

Department of Mathematics  
6188 Kemeny Hall  
Dartmouth College  
Hanover, NH 03755

Phone: (+1) 608 957 1519  
Fax: (+1) 603 646 1312  
zajj.b.daugherty@dartmouth.edu  
<http://www.math.dartmouth.edu/~zdaugherty>

---

**AREAS OF SPECIALIZATION**

---

General: Algebra and Combinatorics (MSC 16, 05E, 17B)  
Specific: Representation theory, centralizer and diagram algebras, Hecke algebras,  
Lie algebras and quantum groups.

---

**EDUCATION**

---

Ph.D. Mathematics, University of Wisconsin–Madison, August 2010  
Dissertation title: *Degenerate two-boundary centralizer algebras*  
Advisor: Arun Ram  
Minor: Mathematics education

M.A. Mathematics, University of Wisconsin–Madison, December 2006

B.S. Mathematics (with distinction), Harvey Mudd College, May 2005

---

**EMPLOYMENT**

---

**Dartmouth College**, John Wesley Young Research Instructor (Summer 2011–present)  
*Calculus* (F 2011, W 2012, F 2013), *Multivariable Calculus* (F 2011), *Graph Theory* (S 2012),  
*Honors Abstract Algebra* (F 2012), *Graduate Topics in Combinatorics* (S 2014).

**Institute for Computational and Experimental Research in Mathematics**, Postdoctoral Fellow (Spring 2013).

**St. Olaf College**, Visiting Assistant Professor of Mathematics (Fall 2010–Spring 2011)  
*Calculus 1* (F 2010), *Calculus 2* (F 2010, S 2011), *Differential Equations* (S 2011)

**University of Wisconsin, Madison**, Graduate student (Fall 2005–Spring 2010):

Teaching assistant

*Finite Math* (S 2010<sup>†</sup>), *Calculus I* (F 2005, F 2006\*, Su 2007, F 2007\*<sup>†</sup>), *Calculus II* (F 2008<sup>†</sup>, F 2009\*<sup>†</sup>), *Linear Algebra and Differential Equations* (S 2007<sup>†</sup>)

<sup>†</sup>Superior rating on course evaluations

\*Teaching assistant coordinator

Research assistant (funded by NSF) (Summer 2008)

VIGRE Fellow (Spring 2006, Summer 2006, Spring 2009)

**MSRI**, Program associate and research assistant (Spring 2008)

**University of Melbourne, AU**, Faculty of Science Fellow (Summer 2009)

## HONORS, AWARDS, AND GRANTS

---

**National Science Foundation Individual Grant** DMS-1162010 “Combinatorics and representation theory of centralizer algebras” \$82,543 (2012–2015)

**Australian Research Council Discovery Grant** DP130100674 “Tantalizer algebras and generalized lattice models,” with A. Ram, \$350,000 (2013–2015)

**AMS-Simons Travel Grant** (2012–2014)

**UW-Madison university-wide Capstone Ph.D. Teaching Award** (2010)

*One of four granted to Ph.D. students who have performed as outstanding teaching assistants throughout their UW-Madison tenure.*

**Elizabeth S. Hirschfelder Scholarship** (2010)

*One of three granted to female mathematics graduate students at UW making excellent progress towards the PhD.*

**VIGRE Merit Based Fellowships** (Spring 2006, Summer 2006, Spring 2009)

**Mathematics Graduate Teaching Award** (2009)

**Celebrating Women in Science & Engineering Grant** (2008 - P.I., 2009)

*Grant to support invited female mathematics colloquium speakers and related activities*

**Mary Ellen Rudin Fellowship** (2005)

## PUBLICATIONS

---

*Centralizers of the infinite symmetric group* (with P. Herbrich) arXiv:1309.3510

*The quasi-partition algebra* (with R. Orellana) arXiv:1212.2596

*Affine and degenerate affine BMW algebras: Actions on tensor space* (with A. Ram and R. Virk), *Selecta Math.*, 19-2 (2013) 611–653. arXiv:1205.1852

*Affine and degenerate affine BMW algebras: The center* (with A. Ram and R. Virk), to appear in *Osaka J. Math.*, 51-1 (2014). arXiv:1105.4207

*Degenerate two-boundary centralizer algebras*, *Pac. J. of Math.*, 258-1 (2012) 91–142. arXiv:1007.3950

*Degenerate two-boundary centralizer algebras*, Doctoral dissertation, University of Wisconsin–Madison, June 2010.

*Voting, the symmetric group, and representation theory* (with A. Eustis, G. Minton, and M. Orrison), *Amer. Math. Monthly* (October 2009) Vol. 116, Iss. 8.

*Integrality of Quotients of Wronskians of the Andrews-Gordon Series*, *Integers*, 6 (2006).

*An Algebraic Approach to Voting Theory*, Senior thesis, Harvey Mudd College (2005), (available at <http://www.math.hmc.edu/seniorthesis/archives/2005/zajj/>).

Papers in preparation:

*Affine and degenerate affine BMW algebras: representation theory* (with A. Ram)

*FI-modules and the partition algebra* (with C. Balantine)

*Centralizer properties of the graded Hecke algebra of type C*

*Two-boundary Hecke algebras and the combinatorics of the type  $(C_n^\vee, C_n)$  Hecke algebra* (with A. Ram)

## PRESENTATIONS

---

*The quasi-partition algebra*, Combinatorics seminar, UC Davis, Davis CA, May 2013.

*Combinatorics of affine Hecke algebras of type C*, Combinatorics seminar, University of Washington, Seattle WA, May 2013.

*Combinatorics of affine Hecke algebras of type C*, Special Session on Combinatorial Avenues in Representation Theory, AMS meeting, Boulder CO, April 2013.

*The quasi-partition algebra*, Discrete Math Day, WPI, Worcester MA, April 2013.

*The quasi-partition algebra*, Discrete math seminar, Brown College, Providence RI, March 2013.

*A taste of combinatorial representation theory*, Center for Women in Math at Smith College, March 2013.

*Two boundary Hecke algebra and the affine Hecke algebra of type C*, Special session on Algebraic Combinatorics and Representation Theory, Joint Math Meetings, January 2013.

*The quasi-partition algebra*, Algebra and combinatorics seminar, Loyola University, Chicago, December 2012.

*The quasi-partition algebra*, Combinatorics seminar, University of Wisconsin, December 2012.

*Universal parameters for centralizer algebras*, Representation theory seminar, Northeastern University, April 2012.

*The two-boundary braid group and its amazing quotients*, Colloquium, Dartmouth College, March 2012.

*Type C symmetry of two-boundary Hecke algebras*, AGC Seminar, San Francisco State University, March 2012.

*The affine BMW algebra and its degenerate version*, Algebra, Geometry, and Topology Seminar, University of Melbourne, December 2011.

*Type C symmetry in type A representation theory*, Combinatorics Seminar, Dartmouth College, November 2011.

*The degenerate affine BMW algebra and its center*, Special Session on Combinatorial Representation Theory, AMS Spring Eastern Section Meeting, April 2011.

*Permutations, braids, partitions, and tableaux: finding the center of the affine BMW algebra*, Mathematics Research Seminar, St. Olaf College, April 2011.

*Centers of the affine BMW algebra and its degenerate version*, Geometric Commutative Algebra and Applications at the AMS Sectional Meeting in Iowa City, March 2011.

*Two-boundary Hecke algebras and the graded Hecke algebra of type C*, Algebraic Lie Theory Seminar, University of Colorado at Boulder, Spring 2011.

*The center of the affine BMW algebra and its degenerate version*, Representation Theory Seminar, Oklahoma University, January 2011.

*The degenerate two-boundary Hecke algebra*, Algebra, Geometry, and Topology Seminar, University of Melbourne, August 2010.

*Degenerate two-boundary centralizer algebras*, Algebraic Geometry Seminar, University of Iowa, April 2010.

*The degenerate two-boundary Hecke algebra*, Special Session on Combinatorial Representation Theory, AMS Spring Central Section Meeting, April 2010.

*Combinatorics of Centralizer Algebras*, Colloquium, Vassar College, March 2010.

*Algebra and Voting Theory*, St. Olaf College, March 2010.

*Degenerate two-boundary centralizer algebras*, Lie Group/Quantum Mathematics Seminar, Rutgers, January 2010.

*Two boundary graded centralizer algebras*, AMS Fall Western Section Meeting, November 2009.

*Building two boundary diagram algebras*, Special Session on Representation Theory, AMS Fall Central Section Meeting, October 2009

*Two boundary graded centralizer algebras*, Lie Theory Seminar, University of Wisconsin, Madison, September 2009.

*Combinatorics and the representation theory of centralizer algebras*, Pure maths student seminars, University of Melbourne, August 2009.

*Two boundary graded centralizer algebras*, Algebra Seminar, University of Sydney, August, 2009.

*Two boundary graded centralizer algebras*, Tuesday Seminar, Department of Mathematics and Statistics, University of Melbourne, August 2009.

*Building my favorite centralizer algebras*, Combinatorics seminar, University of Wisconsin, Madison, March 2009.

*Centralizers and the combinatorics of diagram algebras*, Graduate Student Combinatorics Conference, University of California, Davis, April 2008.

*Graded diagram algebras*, Representation Theory seminar, University of Wisconsin, Madison, December 2007.

*Introduction to affine and graded BMW algebras*, Representation Theory seminar, University of Wisconsin, Madison, April 2007.

#### SERVICE ACTIVITIES

---

Co-organizer of the Dartmouth Combinatorics Seminar (Fall 2011-present)

Co-organizer of the Discrete Math Day (Spring 2014)

Sonia Kovalevsky Mathematics Days Co-organizer (Fall 2011, 2012)

Co-founder and organizer of Women in Mathematics at Wisconsin (2005 - 2009)

UW Mentorship Program for Women in Math and Science, Facilitator (2007, 2008)

Wisconsin Emerging Scholar Program, Instructor (2008)

UW Science Expeditions outreach fair, Station designer (2007)

UW Mathematics Tutorial Program, Instructor, (2006)

Academic Excellence Program, Harvey Mudd College, Facilitator (2003 - 2005)