Eric J. Pabón-Cancel

Curriculum Vitae

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Education

University of Puerto Rico, Mayagüez Campus (UPRM) — **Mayagüez, PR**
Bachelor of Science in Pure Mathematics — May 2023
Curricular Sequence in Applied Mathematics
General GPA: 3.59 // 4.00 // Major GPA: 3.55 // 4.00

Relevant Courses

Pure Mathematics: Intro. to Foundations of Mathematics, Intro. to Algebraic Structures, Ordinary Differential Equations, Complex Variables with Applications, Fundamentals of Mathematical Logic, Advanced Calculus I & II, Point-Set Topology, Linear Algebra (Graduate), Number Theory I (Graduate), Arithmetic Geometry (Graduate Mini-Course)

Applied Mathematics: Intro. to Computer Programming I (C++), Mathematical Statistics I, Partial Differential Equations, Numerical Analysis I

Skills

Software: C++ (Intermediate), MATLAB (Beginner), SAGEMath (Intermediate), LaTeX (Advanced)
Languages: Spanish (Native), English (Native/Fluent)

Research Experience

Undergraduate Research in Pure Mathematics at UPRM — **Mayagüez, PR**
Properties of $\tau_{(n)}$-primes — August 2022 - May 2023
Advisor: Reyes M. Ortiz-Albino // Participants: Eric J. Pabón-Cancel

- Development of more theorems related to the distribution of the $\tau_{(n)}$-primes. Exploration of these elements with algebraic and analytic strategies. Formal approach for the symmetric behavior related to the distribution of the $\tau_{(n)}$-primes modulo a $\tau_{(n)}$-prime.

The Study of $\tau_{(n)}$-primes — August 2021 - May 2022
Advisor: Reyes M. Ortiz-Albino // Participants: Eric J. Pabón-Cancel

- Continuation of the study of $\tau_{(n)}$-prime elements, in particular the investigation of properties for other values of n. Developed an extension of Euler's totient function. Computational results made us speculate a symmetric behavior in the distribution of the elements in each equivalence class modulo a $\tau_{(n)}$-prime.

The Study of $\tau_{(n)}$-atoms — August 2019 - May 2020
Advisor: Reyes M. Ortiz-Albino // Participants: Eric J. Pabón-Cancel

- Project based on Number Theory and Algebra with the purpose to characterize the properties and distribution of the $\tau_{(n)}$-atoms and $\tau_{(n)}$-primes. We characterized the distribution of $\tau_{(2)}$-primes and $\tau_{(3)}$-primes. This characterization led to generalizations of known results in the elementary theory.

Summer@ICERM 2022: Computational Combinatorics — **Providence, RI**
Permutation Invariant Parking Funtions with cars of assorted lenghts — June 2022 - August 2022
Advisor: Pamela E. Harris // Participants: D. Chen, G. Sargent, E. J. Pabón-Cancel

- Computational Combinatorics project, focused on the study of Permutation Invariant Parking Sequences. We developed the sufficient conditions for a preference sequence $\vec{x}$ to be a parking sequence. We also 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 parking sequences and 3-tuple parking sequences.

NSF-REU in Probability, Combinatorics and Coding Theory — **Johnson City, TN**
Improving Bounds of Hermitian-Lifted Codes with their Automorphism Group — June 2021 - August 2021
Advisor: Fernando Piñero // Participants: Lesley Polanco, Eric J. Pabón-Cancel

- Algebraic Geometry Coding Theory project focused on the development of locally recoverable codes from elements that arise from regions of the normal basis of the Hermitian Curve. We used the automorphism group to characterize the good monomials and functions that reduce nicely. We improved the counting of good functions that have a nice reduction.

Improving the Minimum Distance Bound of Trace Goppa Codes   June 2021 - August 2021
Advisor: F. Piñero // Participants: I. Byrne, N. Dodson, R. Lynch, E.J. Pabón-Cancel

- Finite Fields Coding Theory project focused on the development of codes using Goppa matrices and polynomials. Development of codes using the trace over a finite field using quadratic extensions and cubic extensions. We improved the minimum distance bound of trace Goppa Polynomials, and permuted trace Goppa Polynomials.

Papers and Articles

1. Pabón-Cancel, Eric, Oriz-Albino, Reyes. "Properties of $\tau_{(n)}$-primes". (In progress).

2. Chen, Douglas et. al. "Toward a Characterization of Invariant Parking Sequences". (Editing for submission).

3. Allen, Austin, et. al. "Improving Bounds of Hermitian-Lifted Codes". (Editing for submission).

4. Byrne, Isabel, et al. "Improving the Minimum Distance Bound of Trace Goppa Codes." *ArXiv.org*, ArXiv.org, 11 Jan. 2022, https://arxiv.org/abs/2201.03741. (Submitted).

Writings and Contributions

1. A how to guide to a one-hour workshop on mentoring, with Pamela E. Harris, Zoe Markman, Lucy Martinez, Ava Mock, Eric J. Pabón Cancel, Amanda Verga, and Susan Wang. (Submitted).

Presentations

1. **Joint Mathematics Meetings 2023**   **Boston, MA**
   Permutation Invariant Parking Functions with cars of assorted lengths Project Poster   January 2023
   Permutation Invariant Parking Functions with cars of Arbitrary Lengths Presentation

2. **SACNAS NDiSTEM Conference**   **San Juan, PR**
   The Study of $\tau_{(n)}$-primes Project Poster   October 2022

3. **Gulf Coast Undergraduate Research Symposium**   **Houston, TX**
   Properties of $\tau_{(n)}$-primes Presentation   October 2022

4. **Summer@ICERM 2022: Computational Combinatorics**   **Providence, RI**
   On Permutation-Invariant Parking Sequences Presentation   August 2022

5. **2022 JTM-PRISM**   **Humacao, PR**
   The Study of $\tau_{(n)}$-primes Project Presentation   April 2022

6. **Joint Mathematics Meetings 2022**   **Virtual Presentation**
   Improving Bounds of Hermitian-Lifted Codes Project Poster   April 2022

7. **37th SIDIM**   **Virtual Presentation**
   Improving Bounds of Hermitian-Lifted Codes Presentation   February 2022
   The Study of $\tau_{(n)}$-primes Project Poster

8. **2021 Math REU Conference @ Clemson University**   **Virtual Presentation**
   Improved Hermitian-Lifted Codes Presentation   July 2021

9. **2021 JTM-PRISM**   **Virtual Presentation**
   The Study of $\tau_{(n)}$-atoms Presentation   April 2021

10. **35th SIDIM**   **Cayey, PR**
    The Study of $\tau_{(n)}$-atoms Project Poster   March 2020

Conferences

1. Joint Mathematics Meetings 2023   4-7 January, 2023
   John B. Hynes Veterans Memorial Convention Center, Boston, Massachusetts

2. 2022 Field of Dreams Conference   4-6 November, 2022
   The University of Minnesota-Twin Cities, Minneapolis, Minnesota

3. SACNAS National Diversity in STEM Conference   27-29 October, 2022
   Pedro Roselló Convention Center, San Juan, Puerto Rico

4. Gulf Coast Undergraduate Research Symposium   8-9 October, 2022
   Rice University, Houston, Texas

5. 2022 Junior Technical Meeting - PR Interdisciplinary Scientific Meeting   9 April, 2022
   University of Puerto Rico at Humacao, Humacao, Puerto Rico

6. Joint Mathematics Meetings 2022   6-9 April, 2022
   Zoom Conference

7. 37th Interuniversity Mathematical Sciences Research Seminar   25-26 February, 2022
   Zoom Conference, sponsored by University of Puerto Rico, Mayagüez Campus

8. 2021 Math REU Conference @ Clemson University   19 July, 2021
   Zoom Conference. Participanting Institutions:
   Clemson University, East Tennessee State University, North Carolina A&T, Elon University

9. 2021 Junior Technical Meeting - PR Interdisciplinary Scientific Meeting   23-24 April, 2021
   Virtual Conference, sponsored by Puerto Rico Louis Stokes Alliance for Minority Participation

10. 35th Interuniversity Mathematical Sciences Research Seminar   6-7 March, 2020
    University of Puerto Rico at Cayey, Cayey, Puerto Rico

Workshops and Mini-Courses

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

- Algebraic/Arithmetic Geometry graduate mini-course. In this series of lectures, we will develop the theory of heights of algebraic numbers, and present "Weil's height machine" for defining heights more generally for solutions to systems of polynomial equations in algebraic numbers. Lectures by Padmavathi Srinnivassan.

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

- This workshop will serve as the SACNAS National Diversity in STEM Conference preliminary event on the 26-27 of October at San Juan, Puerto Rico. Mini-course in data science and mathematical modeling. The 2022 Modern Math Workshop is organized by the Mathematical Sciences Research Institute.

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: Andrei Jorza, Claudiu Raicu, Evan O'Dorney (Center for Mathematics, University of Notre Dame)

- A problem-solving introduction to modular forms and elliptic curves. During the week, we received mini-courses in Algebraic Geometry, Elliptic Geometry, and Complex Analysis, and at the end we unified these fields, developing the bridge between Number Theory and Complex Analysis. Supported by the NSF.

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

- Multi-day Professional Development and Grant-Writing Workshop. Intensive training in the theory and practice of research project design, grant development, and writing successful grant and fellowship proposals. Detailed training on NSF review criteria, Intellectual Merit and Broader Impacts.

Algebraic Coding Theory Workshop   **Johnson City, TN**
Topics: Finite Fields and Projective Geometry   June 2021
Organizer: Fernando Piñero (University of Puerto Rico at Ponce)

- Coding theory workshop, presented by Prof. Fernando Piñero at East Tennessee State University to introduce students to the fundamental notions of finite fields and projective geometry. We learned how to construct a finite field, and got an introduction to visualization of algebraic objects in the projective plane.

Awards and Merits

Evertec Inc. Scholar	October 2022
National Math Alliance F-GAP Program Scholar	August 2022 - present
Hispanic Scholarship Fund Scholar	June 2022 - present
National Math Alliance Predoctoral Scholar	November 2021 - present
UPRM Faculty of Arts and Sciences Honor Roll	August 2018 - present
PR-Louis Stokes Alliance for Minority Participation Scholar	August 2019 - present
Society of Physics Students Freshman of the year	August 2018 - May 2019
National Trig-Star Math Competition 16th Overall Finalist	June 2017
Eagle Scout Rank, Scouts BSA, Boy Scouts of America	May 2017

Scholarships and Fellowships

2022 Evertec Scholarship	Amount: $1,000.00
2022-2023 PR-LSAMP Scholarship (First Semester 2022)	Amount: $800.00
2021-2022 PR-LSAMP Scholarship	Amount: $1,600.00
UPRM Musical Talent Scholarship (Second Semester 2020)	Amount: $800.00
2019-2020 PR-LSAMP Scholarship	Amount: $1,600.00

Student Associations

PythagoRUM — **Mayagüez, PR**
Co-founder & Vice-President — August 2022 - present

- Served as co-founder and currently serving as Vice-President for the mathematics and computer science student association. This entity has the purpose to promote research in mathematics, as well as related fields of STEM, through professional development workshops and research colloquia. In addition, the association is in charge of organizing math competitions throughout the school year.

Society of Physics Students, UPRM Chapter — **Mayagüez, PR**
Committee Assistant — August 2018 - May 2020

- Served as a Demonstration Committee assistant in 2 physics phenomena presentations. These presentations were general physics demonstrations related to the concepts of conservation of momentum and torque. The presentations were for an audience of elementary school students to motivate them to study science. Served as a Sales Committee assistant in multiple chapter food sales events in order to improve the chapter's office.

Professional Memberships

Society for Advancing Chicanos/Hispanics and Native Americans in Science Member
National Eagle Scout Association Member

Leadership Experience and Development

Fundación Yo Puedo, Inc. — **Manatí, PR**
Roles and Activities — January 2016 - present

- Participated in weekly activities providing food and clothing to the poor people in Manati, Puerto Rico. Created an initiative of knit hats for children suffering from cancer. Managed to recruit seven classmates for one of the major events.

Boy Scouts of America, Troop 24 — **Barceloneta, PR**
National Youth Leadership Training-2-2017 — October 2018 - November 2018

- Boy Scout course for training youth to overcome themselves and become leaders in their troop and community. Gave six lectures about leadership to a patrol of 7 people, serving as the Troop Guide of the patrol.

Order of the Arrow, Yokahu Lodge 506 — Summer 2018 - Summer 2019

- Served as counselor for the youth in two Order of the Arrow camps. Served as secretary for the Order of The Arrow Arasibo district, managing to recruit 5 new member candidates in the summer of 2018.

Boy Scouts of America, Troop 858 — **Vega Baja, PR**
National Youth Leadership Training-1-2017 — June 2017

- Served as Troop Guide for a patrol of 6 people, giving six main patrol lectures about leadership and motivation. Gave a servant leadership conference to an audience of 60+ scout youth.

Eagle Scout Service Project   March 2017 - May 2017

- Earned the Eagle Scout rank by developing the Eagle Scout Service Project with the purpose to benefit the community. I was able to build and paint a 10ft by 10ft gazebo, built and painted a pair of benches and painted the park's swings. Recruited 30+ people to run the project properly.

Juan Quirindongo Morell High School   **Vega Baja, PR**
Roles and Achievements   August 2015 - June 2018

- In the school math club, I provided guidance to 5+ students interested in math competitions. Qualified for the Puerto Rico Math Olympiad in the Region of Arecibo for 3 years, and resulted as the 16th finalist overall on the 2017 National Trig Star Competition, sponsored by the National Society of Professional Surveyors.

Extracurricular Activities
Acting   **Mayaguez, PR**
Theater Presentations and Roles   March 2019 - present

- The Physics Movie (Nicholas Flamel, secondary character) (In Development)

- El Muerto (Sabás Honoré, secondary character) (August 2019)

- The Physics Show (Michael Faraday, secondary character) (March 2019)

Music   **Mayaguez, PR**
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.