

BENJAMIN J. BRAUN

NOVEMBER 2016

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University of Kentucky
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ACADEMIC POSITIONS

University of Kentucky, Lexington, KY

- Wimberly and Betty Royster Research Professor, 2015 – 2017
- Associate Professor of Mathematics, July 2014 – present
- Assistant Professor of Mathematics, August 2007 – June 2014

EDUCATION

Washington University in Saint Louis, Saint Louis, MO

- Ph.D., Mathematics, May 2007
 - Dissertation Title: “Ehrhart Theory for Lattice Polytopes”
 - Adviser: John Shareshian
- A.M., Mathematics, December 2003

Truman State University, Kirksville, MO

- B.A., Magna cum Laude, Mathematics and English Composition, May 2001

RESEARCH: INTERESTS AND PUBLICATIONS

Research Interests

- Algebraic, geometric, and topological combinatorics

Peer-Reviewed Publications

- (1) An Ehrhart Series Formula for Reflexive Polytopes
Electron. J. Combin., 13(1), 2006, N15
- (2) Norm Bounds for Ehrhart Polynomial Roots
Discrete Comput. Geom., 39 (2008), no. 1 – 3, 191 – 193
- (3) Ehrhart Polynomial Roots and Stanley’s Non-negativity Theorem, (with M. Develin)
Integer Points in Polyhedra–Geometry, Number Theory, Representation Theory, Algebra, Optimization, Statistics, Contemporary Mathematics, 2008, Volume: 452, pp 67 – 78
- (4) Symmetries of the Stable Kneser Graphs
Adv. in Appl. Math., 45 (2010), no. 1, 12 – 14
- (5) Complexes of Non-Crossing Diagonals of Polygons, (with R. Ehrenborg)
J. Combin. Theory Ser. A, 117 (2010), no. 6, 642 – 649
- (6) Independence Complexes of Stable Kneser Graphs
Electron. J. Combin., 18, no. 1 (2011), P118
- (7) Nowhere-Harmonic Colorings of Graphs, (with M. Beck)
Proc. Amer. Math. Soc. 140 (2012), 47-63

- (8) Mahonian Partition Identities via Polyhedral Geometry, (with M. Beck and N. Le)
From Fourier Analysis and Number Theory to Radon Transforms and Geometry: In Memory of Leon Ehrenpreis, Farkas, H.M.; Gunning, R.C.; Knopp, M.I.; Taylor, B.A. (Eds.), *Developments in Mathematics*, Vol 28, Springer, 2013
- (9) Deformation Retracts of Neighborhood Complexes of Stable Kneser Graphs, (with M. Zeckner)
Proc. Amer. Math. Soc. 142 (2014), 413-427.
- (10) Cellular Resolutions of Ideals Defined by Nondegenerate Simplicial Homomorphisms, (with J. Browder and S. Klee)
Israel J. Math. 196 (2013), no. 1, 321-344.
- (11) Lattice Point Generating Functions of Symmetric Cones, (with M. Beck, T. Bliem, and C. Savage)
Journal of Algebraic Combinatorics, 38 (2013), 543-566.
- (12) Compositions Constrained by Graph Laplacian Minors, (with R. Davis, A. Harrison, J. Doering, J. Noll, and C. Taylor)
INTEGERS 13 (2013), paper A41.
- (13) Euler-Mahonian Permutation Statistics via Polyhedral Geometry, (with M. Beck)
Advances in Mathematics, 244 (2013), 925-954.
- (14) s -Lecture Hall Partitions, Self-Reciprocal Polynomials, and Gorenstein Cones, (with M. Beck, M. Koeppel, C. Savage, and Z. Zafeirakopoulos)
The Ramanujan Journal, February 2015, Volume 36, Issue 1-2, pp 123-147.
- (15) Hyperoctahedral Eulerian Idempotents, Hodge Decompositions, and Signed Graph Coloring Complexes, (with S. Crown Rundell)
Electron. J. Comb., 21(2) (2014), #P2.35
- (16) Ehrhart Series, Unimodality, and Integrally Closed Reflexive Polytopes (with R. Davis)
Annals of Combinatorics, (2016). doi:10.1007/s00026-016-0337-6
- (17) Generating Functions and Triangulations for Lecture Hall Cones, (with M. Beck, M. Koeppel, C. Savage, and Z. Zafeirakopoulos)
SIAM J. Discrete Math., 30(3), 1470-1479.

Preprints and Submitted Work

- (18) A Shelling of the Hypersimplex (with L. Solus)
submitted
- (19) Matching and Independence Complexes Related to Small Grids, (with W. Hough)
submitted
- (20) Euler-Mahonian Statistics and Descent Bases for Semigroup Algebras, (with M. Olsen)
submitted
- (21) Detecting the Integer Decomposition Property and Ehrhart Unimodality in Reflexive Simplices, (with R. Davis and L. Solus)
submitted

Invited Book Chapters

- (22) Unimodality Problems in Ehrhart Theory
in *Recent Trends in Combinatorics*, Beveridge, A., et al. (eds), Springer, 2016, pp 687-711, doi 10.1007/978-3-319-24298-9_27

SCHOLARSHIP OF TEACHING AND LEARNING: INTERESTS AND PUBLICATIONS

SoTL Interests

- Using writing in mathematics courses, K-12 teacher education, pedagogical use of the history of mathematics, connections between active learning methods and cognitive/social psychology

Peer-Reviewed Publications

- (1) Personal, Expository, Critical, and Creative: Using Writing in Mathematics Courses
PRIMUS (Problems, Resources, and Issues in Undergraduate Mathematics Studies), 24 (6), 2014, 447-464.

Editorial-Board-Reviewed Publications

- (1) Persistent Learning, Critical Teaching: Intelligence Beliefs and Active Learning in Mathematics Courses
Notices of the Amer. Math. Soc., Jan 2014, Volume 61, Number 1, 72–74
- (2) Learning Proofs in the Hallway
MAA Focus, April/May 2016, pgs 32-33
- (3) What Does Active Learning Mean For Mathematicians? (with P. Bremser, A. Duval, E. Lockwood, and D. White)
to appear in *Notices of the Amer. Math. Soc.*

Editorial Activity

- Founding Editor-in-Chief and contributor for the American Mathematical Society blog *On Teaching and Learning Mathematics*, blogs.ams.org/matheducation, June 2014 – present.
- *On Teaching and Learning Mathematics* Contributions
 - (1) Believing in Mathematics, 16 May 2016
 - (2) Recent Reports and Recommendations Related to Courses in the First Two Years of College Study, 4 April 2016
 - (3) The Secret Question (Are We Actually Good at Math?), 1 September 2015
 - (4) Active Learning in Mathematics, Parts I-VI, (with P. Bremser, A. Duval, E. Lockwood, and D. White), 10 September through 1 November 2015
 - (5) Famous Unsolved Math Problems as Homework, 1 May 2015
 - (6) Assessment in Postsecondary Mathematics Courses, 20 August 2014
 - (7) Teaching Practices Between and Beyond All Lecture and All Student Discovery, 20 June 2014

AWARDS, FELLOWSHIPS, AND SCHOLARSHIPS

- External Multi-Year Research Awards
 - Principal Investigator, \$40,000, “Reflexive Polytopes, Lecture Hall Partitions, and Euler-Mahonian Distributions”
National Security Agency Young Investigators Award, May 1, 2016 – April 30, 2018
 - Principal Investigator, \$40,000, “Rational Generating Functions, Enumeration, and Polyhedral Geometry”
National Security Agency Young Investigators Award H98230-13-1-0240, May 1, 2013 – April 30, 2015
 - Principal Investigator, \$128,936, “Topological and Algebraic Combinatorics”
National Science Foundation Award DMS-0758321, July 1, 2008 – June 30, 2012

- co-Principal Investigator, “Polyhedral Geometry and Partition Theory”
American Institute of Mathematics SQuaRE Award, joint with M. Beck, M. Koeppel, P. Paule, C. Savage, 2010 – 2012
- Internal Teaching Award:
 - 2011–2012 College of Arts and Sciences Outstanding Teaching Award
- External Outreach and Infrastructure Awards:
 - co-Principal Investigator, \$559,626, “Graduate Scholars in Mathematics at the University of Kentucky,” National Science Foundation Award DUE-1356253, August 15, 2014 – July 31, 2019
 - Principal Investigator, \$3,317, NASA KY Space Grant Consortium Mini-Grant, “Outreach Activities to Increase Interest in Mathematics Among K-12 Students.” joint with Russell Brown and Katharine Ott, January 2014 – December 2014.
 - co-Principal Investigator, \$2,000, MSRI Math Circles Mini-grant, joint with Russell Brown and Katharine Ott, October 2012 – April 2013
 - co-Principal Investigator \$2,000, MSRI Math Circles Mini-grant, joint with Russell Brown and Jakayla Robbins, July 2010 – June 2011
- External Conference/Workshop Awards:
 - co-Principal Investigator, “Polyhedral Geometry and Partition Theory”
American Institute of Mathematics Workshop, joint with F. Ardila, P. Paule, C. Savage, November 2016
 - co-Principal Investigator, \$15,000, “Graduate Student Combinatorics Conference 2015”,
Workshop Grant, National Science Foundation, October 2014

TEACHING

Course Instructor: Duties included choosing textbooks, designing syllabi, lecturing and leading class discussions, writing and grading homework and exams, supervising teaching assistants, and holding office hours.

- University of Kentucky
 - MA 113, Calculus I, Spring 2010, Fall 2011, Fall 2012, Fall 2016
 - MA 114, Calculus II, Spring 2016
 - MA 310, Problem Solving for Teachers, Spring 2014
 - MA 322, Matrix Algebra and its Applications, Fall 2007
 - MA 330, History of Mathematics, Spring 2008, Spring 2009, Spring 2010, Spring 2012, Fall 2013, Fall 2014, Spring 2015
 - MA 341, Topics in Geometry, Fall 2013
 - MA 391, Mathematical Composition and Communication, Spring 2016
 - MA 515, Linear and Combinatorial Optimization, Fall 2008
 - MA 601, Teaching College Mathematics, Fall 2010
 - MA 614, Enumerative Combinatorics, Spring 2011, Spring 2015
 - MA 714, Local Cohomology and Combinatorics, Spring 2012
 - MA 714, Topological Methods in Combinatorics, Fall 2008
 - MA 714, Unimodality and Log-Concavity, Spring 2014
 - MA 714, Discrete Morse Theory, Fall 2014
 - MA 751, Lie Groups, Lie Algebras, and Representations, Fall 2010
- Washington University in Saint Louis

- Math 309, Matrix Algebra, Fall 2005
- Math 220, Finite Mathematics, Summer 2004
- University of Missouri – Saint Louis
 - Math 1100, Basic Calculus, Summer 2004

ADVISING

Postdoctoral Mentor

Current

- Rafael González D'León

Primary Doctoral Adviser

Current

- Wesley Hough
- Marie Meyer
- McCabe Olsen
- Brian Davis

Previous

- Liam Solus, December 2015
- Robert Davis (secondary adviser: Carl Lee), May 2015
- Matthew Zeckner, (secondary adviser: Carl Lee), May 2011

Masters Exam Adviser

Previous

- Marie Meyer, Fall 2015
- McCabe Olsen, Spring 2015
- Michael Gustin, Fall 2014
- Isaiah Harney, Fall 2014
- Liam Solus, Spring 2014
- Robert Davis, May 2012
- Ashley Harrison, May 2012
- Clifford Taylor, May 2012
- Norman Fox (co-advised with Carl Lee), December 2011
- Megan Robertson, December 2009
- Matthew Zeckner, October 2008

Undergraduate Independent Study Adviser

- Spring 2014: Undergraduate reading group on Hilbert's problems: Matthew Fahrback, Cyrus Hettle, Trevor Leach, Ethan Linville, Weston Roof, Katie Ward
- Megan Alvey, MA 398, Fall 2013 & MA 375 in Fall 2014
- Robert Cass, Non-credit independent study in Summer 2012 & MA 375 in Fall 2013
- Brittney Denton, MA 375, Fall 2012
- Morgan Mattingly, MA 375, Fall 2015
- Alyssa Young, MA 375, Spring 2016
- Chase Carrico, MA 375, Fall 2016

Undergraduate Research Adviser

- Summer 2011: Research team in partition theory and polyhedral geometry

- Robert Davis, graduate student
- Ashley Harrison, graduate student
- Clifford Taylor, graduate student
- Jenna Noll, undergraduate student
- Jessica McKim, undergraduate student
- Summer 2013: Megan Alvey, undergraduate student
- Summer 2014: Morgan Mattingly, undergraduate student
- Spring 2016: Sami Sultan, Santiago de Leon, Kyle Franz, undergraduate students

Undergraduate Math Major Faculty Adviser, 2012-present

UNIVERSITY OF KENTUCKY SERVICE

Committees, Department of Mathematics

- Salary Committee, 2016 – present
- Calculus Committee, Spring 2016
- Postdoc Search Committee, Member, 2014 – 2015
- Lecturer Search Committee, Chair, 2013 – 2014
- Undergraduate Committee, Member, 2012 – 2015 and 2016
- Discrete Mathematics Prelim Committee, January 2009, January 2011 – June 2011, January 2012, January 2015, June 2015
- Topology Prelim Committee, June 2009 – June 2010, June 2012, January 2014, June 2014
- Executive Committee, Member (elected), 2009 – 2010
- Graduate Committee, Member, 2008 – 2010

Committees, College of Arts and Sciences

- Advisory Committee for Selection of Math Department Chair, Member, Summer 2014
- Committee on the Evaluation of Teaching, Member, Fall 2013
- Committee on the Future of Undergraduate Education, Member, Fall 2012
- Outstanding Teaching Award Committee, Member, April 2012
- Envision 2020: Teaching Committee, Member, Summer 2010

Committees, College of Education

- STEM Education clinical faculty search committee, Member, Spring 2014
- Secondary Mathematics Education Program Faculty, Member, 2013 – present

Committees, University-wide

- University Senate Council ad hoc Committee on Teacher/Course Evaluations, Spring and Fall 2014

Seminar Organization

- Summer Math Lunch Talk Series, Organizer, 2012 – 2014
- Discrete CATS Seminar, Co-Organizer, 2010 – 2011, 2014 – 2015, 2016 – present
- WILDCATS (Work, Interactions, and Leading Developments in Combinatorics, Algebra, Topology, and Statistics) Seminar, Co-Organizer, Univ. of Kentucky, 2008 – 2009, 2010 – 2011
- Summer CATS Seminar, Organizer, Summer 2010

Course Coordinator

- MA 113, Calculus I, 2016 – 2017

Other Activities

- New Faculty Mentor, Mathematics Department, 2015 – present
- Mentor, First Scholars Program, 2013 – 2014
- Arts and Sciences Discussion Panel with President Capilouto, Member, Fall 2012
- Arts and Sciences Five-year Self-Study, Assistant Professor Discussion Panel, Member, Fall 2012
- “How to Study Math” presentation, UK First Generation Living Learning Community, August 2012
- “REUs in Mathematics” presentation, UK Physics Club, January 2012
- Undergraduate Problem Solving Competition, Organizer, 2008 – 2010
- MicroTeach Session Leader, 2008 – 2010
- Graduate Student Colloquium panel member
 - The academic job search, October 2010
 - Inquiry-based learning and writing across the curriculum, October 2011
- Math Club Speaker Coordinator, March 2008

EXTERNAL SERVICE

Conference Organization

- American Institute of Mathematics Workshop on “Polyhedral Geometry and Partition Theory,” Co-organizer, November 2016
- AMS Special Session Co-Organizer, March 2014
 - Co-Organizer, with Carl Lee of University of Kentucky, of the AMS Southeastern Section Special Session on Geometric and Algebraic Combinatorics
- Organizing Committee, Member, FPSAC (Formal Power Series in Algebraic Combinatorics), June 2014
- AMS Special Session Co-Organizer, October 2013
 - Co-Organizer, with Carl Lee and David Royster of University of Kentucky, of the AMS Southeastern Section Special Session on The Work of Mathematicians and Mathematics Departments in Mathematics Education, October 2013
- AMS Special Session Co-Organizer, March 2012
 - Co-Organizer, with Drew Armstrong of University of Miami, of the AMS Southeastern Section Special Session on Combinatorics: Algebraic and Geometric
- MAA Mathfest Invited Paper Session Organizer, “Polyhedra are Everywhere!” August 2011
- AMS Special Session Co-Organizer, March 2011
 - Co-Organizer, with Drew Armstrong of University of Miami, of the AMS Southeastern Section Special Session on Algebraic and Geometric Combinatorics

Referee and Reviewer Activities

- Journal Referee
 - Advances in Applied Math
 - American Mathematical Monthly
 - American Mathematical Monthly Notes
 - AMS Contemporary Mathematics
 - Annals of Combinatorics
 - Australiasian Journal of Combinatorics

- Bulletin of London Mathematics Society
- Discrete and Computational Geometry
- Discrete Mathematics
- Electronic Journal of Combinatorics
- European Journal of Combinatorics
- Experimental Mathematics
- FPSAC Extended Abstracts
- Graphs and Combinatorics
- INTEGERS
- Involve
- Israel Journal of Mathematics
- Journal of Algebraic Combinatorics
- Journal of Algebraic Statistics
- Journal of Approximation Theory
- Journal of Combinatorial Theory Series A
- Michigan Mathematics Journal
- PRIMUS: Problems, Resources, and Issues in Mathematics Undergraduate Studies
- Proceedings of the American Mathematical Society
- SIAM Journal of Discrete Mathematics
- Editorial Board Member
 - Notices of the American Mathematical Society, Associate Editor, January 2016 – December 2018
- National Science Foundation Ad Hoc Reviewer, International Research Fellowship Program, January 2012
- National Security Agency, Mathematical Sciences Program, Proposal Reviewer, April 2013, January 2014
- Book Reviewer
 - Springer-Verlag
 - American Mathematical Society
- AMS Mathematical Reviews: Reviewer, 2009 – 2015

Other Activities

- Member, Committee on Education, American Mathematical Society, 2014-2017
 - Chair of writing team for CBMS Statement on Active Learning, July 2016
- MAA Common Vision Project, invited workshop participant, May 2015
- MAA Instructional Practices Guide Project
 - Invited workshop participant, October 2015
 - Steering Committee Member, January 2016 – present
- External REU evaluator, Marshall University Combinatorics REU, Summer 2016
- Professional Development Workshop Leader, Texas A&M International University, September 2014
- Professional Development Webinar Leader, edWeb.net Adaptive Math Learning Community, August 2014
- External Honors Examiner (Invited), Oberlin College Department of Mathematics, April 2014
- Judge, Association for Women in Mathematics Essay Contest, Spring 2013

- President, Board of Directors, Fayette Cooperating Preschool and Kindergarten, June 2013–Nov 2013

OUTREACH ACTIVITIES

Administrative Positions

- Co-Director and Session Leader, Central Kentucky Mathematical Circles, May 2010 – present
- Lead Organizer, UK High School Mathematics Day for Women, November 2014
- Math Circles Coordinator, Washington University in Saint Louis, Fall 2004 – Spring 2005

Other Activities

- Meadowthorpe Elementary School, Volunteer, 2016 – present
- Garden Springs Elementary School, Professional Development Workshop Leader, Fall 2014
- Garden Springs Elementary School, SBDM Homework Policy Committee, Member, Spring 2014
- Garden Springs Elementary School, Volunteer, 2013 – 2016
- Tates Creek Middle School STEM education night, volunteer, December 2011 and January 2013
- Tates Creek Elementary “Monster Math” night, volunteer, October 2012
- Podcast: Central Kentucky Math Circles, Innovate Kentucky Podcast 7, September 2012, <http://innovateky.com/>
- UK High School Math Day, Faculty Address, “What do we do when we do mathematics?” October 2010
- Pi Day Speaker, Rosa Parks Elementary School, Lexington, KY, March 2008

PROFESSIONAL MEMBERSHIPS

- American Mathematical Society, Member, 2002 – present
- Mathematical Association of America, Member, 2005 – present
- Association for Women in Mathematics, Member, 2008 – present
- The Phi Beta Kappa Society, Delta of Missouri Chapter, 2001 – present

INVITED TALKS AND WORKSHOPS

2017:

Talks:

- *Upcoming*: AMS Sectional Meeting, Special Session on Combinatorics, April 2017
- *Upcoming*: “Active Learning in Mathematics,” NCTM National Meeting, April 2017
- *Upcoming*: “Active Learning in Mathematics,” Ohio State University Mathematics Education Seminar, Spring 2017
- *Upcoming*: “Active Learning in Mathematics,” Wright State University Department Colloquium, Spring 2017

2016:

Workshops:

- American Institute of Mathematics workshop on Polyhedral Geometry and Partition Theory, (co-organizer), November 2016

Talks:

- Educational Advancement Foundation Symposium on Active Learning, August 2016

- “Active Learning in Mathematics,” Conference Board of the Mathematical Sciences, May 2016, Washington DC
- Marshall University Combinatorics Seminar, July 2016
- Special Session on Algebraic and Topological Methods in Combinatorics, 2016 Joint Mathematics Meetings, January 2016
- “Broadening Assessment Practices,” MAA Project NExT session, 2016 Joint Mathematics Meetings, January 2016

2015:*Workshops:*

- Workshop on Sandpile Groups, at Banff International Research Station Casa Mathematica Oaxaca, Mexico, November 2015
- A Common Vision for Undergraduate Mathematics in 2025, a joint workshop of AMATYC, AMS, ASA, MAA, and SIAM. Washington D.C., May 2015

Talks:

- Special Session on Enumerative Algebraic and Geometric Combinatorics, AMS Sectional Meeting, October 2015
- University of Washington Combinatorics Seminar, June 2015
- Special Session on Convexity and Combinatorics, AMS Northeastern Section Meeting, March 2015
- Midwest Combinatorics Conference, University of Minnesota, May 2015

2014:*Workshops:*

- Leader of Faculty Professional Development Workshop on Using Writing in STEM Courses, Texas A & M International University, September 2014

Talks:

- Institute for Mathematics and its Applications Workshop on Geometric Combinatorics, November 2014
- Fields Institute Workshop on “Making Models: Stimulating Research in Rigidity Theory and Spatial-Visual Reasoning,” August 2014
- Oberlin College Mathematics Department Colloquium, April 2014
- Hyperoctahedral Eulerian Idempotents, Hodge Decompositions, and Signed Graph Coloring Complexes, San Francisco State University: Algebra, Combinatorics, and Geometry Seminar, February 2014

2013:*Workshops:*

- Invited to participate in Generalizations of Chip-Firing and the Critical Group, AIM Workshop, Palo Alto, CA, July 2013, but unable to attend workshop due to travel cancellation caused by SFO airport crash on 6 July 2013

Talks:

- From unit fractions to the Riemann Hypothesis, Denison University Mathematics Department Colloquium, November 2013
- Hyperoctahedral Eulerian Idempotents, Hodge Decompositions, and Signed Graph Coloring Complexes, AMS Central Section Meeting, October 2013

2012:*Talks:*

- s -Lecture Hall Partitions, Self-Reciprocal Polynomials, and Gorenstein Algebras, AMS Central Sectional Meeting, October 2012
- Euler-Mahonian Statistics via Polyhedral Geometry, AMS Southeastern Sectional Meeting, October 2012
- Euler-Mahonian Statistics via Polyhedral Geometry, Workshop on Convex Polytopes, Kyoto, Japan, July 2012
- Euler-Mahonian Statistics via Polyhedral Geometry, Discrete Math Seminar, University of California, Davis, May 2012
- Local Cohomology and Combinatorics, Student-Run Discrete Math Seminar, University of California, Davis, May 2012

2011:*Talks:*

- Mahonian Partition Identities via Polyhedral Geometry, SIAM Conference on Applied Algebraic Geometry, September 2011
- Cellular Resolutions of Ideals Defined by Simplicial Homomorphisms, San Francisco State University: Algebra, Combinatorics, and Geometry Seminar, April 2011

2010:*Talks:*

- Deformation Retracts of Neighborhood Complexes of Stable Kneser Graphs, AMS Central Section Meeting, November 2010
- Nowhere-Harmonic Colorings of Graphs, SIAM Discrete Mathematics 2010, June 2010
- Nowhere-Harmonic Colorings of Graphs, AMS Western Sectional Meeting, April 2010
- An Ehrhart Series Formula for Reflexive Polytopes, AMS Southeastern Sectional Meeting, March 2010
- Nowhere-Harmonic Colorings of Graphs, University of Miami Combinatorics Seminar, February 2010

2009:*Workshops:*

- Combinatorial Challenges in Toric Varieties, AIM Workshop, Palo Alto, CA. Invited Participant, April 2009

Talks:

- Independence Complexes of Stable Kneser Graphs, San Francisco State University: Algebra, Combinatorics, and Geometry Seminar, June 2009
- Nowhere-Harmonic Colorings of Graphs, AMS Western Sectional Meeting, April 2009
- The Complex of Non-Crossing Diagonals of a Polygon, AMS Southeastern Sectional Meeting, April 2009
- Independence Complexes of Stable Kneser Graphs, Ulam Centennial Conference at University of Florida, March 2009

2008:*Talks:*

- The Complex of Non-Crossing Diagonals of a Polygon, San Francisco State University: Algebra, Combinatorics, and Geometry Seminar, March 2008

2007:*Talks:*

- h^* -vectors of Lattice Polytopes, AMS Southeastern Sectional Meeting, Fall 2007
- h^* -vectors of Lattice Polytopes, Indiana University Combinatorics Seminar, Fall 2007

2006:*Talks:*

- Roots of Ehrhart Polynomials, Integer Points in Polyhedra, AMS Summer Research Conference, Summer 2006
- Ehrhart Theory and Reflexive Polytopes, University of Kansas Combinatorics Seminar, Fall 2006

CONTRIBUTED PRESENTATIONS AND TALKS

2016:

- Undergraduate Education Symposium, University of Kentucky, January 2016
- Constructing a Growth Mindset Environment: Using Psychological Interventions to Support IBL Pedagogies, MAA Session on Inquiry-Based Learning, Joint Mathematics Meetings, January 2016
- Eulerian Polynomials, UK Discrete CATS Seminar, September 2016

2015:

- Kentucky Center for Mathematics Annual Conference, March 2015
- Kentucky Mathematics Educator Development (KMED) Conference, April 2015
- Introduction to Symmetric Functions, UK Discrete CATS Seminar, February 2015

2013:

- Eulerian Idempotents and Hochschild Homology, UK Topology Seminar, November 2013
- Chromatic Polynomials: a Survey, UK Discrete CATS Seminar, March 2013

2012:

- s -Lecture Hall Partitions, Self-Reciprocal Polynomials, and Gorenstein Algebras, UK Discrete CATS Seminar, September 2012
- Personal, Expository, Critical, and Creative: Using Writing in Mathematics Courses, University of Kentucky STEM Education Conference, February 2012

2011:

- Mahonian Partition Identities via Polyhedral Geometry, Poster Presentation, ERC Workshop on High-Complexity Discrete Geometry, October 2011
- Why is a Cohen-Macaulay complex Cohen-Macaulay?, Parts I and II, UK Topology Seminar, October 2011
- Euler-Mahonian statistics via polyhedral geometry, Fall 2011, UK Discrete CATS Seminar, September 2011
- Personal, Expository, Critical, and Creative: Using Writing in Mathematics Courses, MAA Mathfest 2011, August 2011
- Central Kentucky Mathematics Circles, University of Kentucky STEM Education Conference, April 2011
- A Geometric View of MacMahon's Partition Analysis, UK Discrete CATS Seminar, February 2011

- Glory is Fleeting, but a Topological Invariant is Forever, UK Topology Seminar, February 2011
- A neat way to prove that $K_{3,3}$ is not planar using the Borsuk-Ulam theorem (2 talks), UK Topology Seminar, January/February 2011

2010:

- Generating Functions for Plane Partitions, UK Discrete CATS Seminar, September 2010
- Cellular Resolutions of Ideals Defined by Simplicial Homomorphisms, UK Algebra and Geometry Seminar, September 2010
- Counting Integer Points in Polytopes, Truman State University Recruiting Visit, March 2010

2009:

- The Borsuk-Ulam Theorem, UK Graduate Student Colloquium, November 2009
- A Generalized Borsuk-Ulam Theorem, UK Topology and Geometry Seminar, October 2009
- Independence Complexes of Stable Kneser Graphs, UK Discrete CATS Seminar, April 2009
- Polyhedra and Toric Varieties (3 talks), UK Algebra and Geometry Seminar, March 2009
- Enumerating Integer Points in Polytopes, UK Graduate Student Colloquium, Spring 2009

2008:

- Graph Colorings, Morphism Complexes, and Characteristic Classes (2 talks), UK Topology and Geometry Seminar, Fall 2008
- The Complex of Non-Crossing Diagonals of a Polygon, UK Discrete CATS Seminar, Spring 2008
- Discrete Hodge Theory, UK Graduate Student Colloquium, Spring 2008

2007:

- Complexes of Graph Homomorphisms, UK Graduate Student Colloquium, Fall 2007
- Topological Approaches to Evasiveness, UK Topology and Geometry Seminar, Fall 2007
- The Topological Tverberg Problem, UK Discrete CATS Seminar, Fall 2007
- Roots and Coefficients of Ehrhart Polynomials, Dissertation Defense, Washington University in St. Louis, Spring 2007

2006:

- Ehrhart h^* -vectors for Lattice Polytopes, Washington University Operator Theory Seminar, Fall 2006
- Oh, What a Change of Basis Can Do!, MAA Missouri Sectional Meeting, Spring 2006
- Norm Bounds for Ehrhart Polynomial Roots, Graduate Student Combinatorics Conference at U. of Wisconsin, Spring 2006

2005:

- Monomial Ideals, Simplicial Complexes, and Stanley Reisner Rings (3 talks), Washington University Commutative Algebra Seminar, Fall 2005
- Graph Homomorphism Complexes, Washington University Graduate Student Seminar, Spring 2005

2003:

- $K(G,1)$ Spaces and the Origins of Homological Algebra, Washington University Graduate Student Seminar, Fall 2003

OUTREACH AND MATH CLUB PRESENTATIONS

2016:

- Exploding Dots!, UK Math Club, October 2016
- Perfect Numbers (2 sessions), Central Kentucky High School Mathematics Circle, February 2016

2015:

- Counting, Combining, and Constructing (4 sessions), Central Kentucky Elementary School Math Circle, March 2015

2014:

- Counting, Combining, and Constructing (4 sessions), Central Kentucky Elementary School Math Circle, October 2014
- Partition Identities, Central Kentucky High School Math Circle (2 sessions), September 2014
- Counting, Combining, and Constructing (4 sessions), Central Kentucky Elementary School Math Circle, March 2014

2013:

- On Additive Composition and Decomposition, with an Eye Toward Partitions (2 sessions), Central Kentucky High School Math Circle, September 2013
- Counting, Combining, and Constructing (4 sessions), Central Kentucky Elementary School Math Circle, October 2013
- Counting, Combining, and Constructing (4 sessions), Central Kentucky Elementary School Math Circle, March/April 2013

2012:

- Counting, Combining, and Constructing (4 sessions), Central Kentucky Elementary School Math Circle, October 2012
- Catalan Numbers, Central Kentucky High School Math Circle, September 2012
- Counting, Combining, and Constructing (4 sessions), Central Kentucky Elementary School Math Circle, March/April 2012
- Partition Identities, Central Kentucky High School Math Circle, March 2012

2011:

- The Tension Between Algebra and Geometry, Central Kentucky High School Math Circle, December 2011
- Counting, Combining, and Constructing (4 sessions), Central Kentucky Elementary School Math Circle, October 2011
- Counting, Combining, Constructing: Exploring With Zometools (2 sessions), Central Kentucky Elementary School Math Circle, February/March 2011

2010:

- Combinatorial Properties of Points in the Plane (2 sessions), Central Kentucky High School Math Circle, November/December 2010
- Counting, Combining, Constructing: Exploring With Zometools (2 sessions), Central Kentucky Elementary School Math Circle, November 2010
- What Do We Do When We Do Mathematics?, UK High School Math Day, October 2010

2008:

- The Geometry of Voting, UK Undergraduate Math Club, Fall 2008

2006:

- The Frobenius Coin Exchange Problem, Washington University Undergraduate Math Club, Fall 2006
- Pick's Theorem, Washington University Math Circles, Fall 2006
- The Pigeonhole Principle: A Powerful Idea with a Funny Name, Washington University Math Circles, Spring 2006
- Lattice Points in Lattice Polytopes, Washington University Math Circles, Spring 2006
- Brion's Theorem and Lattice Polytopes, Washington University Undergraduate Math Club, Spring 2006

2005:

- How to Use a Generating Function, Washington University Math Circles, Fall 2005
- Using Matrices to Count Paths in Graphs, Washington University Math Circles, Spring 2005
- Stanley's Twelfefold Way to Counting, Washington University Math Circles, Spring 2005
- Matchings in Bipartite Graphs, Washington University Math Circles, Spring 2005
- Integer Lattice Points In and On Circles in \mathbb{R}^2 , Washington University Math Circles, Spring 2005

2004:

- The Erdős-DeBruijn Theorem and Points in the Plane, Washington University Math Circles, Fall 2004
- The Golden Ratio and Fibonacci Numbers, Washington University Math Circles, Fall 2004
- The Game of Sprouts, Washington University Math Circles, Spring 2004

2003:

- Eulers Formula for Planar Graphs, Washington University Undergraduate Math Club, Fall 2003
- What is Graph Theory?, Washington University Math Circles, Fall 2003
- An Introduction to Group Theory via R^2 , Washington University Math Circles, Spring 2003

2002:

- The Bridges of Konigsberg Problem, Washington University Undergraduate Math Club, Fall 2002