

Pedro Fernando Morales-Almazán, Ph.D.

CONTACT INFORMATION	The University of Texas at Austin Department of Mathematics, RLM 8.100 2515 Speedway Stop C1200 Austin, TX 78712-1202 USA	<i>phone:</i> +1(512) 232-6193 <i>e-mail:</i> pmorales@math.utexas.edu http://math.utexas.edu/~pmorales http://towardsthelimitedge.blogspot.com twitter: @p3d40
LANGUAGES	Spanish (Native), English (Fluent), French (Intermediate)	
RESEARCH INTERESTS	Spectral Zeta Functions, Heat Kernels, Differential Geometry, applications to Quantum Field Theory, Number Theory. <i>MSC2010:</i> Primary 11M36,14G10,11F72,35J05 ; Secondary 35J15,34L20,11M45,11M06	
EDUCATION	Baylor University , Waco, Texas USA <i>Department of Mathematics</i> Ph.D., Mathematics, January 2008 - August 2012 <ul style="list-style-type: none">• Dissertation Topic: “Spectral Functions for Generalized Piston Configurations”• Advisor: Klaus Kirsten, Ph.D. Professor of Mathematics, Casper Faculty Universidad de San Carlos de Guatemala , Guatemala City, Guatemala <i>School of Electrical and Mechanical Engineering</i> BE. Electronics, January 2003 - May 2008 <ul style="list-style-type: none">• Thesis: “Reconstrucción de señales de audio” [Audio signal reconstruction]• Advisor: Enrique Ruiz Carvallo, Ph.D., Professor <i>School of Sciences</i> BS. Mathematics, January 2003 - November 2006 <ul style="list-style-type: none">• Thesis: “Distribución de raíces de polinomios” [Polynomial root distribution]• Advisor: Rodrigo Vásquez Bianchi, M.Sc., Emeritus Professor	
HONORS AND AWARDS	Honorable Mention, Visualizing Science Contest of the College of Natural Sciences of The University of Texas at Austin. 2015 Graduate Scholarship, Baylor University. 2008 - 2012 Graduate Research Fellowship, National Science Foundation. 2009, 2010 Excellence Award for Graduates, Universidad de San Carlos de Guatemala. 2007 Magna Cum Laude, Universidad de San Carlos de Guatemala. 2006 Excellence Award for Students, Universidad de San Carlos de Guatemala. 2006 Bronze Medal, Iberoamerican Mathematical Olympiad. 2002 Bronze Medal, Iberoamerican Mathematical Olympiad. 2003 Puerto Rico Cup for best country with relative progress,	

Iberoamerican Mathematical Olympiad. 2002
 Contestant, International Mathematical Olympiad. 2002
 Contestant, International Mathematical Olympiad. 2001
 Contestant, International Mathematical Olympiad. 2000
 Gold Medal, National Mathematical Olympiad, Guatemala. 2002
 Gold Medal, State Mathematical Olympiad, Guatemala. 2002
 Bronze Medal, National Mathematical Olympiad, Guatemala. 1999
 Silver Medal, State Mathematical Olympiad, Guatemala. 1999
 Gold Medal, State Mathematical Olympiad, Guatemala. 1998
 Silver Medal, State Biology Olympiad, Guatemala. 1998

SELECTED
 PUBLICATIONS

- [6] Morales, P., Casimir energy for perturbed surfaces of revolution, *Int. J. Mod. Phys. A*, 31, 1650044 (2016)
- [5] Morales, P. and Kirsten, K., Casimir effect for smooth potentials on spherically symmetric pistons, *J. Phys. A: Math. Theor.* **48** 495201 (2015)
- [4] Morales, P., Grothendieck ring class of Banana and Flower graphs, *Geometric, Algebraic and Topological Methods for Quantum Field Theory*, 346-356 (2014)
- [3] Beaugregard, M., Fucci, G., Kirsten, K., and Morales, P., Casimir Effect in the Presence of External Fields, *J. Phys. A: Math. Theor.* **46** 115401 (2013)
- [2] Fucci, G., Kirsten, K., and Morales, P., Pistons modeled by potentials, *Springer Proceedings in Physics* **137** 28 (2011)
- [1] Morales, P. and Kirsten, K., Semitransparent Pistons. *International Journal of Physics A* **25** 2196-2200 (2010)

PAPERS IN
 PREPARATION

- Morales, P. and Vargas, A., Entropy in numbers, *in preparation* (2016)
- Morales, P. and Fucci, G., Zeta functions on perturbed warped manifolds, *in preparation* (2016)
- Morales, P., Singular contours on meromorphic one forms, *in preparation* (2016)
- Graham, C., Kirsten, K., Streit, B., Morales P., and Yang, Y., Functional determinants for Laplacians on annuli and elliptical regions, *in preparation* (2016)
- Morales, P., A geometric approach to measure irrationality , *accepted* (2015)

ADVISING AND
 MENTORING

- Undergraduate thesis. Martinez, R., *Función espectral zeta para operadores acotados* [Spectral zeta functions for bounded operators]. Universidad de San Carlos de Guatemala. **Current**.
- Undergraduate thesis. Raxón, C., *Invarianza del efecto Casimir en variedades unidimensionales* [Invariance of the Casimir effect in one dimensional manifolds]. Universidad de San Carlos de Guatemala. **Current**.
- Reading course. Differential geometry with applications in relativity, Directed Reading Program, The University of Texas at Austin. **Spring 2016**
- Trainer. Guatemalan National Mathematics Teams. **2003 - 2008**

SCIENTIFIC
ACTIVITIES

Organizer **Online Conference**
II Virtual Meeting in Physics and Mathematics for Latin America. 2016

Organizing committee **Math Teachers' Circles Austin**
Math circle for middle and high school teachers in the Austin district area with monthly meetings.
2015

Conference proceedings editor **Summer School**
9th Summer School in Geometric, Algebraic and Topological Methods for Quantum Field Theory,
held in Villa de Leyva, Colombia. July 2015

Organizer **Online Conference**
I Virtual Meeting in Physics and Mathematics for Latin America. June 2015

Workshop **I Escuela de Invierno en Matemática**
Funciones Zeta en Matemática y Física. Universidad del Valle de Guatemala, Guatemala. January
2015

Team leader **Universidad de San Carlos de Guatemala**
Guatemalan undergraduate team participating in the Iberoamerican Mathematical Competition for
Universities. October 2011

Team leader, Deputy leader **Guatemalan National Math Teams**
Guatemalan high school team participating in different International mathematical Olympiads. Cen-
tralamerican and the Caribbean Mathematical Olympiad. 2003-2007. Iberoamerican Mathematical
Olympiad. 2003-2007. International Mathematical Olympiad. 2002-2007

Organizing committee **Universidad de San Carlos de Guatemala**
National congress in Mathematics Education, Guatemala. 2003-2005

Summer program **Universidad de San Carlos de Guatemala**
Introduction to Lie Algebras. June 2008.

Summer program **Universidad de San Carlos de Guatemala**
Additive Combinatorics. August 2011

ACADEMIC
EXPERIENCE

The University of Texas at Austin
Lecturer **January 2013 - present**

Universidad de San Carlos de Guatemala
Adjunct Researcher **July 2015 - present**

Baylor University
Adjunct Professor **August 2012 - May 2013**

Teacher of Record **January 2009 - May 2012**

Teaching Assistant **January 2008 - December 2008**

Universidad de San Carlos de Guatemala

Adjunct Professor

June 2007 - December 2007

Research Assistant

March 2005 - December 2005

Teaching Assistant

July 2004 - December 2006

WORK EXPERIENCE **The University of Texas at Austin**

Lecturer

January 2013 - present

Taught undergraduate level courses using traditional lecture style, flipped classroom and inquiry based learning methodologies.

- M408L(Flipped) Integral Calculus, Fall 2014, Spring 2015, Spring 2016.
- M316K Foundations of Arithmetic, Fall 2015 (IBL,two sections), Spring 2015, Fall 2014.
- M325K Discrete Mathematics, Fall 2015, Spring 2015.
- M408S(Flipped) Integral Calculus for Science, Fall 2014, Spring 2014 (two sections), Fall 2013.
- M361K Introduction to Real Analysis, Summer 2014.
- M408N(Flipped) Differential Calculus for Science, Spring 2014, Spring 2013.
- M408K(Flipped) Differential Calculus (two sections), Fall 2013.
- M427K Advanced Calculus for Applications I, Spring 2013.
- M316L(IBL) Foundations of Geometry, Statistics, and Probability, Spring 2016 (two sections).

Baylor University

Adjunct Professor

August 2012 - May 2013

Taught undergraduate level courses.

- MTH 1322 Calculus II (two sections), Spring 2013.
- MTH 1321 Calculus I (two sections), Fall 2012.

Graduate Student

January 2008 - August 2012

Includes current Ph.D. research and research/consulting projects.

Teacher of Record

January 2009 - August 2012

Taught undergraduate level courses.

- MTH 1321 Calculus I, Spring 2012.
- MTH 1304 Precalculus, Fall 2011.
- MTH 1308 Business Precalculus, Spring 2011.
- MTH 1304 Precalculus, Fall 2010.
- MTH 1309 Business Calculus, Spring 2010.
- MTH 1304 Precalculus, Fall 2009.
- MTH 1309 Business Calculus, Spring 2009.

Teaching Assistant

January - December, 2008

Duties at various times have included tutoring for undergraduate math classes, grading and keeping grades for Calculus and ODE's courses.

Universidad de San Carlos de Guatemala

Research Assistant

March-December 2005

Analyzed the notion that precalculus and calculus students from the Engineering School have about the concept of function using multivariable statistics applying factor and cluster analysis.

Adjunct Professor

June 2007 - December 2007

Taught undergraduate level courses.

- General Statistics, June 2007
- Biostatistics I, June 2007
- Probabilistic Analysis, June 2007
- Precalculus, July - September 2007
- Biostatistics II, December 2007

Teaching Assistant

June 2004 - May 2007

Duties at various times have included tutoring for undergraduate math classes, grading and keeping grades for Precalculus, Calculus, Laplace Methods for ODE's, Discrete Mathematics, Complex Variables, Digital Telecommunications, and Electromagnetic Theory courses.

SERVICE

Social media manager

Teachers' Math Circle

The University of Texas at Austin. 2015-present

Mission trip team leader

Baylor University

Baylor University Pre-Med students Medical mission trip to Guatemala. March 2013

Social media manager

Baylor University

Baylor University mathematics department. 2010-2012

PRESENTATIONS

- [17] *Una forma geométrica de definir irracionalidad* [A geometric way to define irrationality]. II Escuela de Invierno en Matemática, Universidad del Valle de Guatemala, Guatemala. (2016)
- [16] *Regularización en matemática y física* [Regularization in mathematics and physics]. Colloquium talk, Universidad Diego Portales, Santiago, Chile. (2015)
- [15] *Zeta function regularization with unknown eigenvalues*. Geometric, Algebraic and Topological Methods for Quantum Field Theory, Villa de Leyva, Colombia. (2015)
- [14] *Funciones zeta en capas esféricas con potenciales suaves* [Zeta functions in spherical shells with smooth potentials]. I Encuentro Virtual de Física y Matemáticas, Online event. (2015)
- [13] *Random stuff about pi*. Saturday Morning Math Group, The University of Texas at Austin, Austin, Texas. (2014)
- [12] *Series divergentes en matemática y física* [Divergent series in mathematics and physics]. IV Congreso de Física y Matemáticas, Universidad de las Américas Puebla, Puebla, Mexico. (2014)
- [11] *Unwrapping Infinity*. Summer Program in Mathematical Problem Solving, Bard College, Annandale-on-Hudson, New York. (2013)
- [10] *Linealización de problemas por medio de valores propios* [Linearizing problems using eigenvalues]. I Escuela de Matemática Pura y Aplicada, Guatemala City. (2012)
- [9] *Spectral functions, the geometric power of eigenvalues*. Colloquium talk, Ohio University. (2012)
- [8] *Spectral Functions in the Presence of Background Potentials*. USTARS, University of Iowa. (2012)
- [7] *El efecto Casimir* [The Casimir Effect]. Colegio de Ingenieros de Guatemala, Guatemala City. (2011)
- [6] *Casimir energies and forces in the presence of background potentials*. University of Oklahoma, Norman, Oklahoma. (2011)

- [5] *Semitransparent Pistons*. MAA Sectional Meeting, Tyler, Texas. (2011)
- [4] *Pistons with Compact Support*. A&M University, College Station, Texas. (2010)
- [3] *Funciones Zeta y Pistones Semitransparentes* [Zeta functions and semitransparent pistons]. Universidad del Valle de Guatemala. (2010)
- [2] *Semitransparent Pistons*. A&M University, College Station, Texas. (2009)
- [1] *Generalidades sobre la función Zeta de Riemann* [Generalities about Riemann zeta function]. Universidad de San Carlos de Guatemala. 2005)

CONFERENCE &
WORKSHOPS
ATTENDED

- The p-adic Langlands Program and Related Topics, Indiana University, Bloomington, IN. (2016)
- USTARS, Sam Houston State University, Huntsville, TX. (2016)
- Texas-Oklahoma Representations and Automorphic forms, UNT, Denton, TX. (2016)
- Texas Geometry and Topology Conference, TCU, Dallas Fort Worth, TX. (2016)
- Geometric, Algebraic and Topological Methods for Quantum Field Theory, Villa de Leyva, Colombia. (2015)
- Primer Encuentro Virtual de Física y Matemáticas, Online event. (2015)
- The interrelation between mathematical physics, number theory and noncommutative geometry, Erwin Schrödinger Institute, Vienna, Austria. (2015)
- Escuela de Invierno en Matemática. Universidad del Valle de Guatemala, Guatemala. (2015)
- Inverse Problems and Spectral Theory. A&M University, College Station, Texas. (2014)
- Third International Workshop on Zeta Functions in Algebra and Geometry. CIMAT, Guanajuato, Mexico. (2014)
- IV Congreso de Física y Matemáticas, Universidad de las Américas Puebla, Puebla, Mexico. (2014)
- I Escuela de Matemática Pura y Aplicada, Guatemala City. (2012)
- USTARS 2012, Iowa City, Iowa. (2012)
- Texas-Oklahoma Representations and Automorphic Forms II, Stillwater, Oklahoma. (2012)
- Topological and Algebraic Methods for Quantum Field Theory. Villa de Leyva, Colombia. (2011)
- The Dirichlet Space. MSRI, Berkeley, California. (2011)
- Mathematical Aspects of Quantization. Notre Dame University, South Bend, Indiana. (2011)
- Quantization and Related Topics. Notre Dame University, South Bend, Indiana. (2011)
- Underrepresented Students in Topology and Algebra Research Symposium. University of Iowa, Iowa City, Iowa. (2011)
- Waves and Spectra. A&M University, College Station, Texas. (2011)
- Texas Geometry and Topology Conference. A&M University, College Station, Texas. (2010)
- Analysis on Graphs and its applications. Newton Institute, Cambridge, UK. (2010)
- CIMPA Algebraic Geometry and Dynamical Systems. IMCA, Lima, Peru. (2010)
- Number Theory and Representation Theory. Harvard University, Cambridge, Massachusetts. (2010)
- Career Options for Underrepresented Groups in Mathematics. IMA, Minneapolis, Minnesota. (2010)
- SACNAS National Conference. Dallas, Texas. (2009)

- Modern Math Institutes Workshop. Dallas, Texas. (2009)
- Quantum Field Theory under the influence of external conditions. Oklahoma University, Norman, Oklahoma. (2009)
- Random Matrix Workshop. MSRI, Oakland, California. (2009)
- Texas Algebraic Geometry Seminar. A&M University, College Station, Texas. (2009)
- Mathematical Models in Population Dynamics. Universidad de El Salvador. (2006)

PERSONAL
INFORMATION

Date of Birth: April 1st, 1986
Place of Birth: Guatemala City, Guatemala
Citizenship: Guatemalan
Marital Status: Single