Mary R. Sandoval
Department of Mathematics
Trinity College

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Work Address
300 Summit Street
Department of Mathematics
Hartford, CT 06106

Phone: 860-297-2062
Fax: 860-297-6239
Email: mary.sandoval@trincoll.edu

Education

B. A. cum laude in mathematics, Yale University, 1989.

M. S. in mathematics, The University of Michigan, 1993.

Ph. D. in mathematics, The University of Michigan, 1997.
Dissertation: *Spectral Asymptotics for Operators of Dirac Type*, Alejandro Uribe, adviser.

Professional Academic Positions

Research Assistant Professor, Purdue University, 1997 to 1999.

Visiting Assistant Professor, Trinity College, 1999 to 2001.

Assistant Professor, Trinity College, 2001 to May, 2007

Associate Professor, Trinity College, May 2007 to present.

Research Interests: Geometric Analysis; Spectral Theory; Global Analysis; Foliations; Isometric Group Actions; Singular Spaces; Singular Riemannian Foliations.

Professional Memberships

The American Mathematical Society

The Mathematical Association of America

The Association for Women in Mathematics

The Society for Advancement of Chicanos and Native Americans in Science

Courses Taught at Trinity College

Math 107: Elements of Statistics. A non-calculus based introduction to statistics.

Math 114: Judgement and Decision-Making. A course for non-majors.

Math 125: Functions and Limits.

Math 126: Calculus I with Algebra and Trigonometry.

Math 127: Functions, Graphs, and Modeling.

Math 131: Calculus I.

Math 132: Calculus II.

Math 142: Accelerated Calculus II. An honors course for advanced first year students.

Math 205: Abstraction and Argument. An introduction to Proof Writing and Abstract Thinking.

Math 231: Calculus III.[1]

Math 225: Dynamical Systems and Chaos.[2]

Math 228: Linear Algebra. An abstract course for Math majors.[3]

Math 234: Differential Equations. A methods course for Engineering students.

Math 303: Mathematics of Discrete Structures. An introductory course to more traditional Abstract Algebra courses.

Math 304: Mathematics of Continuous Structures. An introductory course to more abstract versions of Analysis.

Math 307: Abstract Algebra I. Group Theory.

Math 318: Topics in Geometry: Differential Geometry.[4]

Math 318: Topics in Geometry: Plane Geometry. A geometry course for future high school teachers.[5]

Math 318: Topics in Geometry: Special Relativity and the Geometry of Spacetime.[6]

Math 318: Topics in Geometry: A Survey Course in Introductory Topology.[7]

Math 318: Topics in Geometry: Metric Spaces.[8]

Math 325: Special Topics in Analysis: Introduction to Lie Groups.[9]

[1] In 2020, I developed a fully flipped version of this course.
[2] This course was developed from scratch.
[3] In 2021, I developed a fully flipped version of this course.
[4] This course was developed from scratch.
[5] This course was developed from scratch.
[6] This course was developed from scratch.
[7] This course was developed from scratch.
[8] This course was developed from scratch.
[9] This course was developed from scratch.

Math 325: Special Topics in Analysis: The Geometry of Spacetime.[10]

Math 332: Analysis II. Topic: Introductory Complex Analysis.[11]

Math 400: Senior Seminar. Euclidean and Non-Euclidean Geometries Via the Moore Method.[12]

Math 400: Senior Seminar. Naive Lie Theory.[13]

Math 401: Senior Seminar. Lie Groups and Lie Algebras.[14]

FYSM 113: Symmetry and Pattern in Science, Art, Mathematics and Music.[15] A seminar for incoming first year students.

FYSM 152 In Search of a Good Life.[16] A seminar for incoming first year students, encompassing selected topics in Stoic and Buddhist philosophies, neuroscience, positive psychology, and behavioral economics.

Teaching Honors or Information of Note

Nominated for the Brownell Teaching Prize, 2015.

Project NEXT Fellow, 1997–1998, a selective professional development program for new Ph.D.'s who are interested in improving the teaching of undergraduate mathematics.

Pedagogical Grants

Information Technology in Education Committee (ITEC) Course Development Grants for 2012-13.

Center for Teaching and Learning Fellow for 2013-2014.

Writing Center Fellow, Spring 2021.

Mellon Grant, AY2020-2021.

Student Research

Supervised Senior Theses:

Corazon Irizarry, 2009
Andrei Marchidan, 2013
Vlad Burca, 2014
Greg Convertitio, 2016
Samantha Jarvis, 2019

Second Reader for Senior theses of Adam Fong (2017) , Thu Bui (2021).

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[12] This course was developed from scratch.
[13] This course was developed from scratch.
[14] This course was developed from scratch.
[15] This course was developed from scratch.
[16] This course was developed from scratch.

Research Publications

Wave-Trace Asymptotics for Operators of Dirac Type. Communications in Partial Differential Equations, vol. 24, 1999, pp. 1903–1943.

Band Asymptotics for the Dirac Operator on the N-Dimensional Sphere. Communications in Partial Differential Equations, vol. 28, 2003, pp. 561–579.

The Singularities of the Wave Trace of the Basic Laplacian of a Riemannian Foliation. Journal of Functional Analysis, vol. 243, No. 1, 2007, pp. 1–27.

Wave Invariants of the Spectrum of the G-Invariant Laplacian and the Basic Laplacian of a Riemannian Foliation. Communications in Partial Differential Equations, vol. 33, 2008, pp. 1818–1846.

The Wave Trace of the Basic Laplacian of a Riemannian Foliation at a Non-zero Period. Annals of Global Analysis and Geometry, vol. 44, No. 2, 2013, pp. 217–244.

The G-invariant Spectrum and Non-orbifold Singularities. Joint work with I. Adelstein. Archiv der Mathematik, vol. 109, No. 6, 2017, pp. 563–573.

Leaf Space Isometries of Singular Riemannian Foliations and Their Spectral Properties. Joint work with I. Adelstein. Sao Paolo Journal of Mathematical Sciences, vol. 15, 2021, pp. 3–19.

Do the Hodge Spectra distinguish Orbifolds from Manifolds? Part 1. Joint work with Katie Gittens, Carolyn Gordon, Magda Khalile, Ingrid Membrillo-Solis, and Liz Stanhope (Women In Geometry 2 Spectral Theory Team). Accepted, to appear in Michigan Mathematics Journal.

Current Works in Progress

Mean Curvature and the Wave Invariants of the Basic Spectrum for a Riemannian Foliation. Submitted, under review.

Do the Hodge Spectra distinguish Orbifolds from Manifolds? Part 2. Joint work with Katie Gittens, Carolyn Gordon, Magda Khalile, Ingrid Membrillo-Solis, and Liz Stanhope (Women In Geometry 2 Spectral Theory Team), and J. P. Rosetti. Manuscript in preparation.

Professional Activities and Presentations of Note

Research Presentation: "Do the Hodge Spectra Distinguish Manifolds from Orbifolds? Part 1," *AWM Special Session on Women in Geometry.* Joint Mathematics Meeting, April 6, 2022.

Research Presentation: "Geometric Invariants of the Basic Spectra," *Zoom Research Workshop.* June, 2020 and July, 2020.

Research Presentation: "Using the Heat Invariants to Distinguish Orbifolds from Manifolds," *Women in Geometry Workshop II.* Banff International Research Station-Casa Matematica de Oaxaca, Oaxaca, Mexico, June 26, 2019.

Research Presentation: "Spectral Theory Via Quotients," *Geometry and Topology Seminar.* Dartmouth University, May 15th, 2018.

Research Presentation: "Leaf Spaces of Singular Riemannian Foliations and Applications to Spectral Geometry," *EGEO 2016, VI Workshop in Differential Geometry in La Falda, Sierras de Córdoba, Argentina,* August 4th, 2016.

Undergraduate Research Presentation: "Symmetry in Mathematics: A Unifying Theme," *Smith College Colloquium,* September 24, 2015.

Research Presentation: "Wave-Trace Methods on Singular Spaces," *Geometry and Topology Seminar.* Dartmouth University, May 26, 2015.

Research Presentation: "Some Inverse Spectral Results for Related Singular Spaces," *Geometry and Topology Seminar.* Dartmouth University, November 3, 2009.

Research Presentation: "Spectral Theory of the Orbit Spaces of Certain Lie Groupoids: orbifolds, G-manifolds, and Riemannian Foliations," *Workshop on Global Riemannian Geometry, Orbifolds, and Related Topics.* Middlebury College, Middlebury, Vermont, October 10, 2009. Sponsored by the Mellon Foundation.

Research Presentation: "Connections between Singular Spaces: Leaf spaces of Foliated Riemannian Manifolds and Orbifolds," 2009 Sectional Meeting of the American Mathematical Society at San Francisco State University, April 25, 2009.

Faculty Research Committee Common Hour Presentation: "Shadows of Symmetry: A Geometry for Studying Abstract Mathematical Symmetries," March 26, 2009.

Mathematical Sciences Institute Visiting Member: Invited participant in the *Special Semester on Singular Spaces*, Mathematical Sciences Research Institute, Berkeley, California, August–December, 2008.

Research Presentation: "Partial Wave-traces for Two Classes of Examples of Singular Spaces," *Special Session on Inverse Problems in Geometry.* Joint Mathematics Meetings, San Diego, California, January, 2008.

Consulting Project for J. Ristas of Alix, Yale & Ristas, LLP. Prepared several exhibits involving the mathematical analysis of the differences between two families of plane curves in a relation to a patent application. May, 2006.

Research Presentation: "Microlocal Analysis and the Singularities of the Basic Wave Kernel for the Basic Laplacian on a Riemannian Foliation." *Geometry/Topology Seminar.* Dartmouth University, February 28, 2006.

Research Presentation: "The Singularities of the Basic Wave Kernel for the Basic Laplacian on a Riemannian Foliation." *Special Session on Scattering and Spectral Problems in Geometry,* Fall Sectional Meeting of the American Mathematical Society Meeting, Lincoln, Nebraska, October, 2005.

Mathematical Sciences Institute Visiting Member: Invited participant in the *Spectral Invariants Workshop,* Mathematical Sciences Research Institute, Berkeley, California, March 2001.

Research Presentation: "Spectral Clustering for the Dirac Operator on Spheres," Special Session on Spectral Theory, American Mathematical Society Meeting, Louisville, March 1998.

Fields Institute Visiting Scholar: Invited participant at the *Workshop for Microlocal Methods in Geometric Analysis,* Fields Institute, Toronto, Canada, 1997.

Research Grants

Grant to participate in an international collaboration with Banff International Research Station and Casa Matematica Oaxaca, June 2019.

Grant to attend the conference: Lie Group Actions in Riemannian Geometry at Dartmouth College, June 2017.

Travel Grant to attend the EGEO 2016, VI Workshop in Differential Geometry in La Falda, Argentina, July 2016.

Travel Grant to attend the Mathematical Sciences Research Institute and visiting membership at the Institute, Berkeley, 2008.

Travel Grant to attend the Mathematical Sciences Research Institute and visiting membership at the Institute, Berkeley, 2001.

Service to Trinity College

Co-Advisor, Pi Mu Epsilon Honor Society, 2001 to present.

Department Search Committees, Spring 2002, Spring 2004, Spring 2006-2021.

June Task Force of the Curriculum Committee, serving on the Diversity Subcommittee and the Distribution Requirement Subcommittee, June 2003.

Member of the Jury Panel, 2004–2010, September, 2013–2016.

Member of the Committee on Committees, 2004–present. Served as Chair, April 2005–July 2006.

Member of the Committee to Select the Faculty Scholar, 2004–2007.

Faculty Parliamentarian, AY 2006–2007.

Member of the Charter Committee on Campus Climate, Fall 2007.

Member of the President's Campus Climate Council, Spring 2008–2010.

Posse mentor to New York Posse 7 for 2009–2011.

Member of Search Committee for Philosophy Position, 2012.

Department Chair, July, 2010–December, 2012, January, 2013–June, 2013.

Member of Faculty Conference, September, 2012–January, 2013; July, 2020–June, 2022.

Member of Assessment Committee, January, 2014–June, 2014

Interim Director of the Aetna Q-Center, January, 2013–June, 2013

Member of the Financial Affairs Committee/PBC/Benefits Committee (July, 2014–June, 2018).

Member of Search Committee for the Dean of Students (AY2014–2015)

Title IX Panelist, July, 2014–2016

Faculty Diversity Working Group, Spring, 2015–2017

Member of Search Committee for Computer Science Position, 2016, 2019, and 2020.

Member of the Bicentennial Resource Subcommittee, Fall 2016.

Member of Search Committee for Mechanical Engineering Position, 2017 and 2018.

Member of IDP Council, Fall 2017–Fall 2020.

Chair of Hearing Panel, 2017–2018.

Member of the Retirement Committee, September 2019–present.

Faculty mentor through the MAST program, June 2022–present.

Community Service

Project NExT consultant, AY 2019-2020.

Advisor to the Early Career Mathematician's Network, Mathematical Association of America, 2018 to present.

Advisor and Participant at the annual New England Board of Higher Education Science Network Meeting at MIT.

Participant in MentorNet, an e-mentoring network for Women in Engineering and Science.

Mentor for MathAlliance, a mentoring program for underrepresented doctoral students in the mathematical sciences and statistics, 2022.

Appointed as the American Mathematical Society Representative on the Joint Committee On Women In the Mathematical Sciences for a 3-year term beginning 2/1/2023.