Darrin Doud

214 TMCB
Department of Mathematics
Brigham Young University
Provo, UT 84602

e-mail: doud@math.byu.edu
phone: 801-422-1204
fax: 801-422-0504
web: http://math.byu.edu/∼doud

Education

1992	B.S.	Mathematics	Brigham Young University
1993	M.S.	Mathematics	Brigham Young University
1999	M.S.	Teaching Mathematics	University of Illinois at Urbana-Champaign
1999	Ph.D.	Mathematics	University of Illinois at Urbana-Champaign

Academic Positions

1999-2001	NSF Postdoctoral Research Fellow	Harvard University
2001-2007	Assistant Professor	Brigham Young University
2007-2012	Associate Professor	Brigham Young University
2012-present	Professor	Brigham Young University

Published Papers

1. Darrin Doud, A Procedure to calculate torsion of elliptic curves over $\mathbb{Q}$, *Manuscripta Mathematica*, **95** (1998), 463–469.
2. Darrin Doud, S_4 and $\widetilde{S}_4$ extensions of $\mathbb{Q}$ ramified at only one prime, *Journal of Number Theory*, **75** (1999), 185–197.
3. Darrin Doud, Three-dimensional Galois representations with conjectural connections to arithmetic cohomology, in Number Theory for the Millennium, A.K. Peters, Boston, 2002, 365–375.
4. Avner Ash, Darrin Doud, and David Pollack, Galois representations with conjectural connections to arithmetic cohomology, *Duke Math. Journal*, **112** (2002), 521–579.
5. Darrin Doud, Wild ramification in number field extensions of prime degree, *Archiv der Mathematik*, **81** (2003), 646–649.
6. Darrin Doud, Wildly ramified Galois representations and a generalization of a conjecture of Serre, *Experimental Mathematics*, **14** (2005), 119–127.
7. Darrin Doud and Michael W. Moore, Even icosahedral Galois representations with prime conductor, *Journal of Number Theory*, **118** (2006), 62–70.
8. Darrin Doud and Brian Hansen, Explicit Frobenius calculations supporting a generalization of a conjecture of Serre, *JP Journal of Algebra, Number Theory, and Applications*, **6** (2006), 381–398.
9. Barry Bickmore, Kevin M. Rosso, Christopher J. Tadanier, Eric J. Bylaska, and Darrin Doud, Bond-valence methods for pK_s prediction. II. Bond-valence, electrostatic, molecular geometry, and solvation effects, *Geochimica et Cosmochimica Acta*, **70** (2006), 4057–4071.
10. Darrin Doud, Supersingular Galois representations and a generalization of a conjecture of Serre, *Experimental Mathematics*, **16** (2007), 119–128.
11. Darrin Doud, Distinguishing contragredient Galois representations in characteristic two, *Rocky Mountain Journal of Mathematics*, **38** (2008), 835–848.

12. Sharon Brueggeman and Darrin Doud, Local corrections of discriminant bounds and small degree extensions of quadratic base fields, *International Journal of Number Theory*, **4** (2008), 349–361.
13. Meghan DeWitt and Darrin Doud, Finding Galois representations corresponding to certain Hecke eigenclasses, *International Journal of Number Theory*, **5** (2009), 1–11.
14. Darrin Doud and Russell Ricks, LLL reduction and a conjecture of Gunnells, *Proceedings of the American Mathematical Society* **138** (2010), 409–415.
15. Darrin Doud and Paul Jenkins, p-adic properties of coefficients of weakly holomorphic modular forms, *International Mathematics Research Notices* **2010**:16 (2010), 3184–3206.
16. Darrin Doud, Paul Jenkins, and John Lopez, Two-divisibility of coefficients of certain weakly holomorphic modular forms, *Ramanujan Journal*, **28** (2012), 89-111.
17. Avner Ash and Darrin Doud, Reducible Galois representations and the homology of $\mathrm{GL}(3,\mathbb{Z})$, *International Mathematics Research Notices*, **2014:5** (2014), 1379-1408.
18. Avner Ash and Darrin Doud, Highly reducible Galois representations attached to the homology of $\mathrm{GL}(3,\mathbb{Z})$, *Proceedings of the American Mathematical Society*, **143** (2015), 3801-3813.
19. Kevin Childers and Darrin Doud, Proof of a conjecture of Wong concerning octahedral Galois representations of prime power conductor, *Journal of Number Theory*, **154** (2015), 101-104.
20. Avner Ash and Darrin Doud, Relaxation of strict parity for Galois representations attached to the homology of $\mathrm{GL}(3,\mathbb{Z})$, *International Journal of Number Theory*, **12** (2016), 361-381.
21. Kevin Childers and Darrin Doud, Octahedral extensions with a given cubic subfield, *Journal of Number Theory*, **167** (2016), 141-146.
22. Avner Ash and Darrin Doud, Galois representations attached to tensor products of arithmetic cohomology, *Journal of Algebra*, **465** (2016), 81-99.
23. Avner Ash and Darrin Doud, Reducible Galois representations and the arithmetic homology of $\mathrm{GL}(4)$, *Annales mathématiques Blaise Pascal*, **25** (2018), 207–246.
24. Avner Ash and Darrin Doud, Even Galois representations and the cohomology of $\mathrm{GL}(2,\mathbb{Z})$, *Annales mathématiques du Québec*, **25** (2019), 1–35.
25. Avner Ash and Darrin Doud, Sums of Galois representations and arithmetic homology, *Transactions of the AMS*, **373** (2020), 273–293.
26. Melissa Ault and Darrin Doud, Totally p-adic algebraic numbers of degree 4, *Rocky Mountain Journal of Mathematics*, *to appear*.
27. Avner Ash and Darrin Doud, On the Lyndon-Hochschild-Serre spectral sequence for a parabolic subgroup of $\mathrm{GL}_n(\mathbb{Z})$, *in preparation*.
28. Avner Ash and Darrin Doud, Sums of two irreducible Galois representations and the homology of $\mathrm{GL}_n(\mathbb{Z})$, *in preparation*.

Awards Received

1998 Hohn-Nash award in scientific computing
1998 Irving Reiner Memorial Award in algebra
1999 UIUC Mathematics Department Teaching Award
2006 BYU Mathematics Department Distinguished Teaching Award
2008 BYU Mathematics Department Distinguished Citizenship Award
2008 BYU Alcuin Fellowship
2009 BYU College of Physical and Mathematical Sciences Teaching Award
2010 Savage Foundation Distinguished Teaching Award
2015 BYU Mathematics Department Distinguished Teaching Award
2017 BYU Mathematics Department Distinguished Citizenship Award
2019 BYU College of Physical and Mathematical Sciences Teaching Award
2021 BYU Lawrence K. Egbert Teaching and Learning Fellowship

Grants Received

1999 NSF Postdoctoral Research Fellowship DMS-9902390, $90,000

2005 NSA Young Investigators Grant H98230-05-1-0244, $22,951
Reducible Galois Representations and Arithmetic Cohomology

2009 NSF Conference Grant DMS-0910714, $18,000
Graduate Workshop on Zeta Functions, L-functions and applications

2010 Number Theory Foundation Grant, $2,000
Participant Support for the 2010 Western Number Theory Conference

2014 National Security Agency Grant, $12,912
Participant Support for the 2014 Automorphic Forms Workshop

2014 NSF Conference Grant DMS-1404066, $21,520
Participant Support for the 2014 Automorphic Forms Workshop

2020 National Security Agency Grant, $12,960
Participant Support for the 2022 Automorphic Forms Workshop

2020 NSF Conference Grant, $14,000
Participant Support for the 2022 Automorphic Forms Workshop

Graduate Students Supervised

(† indicates that the research led to a publication)

2004	Michael W. Moore, M.S.†	Even icosahedral Galois repesentations
2004	Glen Simpson, M.S.	PSL$(2,7)$-extensions with certain ramification at two primes
2005	Brian Hansen, M.S.†	Explicit computations supporting a generalization of Serre's conjecture
2005	Heather de Melo, M.S.	Totally real Galois representations in characteristic 2 and arithmetic cohomology
2006	Jon Blackhurst, M.S.	Proven cases of a generalization of a conjecture of Serre
2008	Wayne Rosengren, M.S.	Lifting Galois representations in a conjecture of Figueiredo
2010	Brian Hansen, Ph.D.	A lift of cohomology eigenclasses of Hecke operators
2011	Vinh Dang, M.S.	Three-dimensional Galois representations and a conjecture of Ash, Doud, and Pollack
2011	Ka Lun Wong, M.S.	Maximal unramified extensions of cyclic cubic fields
2014	William Cocke, M.S.	Hecke eigenvalues and arithmetic cohomology
2014	Joseph Adams, M.S.	Connecting Galois representations with cohomology
2015	Kevin Childers, M.S.†	Octahedral extensions and proofs of two conjectures of Wong
2021	Pablo Rodriguez, M.S.	Totally real pentagonal extensions of $\mathbb{Q}$
2021	Melissa Ault, M.S.†	Totally p-adic algebraic numbers of degree 4

Undergraduate Students Mentored

(* indicates that the research was jointly mentored with Paul Jenkins)
(† indicates that the research led to a publication)

2006-2007	Kevin Powell	Singly ramified extensions of $\mathbb{Q}$ with Galois group S_n
2007-2008	Wayne Rosengren	The Brocard-Ramanujan Diophantine equation
2006-2007	Meghan DeWitt†	(Honors Thesis) Finding A Galois representation corresponding to a Hecke eigenclass
2007-2008	Minh Nhat Do	Calculating Hecke eigenclasses
2007-2008	Russell Ricks†	LLL reduced lattices and a conjecture of Gunnells
2007-2008	Ben Warner	Galois representations connected with Hecke eigenclasses
2009-2011	Michael Griffin*†	Coefficients of weakly holomorphic modular forms
2009-2010	Joo Youn Lee*	Coefficients of weakly holomorphic modular forms
2010	Kevin Childers*	Coefficients of weakly holomophic modular forms
2010-2011	John Lopez*†	2-divisibility of coefficients of weakly holomorphic modular forms
2010-2011	Nicholas Andersen*	Coefficients of weakly holomorphic modular forms
2010-2011	Jocelyn Peck*	Coefficients of weakly holomorphic modular forms
2010-2011	Chris Hettinger*	Weakly holomorphic modular forms
2012-2014	Kevin Childers	Algebraic number theory
2015-2016	Gail Jardine	(Honors Thesis) Tetrahedral Extensions with a Common Cubic Subfield

Conferences and Seminars Attended

(* indicates that I gave a talk; † indicates that I was an organizer)

1. Halberstam Conference, Urbana, IL, May 1995.
2. *Magma Mini-conference, Montreal, Canada, July 1995.
3. Fermat's Last Theorem Conference, Boston, MA, Aug. 1995.
4. *Fourth Annual Midwest Algebraic Number Theory Day, Mar 1997.
5. *AMS Special Session on Number Theory, Chicago, IL, Sep. 1998.
6. *AMS Special Session on Galois Representations, Urbana, IL, Mar 1999.
7. *Ohio State University Number Theory Seminar, Columbus, OH, Nov. 1999.
8. *Harvard University Number Theory Seminar, Cambridge, MA, Feb. 2000.
9. *Brigham Young University Mathematics Colloquium, Provo, UT, Mar. 2000.
10. *Millennial Conference on Number Theory, Urbana, IL, May 2000.
11. *Boston College Number Theory Seminar, Boston, MA, Nov 2000.
12. *Ohio State University Number Theory Seminar, Columbus, OH, Apr. 2001.
13. *California Institute of Technology Number Theory Seminar, Pasadena, CA, May 2002.
14. *AMS Special Session on Analytic Number Theory, Salt Lake City, UT, Oct. 2002.
15. *AMS Special Session on Arithmetic Algebraic Geometry, Madison, WI, Oct. 2002.
16. *West Coast Number Theory Conference, San Fransisco, CA, Dec. 2002.

17. *Wesleyan University Number Theory Seminar, Middletown, CT, Apr. 2004.
18. *Illinois Number Theory Conference, Urbana, IL, May 2004.
19. *Canadian Number Theory Association VIII Meeting, Toronto, CA, Jul. 2004.
20. *AMS Special Session on Modularity of Galois Representations, Pittsburgh, PA, Nov. 2004.
21. *West Coast Number Theory Conference, Las Vegas, NV, Dec. 2004.
22. *SouthEast Regional Meeting on Numbers (SERMON 2005), Columbia, SC, Apr. 2005.
23. *Wesleyan University Number Theory Seminar, Middletown, CT, Apr. 2005.
24. *Workshop on Automorphic Forms, Modular Forms, and Moduli Spaces, Rome, Italy, Sep. 2005.
25. *West Coast Number Theory Conference, Monterey, CA, Dec. 2005.
26. Pacific Northwest Number Theory Conference, Redmond, WA, Feb. 2006.
27. *SouthEast Regional Meeting On Numbers (SERMON 2006), Greenville, SC, Mar. 2006.
28. *Canadian Number Theory Association IX Meeting, Vancouver, Canada, Jul. 2006.
29. *AMS Special Session on Number Theory, Salt Lake City, UT, Oct. 2006.
30. *University of Illinois Number Theory Fest, Urbana, IL, May 2007.
31. *West Coast Number Theory Conference, Monterey, CA, Dec. 2007.
32. *Canadian Number Theory Association X Meeting, Waterloo, Canada, Jul. 2008.
33. *Western Number Theory Conference, Fort Collins, CO, Dec. 2008.
34. *Wesleyan University Algebra Seminar, Middletown, CT, Mar. 2009.
35. *23rd Annual Workshop on Automorphic Forms and Related Topics, Lewisburg, PA, Mar. 2009.
36. *2009 Intermountain Sectional Meeting of the MAA, Provo, UT, Mar. 2009.
37. Illinois Number Theory Celebration, Urbana, IL, Mar. 2009.
38. *Spring 2009 Central Section Meeting of the AMS, Urbana, IL, Mar. 2009.
39. †Graduate Workshop on Zeta functions, L-functions and applications, Orem, UT, June 2009.
40. *West Coast Number Theory Conference, Monterey, CA, Dec. 2009.
41. *Second Wesleyan Conference on Cohomology of Arithmetic Groups, Middletown, CT, July 2010.
42. *Canadian Number Theory Association XI Meeting, Wolfsville, Canada, July 2010.
43. †Western Number Theory Conference, Orem, UT, Dec. 2010.
44. *Utah Valley University Mathematics Department Colloquium, Orem, UT, Mar. 2011.
45. Torsion in the homology of arithmetic groups, Banff, Canada, July 2012.
46. †AMS Special Session on Homology and Cohomology of Arithmetic Groups, Boston, MA, Apr. 2013.
47. †*28th Automorphic Forms Workshop, Moab, UT, May 2014.
48. *Intermountain Sectional Meeting of the MAA, Provo, UT, Mar. 2015.
49. *Toyota-BYU Applied Math Initiative (TAMI), Provo, UT, June 2015.
50. *Canadian Number Theory Association, XV Meeting, Quebec City, Canada, July 2018.
51. †34th Automorphic Forms Workshop, Provo, UT (online), March 2022.