

# Eric J. Pabón-Cancel

## Curriculum Vitae

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### Education

#### University of Puerto Rico, Mayagüez Campus

Mayagüez, PR

Bachelor of Science in Pure Mathematics

May 2023

Curricular Sequence in Applied Mathematics

General GPA: 3.55 // 4.00 // Major GPA: 3.55 // 4.00

### Courses

Foundations of Mathematics, Intro. to Algebraic Structures, Differential Equations, Partial Differential Equations, Computer Programming I, Complex Variables, Mathematical Statistics I, Foundations of Mathematical Logic, Advanced Calculus I & II, Numerical Analysis I, Point-Set Topology, Linear Algebra (Intermediate/Graduate), Number Theory I (Graduate)

### Skills

Software: C++ (Intermediate), MATLAB (Beginner), SAGEMath (Intermediate), LaTeX (Advanced)

Languages: Spanish (Native), English (Fluent)

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### 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 a theorem related to Euler's totient function and other lemmas related to prime distribution. 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

*Toward a Characterization of Invariant Parking Sequences*

June 2022 - August 2022

*Advisor: Pamela E. Harris // Participants: Douglas Chen, Gabriel Sargent, Eric 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  $y$  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. We have considered to explore the project in the branch of Theoretical Computer Science, since we have the speculation that a complete characterization for parking sequences may be an NP-Complete problem.

## 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 monomials that reduce nice to improve the bound of the codes. 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: Fernando 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 and norm 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.

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## Papers and Articles

1. Pabón, Eric, Oriz-Albino, Reyes. "The Study 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, 17 Jan. 2022, <https://arxiv.org/abs/2201.03741>. (Submitted).

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## 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).

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## Presentations

1. **SACNAS NDiSTEM Conference** (Upcoming) **San Juan, PR**  
*The Study of  $\tau_{(n)}$ -primes Project Poster* October 2022
2. **Summer@ICERM 2022: Computational Combinatorics** **Providence, RI**  
*On Permutation-Invariant Parking Sequences Presentation* August 2022
3. **2022 JTM-PRISM** **Humacao, PR**  
*The Study of  $\tau_{(n)}$ -primes Project Presentation* April 2022
4. **Joint Mathematics Meetings 2022** **Virtual Presentation**  
*Improving Bounds of Hermitian-Lifted Codes Project Poster* April 2022
5. **37th SIDIM** **Virtual Presentation**  
*Improving Bounds of Hermitian-Lifted Codes Presentation* February 2022  
*The Study of  $\tau_{(n)}$ -primes Project Poster*
6. **2021 Math REU Conference @ Clemson University** **Virtual Presentation**  
*Improved Hermitian-Lifted Codes Presentation* July 2021
7. **2021 JTM-PRISM** **Virtual Presentation**  
*The Study of  $\tau_{(n)}$ -atoms Presentation* April 2021

## Conferences

1. 2022 Field of Dreams Conference (Upcoming) 4-6 November, 2022  
*The Graduate Hotel, Minneapolis, Minnesota*
2. SACNAS National Diversity in STEM Conference (Upcoming) 27-29 October 2022  
*Pedro Roselló Convention Center, San Juan, Puerto Rico*
3. 2022 Junior Technical Meeting - PR Interdisciplinary Scientific Meeting 9 April, 2022  
*University of Puerto Rico at Humacao, Humacao, Puerto Rico*
4. Joint Mathematics Meetings 2022 6-9 April, 2022  
*Zoom Conference*
5. 37th Interuniversity Mathematical Sciences Research Seminar 25-26 February, 2022  
*Zoom Conference, sponsored by University of Puerto Rico, Mayagüez Campus*
6. 2021 Math REU Conference @ Clemson University 19 July, 2021  
*Zoom Conference. Participating Institutions:  
 Clemson University, East Tennessee State University, North Carolina A&T, Elon University*
7. 2021 Junior Technical Meeting - PR Interdisciplinary Scientific Meeting 23-24 April, 2021  
*Virtual Conference, sponsored by Puerto Rico Louis Stokes Alliance for Minority Participation*
8. 35th Interuniversity Mathematical Sciences Research Seminar 6-7 March, 2020  
*University of Puerto Rico at Cayey, Cayey, Puerto Rico*

## Workshops and Semester Programs

### MSRI Modern Math Workshop 2022

**San Juan, PR**  
 October 2022

*Topics: Mathematical Modeling and Data Science (Upcoming)*

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

- Mathematical workshop for networking with the math community, sponsored by the Mathematical Sciences Research Institute, Institute for Pure and Applied Mathematics (University of California, Los Angeles), and the Institute for Computational and Experimental Research in Mathematics (Brown University).

### Thematic Program in p-adic L-functions and Eigenvarieties

**Notre Dame, IN**  
 Summer 2022

*Topics: Modular Forms and Elliptic Curves*

*Organizers: Andrei Jorza, Claudiu Raicu, Evan O'Dorney (University of Notre Dame)*

- Undergraduate Summer School in Modular Forms. A problem-solving introduction to modular forms and elliptic curves. Received mini-courses in Algebraic Geometry, Elliptic Geometry, and Modular Forms, unified these fields, and developed the bridge between Number Theory and Complex Analysis. This workshop was hosted by the Center for Mathematics at the University of Notre Dame with support from the NSF.

### 2022 NSF/STEM: Fellowships Application Workshop

**Rio Piedras, PR**  
 May 2022

*Topics: Grants and Fellowships Workshop*

*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

Topics: *Finite Fields and Projective Geometry*

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

Johnson City, TN

Summer 2021

- 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.

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## Awards and Merits

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

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 State Finalist

June 2017

Eagle Scout Rank, Scouts BSA, Boy Scouts of America

May 2017

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## Scholarships and Fellowships

2022-2023 PR-LSAMP Scholarship

Amount \$1,600.00

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

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## Professional Memberships

Society for Advancing Chicanos/Hispanics and Native Americans in Science Member

National Eagle Scout Association Member

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## 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, research colloquia and other activities.

### 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.

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## 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 Manatí, Puerto Rico. Created an initiative of knit hats for children suffering from cancer. Recruited 7 classmates for one event.

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

October 2018 - November 2018

- Boy Scout course for training youth to overcome themselves and become leaders in their troop and community. Participated as a Troop Guide and 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. Mentored these candidates to be initiated as new members for the Camping Honor Society.

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

June 2017

- Served as Troop Guide for a patrol of 6 people in the National Youth Leadership Training Scout Course in the Guajataka Scout Reservation. Gave 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, the highest honor a Scout can achieve, by developing the Eagle Scout Service Project with the purpose to benefit the community. The project was at an outdoor gym and park, and was able to build a 10ft by 10ft gazebo and painted it, built two benches and painted them, painted the park's swings and marked a gravel path for jogging at the gym. Recruited 30+ people to run the project properly.

**Juan Quirindongo Morell High School***Roles and Achievements***Vega Baja, PR**

August 2015 - June 2018

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

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**Extracurricular Activities****Acting***Theater Presentations and Roles***Mayagüez, PR**

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)

**Alma Latina UPRM Music Group***Staff & Musician***Mayagüez, PR**

February 2020 - March 2020

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