

# Stefan M. Mendez-Diez

Mathematics Program, Bard College  
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## Education

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**University of Maryland**, College Park, MD

Ph.D. Applied Mathematics with a specialization in Physics

**August 2010**

**Thesis:** K-Theoretic Aspects of String Theory Dualities

**Committee:** Jonathan Rosenberg (Advisor), James Gates, Theodore Jacobson, Serguei Novikov, Hisham Sati

**Ph.D. Written Qualifying Exams:** Quantum Mechanics, Algebra, Topology

**University of Chicago**, Chicago, IL

B.A. Physics with Special Honors

**June 2004**

**Thesis Topic:** Found a conformal transformation under which the energy density remains finite at both the bang and crunch in Paul Steinhardt and Neil Turok's theory of the cyclic universe.

**Advisor:** Sean Carroll

B.S. Mathematics with Honors

**June 2004**

## Research Experience

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**Bard College**, Annandale-on-Hudson, NY

Visiting Assistant Professor, Mathematics Program

**August 2016-Present**

**Utah State University**, Logan, UT

Postdoctoral Fellow, Mathematics Department

**2014-2016**

**University of Alberta**, Edmonton, AB Canada

Postdoctoral Fellow, Mathematics Department

**2010-2014**

**University of Maryland**, College Park, MD

Research Assistant, Mathematics Department

**2008-2010**

Active member in the string theory Research Interaction Team

**2004-2007**

**NASA Goddard Space Flight Center**, Greenbelt, MD

Research Assistant, Numerical Relativity Group

**2005**

**University of Chicago**, Chicago, IL

Physics Research Student and member of the Kavli Institute for  
Cosmological Physics

**2003-2004**

VIGRE Research Experience for Undergraduates in Mathematics

**Summer 2001**

**Tulane University**, New Orleans, LA

Research Experience for Undergraduates in computational Fluid  
Dynamics

**Summer 2003**

**University of Puerto Rico, Humacao**, Humacao, Puerto Rico

Summer Institute of Mathematics for Undergraduates (SIMU)

**Summer 2002**

## **Publications and Preprints**

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C. Doran, A. Malmendier, S. Mendez-Diez, J. Rosenberg. K3 Orientifolds. Preprint in preparation (22 pgs.).

C. Doran, K. Iga, J. Kostiuk, G. Landweber, S. Mendez-Diez. Geometrization of N-Extended 1-Dimensional Supersymmetry Algebras, II. To be submitted to *Advances in Theoretical and Mathematical Physics*. Available at arXiv:1610.09983.

S.J. Gates, T. Hübsch, K. Iga, S. Mendez-Diez. N=4 and N=8 SUSY Quantum Mechanics and Klein's Vierergruppe. To be submitted. Available at arXiv:1608.07864.

C. Doran, K. Iga, J. Kostiuk, G. Landweber, S. Mendez-Diez. Geometrization of N-Extended 1-Dimensional Supersymmetry Algebras, I. *Advances in Theoretical and Mathematical Physics*, 19 (5), 2015. Available at arXiv:1311.3736.

C. Doran, S. Mendez-Diez, J. Rosenberg. String Theory on Elliptic Curve Orientifolds and KR-theory. *Communications in Mathematical Physics* 335 (2015), no. 2, 955-1001. Available at arXiv:1402.4885.

C. Doran S. Mendez-Diez, J. Rosenberg. T-duality for Orientifolds and Twisted KR-theory. *Letters in Mathematical Physics*: Volume 104, Issue 11 (2014), Page 1333-1364. Available at arXiv:1306.1779.

S. Mendez-Diez, J. Rosenberg. K-theoretic Matching of D-brane Charges in S- and U-duality. *Advances in Theoretical and Mathematical Physics*, 16 (6):1591-1618, 2012. Available at arXiv:1007.1202.

H. Flores, E.J. Lobaton, S. Mendez-Diez, S. Tlupova, and R. Cortez. A Study of Bacterial Flagellar Bundling. *Bulletin of Mathematical Biology*, 67, 2005, 137-158.

### **Research Featured In:**

J. Rosenberg. Dualities in Field Theories and the Role of K-theory. Based on talks at the Closing Meeting on Perspectives in Deformation Quantization and Noncommutative Geometry, RIMS, Kyoto, February, 2011. Available at arXiv:1107.5015.

R. Doran, G. Friedman, J. Rosenberg. Superstrings, Geometry, Topology, and C\*-algebras. Proceedings of Symposia in Pure Mathematics, Volume 81.

## **Research Mentorship and Professional Activities**

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Senior research participant and mentor at the *Adinkra Mini-Meeting* at Brown University, Providence, RI, USA, December 2016.

Co-organizer and Lecturer at the *Pacific Institute for the Mathematical Sciences Undergraduate Workshop on Supersymmetry* at the Pacific Institute for the Mathematical Sciences at the University of British Columbia, BC, Canada, May 2014 and August 2016.

Ran workshop on relationship between the sciences and the humanities at the *Midwest Mellon Mays Undergraduate Fellowship Regional Conference* at the University of Chicago, Chicago, IL, USA, November 2014.

Ran student research panel in mathematics and physics at the *Midwest Mellon Mays Undergraduate Fellowship Regional Conference* at the University of Chicago, Chicago, IL, USA, November 2014.

Co-editor of the String Math 2014 Conference Proceedings. To be published as a volume in the *Proceedings of Symposia in Pure Mathematics* by the American Mathematical Society.

Co-organizer of *String Math Conference* at University of Alberta, AB, Canada, June 2014. The String Math Conference is the most prominent international conference in the field of mathematical physics related to string theory.

Invited panelist at the *Underrepresented Students in Topology and Algebra Research Symposium* at the University of California, Berkeley, CA, USA, April 2014.

Reviewed grant proposals for the NSA's Mathematical Sciences Program, 2014.

Co-supervisor for James Iverson, MSc Mathematics, University of Alberta, 2013-2015.

Lecturer for the Geometry and Physics course for the Alberta Summer Mathematics Institute. Developed and ran a course on general relativity for high school students attending the summer program, Summers 2011-2013.

Guest Lecturer at Math Mania - 2013, a summer camp for First Nations students at Ermineskin Elementary School, Hobbema, AB, Canada, July 2013.

Teaching Assistant for a Summer REU geared towards minorities and women in computational fluid dynamics at Tulane University, New Orleans, LA, Summer 2006.

Mellon Mays Undergraduate Fellow in Physics at the University of Chicago, 2003-2004.

## **Senior Project Students**

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Darren Tirto (Joint Mathematics and Computer Science)

Yuming Liu

**2017/2018**

**2017/2018**

## Teaching

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### **Bard College**

Instructor

Tutorial on Vector Calculus (Spring)	<b>2018</b>
Math 321: Differential Equations (Fall)	<b>2017</b>
Math 142: Calculus II (Fall)	<b>2017</b>
Math 301: Scientific Computing (Spring)	<b>2017</b>
Math 141: Calculus I (Fall/Spring)	<b>2016-2017</b>

### **Utah State University**

Instructor

Math 6910: Hilbert Spaces (Spring)	<b>2016</b>
Math 2270: Linear Algebra (Spring/Fall)	<b>2015</b>

### **University of Alberta**

Instructor

Math 115: Elementary Calculus II (Winter)	<b>2011-2012</b>
Math 113/114: Elementary Calculus I (Fall)	<b>2010-2013</b>

### **University of Maryland**

Instructor

Math 115: Precalculus (Fall/Spring)	<b>2006-2008</b>
Stat 100: Introduction to Statistics (Spring)	<b>2006</b>

Teaching Assistant

Math 140: Calculus (Fall/Spring)	<b>2005</b>
Math 221: Business Calculus (Fall)	<b>2004</b>

### **Montgomery Community College**

Adjunct Professor

MA 181: Business Calculus (Fall)	<b>2007</b>
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### **University of Chicago**

Teaching Assistant

Math 130: Calculus (Fall/Winter/Spring) **2001-2004**

Worked with incoming freshman from Chicago public schools to help prepare them for college level math. (Summer) **2004**

The Young Scholars Program, part of VIGRE (Summer) **2001**

### **Kenwood Academy**

Ran an after school tutoring program in mathematics and physics. (year round) **2001-2004**

## **Selected Talks**

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*Spin Curves from Supersymmetry Algebras.* Presented at the String Math Conference, Tsinghua Sanya International Mathematics Forum, December 2015.

*The Mathematics of Supersymmetry.* Presented at the University of Missouri - St. Louis Mathematics Colloquium, University of Missouri - St. Louis, October 2014.

*The Unreasonable Effectiveness of the Natural Sciences in Mathematics.* Presented at Pepperdine University Natural Sciences Colloquium, Pepperdine University, October 2014.

*T-duality of Real Elliptic Curves.* String Math Workshop on Calabi-Yau Manifolds and their Moduli, University of Alberta, June 2014.

*Geometrization of N-Extended 1-Dimensional Supersymmetry Algebras.* Presented at the String Math Conference, University of Alberta, June 2014.

*Electricity and Magnetism Revisited.* Presented at Colby Mathematics Colloquium, Colby College, October 2012.

*Elliptic Curves, KR-theory, and T-duality.* Presented at the Canadian Number Theory Association 2012 Meeting, University of Lethbridge, June 2012.

*Elliptic Curves, KR-theory, and T-duality.* Presented at the Canadian Mathematical Society's Summer Meeting, Regina, Saskatchewan, June 2012.

*T-duality of Real Elliptic Curves and KR-theory.* Presented at Hodge Theory and String Duality, Banff International Research Station, December 2011.

*K-theoretic Aspects of String Theory Dualities.* Presented at the String Math Conference, University of Pennsylvania, June 2011.

*K-theoretic Aspects of String Theory Dualities.* Presented at the Canadian Mathematical Society's Summer Meeting, June 2011.

*D-branes and String Theory Dualities.* Presented at the Applied Mathematics and Scientific Computing Student Seminar, October 2009.

*D-branes and String Theory Dualities.* Presented at the SACNAS National Conference, October 2009.

*D-branes*, presented at D.C. Mathematics Graduate Student Meeting, George Washington University. April 2009.

*D-branes and K-theory*, talk given at the Geometry and Topology Seminar at the University of Maryland.

## **Conferences and Workshops Attended**

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Pacific Institute for the Mathematical Sciences' 2014 Geometry and Physics Workshop, Vancouver, BC, University of British Columbia, May 2014.

String Math Conference, Stony Brook, NY, Simons Center for Geometry and Physics, June 2013.

Workshop on Refined Invariants in Geometry, Topology and String Theory, Banff, AB, Banff International Research Station, June 2013.

Workshop on String Theory and Generalized Geometries, Banff, AB, Banff International Research Station, December 2012.

String Math Conference, Bonn, Germany, University of Bonn, July 2012.

Canadian Number Theory Association XII Meeting, Lethbridge, AB, University of Lethbridge, June 2012.

Canadian Mathematical Society's Summer Meeting, Regina, SK, June 2012.

Workshop on Hodge Theory and String Duality, Banff, AB, Banff International Research Station, December 2011.

String Math Conference, Philadelphia, PA, University of Pennsylvania, June 2011.

Canadian Mathematical Society's Summer Meeting, Edmonton, AB, University of Alberta, June 2011.

Harvey Mudd Mathematics Conference: Broadening Participation in the Mathematical Sciences, Claremont, CA, Harvey Mudd College, February 2011.

Summer School on Mathematical String Theory, Blacksburg, VA, Virginia Tech, June 2010.

Michigan Conference on Topology and Physics, Ann Arbor, MI, February 2010.

Attended the annual Society for the Advancement of Chicanos and Native Americans in Science National Conference, 2002-20014.

NSF/CMBS Conference on Topology, C\*-algebras and String Dualities, Fort Worth, TX, Texas Christian University, June 2009.

D.C. Mathematics Graduate Student Meetings, Washington D.C., George Washington University, April 2009.

Joint Mathematics Meetings, 2003 and 2004.