Robert G. Smits
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Professor
Department of Mathematical Sciences   Office: (575) 646-2884
New Mexico State University   Home: (575) 522-5538
Las Cruces, NM 88003   e-Mail:
rsmits@nmsu.edu

EDUCATION
Ph.D. Mathematics, ***Purdue University,*** West Lafayette, Indiana (May 1996)
B.S. Mathematics (Minor in Economics), ***University of Nebraska,*** Lincoln, Nebraska
(May 1988). Completed the requirements for a now offered B.S. in Actuarial Science

THESIS
Heat Kernel Estimates and Conditioned Brownian Motion
Thesis advisor: Rodrigo Bañuelos

CURRENT POSITION

Full Professor (Department of Mathematical Sciences, New Mexico State University) 2012- Present

Dr. John A. and Margy Papen Endowed Professor of Actuarial Science (2014-2020)

Tenured position involving research in probability and harmonic analysis with applications, as well as teaching courses in statistics, analysis, partial differential equations and lower level courses throughout the undergraduate curriculum

POSITIONS HELD

Interim Department Head (Department of Mathematical Sciences, New Mexico State University), 2018
Coordinated restructuring of time schedules, updated the PhD program and submitted dozens of course change forms, introduced newsletter for outreach, restructured committee assignments and more

Visiting Research Professor (Department of Mathematics, University of Rome "La Sapienza"-Italy), 2008-2009, 2015-2016
Interacted with the research group in probability and numerical analysis

Associate Professor (Department of Mathematical Sciences, New Mexico State University), 2006-2012

Assistant Professor (Department of Mathematical Sciences, New Mexico State University), 2002-2006

Assistant Professor (Mathematics Department, Towson University 1999 - 2002)
    Position which involved research in probability as well as teaching courses in Actuarial
    Science, mathematical finance, partial differential equations, stochastic modeling

Adjunct Professor (Part-time Engineering Program, Johns Hopkins University 2001 - 2002)
Position which involved the teaching of graduate courses in stochastic processes and probability theory

Visiting Assistant Professor (Department of Mathematics, Syracuse University, 1998 - 1999)
Position which involved the teaching of upper division courses in probability and statistics as well as service courses in calculus, and contributing to research in the analysis and probability groups of the department

Postdoctoral Research Assistant (Department of Agronomy, Purdue University, 1996 - 1998)
Developed and coded stochastic models for the simulation of bacterial motion in a porous medium, as part of an interdisciplinary Office of Environmental Management Grant on the subject of *"Dynamics of Coupled Contaminant and Microbial Transport in Heterogeneous Porous Media"*

RESEARCH INTERESTS
Real and Stochastic Analysis
Applied Probability
Partial Differential Equations
Eigenvalue Problems

FELLOWSHIPS and FUNDED GRANTS
Travel Grant from the College of Arts and Sciences. (Spring 2017)
Grant awarded to support travel to attend Society for Math Biology Conference in support of my research as well as aid in poster presentation of Ph.D. student.

J. William Fulbright Commission-Portugal (May 2011- August 2011)
Fellowship awarded to investigate, "Numerical Approaches to Spectral Gaps and Nonlinear Analogues", with Pedro Freitas of the University of Lisbon, during the summer of 2011.

National Science Foundation – (Analysis Program 2007)
National Science Foundation for support of the New Mexico Analysis Seminar (October 2007, March 2008), Co-PI

College of Arts and Sciences – (Student Performance Enhancement in General Education and Gate Courses Pilot Program 2007) for support in designing materials for Math 210G, including Star Dates, Clickers and Software Modules

National Security Agency (NSA) (May 2005 - September 2007) Young Investigators Award "Singular Stochastic Differential Equations, Conditioned Diffusions and Interest Rate Models", Principal Investigator

National Science Foundation-Conference Board in Mathematical Sciences
National Science Foundation for support of a CBMS conference given by Terence Tao on the topic "Nonlinear and Dispersive Wave Equations", Co-PI in charge of conference facilities and arrangement

National Science Foundation – (Analysis Program 2004)
National Science Foundation for support of the New Mexico Analysis Seminar series (October 2004, June 2005)

Minigrant: *Relaxation Times for Interest Rate Models* (April 2004) NMSU Research

Faculty Development and Research Grant (Spring 2001) Towson University Development Office

Research Fellowship (Fall 1994 - Spring 1996) Purdue Research Foundation Grants

PUBLICATIONS

with Ishraq Al-Awamleh **Statistical and Algebraic Properties of the 4-Laplacian vis Averaging,** submitted

with T. Giorgi **Errata: Principal Eigenalue Estimates via Supremum of Torsion** Indiana University Math Journal to appear 2022

with T. Beck et al "**Improved Bounds for Hermite-Hadamard Inequalities in Higher Dimensions**", accepted Journal of Geometric Analysis

with R. D. DeBlassie "**The Behavior at Infinity of p-Harmonic Measure in an Infinite Slab**", Michigan Math Journal (70) 2021 pg 561-585

with R. D. DeBlassie "**The p-Harmonic Measure of Small Axially Symmetric Sets**", Potential Analysis 49 (2018)

with E. DiCostanzo, et. al. **A discrete in continuous mathematical model of cardiac progenitor cells formation and growth as spheroid clusters (Cardiospheres**), *Mathematical Medicine and Biology (35)* **2018**

with R. D. DeBlassie, **The p-Harmonic Measure of a Small Spherical Cap** Le Matematiche Vol LXXI pp. 149-171, **2016**

with R.D. DeBlassie **The tug-of-war without noise and the infinity Laplacian in a Wedge** Stochastic Processes and their Applications Volume 123, Issue 12, December 2013, Pages 4219‑ 4255

with Falcone, M. Finzi-Vita, S. and Giorgi, T. (in press). **A semi-lagrangian approach for the game p-Laplacian via p-averaging.** Applied Numerical Mathematics Volume 73, November 2013, Pages 63‑ 80

with R. D. DeBlassie **The Expected Time to End the Tug-of-War in a Wedge** (2013) Probability Theory and Related Fields Vol 155 Issue 1-2 347-378

with T. Giorgi, **Mean Value Property for p-Harmonic functions** Proc. Amer. Math. Soc. 140 (2012). No. 7, 2453-2463. 2.

with T. Giorgi, *Gauge uniqueness of solutions to the Ginzburg-Landau system for small superconducting domains*, accepted for publication Siam Journal of Math Analysis 42 (2010) no. 1, pg 163-182

with T. Giorgi, *Principal Eigenvalue Estimates via the Supremum of Torsion*, *Indiana Univ. Math. J.59* (2010) no. 3 pg. 987-1012

The Brachistochrone Problem, between Euclidean and Hyperbolic, refereed conference proceedings, Bridges Leeuwarden 2008, Stenden University, Netherlands

with T. Giorgi, *Bounds and Monotonicity for the Generalized Robin Problem*, Z. Angew. Math. Phys. 59 (2008), no. 4, 600-618

with R.D. DeBlassie, **The Influence of a Power of a Bessel Drift on the Exit Time of Brownian Motion from a Half-Line**, Stochastic Processes and their Applications 117 (2007), no. 5 629-654

with T. Giorgi, **Eigenvalue Estimates and Critical Temperature in Zero Fields for Enhanced Surface Superconductivity**, Z. Angew. Math. Phys. 58 (2007), no.2, 224-245

with R.D. DeBlassie, **Brownian Motion in Self-Similar Domains,** Bernoulli 12 (2006), no.1, 113-132

with T. Giorgi, **Monotonicity Results for the Principal Eigenvalue of the Generalized Robin Problem**, Illinois J. Math. 49 (2005), no. 4, 1133-1143

with R. D. DeBlassie, **Brownian Motion in Twisted Domains,** Trans. Amer. Math. Soc. 357 (2005), no. 3, 1245-1274

with T. Giorgi, **Dynamics on Discrete Structures, a Dialog between Squares and Circles**, Refereed conference proceedings. Bridges 2005, Banff Canada

with T. Giorgi, **From Hot Spots to High School Geometry and Calculus,** refereed conference proceedings. Bridges 2004, Southwestern College, Winfield

Square Decompositions with Hyperbolic Consequences in Art, Chemical Physics and Mathematics, refereed conference proceedings, ISAMA-Bridges 2003, University of Granada

with T. Giorgi, **Remarks on the Existence of Global Minimizers for the Ginzburg-Landau Energy Functional,** Nonlinear Anal. 53 (2003), no.2

with R. Banuelos, R. D. DeBlassie, **The First Exit Time of a Planar Brownian Motion from the Interior of a Parabola,** The Annals of Probability 29 (2001), no. 2, 882-901

with R. Banuelos, **Brownian Motion in Cones,** Prob. Theory Related Fields 108 (1997), no.3, 299-319

Spectral Gaps and Rates to Equilibrium for Diffusions in Convex Domains, Michigan Math. J. 43 (1996), no. 1, 141-157

Necessary and Sufficient Conditions for Finiteness of Lifetime, Potential Anal. 5 (1996), no.5, 513-521

Ph.D. STUDENTS ADVISED

Pradip Aryal, Thesis: *A Study of the Behavior of Brownian Motion Under Brachistochrone-Type Metrics,* December 2014

Qianning Liu, *A Study of a Pharmacokinetic Model,* August 2018

Ishraq Al-Awamleh, May 2022 *A Statistical Representation of a Nonlinear Parabolic Partial Differential Equation*

UNDERGRADUATE STUDENTS ADVISED

Matej Danter, Undergraduate Honors Thesis: *Computational Modeling of Random Interfaces Generated by Stochastic Processes with Parameters,* May 2004

CONFERENCES ORGANIZED

Special Session (American Mathematical Association National Meeting): " Stochastic differential equations and application in mathematical biology", Denver, **January 2020** (organizer, with J. Tian, H. Nguyen and X. Zeng)

Twelfth New Mexico Analysis Seminar (Sponsored by National Science Foundation): University of New Mexico, Albuquerque, **April 2009** (organizer, with C. Pereira, J. Lakey, T. Giorgi and A. Sikora)

Eleventh New Mexico Analysis Seminar (Sponsored by National Science Foundation): New Mexico State University, Las Cruces, **April 2008** (organizer, with C. Pereira, J. Lakey, T. Giorgi and A. Sikora

Tenth New Mexico Analysis Seminar (Sponsored by National Science Foundation): University of New Mexico, Albuquerque, **October 2007** (organizer, with C. Pereira, J. Lakey, T. Giorgi and A. Sikora)

Ninth New Mexico Analysis Seminar (Sponsored by National Science Foundation): University of New Mexico, Albuquerque, **April 2006** (organizer, with C. Pereira, J. Lakey, T. Giorgi and A. Sikora)

Eighth New Mexico Analysis Seminar (Sponsored by National Science Foundation): New Mexico State University, Las Cruces, **June 2005** (organizer, with C. Pereira, J. Lakey, T. Giorgi and A. Sikora

Conference Board in Mathematical Sciences "Nonlinear and Dispersive Wave Equations", by Terence Tao, Las Cruces, **June 2005**

Special Session (American Mathematical Association Sectional Meeting): "Analysis and Geometry in Carnot-Caratheodory Spaces", Albuquerque, **October 2004** (organizer, with L. Capogna)

Seventh New **Mexico Analysis Seminar (Sponsored by National Science Foundation):** University of New Mexico, Albuquerque, **October 2004** (organizer, with C. Pereira, J. Lakey, T. Giorgi and A. Sikora)

Bridges International Conference-Mathematical Connections between Art and Mathematics Towson University, Towson, Maryland, **July 2002** (Chair of Registration)

CONFERENCE TALKS

Second International Conference on Applications of Mathematics to Nonlinear Sciences, Pokora Nepal, June 2019 *P-harmonic Measure in Slabs and Other Regions*

Conference in stochastic analysis and related topics, West Lafayette IN, May 2015, *Cones, kernels, eigenvalues, averaging and harmonic measure for the normalized and variational p-Laplacian*

AMS Western Spring Meeting, Albuquerque 2014 *A Cox-Ingersoll-Ross type Model with Subexponential Return Times.*

Frontier Probability Days, Tucson Arizona May 2014, *The tug-of-war without noise and the infinity laplacian in a wedge*

AMS Southeastern Sectional Meeting, Lexington, KY, March 2010, *Brownian Motion and the Bass Note of a Drum, What's New*

Brownian Motion and Partial Differential Equations, Workshop, organizer: Dr. Bernd Kawohl, University of Cologne, April 14-17, 2009, *Main speaker* (http://www.mi.uni-koeln.de/mi/Forschung/Kawohl/Oberseminarlisten/obersemiss09liste.htm)

Bridges Leeuwarden, Stenden University, Netherlands, July 2008, *The Brachistochrone Problem, between Euclidean and Hyperbolic*

AMS Western Section Meeting, Albuquerque, October 2007, *Asymptotic Analysis of a Cox-Ingersoll-Ross Type Diffusion*

Low Eigenvalues of Laplace and Schrodinger Operator, American Institute of Mathematics, Palo Alto, California, May 2006, *supporting speaker*

Bridges, Southwestern College, Winfield, July 2004**,** *From Hot Spots to High School Geometry and Calculus*

Sixth International Joint Meeting of the AMS and the Sociedad Matematica Mexicana (SMM), Houston, May 2004, *Sub-exponential Decay of Heat Kernels and Brownian Motion*

Third Prairie Analysis Seminar, Kansas State University, October 2003, *Heat Kernels and the Martin Boundary*

ISAMA-Bridges, University of Granada*,* Spain, July 2003, *Decompositions with Hyperbolic Consequences in Art, Chemical Physics and Mathematics*

Second Prairie Analysis Seminar, University of Kansas, October 2002, *Brownian Motion and Conformal Mapping*

Harmonic Measure from a Geometric and Analytic Point of View, University of Arkansas, March 2000, *Geometric Properties of the Laplacian in Unbounded Domains*

MFO, Conference on "Spectral Theory and Stochastic Analysis", **Oberwolfach** Germany, August 1998 (invited participant, **speaker)**

916th Meeting of the AMS, Columbia, Missouri, November 1996 (invited speaker), *Spectral Gaps for Diffusions in Convex Domain*

TEACHING EXPERIENCE
New Mexico State University, Fall 2002 - present
Taught undergraduate and graduate courses in probability and in statistics for both
engineering and business students

Johns Hopkins University, 2001-2002
Taught graduate sequences in Stochastic Modeling for professional engineers at the Applied Physics Laboratory

Syracuse University, Fall 1998 - Spring 1999
Taught upper division courses in applied probability-statistics for mathematics and
engineering students, and applied calculus with TI92 Graphing Calculator

UNDERGRADUATE STUDENTS ADVISED Matej Danter, Undergraduate Honors Thesis: *Computational Modeling of Random Interfaces Generated by Stochastic Processes with Parameters,* May 2004