

Department of Mathematics
University of Wisconsin-Madison
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Employment

Honorary Fellow in Mathematics, University of Wisconsin-Madison, May 2018-current

Mathematics Placement Advisor, [Placement Advising](#) University of Wisconsin-Madison, August 2017-May 2018

Lecturer at University of Wisconsin-Madison, August 2016-December 2017

Golomb Visiting Assistant Professor at Purdue University, West Lafayette IN, August 2013-July 2016. Mentor: [Edray Goins](#)

Education

PhD Mathematics, [University of Wisconsin-Madison](#), Madison, WI, August 2013.

Thesis advisor: [Nigel Boston](#)

MA Mathematics, [University of Wisconsin-Madison](#), Madison, WI, May 2009.

BA Mathematics (summa cum laude), [Le Moyne College](#), Syracuse, NY, May 2007.

Mathematics Advanced Study Semester, The Pennsylvania State University [MASS Program](#), State College, PA, Fall 2006.

Publications and preprints

- R. Davis, R. Pries, K. Wickelgren [The Galois action on the lower central series of the fundamental group of the Fermat curve](#), submitted August 2018.
- R. Davis and R. Pries [Cohomology groups of Fermat curves via ray class fields of cyclotomic fields](#), submitted July 2018.
- R. Davis and E. H. Goins [Arithmetic of quaternion origami](#), May 2018.
- R. Davis [A note on the procedure to find the generic polynomial of a quotient \(closely following Adelman\)](#), May 2018.
- R. Davis, R. Pries, V. Stojanoska, K. Wickelgren [The Galois action and cohomology of a relative homology group of Fermat curves](#), , J. Algebra, 505: 33-69, 2018.

- A. C. Cojocaru, R. Davis, A. Silverberg, and K. E. Stange [Arithmetic properties of the Frobenius traces defined by a rational abelian variety](#), with two appendices by J-P. Serre. *International Mathematics Research Notices* doi:10.1093/imrn/rnw058, ol. 2016, pages 1-46.
- R. Davis, R. Pries, V. Stojanoska, K. Wickelgren [Galois action on the homology of Fermat curves](#), *Directions in Number Theory: proceedings of the 2014 WIN3 workshop*, Springer XV, pages 57-86.
- R. Davis [Images of metabelian Galois representations associated to elliptic curves](#) in WIN 2: *Research Directions in Number Theory*, eds. C. David, M. Lalin, and M. Manes, *Contemporary Mathematics* 606, 29–46, American Mathematical Society and Centre de Recherches Mathématiques, Providence, RI, 2013.
- [Images of metabelian Galois representations associated to elliptic curves](#) [Thesis](#), 2013.
- A. Brouwer, R. Davis, A. Larkin, D. Studenmund, and C. Tucker [Intrinsically \$S^1\$ 3-Linked Graphs and Other Aspects of \$S^1\$ Embeddings](#), 2007.

Grants and awards

- Awarded a 2017-2018 Postdoctoral Ambassadorship from the Institute for Advanced Study for co-organizing a conference for April 2018 on “Arithmetic of algebraic curves” with Wanlin Li and with faculty advisor Melanie Wood at UW-Madison.
- AWM-NSF Travel Grant, November 2016 to speak in the August 2017 Applied Mathematics, Modeling and Computational Science conference in Waterloo, ON.
- Advance Grant awarded in June 2016 to attend the January 2017 Joint Mathematics Meetings in Atlanta, GA.
- AIM SQuaRE proposal [American Institute of Mathematics SQuaRE](#) funded in December 2015 on Cohomological obstructions for rational points on Fermat curves (with R. Pries, V. Stojanoska, and K. Wickelgren), San Jose, CA, October 2016, November 2017.
- Grant-writing boot camp at Duke University [Duke](#), March 2016, June 2017.
- AWM-NSF Travel Grant, awarded in February 2014 to attend Women in Numbers 3 in April 2014 in Banff, AB.
- National Science Foundation Research Training Groups in the Mathematical Sciences Award [NSF-RTG](#) Fellow, Spring 2011, Spring 2012, Spring 2013.

Upcoming and Recent Presentations

- Co-organizing special session on “Origami, Belyi Maps, and Dessins d’Enfants” [AWM Research Symposium](#), Rice University, April 2019.
- Talk at [pop-up conference in number theory](#), University of Illinois at Chicago, November 2018.

- Invited talk on “Introduction to homology” [Valparaiso Experience in Research by Undergraduate Mathematicians \(VERUM\)](#), Valparaiso, IN, July 2018.
- Poster on “Ray Class Group Calculations for Fermat Curves over Cyclotomic Fields” presented at [ANTS XIII](#) University of Wisconsin-Madison, July 2018.
- Invited talk in an AMS special session on Automorphisms of Riemann Surfaces and Related Topics, [Automorphisms of Riemann Surfaces](#) Portland, OR, April 2018.
- Introduction to dessins d’enfants in the Graduate Algebraic Geometry Seminar in preparation for “Arithmetic of algebraic curves” conference [GAGS](#), April 2018.
- Talk on Congruence and noncongruence subgroups arising from G -structures at the 32nd Automorphic Forms Workshop [AFW 32](#), Tufts University, Medford, MA, March 2018.
- Invited talk in special session on computational number theory at the [AMMCS](#) conference, Waterloo, Ontario, Canada, August 2017.
- Talk on Fox calculus and Magnus representations in the University of Wisconsin-Milwaukee topology seminar, [UWM](#) Milwaukee, WI, May 2017
- Invited talk in a special session during the [AWM Research Symposium](#) at UCLA Los Angeles, CA, April 2017.
- Wayne State University colloquium, [WSU](#), Detroit, MI, January 2017.
- Invited talk at a special session on [Mapping Class Groups and Their Subgroups](#) at the Joint Mathematics Meetings, Atlanta, GA, January 2017.
- Invited talk during the [AWM Workshop on Number Theory](#), JMM, Atlanta, GA, January 2017.
- Invited talk in the FRAGMENT seminar [FRAGMENT](#) held at Colorado State University, Fort Collins, CO, August 2016.
- Contributed talk at the [Connecticut Summer School in Number Theory on Elliptic Curves and Modular Forms, and Related Topics](#), University of Connecticut, Storrs, CT, August 2016.
- Talk during the [West Coast Algebraic Topology Summer School](#) (on the interplay between homotopy theory and number theory) University of Oregon, Eugene, OR, August 2016.
- Talk on Galois representations as part of the [Classical Modular Forms course/seminar](#) at Purdue University, West Lafayette, IN, July 2016.
- Contributed talk at the [Upstate New York Number Theory Conference](#) at the University of Rochester, May 2016.

- Invited lecture at Fourth Annual Women in Mathematics Symposium [UIUC WIMS](#), April 2016.
- Catholic University of America colloquium, Washington DC, March 2016.
- Worcester Polytechnic Institute colloquium, Worcester, MA, January 2016.
- Talk in AMS Special Session 72a on Number Theory and Cryptography at the Joint Mathematics Meetings in Seattle, Washington [JMM 2016](#), January 2016.
- AMS Central Fall Sectional Meeting held at Loyola University in Chicago, IL [Automorphisms of Riemann Surfaces, Algebraic Curves and Related Topics Interest Group](#), October 2015.
- Invited talk in the University of Illinois at Urbana-Champaign Number Theory Seminar [Illinois](#), September 2015.
- Invited talk at workshop on Lifting Problems and Galois Theory conference held at BIRS in Banff, Alberta [Lifting Problems and Galois Theory](#). See the video here: [video](#), August 2015.
- Poster presented for the AWM Research Symposium held at the University of Maryland, College Park [AWM Research Symposium 2015](#), April 2015.
- Talk at the 3rd annual Midwest Women in Mathematics Symposium held at Dominican University [WIMS3](#), March 2015.
- Talk at the University of Michigan at Ann Arbor Automorphic Forms Workshop, March 2015.
- Invited talk in the University of Wisconsin-Madison Number Theory Seminar, February 2015.
- Invited talk in the Wesleyan University Algebra Seminar, January 2015.
- Invited talk in the AMS Sectional meeting at University of North Carolina Greensboro on Galois Theory and Interactions with Algebra and Number Theory, November 2014.
- Talk in Purdue working algebraic geometry seminar, October 2014.
- Invited talk at the University of Colorado at Boulder Number Theory Seminar, April 2014.
- Presentation on fixed point theorems Basic Notions Seminar, Purdue University, April 2014.
- Presentation at the 2nd Annual Midwest Women in Mathematics Symposium held at the University of Notre Dame, [WIMS2](#), April 2014.
- Number theory seminar at Purdue University. Talk on the Tate-Shafarevich group associated to elliptic curves. September 2013.

- Automorphic forms seminar at Purdue University. Talks on ℓ -adic Galois representations and metabelian representations associated to elliptic curves. September 2013.
- Invited talk at Iowa State University Combinatorics, Algebra, Number Theory Seminar, January 2013.
- Joint Mathematics Meetings [JMM](#) talk in the AMS Special Session 46: Mathematics of computation: algebra and number theory and a present at the AWM poster session on number theory, San Diego, CA. January 2013,
- Talk in the University of Illinois at Chicago Number Theory Seminar, October 2012.

Upcoming and Recent Conferences Attended

- AIM SQuaREs, American Institute of Mathematics, San Jose, CA, May 2019.
- [Early Career Research Workshop in Coding Theory, Cryptography, and Number Theory](#), Clemson University, SC, June 2018.
- [Institute for Advanced Studies Women and Mathematics Program on Mathematics of Modern Cryptography](#), Princeton, NJ, May 2018.
- [Macaulay2 Workshop at Wisconsin](#), University of Wisconsin-Madison, April 2018.
- [Arithmetic of algebraic curves conference](#) (co-organized with W. Li), April, 2018.
- AIM SQuaREs, American Institute of Mathematics, San Jose, CA, November 2017.
- [CA+ Commutative Algebra conference](#) at the University of Minnesota, Minneapolis, MN, September 2017.
- [Sage Days 87: p-adics in Sage and the LMFDB](#), July 2017.
- BIRS meeting on [Nilpotent Fundamental Groups](#), Banff, Alberta, Canada, June 2017.
- Conference Board of the Mathematical Sciences [Topological data analysis](#) Macalester College, St. Paul, MN, June 2017.
- re:boot Number Theory Workshop at Duke University [Duke](#), June 2017.
- AIM SQuaREs, American Institute of Mathematics, San Jose, CA, October 2016.
- Super Quebec Vermont Number Theory Seminar on Kummer Classes and Anabelian Geometry, Burlington, VT, September 2016.
- Grant-writing boot camp at Duke University [Duke](#), March 2016.
- Arithmetic 2015: Silvermania on Elliptic Curves, Diophantine Geometry, and Dynamics held in Providence, Rhode Island [Silvermania](#), August 2015.
- Computational Representation Theory in Number Theory held at Oregon State University [LMFDB](#). Here is an article about it on the AMS Blog on Math Blogs: [In Praise of Teamwork](#), July 2015.

- Workshop on L-functions and Trace Formula held at Purdue University [L-functions](#), May 2015.
- Université du Montréal Summer School on Counting Arithmetic Objects, June 2014.
- Bateman Memorial Conference and Midwest Number Theory Conference for Graduate Students and Recent PhDs, June 2014.
- WIN 3: Women in Numbers 3 [WIN3](#) Banff, Canada. April 2014.
- Arizona Winter School on Arithmetic Statistics [AWS](#) Tucson, AZ. March 2014.
- University of Illinois at Chicago Atkin Memorial Lecture and Workshop on Cohen-Lenstra Heuristics, Chicago, IL, May 2013.
- AMS Sectional Meeting on Arithmetic statistics and big monodromy Boulder, CO. April 2013.
- Arizona Winter School on Modular forms and modular curves [AWS](#) Tucson, AZ. March 2013.
 - * Worked on a project on Modular curves at infinite level led by J. Weinstein
- Sage Days 44: Overconvergent modular symbols [Sage Days 44](#) Madison, WI. January 2013.
- Group Theory, Number Theory, and Topology Day miniconference [gtntd2013](#) Madison, WI January 2013.
- Midwest Number Theory Conference for Graduate Students [MNTCG9](#) University of Illinois at Urbana-Champaign, October 2012.
- Joint Mathematics Meetings [JMM](#) Boston, MA, January 2012.
- WIN2 - Women in Numbers 2 [WIN2](#) Banff, Canada, November 2011.
- Midwest Number Theory Conference for Graduate Students [MNTCG8](#) Madison, WI, November, 2011.
- Arizona Winter School [AWS](#) Tucson, AZ, March, 2010.
 - * Worked on a project on Quantum unique ergodicity led by K. Soundararajan

Teaching

Lecturer

- Lecturer [Calculus I](#) University of Wisconsin-Madison, Fall 2017.
- Lecturer [Linear Algebra](#) University of Wisconsin-Madison, Spring 2017.
- Lecturer [Calculus II](#) University of Wisconsin-Madison, Fall 2016.
- Lecturer [Ordinary Differential Equations](#) Purdue University, Spring 2016.

Lecturer [Ordinary Differential Equations](#) Purdue University, Fall 2015.

Lecturer [Linear Algebra and Differential Equations](#) Purdue University, Spring 2015.

Lecturer [Linear Algebra and Differential Equations](#) Purdue University, Fall 2014.

Lecturer [An Introduction to Proof Through Real Analysis](#) Purdue University, Spring 2014.

Lecturer [Linear Algebra and Differential Equations](#) Purdue University, Fall 2013.

Lecturer/Coordinator of the Wisconsin Collaboratory for Enhanced Learning Math portion of Summer Collegiate Experience [WisCEL](#), [SCE](#) University of Wisconsin-Madison, Summer 2012.

Lecturer [Math 112](#) University of Wisconsin-Madison, Fall 2011.

Lecturer [Summer Collegiate Experience](#) University of Wisconsin-Madison, Summer 2010, Summer 2011.

[Intermediate Algebra](#) University of Wisconsin-Madison, Spring 2010.

* Taught both a traditional section as well as a computer software-based section.

[Mathematics for Teaching—Numbers and operations](#) University of Wisconsin-Madison, Fall 2009.

Teaching assistant

[Calculus and Analytic Geometry I](#) University of Wisconsin-Madison, Fall 2012.

* Teaching assistant coordinator

[Calculus and Analytic Geometry I](#) University of Wisconsin-Madison, Fall 2010.

* Taught for the Wisconsin Emerging Scholars Program. [WES Program](#)

[Calculus—Functions of Several Variables](#) University of Wisconsin-Madison, Spring 2009.

[Calculus and Analytic Geometry II](#) University of Wisconsin-Madison, Fall 2008.

* Teaching assistant coordinator

[Calculus and Analytic Geometry I](#) University of Wisconsin-Madison, Fall 2007.

Other Teaching Experience

[EDGE](#) (Enhancing Diversity in Graduate Education) Mini-course instructor. The mini-course focused on using Sage for problems from linear algebra, abstract algebra, and cryptography, West Lafayette, IN, June 2016.

Purdue ScienceScape instructor and curriculum development [ScienceScape](#), [Video highlights](#), West Lafayette, IN, June 2015, 2016.

Judge for MAA poster session at the JMM, Seattle, WA, January 2016.

Judge for Purdue Undergraduate Research and Poster Symposium [Poster session](#), West Lafayette, IN, April 2015.

Mega Math Meet Co-organizer [MMM](#), May 2009, 2010, 2011, 2012, 2013.

Orientation for incoming mathematics graduate students, August 2011, 2012, 2013.

Student Orientation, Advising, and Registration Math Consultant, [SOAR](#), Summer 2010 and Summer 2011.

Summer Program for Women in Mathematics Teaching Assistant [SPWM](#), George Washington University, Summer 2009.

Other Experience

Contributor to AWM EDGE Volume Article “Difficult Dialogues in the Midwest” on EDGE 2016 and Sage mini-course, Summer 2018.

National Security Agency’s Director’s Summer Program, [NSA DSP](#), Fort Meade, MD, coauthored a paper for internal publication, Summer 2007.

SUNY Potsdam-Clarkson Summer Mathematics Program- Research Experience for Undergraduates [SUNY Potsdam REU](#), Summer 2006.

Summer Program for Women in Mathematics [SPWM](#), George Washington University, Washington, DC, July 2005.

Society of Actuaries Exam P - probability certification [Exam P](#).

Harbridge Consulting Group, actuarial intern [Harbridge Consulting Group](#) Syracuse, NY, June 2005.

Professional Memberships

- American Mathematical Society [AMS](#)
- Association for Women in Mathematics [AWM](#)
- National Association of Mathematicians [NAM](#)

References

- [N. Boston](#) (thesis advisor)
- [J. Ellenberg](#) (thesis committee member)
- [E. Goins](#) (postdoctoral mentor)
- [D.B. McReynolds](#) (teaching reference)
- [R. Pries](#) (collaborator)
- [S. Malekpour](#) (teaching reference)