Patricia Alonso Ruiz

Department of Mathematics
Texas A&M University
College Station TX 77843-3368

Email: paruiz@math.tamu.edu
website: www.math.tamu.edu/ paruiz/

Research Stochastic processes, Dirichlet forms and heat kernels on metric measure spaces, fractals and graphs, limit theorems in stochastic geometry, random fields.

Appointments

Assistant Professor, Texas A&M University
August 2019 - present

Evarist Giné Assistant Research Professor, University of Connecticut
August 2016 - July 2019

Scientific employee, Ulm University
September 2013 - July 2016.

Education

Ph.D. in Mathematics, University of Siegen
May 2013
Thesis advisor: Uta R. Freiberg
Thesis title: Dirichlet forms on non self-similar sets, Hanoi attractors and the Sierpiński Gasket

Licenciatura en Ciencias Matemáticas (M.Sc.), Universidad Complutense de Madrid
July 2009

Erasmus exchange program, Ludwig Maximilians University Munich
2007 - 2008

Selected awards

NSF Research grant, July 2019 - June 2022

AWM-NSF travel grant, September 2018

Feodor Lynen fellowship, Alexander von Humboldt Foundation
October 2016 - August 2018

Research and travel grant for female scientists, Ulm University
October 2015 - April 2016

DAAD graduate fellowship, September 2009 - April 2012

preprints

[5] P. Alonso Ruiz, *Heat kernel analysis on diamond fractals* (2019) arXiv:1906.06215, 30 pp.

[4] P. Alonso Ruiz, F. Baudoin, L. Chen, L. Rogers, N. Shanmugalingam and A. Teplyaev, *Besov class via heat semigroup on Dirichlet spaces III: BV functions and sub-Gaussian heat kernel estimates* (2019) arXiv:1903.10078, 36 pp.

[3] P. Alonso Ruiz, F. Baudoin, L. Chen, L. Rogers, N. Shanmugalingam and A. Teplyaev, *Besov class via heat semigroup on Dirichlet spaces II: BV functions and Gaussian heat kernel estimates* (2018) arXiv:1811.11010, 38 pp.

[2] P. Alonso Ruiz, F. Baudoin, L. Chen, L. Rogers, N. Shanmugalingam and A. Teplyaev, *Besov class via heat semigroup on Dirichlet spaces I: Sobolev type inequalities* (2018) arXiv:1811.04267, 36 pp.

[1] *Canonical diffusions on pattern spaces of aperiodic Delone sets*, with M. Hinz, A. Teplyaev and R. Treviño (2018) arXiv:1801.08956, 46 pp.

Publications

[11] *Analysis on hybrid fractals*, with Y. Chen, H. Gu, R. S. Strichartz and Z. Zhou, to appear in Comm. Pure App. Anal. (2019) arXiv:1804.05434.

[10] *Explicit formulas for heat kernels on diamond fractals*, Communications in Mathematical Physics (2018), **364**, no. 3, 1305–1326.

[9] *Completely symmetric resistance forms on the Stretched Sierpinski gasket*, with U. Freiberg and J. Kigami, Journal of Fractal Geometry **5** (2018), no. 3, 227–277.

[8] *Entropy-based inhomogeneity detection in fiber materials*, with E. Spodarev, Methodology and Computing in Applied Probability (2018), **20**, no. 4, 1223–1239.

[7] *Power dissipation in fractal Feynman-Sierpinski AC circuits*, Journal of Mathematical Physics, **58** (2017), no. 7, 073503.

[6] *Nonparametric estimation of entropy for marked Poisson point processes*, with E. Spodarev, Advances in Applied Probability, **49** (2017), no. 1, 258–278.

[5] *Weyl asymptotics for Hanoi attractors*, with U. Freiberg, Forum Mathematicum **29** (2017), no. 5, 1003–1022.

[4] *The limit theorem for maximum of partial sums of exchangeable random variables*, with A. Rakitko. Statistics and Probability Letters **119** (2016), 357–362.

[3] *Energy and Laplacian on Hanoi-type fractal quantum graphs*, with D. Kelleher, and A. Teplyaev, Journal of Physics A: Mathematical and Theoretical **49** (2016), no. 4, 1501–1533 (electronic).

[2] *Dirichlet forms on Hanoi attractors*, with U. Freiberg, Int. J. Applied Nonlinear Science, **1** (2014), no. 3, 247–274.

[1] *Hanoi attractors and the Sierpiński Gasket*, with U. Freiberg, Special issue of Int. J. Math. Model. Numer. Optim. on Fractals, Fractal-based Methods and Applications **3** (2012), no. 3, 251–265.

Conference & Workshop Talks

Japanese-German Open Conference on Stochastic Analysis, Fukuoka, September 2019

AMS Special Session on Analysis, Geometry, and PDEs in Non-smooth Metric Spaces, University of Connecticut, Hartford, April 2019

AMS Special Session in Analysis on fractals, Joint Mathematics Meetings, Baltimore, January 2019

Fractal geometry and Stochastics VI, Bad Herrenalb, Germany, October 2018

Theoretical and Applied Stochastic Analysis, Casa matemática, Oaxaca, Mexico, September 2018

AMS Special Session on Analysis and Geometry of Fractals, UC Riverside, CA, November 2017

Nonsmooth Analysis Workshop, University of Connecticut, Storrs, CT, November 2017

Analysis and Geometry on Graphs and Manifolds, University of Potsdam, Germany, August 2017

6th Cornell Conference on Analysis, Probability, and Mathematical Physics on Fractals, Cornell University, Ithaca, NY, June 2017

Women's Intellectual Network Research Symposium, Brown University, RI, March 2017

German Probability and Stochastic Days, University of Bochum, Germany, March 2016

Workshop: Probability, Analysis and Geometry, Moscow State University, Russia, October 2014

The 10th AIMS Conference on Dynamical Systems, Differential Equations and Applications, Universidad Autónoma de Madrid, Spain, July 2014

5th Cornell Conference on Analysis, Probability, and Mathematical Physics on Fractals Cornell University, Ithaca, NY, June 2014

Fractal geometry and Stochastics V, Tabarz, Germany, March 2014

Workshop: Probability, Analysis and Geometry, Ulm University, Germany, September 2013

International Conference of Advances on Fractals and Related Topics, Hong Kong University, Hong Kong, December 2012

Colloquium Talks

Colloquium, Texas A&M University, College Station, TX, January 2019

Colloquium, Purdue University, West Lafayette, IN, January 2019

Colloquium, Washington University in St Louis, St Louis, MO, December 2018

Mathematisches Kolloquium, Martin-Luther-University Halle-Wittenberg, Halle (Saale), Germany, December 2018

Mathematisches Kolloquium, University of Kaiserslautern, Kaiserslautern, Germany, November 2018

Colloquium, Bonn University, Bonn, Germany, October 2018

Lehigh Math Colloquium, Lehigh University, Bethlehem, PA, February 2017

Mathematisches Kolloquium, University of Bremen, Germany, June 2015

Seminar Talks

Kansai Probability Seminar, Kyoto University, Japan, July 2019

Oberseminar Analysis, Geometrische Analysis, University of Bielefeld, Germany, June 2019

Analysis and PDE Seminar, Worcester Polytechnic Institute, Worcester, MA, November 2018

Oberseminar Stochastik, University of Tübingen, Germany, July 2018

Oberseminar Stochastik und Anwendungen, University of Stuttgart, Germany, July 2018

Mathematics Seminar, Seoul National University, Seoul, South Korea, June 2018

Probability Seminar, Michigan State University, East Lansing, MI, April 2018

Norbert Wiener Center Seminar, University of Maryland, Washington DC, MD, February 2018

15th Northeast Probability Seminar, Columbia University, New York, November 2017

Analysis Seminar, Cornell University, Ithaca, NY, January 2017

Stochastics Seminar, Moscow State University, Russia, April 2014

Probability Seminar, University of Essen, Germany, November 2013

Analysis and Probability Seminar, University of Connecticut, Storrs, CT, March 2013

Professional activities

Referee: Fractals, Communications in Pure and Applied Analysis, Demonstratio, Monatshefte für Mathematik, Statistics & Probability Letters, Stochastic Processes and their Applications, Comptes Rendus Mathématique, Journal of Theoretical Probability

Reviewer for MathSciNet

Member of: Association of Women in Mathematics, Women in Probability Group, American Mathematical Society, Fachgruppe Stochastik (DMV)

Co-organizer (with M. Hinz, L. Rogers, A. Teplyaev and R. S. Strichartz): 7th Cornell Conference on Analysis, Probability and Mathematical Physics on Fractals, June 2020

Co-organizer (with J. Neemar): Austin-TAMU Probability and Related Fields, Texas A&M University, October 2019

Co-organizer (with P. Mariano): AMS Special Session in Stochastic processes, random walks and heat kernels. Spring Eastern Sectional meeting, Hartford, April 2019

Co-organizer (with J. P. Chen, L. Rogers, A. Teplyaev and R. S. Strichartz): AMS Special Session in Analysis on fractals. Joint Mathematics Meetings, Baltimore, January 2019

Co-writer and developer (with UConn's Mathematics department) of an open-source learning platform for the undergraduate probability courses www.probability.oer.math.uconn.edu, University of Connecticut, Fall 2017 to present

Co-director (with R. S. Strichartz): REU project, Cornell University, 2017

Co-editor (with J. P. Chen, L. Rogers, A. Teplyaev and R. S. Strichartz): Proceedings volume for the 6th Cornell Conference on Analysis, Probability and Mathematical Physics on Fractals 2017

Co-organizer (with U. R. Freiberg and P. Arzt): Mini-Workshop *Dirichlet forms, Riemannian structures and spectral analysis on fractals*, University of Siegen, Germany, June 2012

Mentoring: Online-Programm for female school students "CyberMentor: E-Mentoring-Programm für Mädchen in MINT", University of Regensburg, 2015-2016

Supervision

Co-advisor (with E. Spodarev): B.Sc. Thesis *Estimation of entropy of directional distributions* by J. Schwarz, Spring 2016, Ulm University

Teaching experience

At Texas A&M University: instructor

Math411 Probability, Fall 2019

At the University of Connecticut: instructor

MATH3150 Analysis I, Spring 2019

MATH3160 Probability, Fall 2018

2410Q Differential equations, Fall 2018

MATH3160 Probability, Fall 2017

MATH3160 Probability, Fall 2016 (two sections)

At Ulm University: instructor

Random fields, Spring 2016 (M.Sc. course)

Stochastic for Economic Sciences, Fall 2014 (service course, 150 students)

Stochastic Geometry and its Applications, undergraduate seminar organization, Spring 2014

At the Academy of Sciences, Finance and Technology, Ulm: distance course teaching assitant

Stochastic risk modeling and statistical methods, Spring 2015

Stochastic risk modeling and statistical methods, Spring 2014

Insurance claim mathematics, Spring 2014

At the University of Siegen: teaching assistant

Fractal Geometry, Spring 2013

Mathematics III for engineers, Spring 2013

Linear Algebra I, Fall 2012

Fractal Geometry, Spring 2012

Discrete Mathematics for Computer Sciences, Fall 2011

At the Ludwig-Maximiliams University Munich: undergraduate teaching assistant

Analysis I, Fall 2010

Ordinary Differential Equations, Spring 2010

At the Universidad Complutense Madrid: Undergraduate teaching assistant

Introductory course in Mathematics, Fall 2009

LANGUAGES Spanish (Native), English (Fluent), German (Fluent), French (Good).