

Luis A. Medina

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Employment	University of Puerto Rico, Río Piedras San Juan, PR	Associate Professor July 2014 - Present
	University of Puerto Rico, Río Piedras San Juan, PR	Assistant Professor January 2010 - June 2014
	Rutgers University New Brunswick, NJ	Assistant Professor (NTT) August 2008 - December 2009
Education	Tulane University Ph.D. in Mathematics	2008 Advisor: Victor H. Moll
	University of California, Los Angeles (UCLA) Visiting Graduate Student	Fall 2005
	University of Puerto Rico at Humacao B.S. in Computational Mathematics	2003 <i>magna cum laude</i>
Grants	Scholarship fund for excellence in Computer Science and Mathematics <i>NSF DUE-1356474</i> (Co-PI) Amount: \$630,217.00	2014 - 2019
	Computerized Pure Mathematics: Exponential Sums of Symmetric Boolean Functions <i>Fondo Institucional para la Investigación</i> (PI) Amount: \$36,130.00	2014 - 2016
Honors and Awards	Latin@s and Hispanics in Mathematical Sciences (Lathisms 17) Lathisms showcases the contributions of 31 Hispanic and Latino/a mathematicians, one each day from September 15th to October 15th. Showcased on September 25, 2017.	Fall 2017
	Project NExT Fellowship A professional development program for new or recent Ph.D.s in the mathematical sciences. Color: Red'08	2008 - 2009
	IBM Fellowship	Fall 2007 - Spring 2008
	VIGRE Fellowship	Fall 2004 - Spring 2006
	Mathematics Department Awards (Tulane) <ol style="list-style-type: none">Outstanding Performance in Oral Examination.Outstanding Performance in Teaching Assistance.Outstanding Performance in Written Examinations.	
	The Graduate Alliance for Education in Louisiana Fellowship	Fall 2003
	National Physical Science Consortium Fellowship Sponsor by NSA	Fall 2003 - Spring 2004
	NASA Puerto Rico Space Grant Consortium Fellowship	Fall 2002 - Spring 2003
	CSEMS Computer Science, Engineering, and Mathematics Scholarships	Fall 2002 - Spring 2003

**Published or
accepted papers****Diophantine equations with binomial coefficients and perturbations of symmetric Boolean functions**

Authors: Francis N. Castro, Oscar E. González and Luis A. Medina
To appear in *IEEE Trans. Inf. Theory*.

Exact 2-Divisibility of Exponential Sums Associated to Boolean Functions

Authors: Francis N. Castro, Luis A. Medina and Ivelisse Rubio
To appear in *Cryptography and Communications*.

Periodicity in the p -adic valuation of a polynomial

Authors: Luis A. Medina, Victor H. Moll and Eric S. Rowland
To appear in *The Journal of Number Theory*.

New families of balanced symmetric functions and a generalization of Cusick, Li and Stănică's conjecture

Authors: R. Arce-Nazario, F. N. Castro, O. E. González, L. A. Medina, and I. Rubio
To appear in *Designs, Codes and Cryptography*.

Generalized exponential sums and the power of computers

Authors: Francis N. Castro, Oscar E. González and Luis A. Medina
To appear in *Involve*.

Modular periodicity of exponential sums of symmetric Boolean functions

Authors: Luis A. Medina and Armin Straub
Discrete Appl. Math., **217**, 2017, 455–473.

On multiple and infinite log-concavity

Authors: Luis A. Medina and Armin Straub
Annals of Combinatorics, **20(1)**, 2016, 125-138.

The integrals in Gradshteyn and Ryzhik. Part 27: More logarithmic examples

Authors: Luis A. Medina and Victor H. Moll
Scientia, **26**, 2015, 49-61.

 p -regularity of the p -adic valuation of the Fibonacci sequence

Authors: Luis A. Medina and Eric S. Rowland
The Fibonacci Quarterly, **53 (3)**, 2015, 265-271.

A divisibility approach to the open boundary cases of Cusick-Li-Stănică's Conjecture

Authors: Francis Castro, Oscar E. González and Luis A. Medina
Cryptography and Communications, **7 (4)**, 2015, 379-402.

The p -adic valuation of Eulerian numbers: trees and Bernoulli numbers

Authors: Francis Castro, Oscar E. González and Luis A. Medina
Experimental Mathematics, **24 (2)**, 2015, 183-195.

Asymptotic Behavior of Perturbations of Symmetric Functions

Authors: Francis Castro and Luis A. Medina
Annals of Combinatorics, **18**, 397-417, 2014.

The integrals in Gradshteyn and Ryzhik. Part 23: Combination of logarithms and rational functions

Authors: Luis A. Medina and Victor H. Moll
Scientia, Series A: Math. Sciences **23**, 2012, 1-18.

Exact Divisibility of Exponential Sums and Some Consequences

Authors: Francis N. Castro, Luis A. Medina, and Raúl Figueroa

Theory and Applications of Finite Fields, AMS Contemporary Math., **579**, 2012, 55-66.

Iterated primitives of logarithmic powers

Authors: Luis A. Medina, Victor H. Moll and Eric S. Rowland

International Journal of Number Theory, **7**, Num. 3, 2011.

Linear Recurrences and Asymptotic Behavior of Exponential Sums of Symmetric Boolean Functions

Authors: Francis N. Castro and Luis A. Medina

Elec. J. Combinatorics, **18(2)**, 2011, #P8.

Exact Divisibility of Exponential Sums over the Binary Field via the Covering Method

Authors: Francis N. Castro, Luis A. Medina and Ivelisse Rubio

Groups, Algebras and Applications, AMS Contemporary Math., **537**, 2011, 129-136.

The p -adic valuation of Stirling numbers

Authors: A. Berrizbeitia, L. Medina, A. Moll, V. Moll, and L. Noble

Journal for Algebra and Number Theory Academia, **1**, 2010, 1-30.

An Experimental Mathematics Perspective on the Old, and still Open, Question of When To Stop?

Authors: Luis A. Medina and Doron Zeilberger

Gems in Experimental Mathematics, AMS Contemporary Math. **517**, 2010, 265-274.

A fast numerical algorithm for the integration of rational functions

Authors: Dante Manna, Luis A. Medina, Victor H. Moll, and Armin Straub

Numerische Mathematik **115**, 2010, 289-307.

A Class of Logarithmic Integrals

Authors: Luis A. Medina and Victor H. Moll

The Ramanujan Journal **20**, 2009, 91-126.

Asymptotic valuations of sequences satisfying first order recurrences

Authors: Tewodros Amdeberhan, Luis A. Medina, and Victor H. Moll

Proc. Amer. Math. Soc. **137**, 2009, 885-890.

Arithmetical properties of a sequence arising from an arctangent sum

Authors: Tewodros Amdeberhan, Luis A. Medina, and Victor H. Moll

Journal of Number Theory **128**, 2008, 1808-1847

The integrals in Gradshteyn and Ryzhik. Part 11: The incomplete beta function

Authors: Khristo N. Boyadzhiev, Luis A. Medina, and Victor H. Moll

Scientia, Series A: Math. Sciences **18**, 2009, 61-75.

The integrals in Gradshteyn and Ryzhik. Part 10: The digamma function

Authors: Luis A. Medina and Victor H. Moll

Scientia, Series A: Math. Sciences **17**, 2009, 45-66.

The integrals in Gradshteyn and Ryzhik. Part 5: Some trigonometric integrals

Authors: Tewodros Amdeberhan, Luis A. Medina, and Victor H. Moll

Scientia, Series A: Math. Sciences **15**, 2007, 47-60.

Books

Gems in Experimental Mathematics

Contemporary Mathematics, AMS **517** (2010)

Editors: Tewodros Amdeberhan, Luis A. Medina, and Victor H. Moll

Graduate Students

University of Puerto Rico, Río Piedras Campus

PhD Students:

1. Leonid Sepúlveda (current).

Articles:

- (a) F. Castro, L. A. Medina and L. B. Sepúlveda. Recursions associated to trapezoid, symmetric and rotation symmetric functions over Galois fields. *Submitted*.

Masters Students:

1. Stephany Nieves (current).

**Undergraduate
Research Efforts**

Articles

Articles with undergraduate students

1. A. Byrnes, J. Fink, G. Lavigne, I. Nogues, S. Rajasekaran, A. Yuan, L. Almodovar, X. Guan, A. Kesarwani, E. Rowland, and V. Moll. A closed-form solution might be given by a tree. Valuations of quadratic polynomials. *Submitted*.
2. R. Arce-Nazario, F. Castro, O. González, L. A. Medina, and I. Rubio. New families of balanced symmetric functions and a generalization of Cusick, Li and Stanica's conjecture. To appear in *Designs, Codes and Cryptography*.
3. F. Castro, O. E. González and L. A. Medina. Generalized exponential sums and the power of computers. To appear in *Involve*.
4. F. Castro, O. E. González and L. A. Medina. The p -adic valuation of Eulerian numbers: trees and Bernoulli numbers. *Experimental Mathematics* **24** (2) (2015), 183-195.
5. F. Castro, O. E. González and L. A. Medina. A divisibility approach to the open boundary cases of Cusick-Li-Stanica's conjecture. *Cryptography and Communications* **7** (4) (2015), 379-402.
6. A. Berrizbeitia, L. A. Medina, A. C. Moll, V. H. Moll, and L. Noble. The p -adic valuation of Stirling numbers. *J. Algebra and Num. Th. Academia* **1** (2010), 1-30.

Undergraduate Research Mentor

Research mentor of undergraduate students.

1. Oscar E. González
2. Stefan R. Klajbor (now at U. Illinois, Urbana-Champaign)

Claude Shannon Scholarship Mentor

Mentor Claude Shannon Scholarship.

1. Luis Quiñones (2016 - Present).
2. Raúl Negrón (2014 - Present).
3. Samuel Pérez (2014 - 2015; now at U. of Notre Dame).
4. José Pastrana (2014 - 2015; now at U. of Notre Dame).
5. Carlos Buxó (2015 - 2016; now at Michigan State University [Physics]).

REU Mentor

Research leader of a student at the REU sponsored by the Rutgers Mathematics Department and DIMACS, the Center of Discrete Mathematics and Theoretical Computer Science.

MSRI - UP

PostDoc. Research sub-leader in the REU MSRI-UP.

**Invited talks and
presentations**

Diophantine equations with binomial coefficients and perturbations of symmetric Boolean functions

Number Theory Seminar

July 2017

University of Illinois, Urbana-Champaign

Linear recurrences for generalized Walsh transforms of symmetric Boolean functions

Computer and Education Conference

May 2017

Inter American University, San Germán, Puerto Rico

Linear recurrences for trapezoid and rotation symmetric Boolean functions

SIDIM 2017

March 2017

University of Puerto Rico at Ponce.

- Modular periodicity of exponential sums of symmetric Boolean functions**
SIDIM 2016 February 2016
 University of Puerto Rico at Humacao
- Exact divisibility of exponential sums associated to elementary symmetric Boolean functions**
SIDIM 2015 February 2015
 University of Puerto Rico, Mayagüez Campus; presented by the undergraduate students O. González and R. Negrón.
- The p -adic valuation of Eulerian numbers: trees and Bernoulli numbers**
UMaRch Puerto Rico 2015 February 2015
 Mayagüez, PR; presented by the undergraduate student O. González.
- The p -adic valuation of Eulerian numbers: trees and Bernoulli numbers**
AMS Fall Southeastern Sectional Meeting November 2014
 Greensboro, NC
- Open boundary cases of Cusick-Li-Stănică's conjecture**
SACNAS 2014, Special Session: On the Discrete Side of Mathematics October 2014
 Los Angeles, CA
- A divisibility approach to the open boundary cases of Cusick-Li-Stănică's conjecture**
Department of Mathematics April 2014
 UPR, Humacao
- Generalized exponential sums and holonomic sequences**
SIDIM 2014 February 2014
 Ponce, PR
- On multiple and infinite log-concavity**
REGS Program July 2013
 University of Illinois, Urbana-Champaign
- Exponential sums of symmetric Boolean functions, II**
REGS Program July 2013
 University of Illinois, Urbana-Champaign
- Exponential sums of symmetric Boolean functions, I**
REGS Program July 2013
 University of Illinois, Urbana-Champaign
- Asymptotic behavior of the exponential sum of perturbations of symmetric polynomials**
Department Colloquium March 2013
 University of Puerto Rico, Río Piedras
- Asymptotic behavior of the exponential sum of perturbations of symmetric polynomials**
SIDIM 2013 March 2013
 San Juan, PR
- Asymptotic behavior of the exponential sum of distortions of symmetric polynomials**
Department Colloquium September 2012
 University of Puerto Rico, Mayagüez
- Linear Recurrences and Asymptotic Behavior of Exponential Sums of Symmetric Boolean Functions**
Fq10 The 10th International Conference on Finite Fields and their Applications July 2011
 Ghent, Belgium

Linear recurrences of exponential sums of symmetric boolean functions

New Influences in Mathematical Research in Puerto Rico by Young Researchers February 2011
Mini Simposia. Main Talk. SIDIM 2011. UPR-H/Palmas del Mar, Humacao.

Valuaciones p -ádicas de secuencias de números enteros

Department of Mathematics October 2010
UPR-Humacao.

Experiments with Exponential Sums over the Binary Field

From $A = B$ to $Z = 60$: Conference in Honor of Doron Zeilberger's 60th Birthday May 2010
DIMACS, Rutgers University

When to stop throwing the coin?

SACNAS Conference October 2009
Dallas, TX

Case studies of Experimental Mathematics: p -adic valuations of recurrences.

Department of Mathematics July 2009
University of Puerto Rico, Río Piedras Campus

Arithmetic properties of sequences satisfying first order recurrences

ACA 2009: Applications of Computer Algebra June 2009
Montréal, Québec, Canada

Risch and Parallel Risch Algorithms

Experimental Mathematics Seminar March 2009
Rutgers University

Asymptotic valuations of sequences satisfying first order recurrences

Analysis and Its Applications Seminar November 2008
The University of Arizona

A World of Irresistible Integrals

Mathematical Careers and Ideas November 2008
Rutgers University

Asymptotic valuations of sequences satisfying first order recurrences

Collaborative Number Theory Seminar October 2008
CUNY Graduate Center

Asymptotic valuations of sequences satisfying first order recurrences

Experimental Mathematics Seminar September 2008
Rutgers University

Arithmetic properties of sequences satisfying first order recurrences

Experimental Mathematics Day March 2008
Tulane University

Asymptotic valuations of sequences satisfying first order recurrences

Joint Mathematics Meetings January 2008
San Diego, CA

Projects

Symbolic Integration

Summer 2007
Implementation of the transcendental Risch and Parallel Risch algorithms in Mathematica.
Authors: Luis A. Medina and Sasha Pavlyk

**Service to the
University and/or
Department**

Interim Dean of Graduate Studies and Research of the Faculty of Natural Science
UPR-Río Piedras
March 10-18, 2016; August 24-31, 2017.

Interim Chair of the Department of Mathematics

UPR-Río Piedras

August 1-4, 2017.

Site Administrator of Mathematica License

UPR-Río Piedras

Spring 2014-Present

Site administrator of the Mathematica License of the Faculty of Natural Science of the University of Puerto Rico, Río Piedras Campus.

College of Natural Science Graduate Assembly

UPR-Río Piedras

Fall 2012-Present

Member. The Natural Science Graduate Assembly is the regulatory entity of all graduate programs in the College of Natural Science.

Graduate Program Coordinator

UPR-Río Piedras

Spring 2012-Present

Administrative duties of the graduate program.

Curriculum Committee

UPR-Río Piedras

Spring 2011-Fall 2013

Member.

Seminar Coordinator

UPR-Río Piedras

Spring 2011

Discrete Mathematics Research Seminar.

Course Coordinator

UPR-Río Piedras

Fall 2010-Fall 2011

Calculus.

Course Coordinator

Rutgers University

Spring 2009

Calculus 1 for the Mathematical and Physical Sciences.

**Professional
Activities****Project NExT Consultant**

Mathematical Association of America

September 2017 - Present

A professional development program for new or recent Ph.D.s in the mathematical sciences.

Wolfram Mathematica Site License Administrator

College of Natural Sciences, UPR-Río Piedras

May 2015 - Present

Responsibilities include: assignment of single user and lab licenses, approve or reject requested activation keys, etc.

Referee

Research journals

Referee for various research journals.

Judge

Colegio Espíritu Santo, Hato Rey, PR

November 2016

Judge of Mathematics Competition. Over 50 schools participated.

AMS Special Session on Experimental Mathematics

Washington, DC

January 2009

Co-Organizer

**Teaching
Experience****As Professor**

1. Modern Algebra 2 [Graduate] (UPR-Río Piedras)
2. Modern Algebra 1 [Graduate] (UPR-Río Piedras)
3. Linear Algebra [Graduate] (UPR-Río Piedras)
4. Theory of Numbers (UPR-Río Piedras, Rutgers University)
5. Experimental Mathematics (UPR-Río Piedras)

6. Abstract Algebra 2 (UPR-Río Piedras)
7. Abstract Algebra (UPR-Río Piedras)
8. Advanced Calculus (UPR-Río Piedras, Rutgers University)
9. Linear Algebra [Undergraduate] (UPR-Río Piedras)
10. Intro. Discrete Mathematics (UPR-Río Piedras)
11. Intro. Linear Algebra (Rutgers University)
12. Inmersión Program (UPR-Río Piedras)
13. Calculus 2 (Rutgers University, Tulane University)
14. Calculus 1 (UPR-Río Piedras, Rutgers University, Tulane University)
15. Pre-Calculus 2 (UPR-Río Piedras)
16. Undergraduate Seminar

As Graduate Teaching Assistant

1. Real Analysis (Tulane University)
2. Applied Math (Tulane University)
3. Statistics (Tulane University)

**Conferences,
Schools, and
Internships**

ALGECOM 13

University of Notre Dame, Notre Dame, IN
Algebra, Geometry and Combinatorics Day

March 2016

USTARS 2016

Sam Houston State University, Huntsville, Texas
Underrepresented Students in Topology and Algebra Research Symposium

March 2016

Joint Mathematics Meeting (AMS)

2003, 2006, 2007, 2008, 2009, 2016

Society for Advancement of Chicanos and Native Americans in Science (SACNAS)

National Conference 2002, 2003, 2004, 2006, 2009, 2012, 2014, 2015

AMS Fall Southeastern Sectional Meeting

Greensboro, NC

November 2014

Fq10 The 10th International Conference on Finite Fields and their Applications

Ghent, Belgium

July 11-15, 2011

From $A = B$ to $Z = 60$: Conference in Honor of Doron Zeilberger's 60th Birthday

DIMACS, Rutgers University

May 27 - 28, 2010

MathFest

2008, 2009

ACA 2009: Applications of Computer Algebra

Montréal, Québec, Canada

June 25-28, 2009

100th Statistical Mechanics Conference

Rutgers University, New Brunswick, NJ

Dec 13 - Dec 18, 2008

Promoting Diversity at the Graduate Level in Mathematics: a National Forum

MSRI, Berkeley, CA

Oct 15 - Oct 17, 2008

Panelist. Professional Development: "Am I Ready for Life after Graduate School?"

Experimental Mathematics Day

Tulane University, New Orleans, LA

March 6 and 7, 2008

Wolfram Technology Conference

Champaign, IL

October 10 -13, 2007

Wolfram Research, Inc (Internship)
 Champaign, IL Summer 2007

Modern Mathematics: An Introduction to 2007-08 Programs at MSRI
 Tampa, FL October 25-26, 2006

Number Theory and Random Matrix Theory School
 University of Rochester, Rochester, NY May 30 - June 3, 2006

Computing the Continuous Discretely: Integer-point enumeration in polyhedra
 Banff International Research Station, Canada August 6 - 20, 2005

Summer Institute in Mathematics for Undergraduate
 Humacao, Puerto Rico Summer 2002

Puerto Rico Louis Stokes-Alliance For Minority Participation (PRLS AMP)
 Junior Technical Meeting 2002, 2003

Seminario Interuniversitario de Investigación en Ciencias Matemáticas (SIDIM)
 2002-2003, 2010-2017

Computer Skills

Computer Languages
 Experience with C++ and JAVA.

Other Programming Tools
 Experience with Maple. Extensive programming experience in Mathematica.

Other Job Experiences

Wolfram Research, Inc
 Champaign, IL September 2007- December 2007

Languages

Spanish, English

Professional Memberships

American Mathematical Society (AMS)

Mathematical Association of America (MAA)

Society for Advancement of Chicanos and Native Americans in Science (SACNAS)