D. Corbett Redden

Curriculum Vitae

Contact Information

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Education

1997-2001. Rice University. B.A. in Mathematics and Philosophy.

2001-2006. University of Notre Dame. M.S, Ph.D. in Mathematics.

Ph.D. Thesis Title: Canonical metric connections associated to string structures.
Ph.D. Advisor: Prof. Stephan Stolz

Personal

Date of birth: March 30, 1979
Citizenship: United States

Positions

2006-2009. SUNY Stony Brook. Simons Instructor and RTG Postdoctoral Fellow.

2009-2011. Michigan State University. RTG Postdoctoral Fellow.

2011. Hausdorff Research Institute for Mathematics. Bonn, Germany. Participant in Junior Trimester Program "Differential Geometry."

2012. Max Planck Institute for Mathematics. Bonn, Germany. Visiting researcher.

Research Interests

Algebraic Topology, Differential Geometry, and interactions with Quantum Field Theory.

Journal Publications and Preprints

Harmonic forms on principal bundles. *Asian J. Math.*, to appear.

String structures and canonical 3-forms. *Pacific J. Math.*, 249(2):447-484, 2011.

Trivializations of differential cocycles. [arXiv:1201.2919]

Geometric string structures and trivializations. *in preparation.*

Articles in Conference Proceedings

Elliptic cohomology: a historical overview. to appear in *Proceedings of 2007 Talbot workshop on TMF.*

String structures, 3-forms, and tmf classes. *Oberwolfach Reports* No. 28/2009, edited by G.-M. Greuel, EMS Publishing House, 2009.

Outreach

Supervised high-school student Ian Drayer in a research project "Irrational Tangles." His paper was submitted to Intel STS, Siemens, and LISEF competitions. 2007.

Taught mathematics lessons to 3rd graders at JFK Intermediate School and enriched 1st graders at JQA Primary School. Deer Park, NY. 2007, 2009.

Undergraduate Math Club talk: The Gauss–Bonnet Theorem. Stony Brook, 2008.

Created and taught module on Population Dynamics at SpartaNature, a summer program for incoming freshmen which takes place at MSU's Kellogg Biological Station. 2011

Teaching Experience

Michigan State University

MTH 132 – Calculus I – Limits, derivatives, integrals, and applications. ∼30 students. Fall 2009.

MTH 234 – Multivariable Calculus – Vectors in $\mathbb{R}^3$, functions of several variables, partial derivatives, multiple integrals, line/surface integrals, Green/Stokes theorem. ∼85 students. Spring 2010.

MTH 309 – Linear Algebra – Linear algebra for abstract vector spaces. This is the first proof-based course for most students. ∼25 students. Fall 2010, Spring 2011.

SUNY Stony Brook

MAT 123 – Introduction to Calculus – Pre-calculus. Covers rational, exponential, logarithmic, and trigonometric functions. Introduces asymptotes and limits. One section had ∼150 students, and the other had ∼50 students. Fall 2006 (2 sections).

MAT 131 – Calculus I – Limits, derivatives, integrals, FTC, and applications. This is the faster calculus sequence, as MAT 131,132 cover the same material as MAT 125, 126, 127. I was course coordinator for the multi-section course. ∼90 students. Spring 2007.

MAT 132 – Calculus II – A continuation of MAT 131, covering symbolic and numeric methods of integration; area under a curve; volume; applications such as work and probability; improper integrals and l'Hospital's rule; complex numbers; sequences; series; Taylor series; differential equations; and modelling. Mandatory use of programmable calculators. ∼50 students. Spring 2009.

MAT 205 – Calculus III – Vector algebra, multivariate differential and integral calculus, divergence and curl, line and surface integrals, theorems of Green, Gauss, and Stokes. ∼35 students. Spring 2008.

MAT 303 – Calculus IV with Applications – ODEs. First order equations (incl. separable, homogeneous, exact), linear differential equations with constant coefficients, and systems of linear equations, matrix exponentiation, stability, applications. ∼70 students. Fall 2007.

MAT 531 – Topology and Geometry II – Graduate core course on differentiable manifolds, using Spivak's "A Comprehensive Introduction to Differential Geometry, Vol. 1." 13 students. Spring 2008.

MAT 552 – Lie Groups and Lie Algebras – 2nd year graduate course on Lie groups, Lie algebras, and their representations. 6 students. Fall 2008.

University of Notre Dame

MATH 105 – Elements of Calculus I – First year calculus course designed for students not majoring in engineering or natural science. ∼50 students. Fall 2004.

MATH 108 – Elements of Calculus II-Business – This continuation of Math 105 focuses on applications of calculus to business. Includes exponential/logistic growth, optimization problems with functions of 2 variables, numeric methods, Taylor series, and probability. ∼30 students. Spring 2005.

MATH 225 – Calculus III – Multivariable calculus course for natural science and engineering majors. ∼50 students. Spring 2004.

Calculus A and B, Calculus I and II – Teaching assistant. Duties included leading weekly recitation sections, holding office hours, grading quizzes. Fall 2002, Spring 2003, Fall 2003, Fall 2005.

Service

Reviewer for Mathematical Reviews

Reviewer for Zentralblatt MATH

Referee for Journal of the Australian Math Society

Examiner for oral qualifying exams, Stony Brook

Selected Presentations

Higher Structures in Geometry and Physics Conference, Göttingen, November 2011.

Junior HTP Seminar, Hausdorff Research Institute, October 2011.

Oberseminar Topologie, Ruhr-Universität Bochum, October 2011.

Topology Seminar, Michigan State, April 2011.

AMS/MAA Joint Mathematics Meeting, New Orleans, January 2011.

Operator Algebras and CFT Workshop, University of Oregon, August 2010.

Topology Seminar, Notre Dame, February 2010.

Geometric Analysis Seminar, Michigan State, September 2009.

Workshop on Strings, Fields, and Topology, Oberwolfach, Germany, June 2009.

AIM SQuaREs workshop in Algebraic Topology and Physics, Palo Alto, CA, June 2009.

Geometry/Toplogy Seminar, Stony Brook, October 2008.

Topology Seminar, Notre Dame, August 2008.

AIM SQuaREs workshop in Algebraic Topology and Physics, Palo Alto, CA, May 2008.

Topology Seminar, University of Virginia, May 2007.

Topology Seminar, MIT, April 2007.

MIT-Talbot Workshop on Topological Modular Forms, March 2007.

Geometry/Topology Seminar, Stony Brook, November 2006.

Topology Seminar, Northwestern University, April 2006.

Graduate Geometry Seminar, University of Texas Austin, March 2006.

Special Session on Topology and Physics, AMS Sectional Meeting, Notre Dame, IN, April 2006.

Topology Seminar, Notre Dame, October 2005.

MIT-Talbot Workshop on the Stolz–Teichner Model of Elliptic Cohomology, February 2004.

Numerous working seminar talks at Notre Dame.

Research Support

Michigan State University RTG Geometry and Topology Postdoctoral Fellowship, Fall 2009-Summer 2011. (summer support, travel stipend)

SUNY Stony Brook RTG Program in Geometry and Physics Postdoctoral Fellowship, Summer 2008-Summer 2009. (summer support, travel and computer stipend)

AIM SQuaREs research program in Algebraic Topology and Physics, 2008-2010. (support to attend yearly research meeting)

Selected Workshops and Conferences Attended

Higher Structures in Geometry and Physics, Göttingen, November 2011.

AMS/MAA Joint Mathematics Meeting, New Orleans, January 2011.

AMS Fall Central Section Meeting, Notre Dame, November 2010.

Operator Algebras and CFT Workshop, University of Oregon, August 2010.

Michigan Conference on Topology and Physics, University of Michigan, February 2010.

AMS/MAA Joint Mathematics Meeting, San Francisco, January 2010.

Mayday 2009 Midwest Topology Seminar, University of Chicago, October 2009.

Oberwolfach workshop on Strings, Fields, and Topology, Germany, June 2009.

FRG Workshop on Algebraic Topology and Quantum Field Theory, CUNY Grad Center, September 2008.

AIM SQuaREs workshop in Algebraic Topology and Physics, Palo Alto, CA, May 2008, June 2009.

AMS/MAA Joint Mathematics Meeting, Washington D.C., January 2009.

Yang/Simons Conference on The Stony Brook Dialogues in Mathematics and Physics, Stony Brook, March 2008.

Abel Symposium on Algebraic Topology, Oslo, Norway, August 2007.

MIT-Talbot Workshop on TMF, Spring 2007.

AMS Spring Central Sectional Meeting, Notre Dame, April 2006.

MIT-Talbot Workshop on Automorphisms of Manifolds, Spring 2006.

Oberwolfach workshop on Geometric Topology and Connections with Quantum Field Theory, Germany, June 2005.

Workshop on Forms of Homotopy Theory: Elliptic Cohomology and Loop Spaces, Fields Institute, September 2004.

MIT-Talbot Workshop on The Stolz-Teichner Model of Elliptic Cohomology, February 2004.

Workshop on Topological Modular Forms, Universität Münster, Germany (October 2003)

Spring School on Noncommutative Geometry, Vanderbilt, May 2003.

Numerous Midwest Topology Seminars