



CONTACT INFORMATION	<p>Mathematical Sciences Building, Office 609 Department of Mathematics, Purdue University</p>	<p> epabonca@purdue.edu  epaboncancel.github.io</p>
EDUCATION & ACADEMIC BACKGROUND	<p>Doctor of Philosophy in Mathematics <i>Purdue University</i>, West Lafayette, Indiana</p> <p>Bachelor of Science in Pure Mathematics (<i>Magna Cum Laude</i>) Curricular Sequence in Applied Mathematics for Science and Engineering <i>University of Puerto Rico, Mayagüez Campus (UPRM)</i>, Mayagüez, Puerto Rico</p> <p>High School Diploma (<i>Highest Honors</i>) Juan Quirindongo Morell High School, Vega Baja, Puerto Rico</p>	<p>Starting August 2023</p> <p>June 2023</p> <p>June 2019</p>
RESEARCH POSITIONS	<p>Research Intern in Machine Learning and Generative AI MIT Lincoln Laboratory Summer Research Program GEM Fellowship Employer Sponsor Group 39, Division 3, <i>MIT Lincoln Laboratory</i>, Massachusetts Institute of Technology <i>Unsupervised Machine Learning via LSTM Autoencoders</i> Supervised by: Dr. Sam Polk & Dr. Mabel Ramírez, MIT Lincoln Laboratory Participants: Eric J. Pabón Cancel</p> <ul style="list-style-type: none"> Machine Learning and Mathematical Algorithms research project focused on Long Short-Term Memory autoencoders. I identified the autoencoder that both minimized the reconstruction loss and learned relevant information of encoded sequences. <p>Research Assistant in Number Theory Puerto Rico Louis Stokes Alliance for Minority Participation Department of Mathematical Sciences, University of Puerto Rico, Mayagüez Campus <i>Properties of $\tau_{(n)}$-primes</i> Supervised by: Prof. Reyes M. Ortiz Albino, University of Puerto Rico at Mayagüez Participants: Eric J. Pabón Cancel</p> <ul style="list-style-type: none"> Algebra and Number Theory research based on the theory of generalized factorizations in integral domains. I generalized the notion of complete residue systems for $\tau_{(2)}$-primes, $\tau_{(3)}$-primes and $\tau_{(6)}$-primes. I extended the Euler totient function to the notion of equivalence classes modulo a $\tau_{(n)}$-prime. <p>Research Assistant in Combinatorics <i>Summer@ICERM 2022: Computational Combinatorics</i> <i>Institute for Computational and Experimental Research in Mathematics</i>, Brown University <i>Permutation Invariant Parking Assortments</i> Supervised by: Prof. Pamela E. Harris, University of Wisconsin-Milwaukee Participants: Douglas Chen, J. Carlos Martinez Mori, Eric J. Pabón-Cancel, Gabriel Sargent</p> <ul style="list-style-type: none"> Enumerative Combinatorics research focused on the study of generalizations of parking functions. Characterized when the car length vector \vec{y} is minimally invariant (when (1^n) is the only invariant parking sequence), and characterized the form of the 2-tuple and 3-tuple parking sequences. <p>Research Assistant in Algebraic Coding Theory <i>NSF REU in Combinatorics, Probability and Algebraic Coding Theory</i> East Tennessee State University & University of Puerto Rico at Ponce <i>Improving the Dimension Bound of Hermitian-Lifted Codes</i> Supervised by: Prof. Fernando Piñero González, University of Puerto Rico at Ponce Participants: Austin Allen, Eric J. Pabón-Cancel, Lesley Polanco</p> <ul style="list-style-type: none"> Algebraic Geometry research focused on locally recoverable codes from elements that arise from regions of the normal basis of the Hermitian Curve. Developed a formula that improved the counting of good recoverable functions. Improved the bound rate of the code from 0.7% to 10%. 	<p>May 2023–August 2023</p> <p>August 2019–December 2022</p> <p>June 2022–August 2022</p> <p>June 2021–August 2021</p>

Improving the Minimum Distance Bound of Trace Goppa Codes

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

Participants: Isabel Byrne, Natalie Dodson, Eric J. Pabón Cancel, Ryan Lynch

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

PROJECTS	Project in Optimization applied to Biochemistry MIT Lincoln Laboratory Summer Research Program 2023 MIT Lincoln Laboratory Intern Innovative Idea Challenge (I ³ C) <i>SKINS: Skin-growth boosting and Intra-absorptive Solution bandages</i> Supervised by: Ryan Burrow and Ashok Kumar, MIT Lincoln Laboratory Participants: Samuel Brown, Eric J. Pabón-Cancel, Daniel Reyes <ul style="list-style-type: none">• Chemistry and Biotech research project proposal of the 2023 edition of the MIT Lincoln Laboratory Intern Innovative Idea Challenge, based on the development of a hydrogel bandage with accelerated healing and anti-scarring properties. My team proposed a combination of Sodium Carboxymethyl Cellulose, BMM and Aloe vera. I focused on estimating the materials cost, as well as establishing an approximate size of the bandage to optimize the amount of medicine that will be applied to the product. The project won 3rd Place, ranked Top 3 out of 28 submitted proposals in the competition.	June 2023–July 2023
SCHOLARSHIPS, FELLOWSHIPS AND PRIZES	2023 National GEM Consortium PhD Science Fellowship, \$16,000 • Purdue University Department of Mathematics Sponsorship, \$11,700 • MIT Lincoln Laboratory Employer Sponsorship 2023 MIT Lincoln Laboratory I ³ C 3 rd Place Prize, \$1,000 2022 Evertec Inc. Scholarship, \$1,000.00 Puerto Rico-LSAMP Scholarship, \$4,800.00 UPRM Musical Talent Scholarship, \$800.00	August 2023–May 2024 August 2023–May 2024 December 2022 July 2023 October 2022 August 2019–December 2022 February 2020
TRAVEL FUNDING	2023 GEM Annual Board Meeting and Conference Travel Grant 2023 Emerging Researchers National Conference in STEM Travel Grant 2022 Field of Dreams Math Alliance Conference Travel Scholarship 2022 Puerto Rico-LSAMP Travel Grant	September 2023 February 2023 November 2022 October 2022
AWARDS AND MERITS	2023 MIT Lincoln Laboratory I ³ C 3 rd Place Research Proposal Winner 2023 Ford Foundation Predoctoral Fellowship Honorable Mention 2022 Hispanic Scholarship Fund Scholar National Math Alliance Predoctoral Scholar UPRM Faculty of Arts and Sciences Honor Roll National Trig-Star Math Competition, 16th Overall Finalist Eagle Scout Rank, with 2 Silver Palms	July 2023 March 2023 June 2022 November 2021-May 2023 August 2018–May 2023 June 2017 May 2017
PREPRINTS AND PAPERS	[1] <u>E.J. Pabon-Cancel</u> and R.M. Ortiz-Albino. Properties of $\tau_{(n)}$ -primes. (In progress). [2] A. Allen, <u>E.J. Pabon-Cancel</u> , L. Polanco and F. Piñero-Gonzalez. Improving the Dimension Bound of Hermitian-Lifted Codes. (Submitted). <i>Submitted to Designs, Codes and Cryptography</i> . arXiv: https://arxiv.org/abs/2302.01557 . [3] D. Chen, P.E. Harris, J. Carlos Martinez Mori, <u>E.J. Pabon-Cancel</u> and G. Sargent. Permutation Invariant Parking Assortments. <i>Enumerative Combinatorics and Applications</i> , 4:1 , 1-25 (2024). #S2R4. arXiv: https://arxiv.org/abs/2211.01063 .	

- [4] 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).
arXiv: <https://arxiv.org/abs/2201.03741>

CONTRIBUTIONS TO THE PROFESSION	[1] P.E. Harris, Z. Markman, L. Martinez, A. Mock, <u>E.J. Pabón-Cancel</u> , A. Verga, and S. Wang. A Model for a One-Hour Workshop on Mentoring. <i>MAA Focus</i> , 43 (1), 18-21 (2023).	
INVITED TALKS	<ul style="list-style-type: none"> Combinatorics and Coding Theory in the Tropics (UPR-Ponce) <i>REU Seminar: Graduate School: Application tips and advice</i> 	Virtual Seminar July 2023
POSTERS AND PRESENTATIONS	<ul style="list-style-type: none"> 2023 MIT Lincoln Lab Intern Innovative Idea Challenge <i>SKINS: Skin-growth boosting and Intra-absorptive Solution Bandages Presentation</i> 2023 MIT Lincoln Lab Intern Innovative Idea Challenge <i>Skin-Absorptive and Skin-Growth Boosting Bandages Poster</i> 2023 JTM-PRISM <i>Properties of $\tau_{(n)}$-primes Presentation</i> 38th Interuniversity Mathematical Sciences Research Seminar <i>Permutation Invariant Parking Assortments Presentation</i> 2023 AAAS Emerging Researchers National Conference in STEM <i>Permutation Invariant Parking Functions with cars of assorted lengths Poster</i> Joint Mathematics Meetings 2023 <i>Permutation Invariant Parking Functions with cars of assorted lengths Poster</i> <i>Permutation Invariant Parking Functions with Cars of Arbitrary Lengths Presentation</i> 2022 SACNAS National Diversity in STEM Conference <i>The Study of $\tau_{(n)}$-primes Poster</i> 2022 Gulf Coast Undergraduate Research Symposium <i>Properties of $\tau_{(n)}$-primes Presentation</i> Summer@ICERM 2022: Computational Combinatorics <i>On Permutation-Invariant Parking Sequences Presentation</i> 2022 JTM-PRISM <i>The Study of $\tau_{(n)}$-primes Presentation</i> Joint Mathematics Meetings 2022 <i>Improving Bounds of Hermitian-Lifted Codes Poster</i> 37th Interuniversity Mathematical Sciences Research Seminar <i>Improving Bounds of Hermitian-Lifted Codes Presentation</i> <i>The Study of $\tau_{(n)}$-primes Poster</i> 2021 Math REU Conference@Clemson University <i>Improved Hermitian-Lifted Codes Presentation</i> 2021 JTM-PRISM <i>The Study of $\tau_{(n)}$-atoms Presentation</i> 35th Interuniversity Mathematical Sciences Research Seminar <i>The Study of $\tau_{(n)}$-atoms Poster</i> 	Lexington, MA July 2023 Lexington, MA July 2023 Bayamón, PR April 2023 Mayagüez, PR February 2023 Washington, DC February 2023 Boston, MA January 2023 San Juan, PR October 2022 Houston, TX October 2022 Providence, RI August 2022 Humacao, PR April 2022 Virtual Presentation April 2022 Virtual Presentation February 2022 Virtual Presentation July 2021 Virtual Presentation April 2021 Cayey, PR March 2020

CONFERENCES	• 2023 GEM Annual Board Meeting and Conference <i>Sheraton Downtown Philadelphia</i>	14-16 September, 2023 Philadelphia, Pennsylvania
	• 2023 Junior Technical Meeting-PR Interdisciplinary Scientific Meeting <i>University of Puerto Rico at Bayamón</i>	29 April, 2023 Bayamón, Puerto Rico
	• 38th Interuniversity Mathematical Sciences Research Seminar <i>University of Puerto Rico, Mayagüez Campus</i>	24-25 February, 2023 Mayagüez, Puerto Rico
	• 2023 AAAS Emerging Researchers National Conference in STEM <i>Omni Shoreham Hotel</i>	9-11 February, 2023 Washington, District of Columbia
	• Joint Mathematics Meetings 2023 <i>John B. Hynes Veterans Memorial Convention Center</i>	4-7 January, 2023 Boston, Massachusetts
	• 2022 Field of Dreams Conference of The National Math Alliance <i>The University of Minnesota-Twin Cities</i>	4-6 November, 2022 Minneapolis, Minnesota
	• 2022 SACNAS National Diversity in STEM Conference <i>Pedro Roselló Convention Center</i>	27-29 October, 2022 San Juan, Puerto Rico
	• 2022 Gulf Coast Undergraduate Research Symposium <i>William Marsh Rice University</i>	8-9 October, 2022 Houston, Texas
	• 2022 Junior Technical Meeting-PR Interdisciplinary Scientific Meeting <i>University of Puerto Rico at Humacao</i>	9 April, 2022 Humacao, Puerto Rico
	• Joint Mathematics Meetings 2022 <i>Zoom Conference</i>	6-9 April, 2022
	• 37th Interuniversity Mathematical Sciences Research Seminar <i>Zoom Conference</i>	25-26 February, 2022
	• 2021 Math REU Conference@Clemson University <i>Zoom Conference</i>	19 July, 2021
	• 2021 Junior Technical Meeting-PR Interdisciplinary Scientific Meeting <i>Virtual Conference, sponsored by Puerto Rico Louis Stokes Alliance for Minority Participation</i>	23-24 April, 2021
	• 35th Interuniversity Mathematical Sciences Research Seminar <i>University of Puerto Rico at Cayey</i>	6-7 March, 2020 Cayey, Puerto Rico

WORKSHOPS AND MINI-COURSES	Preliminary Arizona Winter School 2023: Elliptic Curves and Abelian Varieties	Virtual Course
	<i>Topics: Abelian varieties over finite fields</i>	October 2023–November 2023
	<i>Organizers: Southwest Center for Arithmetic Geometry, University of Arizona</i>	
	Inclusion In Innovation Initiative (I4) PEP Talk Workshop	Virtual Workshop
	<i>Topics: Pathways to Entrepreneurship in STEM</i> <i>Organizers: Camille Martin (speaker), The National GEM Consortium and NSF I-Corps</i>	August 2023
	Inclusion In Innovation Initiative (I4) GEMpreneur Workshop	Virtual Workshop
	<i>Topics: Introduction to the NSF I-Corps program</i> <i>Organizers: The National GEM Consortium and NSF I-Corps</i>	June 2023
	Preliminary Arizona Winter School 2022: Heights and Model Theory	Virtual Course
	<i>Topics: Heights in Diophantine geometry</i> <i>Organizers: Southwest Center for Arithmetic Geometry, University of Arizona</i>	October 2022–November 2022

MSRI Modern Math Workshop 2022*Topics: Mathematical Modeling and Data Science**Organizers: Hélène Barcelo (MSRI), Christian Ratsch (IPAM), Ulrica Wilson (ICERM)***San Juan, PR**

October 2022

Thematic Program in p-adic L-functions and Eigenvarieties*Topics: Modular Forms and Elliptic Curves (Undergraduate Summer School)**Organizers: A. Jorza, C. Raicu, E. O'Dorney (Center for Mathematics, University of Notre Dame)***Notre Dame, IN**

May 2022–June 2022

2022 NSF/STEM: Fellowships Application Workshop*Topics: Grants and Fellowships Workshop**Organizers: Mike Westrate (Villanova University)***Rio Piedras, PR**

May 2022

Algebraic Coding Theory Workshop*Topics: Finite Fields and Projective Geometry**Organizer: Fernando Piñero González (University of Puerto Rico at Ponce)***Johnson City, TN**

June 2021

**SKILLS AND
OTHER
INFORMATION**

Programming: Python, SAGEMath, Julia, C++, MATLAB

Software: Git, Markdown, LaTeX

Languages: English (fluent) and Spanish (native)

Clearance Status: Secret Level Clearance

Professional Memberships:

- SACNAS Member

since March 2022

**GRADUATE
COURSEWORK****Purdue University**

MA 55300: Introduction to Abstract Algebra I

August 2023–December 2023

MA 53000: Functions of a Complex Variable I

August 2023–December 2023

University of Puerto Rico, Mayagüez Campus

MATE 6101: Number Theory I

August 2022–December 2022

MATE 5150: Linear Algebra

January 2021–May 2021

**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.

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.

Hermanidad Colegial de Avivamiento**Mayagüez, PR***Committee Assistant*

August 2018–December 2022

- Served as percussion musician for Hermanidad Colegial de Avivamiento. Went on a mission to the municipality of Vieques, Puerto Rico in the winter of 2019, and helped distribute donated food, clothing and gifts for people in need.

Acting and Music**Mayagüez, PR***Acting: Theater Presentations and Roles*

February 2019–December 2022

- The Physics Movie (Nicholas Flamel, secondary character) (Animated film in production)
- El Muerto (Sabás Honoré, secondary character) (August 2019)
- The Physics Show (Michael Faraday, secondary character) (March 2019)

Music: Alma Latina UPRM

February 2020–March 2020

- Worked as percussion musician and staff for the Latin jazz and salsa music group Alma Latina at UPRM.

REFERENCES Available upon request