

Department of Mathematics
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Education

Ph.D. in Mathematics, Rice University, May 2009 (anticipated).
M.A. in Mathematics, Rice University, May 2006.
B.A. in Mathematics, Summa Cum Laude, *Bipolar Plots* (senior thesis), Hendrix College, May 2004.

Areas of Research Interest

Topology, knot theory, three- and four-dimensional manifolds.

Research Experience

Graduate research, Rice University, 2006-present. Dr. Tim Cochran, advisor.
Student Researcher, Texas A&M University Research Experience for Undergraduates, Summer 2003. Responsible for attending seminar in modeling complex ecosystems and conducting group research project. Dr. Jay Walton, supervisor.
Undergraduate research, Hendrix College, 2001-2004. Individual research projects, including Star-derivatives and Bipolar Plots. Dr. Duff Campbell, advisor.

Teaching

Instructor

Linear Algebra, Rice University, Summer 2007.
Ordinary Differential Equations and Linear Algebra, Rice University, Summer 2006.
Multivariable Calculus, Rice University, Spring 2006.
Multivariable Calculus, Rice University, Summer 2005.

Teaching Assistant

General Topology, Rice University, Spring 2008.
Differential Geometry, Rice University, Fall 2007.
Algebraic Topology, Rice University, Spring 2007.
Honors Linear Algebra, Rice University, Fall 2006.
Ordinary Differential Equations, Rice University, Fall 2005.
Multivariable Calculus, Rice University, Spring 2005.
Single Variable Calculus, Rice University, Fall 2004.

Graduate Teaching Seminar Participant

Rice University, Fall 2004-2005.

Peer Academic Tutor and Teaching Assistant

Hendrix College, 2001-2004.

Publications

Modeling the Impact of Forest Fragmentation on Predator-Prey Populations, with Ryan Westbrook. The Pi Mu Epsilon Journal, Vol. 12, No. 1. Fall 2004.

The First-order Genus of a Knot (14 pages) arxiv:0712.1010. To appear in *Mathematical Proceedings of the Cambridge Philosophical Society*.

Preprints

The Non-triviality of the Grope Filtrations of The Knot and Link Concordance Groups (16 pages) arxiv:0804.2661. Submitted for publication.

Higher-order Genera of Knots (10 pages) arxiv:0807.0434. Submitted for publication.

Presentations

The Grope Filtration and Higher-order Genera of Knots. Fifty Years Since Fox and Milnor: a Conference in Honor of Jerry Levine, Brandeis University, Waltham MA. 3 June, 2008.

Higher-order Genera of Knots. AMS Sectional Meeting, Louisiana State University, Baton Rouge, LA. 28 March, 2008.

Non-triviality in the Knot Concordance Group. Third Annual Louisiana-Texas Topology Retreat, Rice University, Houston, TX. 9 February, 2008.

Algebraic Knot Invariants. Undergraduate Mathematics Seminar, Trinity University, San Antonio, TX. 8 February, 2007.

Polynomials from Topology. with Andrew Elliot and Shelly Harvey. Algebraic Geometry: A Conference for Undergraduate Mathematics Majors, Rice University, Houston, TX. 11 February, 2006.

Manifolds with Density: an Introduction. Current Mathematics Seminar, Rice University, Houston, TX. 1 September, 2005.

Bipolar Plots. Current Mathematics Seminar, Rice University, Houston, TX. 8 February, 2005.

Bipolar Plots. Hendrix-Rhodes-Sewanee Undergraduate Mathematics Symposium, Rhodes College, Memphis, TN. 10 April, 2004.

Bipolar Plots. Senior Defense Seminar, Hendrix College, Conway, AR. 14 April, 2004.

Bipolar Plots. The Mathematical Association of America's MathFest 2003, Boulder, CO. 31 July, 2003.

Modeling the Impact of Forest Fragmentation on Predator-Prey Populations. Texas A&M University REU-VIGRE Student Conference, College Station, TX. 22 July, 2003.

Bipolar Plots. Hendrix-Rhodes-Sewanee Undergraduate Mathematics Symposium, University of the South, Sewanee, TN. 12 April, 2003.

Service

Graduate Student Liaison, Rice University Department of Mathematics, 2005-present. Oversee teaching assistant and office assignments, meet with Graduate Committee.

Peer Academic Mentor, Hendrix College, 2002-2003. Mentored a dozen freshman students regarding their personal, academic and extracurricular endeavors.

Fellowships and Honors

Lodieska Stockbridge Vaughn Fellowship, Rice University, 2008-2009. Awarded to a graduate student at Rice University who exhibits outstanding achievement and promise.

NSF VIGRE Fellowship, Vertical Integration of Research and Education in Mathematical Sciences, Rice University, 2006-2008.

Graduate Fellowship, Rice University, 2004-2006.

Richard V. Andree Award, 2004. Given by The Pi Mu Epsilon Journal to the authors of the best papers appearing in the Journal.

Walter E. Hogan Award, May 2004. Given to the senior mathematics major at Hendrix College with high achievement in upper-level mathematics courses and with active participation in department activities.

Phillip E. Parker Undergraduate Research Award, May 2004. Given to a senior mathematics major at Hendrix College for outstanding undergraduate research culminating in publication or presentation at a regional or national research conference.

Barry M. Goldwater Scholarship, March 2003. A nationwide scholarship awarded to mathematics and science majors for high achievement in undergraduate research.

Elizabeth McHenry and Harry I. Lane Award, May 2002. Given to the freshman student at Hendrix College with the highest achievement in the calculus sequence.

Professional Organizations

American Mathematical Society

Mathematical Association of America

Pi Mu Epsilon Honorary Mathematics Society