023 MIT Lincoln Laboratory I³C 3rd Place Research Proposal Prize

July 2023

2022 Evertec Inc. STEM Scholarship

October 2022

Puerto Rico-Louis Stokes Alliance for Minority Participation Scholarship

August 2019–December 2022

Merits and Honors

2023 Ford Foundation Predoctoral Fellowship Honorable Mention

March 2023

2022 Hispanic Scholarship Fund Scholar

June 2022

National Math Alliance Predoctoral Scholar

November 2021

UPRM Faculty of Arts and Sciences Honor Roll

August 2018–May 2023

National Trig-Star Math Competition, 16th Overall Finalist

June 2017

Eagle Scout Rank, with 2 Silver Palms

May 2017

Papers and Articles

- [1] E.J. Pabon-Cancel and R.M. Ortiz-Albino. Properties of $\tau_{(n)}$ -primes. *Currently in progress*.
- [2] S. Polk, E.J. Pabon-Cancel, R. Paleja, K. Chestnut-Chang, R. Jensen and M. Ramirez. Unsupervised Network-Based behavior Inference from human Action Sequences (UNBIAS). *To appear in Proceedings of IEEE Conference on Games 2024*.
- [3] A. Allen, E.J. Pabon-Cancel, F. Piñero-Gonzalez and L. Polanco. Improving the Dimension Bound of Hermitian-Lifted Codes. arXiv: <https://arxiv.org/abs/2302.01557>
- [4] D. Chen, P.E. Harris, J. Carlos Martinez Mori, E.J. Pabon-Cancel and G. Sargent. Permutation Invariant Parking Assortments. *Enumerative Combinatorics and Applications*, **4:1**, 1-25 (2024). #S2R4.
- [5] P.E. Harris, Z. Markman, L. Martinez, A. Mock, E.J. Pabon-Cancel, A. Verga, and S. Wang. A Model for a One-Hour Workshop on Mentoring. *MAA Focus*, **43**(1), 18-21 (2023).
- [6] I. Byrne, N. Dodson, R. Lynch, E.J. Pabon-Cancel and F. Piñero-Gonzalez. Improving the minimum distance bound of Trace Goppa codes. *Designs, Codes and Cryptography*. **91**, 2649–2663 (2023).

Teaching and Grading Experience

- MA 13900: Mathematics for Elementary Teachers III (Grading)

June 2024 – August 2024

Poster Sessions and Presentations

- 2023 MIT Lincoln Lab Intern Innovative Idea Challenge 14, 21 July, 2023
MIT Lincoln Laboratory Auditorium Lexington, Massachusetts
Poster: Skin-Absorptive and Skin-Growth Boosting Bandages
Presentation: SKINS: Skin-growth boosting and Intra-absorptive Solution Bandages
- Combinatorics and Coding Theory in the Tropics (UPR-Ponce) 7 July 2023
Invited REU Seminar Talk: Graduate School: Application tips and advice Virtual Seminar
- 2023 ACS Junior Technical Meeting-Puerto Rico Interdisciplinary Scientific Meeting 29 April, 2023
University of Puerto Rico at Bayamón, Sponsored by PR-LSAMP Bayamón, Puerto Rico
Presentation: Properties of $\tau_{(n)}$ -primes
- 38th Interuniversity Mathematical Sciences Research Seminar 24-25 February, 2023
University of Puerto Rico, Mayagüez Campus Mayagüez, Puerto Rico
Presentation: Permutation Invariant Parking Assortments
- 2023 AAAS Emerging Researchers National Conference in STEM 9-11 February, 2023
Omni Shoreham Hotel Washington, District of Columbia
Poster: Permutation Invariant Parking Functions with cars of assorted lengths
- Joint Mathematics Meetings 2023 4-7 January, 2023
John B. Hynes Veterans Memorial Convention Center Boston, Massachusetts
Poster: Permutation Invariant Parking Functions with cars of assorted lengths
Presentation: Permutation Invariant Parking Functions with Cars of Arbitrary Lengths
- 2022 SACNAS National Diversity in STEM Conference 27-29 October, 2022
Pedro Roselló Convention Center San Juan, Puerto Rico
Poster: The Study of $\tau_{(n)}$ -primes
- 2022 Gulf Coast Undergraduate Research Symposium 8-9 October, 2022
William Marsh Rice University Houston, Texas
Presentation: Properties of $\tau_{(n)}$ -primes
- Summer@ICERM 2022: Computational Combinatorics 3 August, 2023
Institute for Computational and Experimental Research in Mathematics Providence, Rhode Island
Presentation: On Permutation-Invariant Parking Sequences
- 2022 ACS Junior Technical Meeting-Puerto Rico Interdisciplinary Scientific Meeting 9 April, 2022
University of Puerto Rico at Humacao, Sponsored by PR-LSAMP Humacao, Puerto Rico
Presentation: The Study of $\tau_{(n)}$ -primes
- Joint Mathematics Meetings 2022 (Virtual) 6-9 April, 2022
Poster: Improving Bounds of Hermitian-Lifted Codes
- 37th Interuniversity Mathematical Sciences Research Seminar (Virtual) 25-26 February, 2022
Poster: The Study of $\tau_{(n)}$ -primes
Presentation: Improving Bounds of Hermitian-Lifted Codes
- 2021 Math REU Conference@Clemson University (Virtual) 19 July, 2021
Presentation: Improved Hermitian-Lifted Codes

- 2021 ACS Junior Technical Meeting-Puerto Rico Interdisciplinary Scientific Meeting 23-24 April, 2021
Sponsored by PR-LSAMP (Virtual)
Presentation: The Study of $\tau_{(n)}$ -atoms
- 35th Interuniversity Mathematical Sciences Research Seminar 6-7 March, 2020
University of Puerto Rico at Cayey
Poster: The Study of $\tau_{(n)}$ -atoms Cayey, Puerto Rico

Workshops, Semester Mini-Courses and Summer Schools

Preliminary Arizona Winter School 2023: Elliptic Curves and Abelian Varieties **Virtual Course**
Topics: Abelian varieties over finite fields October 2023–November 2023

Organizers: Southwest Center for Arithmetic Geometry, University of Arizona

Preliminary Arizona Winter School 2022: Heights and Model Theory **Virtual Course**
Topics: Heights in Diophantine geometry October 2022–November 2022

Organizers: Southwest Center for Arithmetic Geometry, University of Arizona

MSRI Modern Math Workshop 2022 **San Juan, PR**
Topics: Mathematical Modeling and Data Science October 2022

Organizers: Hélène Barcelo (MSRI), Christian Ratsch (IPAM), Ulrica Wilson (ICERM)

Thematic Program in p-adic L-functions and Eigenvarieties **Notre Dame, IN**
Topics: Modular Forms and Elliptic Curves (Undergraduate Summer School) May 2022–June 2022

Organizers: A. Jorza, C. Raicu, E. O’Dorney (Center for Mathematics, University of Notre Dame)

Algebraic Coding Theory Workshop **Johnson City, TN**
Topics: Finite Fields and Projective Geometry June 2021

Organizer: Fernando Piñero González (University of Puerto Rico at Ponce)

Skills and Other Information

Programming: Python, SAGEMath, Julia, C++, MATLAB | Software: Git, L^AT_EX

Languages: English (fluent) and Spanish (native)

Professional Memberships

- American Mathematical Society Member since October 2023
- National Eagle Scout Association Member since June 2017

Student Associations

PythagorUM **Mayagüez, PR**
Co-founder & Vice-President August 2022–December 2022

- Served as co-founder and Vice-President for the mathematics and computer science student association. This association has the purpose to promote research in mathematics, as well as related fields of STEM, through professional development workshops and research colloquia.
- Coordinated professional development workshops and semester activities.

Society of Physics Students, UPRM Chapter **Mayagüez, PR**
Committee Assistant August 2018–December 2022

- Served as a Demonstration Committee assistant in 2 physics phenomena presentations. The presentations were for an audience of 20+ elementary school students to motivate them to study science. Served as a Sales Committee assistant in chapter food sales events.