Diana Davis

Contact Information

Mathematics Department
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Employment

Williams College, Visiting Assistant Professor — 2016-present
Northwestern University, Postdoctoral Lecturer — 2013-2016

Research Interests

Low-dimensional geometry, polygonal billiards, dynamical systems, symbolic dynamics, geodesic flows, translation surfaces, planar tilings.

Education

Brown University
Ph.D. in Mathematics, 2013. Advisor: Richard Schwartz
Thesis: "Cutting sequences on translation surfaces."
Sc.M. in Mathematics, 2010.

Williams College
B.A. in Mathematics, 2007, *cum laude*, with honors in mathematics

Publications (student coauthors)

1. Diana Davis and W. Patrick Hooper, *Periodicity and ergodicity in the trihexagonal tiling*, submitted 2016.
2. Diana Davis, Irene Pasquinelli and Corinna Ulcigrai, *Cutting sequences on Bouw-Möller surfaces: an S-adic characterization*, submitted 2016.
3. Keith Burns, Orit Davidovich and Diana Davis, *Average pace and horizontal chords*, to appear in *Mathematical Intelligencer*, 2017.
4. Diana Davis, Victor Dods, Cynthia Traub and Jed Yang, *Geodesic trajectories on regular polyhedra*, to appear in *Discrete Mathematics*, 2016.
5. Diana Davis, **Kelsey DiPietro, Jenny Rustad**, and **Alexander St Laurent**, *Negative refraction and tiling billiards*, to appear in *Advances in Geometry*, 2016.
6. Diana Davis, *Cutting sequences on translation surfaces*, New York Journal of Mathematics, Volume 20, 2014, 399-429.
7. Diana Davis, *Cutting sequences, regular polygons, and the Veech group*, Geometriae Dedicata, Volume 162, Issue 1, 2013, 231-261.
8. Diana Davis, Dmitry Fuchs and Sergei Tabachnikov, *Periodic trajectories in the regular pentagon*, Moscow Mathematics Journal, Volume 3, 2011, 439-461.
9. Joseph Corneli, Ivan Corwin, Stephanie Hurder, Vojislav Šešum, Ya Xu, Elizabeth Adams, Diana Davis, Michelle Lee, Regina Visocchi and Neil Hoffman, *Double Bubbles in Gauss Space and Spheres*, Houston Journal of Mathematics, Volume 34, No. 1, 2008, 181-204.
10. Elizabeth Adams, Ivan Corwin, Diana Davis, Michelle Lee and Regina Visocchi, *Isoperimetric Regions in Gauss Sectors*, Rose-Hulman Undergraduate Mathematics Journal, Volume 8, No. 1, 2007.

Papers in preparation (student coauthors)

11. **Paul Baird-Smith**, Diana Davis, **Elijah Fromm** and **Sumun Iyer**, *Tiling billiards on triangle tilings*, in preparation 2017.
12. Diana Davis and Samuel Lelièvre, *Periodic trajectories on the double pentagon and golden L*, in preparation 2017.

Pedagogy

13. Diana Davis, *Inquiry-based learning in a first-year honors course*, submitted 2016.

Book

14. Diana Davis, *Lines in positive genus: An introduction to flat surfaces*, European Mathematical Society Series of Lecture Notes book *Dynamics done with your bare hands*, 2017.

Exposition

15. Diana Davis, *Billiards and Flat Surfaces*, a Snapshot of Modern Mathematics for Oberwolfach. Subsequently translated into German by *Notices of the German Mathematical Society* and published as *Billard und ebene Flächen*, Volume 23, Issue 3, September 2015, 151-155.

Teaching Experience

Course Head for first-year honors sequence at Northwestern 2015-2016
Coordinated instruction and exams across six sections of Math 290-1,2,3

Williams College

Geometry, Surfaces & Billiards - inquiry-based curriculum	Fall 2016
Applied Real Analysis	Fall 2016
Multivariable Calculus - inquiry-based curriculum	Spring 2017

Northwestern University

Game Theory	Spring 2014
Introduction to Mathematics	Winter 2014
Differential Multivariable Calculus	Fall 2014
Linear Algebra	Fall 2013, 2014, 2015
Differential Multivariable Calculus	Winter 2014, 2015, 2016
Integral Multivariable Calculus - lecture	Spring 2015
Integral Multivariable Calculus - inquiry-based curriculum	Spring 2016
Foundations of Higher Mathematics	Fall 2013; Spring 2014, 2016

Brown University, primary instructor

Differential Calculus	Fall 2010
Multivariable Calculus	Fall 2011
Linear Algebra	Spring 2013

Brown University, as a teaching assistant

Integral Calculus	Fall 2009

Williams College, as a teaching assistant:

Differential Calculus, Applied Real Analysis, Abstract Algebra	2003-2006

designed new course

Mini Course	Summer School on Boundaries and Dynamics, Notre Dame	May 2015
	A 6-hour introduction to flat surfaces for undergraduates	
	Lecture notes from this course are the book [14]	
Mentoring Students	Senior thesis students at Williams College	2016-2017
	Megumi Asada '17, Paul Baird-Smith '17, Dylanger Pittman '17	
	SMALL REU at Williams College	Summer 2016
	Advised a group of three students, leading to the paper [11]	
	Summer@ICERM REU	Summer 2012, 2013
	Advised groups of students, leading to three publications including [5]	
Grants	GAANN Fellowship (salary support)	2010-2012
	AMS Travel Grant for the ICM in Seoul, South Korea ($3700)	2014
Honors and Awards	Math Dept award for Excellence in Teaching, Northwestern University	2016
	Presidential Award for Excellence in Teaching finalist, Brown University	2012
	"Dance Your Ph.D." competition winner – Physics and Math category	2012
	Math Department Outstanding Teaching Award, Brown University	2011
	Morgan Prize for Excellence in Teaching, Williams College	2007
	AMS Student Speaker Prize	2005
	National Merit Scholar	2003-2007
Seminar Talks	University of Rhode Island, Faculty Seminar	February 2017
	Colorado College, Research Seminar	January 2017
	Williams College, Faculty Seminar	October 2016
	Smith College, Algebra/Geometry/Combinatorics Seminar	September 2016
	U.S. Naval Academy, Seminar	January 2016
	Colorado College, Research Seminar	January 2016
	Penn State University, Dynamical Systems Seminar	November 2015
	University of Chicago, Dynamics Seminar	November 2015
	University of Minnesota, Combinatorics Seminar	February 2015
	University of Utah, Max Dehn Seminar	April 2014
	University of Illinois, Ergodic Theory Seminar	April 2014
	University of Chicago, Dynamics Seminar	March 2014
	Northwestern University, Dynamics Seminar	October 2013, January 2015
	Yale University, Geometry & Topology Seminar	April 2013
	Harvard University, Geometry & Dynamics Seminar	February 2013
	University of Maryland, Geometry & Topology Seminar	February 2013
	Tufts University, Colloquium	February 2013
	Indiana University, Geometry Seminar	January 2013
	Oxford University, Graduate Seminar	December 2012
	Freie Universität Berlin, Discrete geometry Seminar	November 2012
	Colby College, Colloquium	March 2012
	University of Bristol, Dynamics Seminar	February 2012

Conference Talks	CIRM, Teichmüller space, Polygonal Billiard, Interval Exchanges	February 2017
	Joint Mathematics Meetings (Atlanta), AMS Special Session	January 2017
	Joint Mathematics Meetings (Seattle)	January 2016
	CIRM, Dynamics and Geometry in the Teichmüller space	July 2015
	Midwest Women in Mathematics Symposium	April 2014, March 2015
	Oberwolfach, Flat Surfaces and Dynamics on Moduli Space	March 2014
	ICERM, Geometric Structures in Low-Dimensional Dynamics	November 2013
	Joint Mathematics Meetings (San Diego), AMS Special Session	January 2013
	Phillips Exeter Academy Conference for Teachers	June 2012, '13, '14, '15

Expository Talks	Swarthmore College, Colloquium	February 2017
	Colby College, Colloquium	January 2017
	Colorado College, Fearless Friday Seminar	January 2017
	Williams College, Science Lunch	November 2016
	Lehigh University, Colloquium	November 2016
	Smith College, Lunch talk series	September 2016
	Williams College SMALL REU, Colloquium	July 2016
	Gonzaga University University, Colloquium	January 2016
	Colorado College, Fearless Friday Seminar	January 2016
	Northwestern Undergraduate Math Society	April 2014
	Bard College at Simons Rock	September 2014
	Simons Center for Geometry and Physics summer talk	July 2013
	Southern Illinois University Edwardsville Math Club	January 2013
	Summer@ICERM REU	July 2012

Other Exposure

My video that explains my Ph.D. result through dance has been shown at:

ICM (Seoul), IMAGINARY Exhibition	August 2014
Bridges Conference (Seoul), Short Movie Festival	August 2014
Heidelberg Laureate Forum, in Curt McMullen's talk	September 2013
Dynamics on Parameter Spaces (Sde Boker, Israel)	January 2013

Service	Williams College AMS student chapter advisor	2016-2017
	Williams College faculty affiliate to Men's and Women's Cross Country	2016-2017
	Williams College faculty organizer for Hudson River conference	2017
	Northwestern University Women in Mathematics co-organizer	2014-2016
	Northwestern University Dynamics Seminar co-organizer	2013-2015
	AMS Graduate Working Group Committee	2011
	AMS Working Group on the Nominee Program	2010
	AMS Graduate Student Blog	2009-2012
	Brown University Running Club president	2009-2012

Outreach

Take our Children to Work Day, Northwestern University — April 2016

Hands-on activity on the Fold-and-Cut Theorem

Summer Research	Director's Summer Program, National Security Agency	2007
	Solving applied problems relating to national defense	
	SMALL REU, Williams College	2005
	Geometry Group with Frank Morgan, leading to two publications [9,10]	
Courses for High School Teachers	**Phillips Exeter Academy Math and Science Conference**	
	10-hour week-long courses with 12-15 participants	
	Exeter Mathematics: An Inquiry-Based Curriculum	2012, 2013, 2015
	Greatest Hits of Higher Mathematics	2012, 2013
High School Teaching	**Phillips Exeter Academy**	
	Teaching Fellow in Mathematics	Academic year 2007-2008
	Summer School Faculty	Summers 2008-2011, 2014
	Northfield Mount Hermon School	
	Summer School Faculty	Summer 2006
Other Skills	Conversational French	
	Competitive long-distance runner	
	HTML, Java, C++	
	Certified in CPR, 14-passenger mini bus driving, safe small boat handling	