Richard Ehrenborg
Vita (1/2024)

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Research Interests

Combinatorics, coalgebras, geometry, invariant theory, probability, and stochastic processes.

Education

University of Stockholm (7/82–8/88)

- B.S. in Mathematics (9/88).
- Minor in Mathematical Statistics.
- Attended in parallel with primary school and high school (7/82–6/87).
- Attended in parallel with military service (6/87–8/88).

Massachusetts Institute of Technology (8/88–5/93)

- Ph.D. in Mathematics (5/93).
- Dissertation title, *Combinatorial Methods in Multilinear Algebra.*
- Supervised by Professor Gian-Carlo Rota.

Employment

University of Kentucky (8/00–present)

- Sabbatical leave (1/21–6/21).
- Edwards Research Professor (7/17–6/20).
- Professor (7/06–present).
- Sabbatical leave (7/14–12/14) and scholarly leave (1/15–6/15).
- Sabbatical leave (7/10–12/10) and scholarly leave (1/11–6/11).
- Sabbatical leave (7/06–6/07).
- First Royster Research Professor (7/04–6/06).
- Associate Professor (8/00–6/04).

Royal Institute of Technology (10/98–6/00)

- Associate Professor.
- On leave the academic year 1998–1999.
- Senior researcher (1/00–6/00).

Institute for Advanced Study (9/98–7/99)

- Member.

Cornell University (7/95–8/98)

- H. C. Wang Assistant Professor.

Université du Québec à Montréal (8/93–6/95)

- Post-doctoral Fellow. Supported by LaCIM, Université du Québec à Montréal and CRM, Université de Montréal.

Massachusetts Institute of Technology (8/88–5/93)

- Research Assistant 1/93–5/93 for Prof. Dan Kleitman.
- Research Assistant 6/90–8/90 for Prof. Gian-Carlo Rota.

Swedish Army (6/87–8/88)

- Compulsory military service, detailed to special service as a mathematician.

Visiting Positions

Institute for Advanced Study (6/18–7/18, 6/19–7/19, 6/22–7/22)

- Visitor for two months each year.

Princeton University (7/21)

- Faculty visitor for one month.

Princeton University (8/14–7/15)

- Visiting Professor and Research Scholar for a year, while on sabbatical and scholarly leave.

Institute for Advanced Study (5/13)

- Visitor for two weeks, assisting the Women and Mathematics Program.

The Fields Institute (10/11)

- Visiting for four days. Workshop on Symmetry in Graphs, Maps and Polytopes.

Institute for Advanced Study (9/10–7/11)

- Member for a year, while on sabbatical and scholarly leave.

Banff International Research Station (11/10)
- Visiting for two days. Workshop on Quasisymmetric Functions.

Institute for Pure and Applied Mathematics (IPAM) at UCLA, (10/09)
- Visiting for one week. Workshop on Combinatorial Geometry.

Satellite conference of International Congress of Mathematics 2006, Madrid, Spain (8–9/06)
- Visiting for one week. Workshop on Geometric and Topological Combinatorics.

Massachusetts Institute of Technology (7/06–6/07)
- Visiting Scholar for one year, while on sabbatical.

Banff International Research Station (3/06)
- Visiting for one week. Workshop on Convex Sets and their Applications.

The Mittag-Leffler Institute, The Royal Swedish Academy of Sciences (3/05)
- Visiting Scholar for one month. Research Program in Algebraic Combinatorics.

Banff International Research Station (8/04)
- Visiting for one week. Combinatorial Hopf Algebra Workshop.

Institute for Advanced Study/Park City Mathematics Institute (7/04)
- Participating for three weeks in the Research Program in Geometric Combinatorics.

Mathematical Sciences Research Institute (11/03)
- Invited speaker and participating in the week-long workshop Combinatorial and Discrete Geometry.

Mathematisches Forschungsinstitut Oberwolfach (4/03)
- Visiting for one week. Workshop in Topological and Geometric Combinatorics.

University of Minnesota (7/02–8/02)
- Visiting Scholar for two weeks.

Institute for Advanced Study (6/02)
- Visiting Member for three weeks.

Massachusetts Institute of Technology (7/01–8/01)
- Visiting Scholar for one month.

Cornell University (6/00–8/00)
- Co-organizer of Research Experiences for Undergraduates Program in Mathematics. Advised four students in research in algebraic combinatorics (6–8/00).

Mathematisches Forschungsinstitut Oberwolfach (4/99)
- Visiting for one week. Workshop in Geometric and Topological Combinatorics.

Massachusetts Institute of Technology (9/98)
- Visiting Scholar for two weeks.

Chalmers University of Technology (5/97)

- Visiting Scholar for three weeks.

Mathematical Sciences Research Institute (10/96 and 1/97)

- General Member for special year in Combinatorics.

AT&T Bell Laboratories, Murray Hill (6/91–8/91)

- Consultant. Worked in the Mathematical Sciences Research Group with Dr. David S. Johnson and Dr. Peter W. Shor.

Ericsson's Computer Science Laboratory (summers of '85,'86,'89)

- Two months each summer. Programmed in modern logic and functional computer languages, such as Prolog and Erlang.

Grants

Explorations in Stratified, Topological and Geometric Combinatorics

- Principal Investigator for Simons Foundation grant #854548. Funded for five years, amount awarded $42,000. (9/21–8/26).

Whitney Stratifications, Partitions and Permutations

- Principal Investigator for Simons Foundation grant #429370. Funded for five years, amount awarded $35,000. (9/16–8/21).

The Combinatorics of Flag Enumeration, Permutations and Material Science

- Principal Investigator for National Security Agency grant H98230-13-1-0280. Funded for two years, amount awarded $78,313. (6/13–5/15).
- During the summer 2013 supported two graduate students to do research.
  - Brad Fox, The lattice path interpretation for the diamond product (6/13–7/13).
  - Yue Cai, Refined enumeration of q-analogues (6/13–7/13).
- During the summer 2014 supported three graduate students to do research.
  - Brad Fox, The descent set polynomial (6/14–7/14).
  - Alex Happ, Refined enumeration parking functions (6/14–7/14).
  - Dustin Hedmark, The cubical subcomplex of the permutahedron (6/14–7/14).

Bruhat and Balanced Graphs, Manifolds, Partitions and Affine Permutations

- Principal Investigator for National Science Foundation grant DMS-0902063. Funded for three years, amount awarded $156,625.00. (7/09–6/13).
- During the summer 2010 supported two graduate students to do research.
  - Eric Clark, The Stirling complex (6/10–7/10).
  - JiYoon Jung, New partition posets in poset topology (6/10–7/10).
- During the summer 2011 supported one graduate student to do research.
  - JiYoon Jung, The topology of new restrictions in partition lattices (6/11–7/11).
- During the summer 2012 supported one graduate student to do research for a month.
  - Brad Fox, The strong Bruhat order of the universal Coxeter group (5/12–6/12).

Combinatorics 2010: Advances, Trends & Speculations (CATS 2010 Workshop)

- Co-principal Investigator for National Science Foundation grant DMS-1024407. Amount awarded $7,633. (2/10–1/11).

Polytopes: Inequalities for Flag Vectors, Poset Transformations and Complex Polytopes

- Principal Investigator for National Security Agency grant H98230-06-1-0072. Amount awarded $62,691.00 (6/06–5/08).
- During the summer 2006 supported two graduate students to do research.
  - Eric Clark, Inequalities among the excedance set statistic (6/06–7/06).
  - Michael Slone, Extending the **cd**-index to partially ranked posets (6/06–7/06).
- During the summer 2007 supported two graduate students to do research.
  - JiYoon Jung, Determinant identities for the Dowling numbers (6/07–7/07).
  - Michael Slone, The manifold product of posets (6/07–7/07).

Inequalities for Polytopes and Permutations, and Homology for Newtonian Coalgebras

- Principal Investigator for National Science Foundation grant DMS-0200624. Funded for four years, amount awarded $102,104.00 (6/02–5/06).
- During each of the summers 2002 through 2004 supported one graduate student to do research.
  - Michael Slone, The Hochschild cohomology of interpolation coalgebras (6/04–7/04).
  - Scott Godefroy, New identities for the excedance set statistic (6/03–7/03).
  - Molly Dunkum, Homology of coalgebras (6/02–7/02).

Inequalities for polytopes and complex zonotopes

- 2004 Summer Faculty Research Fellowship Program. Amount awarded $4,000.00. (7/04–9/04).
- Supported one graduate student during the summer 2004 to do research.
  - Keith Kohrs, Properties of the beta-invariant of the subspace lattice (7/04–8/04).

Senior Researcher Position

- Senior researcher at the Royal Institute of Technology, Swedish Natural Science Research Council DNR 702-238/98 (1/00–6/00).

Research Experiences for Undergraduates Program

- Co-investigator for National Science Foundation grant DMS-9619681, amount awarded: $248,788.00 (7/97–8/97).

Rotafest, MIT

- Co-investigator for National Science Foundation grant DMS-9600082, amount awarded: $12,500.00 (4/96).
- Co-investigator for National Security Agency grant MDA904-96-1-0063, amount awarded: $10,000.00 (4/96).

Pending Grants

Extending sharing theorems for Coxeter arrangements, poset homology and spectral methods in permutation analysis

- Principal Investigator for pending National Science Foundation grant. Amount requested $187,543 starting July 2024 to June 2027.

Geometric and topological combinatorics

- Sabbatical extension grant from the Simons Foundation. Amount requested $90,089 starting August 2024 to August 2025.

Outreach Grants

Kentucky Math Carnival

- Coinvestigator for Mathematical American Association Neff grant. Amount awarded $9,290. (10/22–5/23).

A Night of Mathematical Musings and Appalachian Initiative for Mathematics

- Women and Mathematics Ambassador. Funded for one year by the Institute for Advanced Study, amount awarded $2,000. Co-organizing with Ph.D. student Julianne Vega. (9/19–5/20).

Editor

Electronic Journal of Combinatorics

- Editor-in-chief (5/03–4/04).
- Editor (5/04–present).

Order

- Editor (10/05–present).

Invariant Theory

- Joint editor with Joseph Kung on the third volume of Gian-Carlo Rota's collected works.

Organizing Committees

Rotafest, MIT, April 17–20, 1996

- Member of the organizing committee for a conference in honor of Gian-Carlo Rota's 64th birthday. Organized this conference together with Richard Stanley and Neil White.

Special session Algebraic and Analytic Combinatorics, October 28–29, 2006

- Organized the special session Algebraic and Analytic Combinatorics at the AMS sectional meeting in Storrs, CT, together with Margaret Readdy.

Combinatorics 2010: Advances, Trends & Speculations (CATS 2010 Workshop), March 26, 2010

- Organizing the workshop, with four invited speakers (Sara Billey, University of Washington; Patricia Hersh, North Carolina State University; Isabella Novik, University of Washington; Stephanie van Willigenburg, University of British Columbia) at the University of Kentucky together with Margaret Readdy.

Special session Advances in Algebraic & Geometric Combinatorics, March 27–28, 2010

- Organizing the special session Advances in Algebraic & Geometric Combinatorics at the AMS sectional meeting in Lexington, KY, together with Margaret Readdy.

KOI Combinatorics Lectures, 2023–present

- Organizing semiannual meetings in the Kentucky, Ohio, Indiana area in combinatorics and the related fields. Jointly organizing with Margaret Readdy (University of Kentucky), Eric Katz (Ohio State), Saúl A. Blanco (Indiana University) and Mihai Ciucu (Indiana University).

Awards

- Edwards Research Professor (7/17–6/20).
- Membership at the School of Mathematics at the Institute for Advanced Study (9/98–7/99 and 9/10–7/11).
- Royster Research Professor (7/04–6/06).
- Post-doctoral fellowship from LACIM, Université du Québec à Montréal and CRM, Université de Montréal (8/93–6/95).
- MIT Applied Mathematics Fellowship (9/88–5/89 and 9/89–12/89).
- Fellowship from Sweden America Foundation, 1988.
- Member of the Swedish team at three International Mathematical Olympiads: Finland 1985; Poland 1986, Third Prize; and Cuba 1987, Third Prize.
- Second place award for the paper *"The Archimedean Tree"* in the final round of European Philips Contest for Young Scientists and Inventors, 1982.

Students

Postdoctoral

- Sergey Kitaev (9/03–12/04).
- Guoce Xin (9/05–5/06).
- Rafael Gonzalez D'Leon (9/14–5/17).

Doctoral students

- Michael Slone (11/03–4/08).
  Dissertation title: "Homological combinatorics and extensions of the **cd**-index".
- Eric Clark (5/06–4/11).
  Dissertation title: "Combinatorial aspects of excedances and the Frobenius complex".
- JiYoon Jung (6/07–4/12).
  Dissertation title: "Analytic and Topological Combinatorics of Partition Posets and Permutations".
- Brad Fox (11/12–4/15).
  Dissertation title: "Combinatorial potpourri permutations, products, posets, and Pfaffians".
- Dustin Hedmark (4/15–4/17).
  Dissertation title: "The Partition Lattice in Many Guises".
- Cyrus Hettle (9/14–5/17).
- Alex Happ (4/15–4/18).
  Dissertation title: "A Combinatorial Miscellany: Antipodes, Parking Cars, and Descent Set Powers".
- Karthik Chandrasekhar (11/16–4/19).
  Dissertation title: "Bounding the Number of Compatible Simplices in Higher Dimensional Tournaments".

Research Assistants

- Molly Dunkum (6/02–7/02).
- Scott Godefroy (6/03–7/03).
- Keith Kohrs (7/04–8/04).
- Michael Slone (6/04–7/04, 6/06–7/06 and 6/07–7/07).
- Eric Clark (6/06–7/06 and 6/10–7/10).
- JiYoon Jung (6/07–7/07, 7/08–8/08, 6/10–7/10 and 6/11–7/11).
- Brad Fox (6/12, 6/13–7/13 and 6/14–7/14).
- Yue Cai (6/13–7/13).
- Alex Happ (6/14–7/14).
- Dustin Hedmark (6/14–7/14 and 6/15–7/15).

Undergraduate Research Students

- Harold Fox, Cornell University (6–8/97).
- Dan Johnston, Washington University in St. Louis (6–8/97).
- Rajmohan Rajagopalan, Oberlin College (6–8/97).
- Debbie Grier, Cornell University (6–8/00).

- Geir Helleloid, University of Wisconsin (6–8/00).
- Michael Levin, Harvard University (6–8/00).
- Adnan Rubai, Binghamton University (6–8/00).
- Michael Raba, University of Kentucky (6–8/08).
- Cyrus Hettle, University of Kentucky (1/13–5/14).
- Peter Park, Princeton University (1/15–5/15).
- Likith Govindaiah, Princeton University (1/15–5/15).

Seminar Organizing

University of Kentucky (1/19–4/19)

- Organizer of the Discrete CATS Seminar (1/19–4/19).

Princeton University (8/99–5/00)

- Organizer of the Combinatorics Seminar (1/15–4/15).

Royal Institute of Technology (8/99–5/00)

- Organizer of the Combinatorics Seminar (8/99–5/00).

Institute for Advanced Study (9/98–7/99)

- Organizer of the Working Seminar in Algebraic Combinatorics (10/98–4/99).

Cornell University (7/95–8/98)

- Organizer of the Combinatorics and Algebraic Geometry Seminar (9/95–8/96, 9/97–5/98).
- Cofounder of the Working Seminar in Algebraic Combinatorics (9/96–5/97).

Refereeing

Conferences

- 14th International Conference on Formal Power Series and Algebraic Combinatorics, University of Melbourne.
- 16th International Conference on Formal Power Series and Algebraic Combinatorics, University of British Columbia.
- 20th International Conference on Formal Power Series and Algebraic Combinatorics, Universidad de Talca, Chile.

Journals

- Graphs and Combinatorics
- Discrete and Computational Geometry
- Discrete Mathematics
- Electronic Journal of Combinatorics
- Journal of Algebraic Combinatorics
- Journal of Combinatorial Theory, Series A
- Journal of Computational and Applied Mathematics
- Linear Algebra and its Applications
- Proceedings of the American Mathematical Society

Referee for promotion cases

- Outside letter writer for Dr. William Schmitt's promotion to Full Professor at the George Washington University. (11/06)

External examiner

- External examiner of Matthew Morin's doctoral dissertation at the University of British Columbia (3/10).

Invited Lectures

2023:

- "Pizza and 2-structures"
  - Colloquium talk, Cornell University, 26 October, 2023.
  - 35th International Conference on Formal Power Series and Algebraic Combinatorics, University of California, Davis, 18 July 2023.
- "Sharing pizza in n dimensions"
  - KOI Combinatorics Lectures, University of Kentucky, 1 April 2023.
- "The face polynomials of the graph polytope of a cycle"
  - One Picture/One Theorem Poster Session, KOI Combinatorics Lectures, University of Kentucky, 1 April 2023.

2022:

- "Sharing pizza in n dimensions"
  - Université du Québec à Montréal, Canada, 28 October 2022.
  - Rutgers Experimental Mathematics Seminar, Rutgers University, 31 March 2022.
  - University of Kentucky, 7 February 2022.

2021:

- "Sharing pizza in n dimensions"
  - University of North Carolina at Charlotte, 9 March 2021.
  - Kennesaw State University, 16 April 2021.
- "Three combinatorial applications"
  - University of North Carolina at Charlotte, 16 February 2021.

2020:

- "Three combinatorial applications"
  - University of Kentucky, 9 November 2020.

2019:

- "A theorem by Baxter"
  - Princeton University, 1 May 2019.
- "(Cyclically) consecutive 123-avoiding permutations"
  - Helen Barton Lecture, University of North Carolina at Greensboro, 8 November 2019.

2018:

- "Uniform flag triangulations of the Legendre polytope"
  - University of Kentucky, 10 September 2018.
- "(Cyclically) consecutive 123-avoiding permutations"
  - Colloquium talk at Université Lyon 1, France.

2017:

- "Simion's type B associahedron is a pulling triangulation of the Legendre polytope"
  - University of Kentucky, 18 September 2017.
- "On filters of the partition lattice"
  - AMS meeting, Bloomington, IN, 1 April 2017.

2016:

- "Mathematical magic"
  - Henry Clay High School, Lexington KY, 30 November 2016.
  - Marshall University, 10 October 2016.
  - All Math Meeting, University of Kentucky, 22 February 2016.
- "Counting Permutations with Calculus"
  - Marshall University, 11 October 2016.
- "(Cyclically) consecutive 123-avoiding permutations"
  - Colloquium, University of Maine, 30 March 2016.

2015:

- "Treasure hunting and complex numbers"
  - Henry Clay High School, Lexington KY, 21 October 2015.
- "On filters of the partition lattice"
  - AMS meeting, Memphis, TN, 17 October 2015.
- "The descent set polynomial revisited"
  - Invited speaker at The 2015 Midwest Combinatorics Conference, University of Minnesota, 21 May 2015.
- "The Law of Aboav–Weaire and its analogue in three dimensions"
  - Rutgers University, 13 April 2015.
- "The mathematics of juggling"
  - Princeton University, 13 March 2015.
- "Weighted enumeration of consecutive 123-avoiding permutations and the Hurwitz zeta function"
  - Princeton University, 18 February 2015.
- "Weighted enumeration of consecutive 123-avoiding permutations, the Hurwitz zeta function and the derivatives of cotangent"
  - Invited speaker for The Mathematics of Michelle Wachs Conference, University of Miami, 8 January 2015.

2014:

- "The law of Aboav–Weaire and extensions"
  - Institute for Advanced Study, 10 December 2014.

- "(Cyclically) consecutive 123-avoiding permutations"
  - University of Pennsylvania, 20 November 2014.
  - Invited speaker at Clemson Mini-Conference, Clemson University, SC, 16–17 October 2014.
- "Euler enumeration"
  - Invited speaker at Triangle Lectures in Combinatorics, High Point University in High Point, NC, 4 October 2014.
- "The descent set polynomial"
  - Colloquium, University of North Carolina at Charlotte, 2 October 2014.
- "A poset view of the major index"
  - University of Kentucky, 21 April 2014.
- "Cyclically consecutive permutation avoidance"
  - AMS meeting, Knoxville, TN, 22 March 2014.

2013:

- "Manifold arrangements"
  - AMS meeting, St. Louis, MO, 19 October 2013.
- "The blind bartender's problem, A game that I would like to see implemented"
  - CGamesUSA 2013 – 18th International Conference on Computer Games, Louisville, 1 August 2013.
- "Euler flag enumeration of Whitney stratified spaces"
  - 24th International Conference on Formal Power Series and Algebraic Combinatorics, Paris, France, 25 June 2013.
- "Manifold arrangements and shelling components"
  - 11th Nordic Combinatorial Conference (NORCOM), Stockholm, Sweden, 18 June 2013.
- "Mathematical magic"
  - Women and Mathematics Program, Institute for Advanced Study, 23 May 2013, with Carolyn L. Chen (Princeton University), Max Kaplan (Princeton University), Bing Lin (Princeton University) and Daniel Toro (Princeton University).

2012:

- "Euler flag enumeration of Whitney stratified spaces"
  - MIT, 24 October 2012.
- "Hamiltonian cycles on Archimedean solids are twisting free"
  - University of Kentucky, 1 October 2012.
- "Prisms and pyramids of shelling components"
  - University of Kentucky, 24 September 2012.
- "The Law of Aboav–Weaire and its analogue in three dimensions"
  - Colloquium, University of Strathclyde, Scotland, 18 May 2012.
  - George Washington University, 14 March 2012.
  - AMS meeting, Boston, Massachusetts 6 January 2012.

- "Euler Flag Enumeration of Whitney Stratified Spaces"
  - University of Strathclyde, Scotland, 16 May 2012.

2011:

- "Euler Flag Enumeration of Whitney Stratified Spaces"
  - Fields Institute, Canada, 24 October 2011
- "The mathematics of juggling"
  - Princeton University, 13 July 2011
- "The Law of Aboav–Weaire and its analogue in three dimensions"
  - Invited speaker at 22nd International Conference on Formal Power Series and Algebraic Combinatorics, University of Reykjavik, Iceland, 14 June 2011.
- "Mathematical magic"
  - Women and Mathematics program, Institute for Advanced Study, 27 May 2011, with Christine Taylor (Harvard and IAS).
- "Mathemagical"
  - Mathematical Conversations, Institute for Advanced Study, 4 May 2011, with Christine Taylor (Harvard and IAS).
- "The topology of restricted partition posets"
  - Université du Québec à Montréal, Canada, 25 March 2011.
- "Counting pattern avoiding permutations via integral operators"
  - Rutgers University, 24 February 2011.

2010:

- "The topology of restricted partition posets"
  - Banff International Research Station, Canada, 18 November 2010.
  - Institute for Advanced Study, 2 November 2010.
  - University of Pennsylvania, 21 October 2010.
- "An extension of the d-divisible partition lattice"
  - SIAM Conference on Discrete Mathematics, Austin, TX, 14 June 2010.
  - AMS meeting, San Francisco, California, 16 January 2010.
- "Counting pattern avoiding permutations via integral operators"
  - Institute for Advanced Study, 23 November 2010.
  - Colloquium, University of North Carolina at Charlotte, 20 April 2010.
- "The mathematics of juggling"
  - Special presentation during Geek Week 2010, University of Kentucky, 7 April 2010.
  - Invited speaker at Southwestern Undergraduate Mathematics Research Conference, University of Texas at El Paso, 6 March 2010.

2009:

- "The mathematics of juggling"
  - Morehead State University, 12 November 2009.
  - Special presentation during Geek Week 2009, University of Kentucky, 8 April 2009.

- "Excedance statistic for affine permutations and skew root polytopes"
  - IPAM, 22 October 2009.
- "Mathematical magic"
  - University of Kentucky High School Mathematics Day, 17 October 2009.
- "An Eulerian poset that lacks an R-labeling"
  - University of Kentucky, 5 October 2009.
- "Toric arrangements"
  - Colloquium, The George Washington University, 20 April 2009.
- "The **cd**-index of Bruhat and balanced graphs"
  - AMS meeting, Raleigh, NC, 4 April 2009.
- "The descent set polynomial"
  - University of Kentucky, 23 February 2009.
- "A brief introduction to Coxeter groups and juggling"
  - Graduate colloquium, University of Kentucky, 18 February 2009.

2008:

- "Toric arrangements"
  - Billerafest, Cornell University, 14 June 2008.
- "Exponential Dowling structures"
  - AMS meeting, Bloomington, IN, 5 April 2008.
  - University of Kentucky, 11 February 2008.

2007:

- "Toric arrangements"
  - Indiana University, 13 November 2007.
  - Michigan State University, 27 October 2007.
  - University of Kentucky, 10 September 2007.
  - AMS meeting, Davidson, NC, 4 March 2007.
- "A tale of two cities"
  - The Undergraduate Math Club, University of Kentucky, 8 November 2007.
- "The graduate program at the University of Kentucky"
  - Joint 2007 Michigan Undergraduate Mathematics and Midwest Systems Biology Conference, 28 October 2007.
- "Eulerian binomial and Sheffer posets"
  - Northeastern University, 23 April 2007.
  - Cornell University, 28 March 2007.
- "Counting pattern avoiding permutations via integral operators"
  - MIT, 23 February 2007.

2006:

- "Counting pattern avoiding permutations via integral operators"
  - Brandeis-Harvard-MIT-Northeastern joint mathematics colloquium, 14 September 2006.
  - University of Minnesota, 31 March 2006.
  - Colloquium, University of British Columbia, 24 March 2006.
- "Counting pattern-avoiding permutations with Perron and Frobenius"
  - AMS meeting, Storrs, CT, 28 October 2006.
- "The **cd**-index of Gorenstein* lattices"
  - AMS meeting, Cincinnati, OH, 22 October 2006.
- "The **cd**-index, polytopes and Gorenstein* lattices"
  - Workshop on Geometric and Topological Combinatorics - A satellite conference of ICM 2006, Alcalá de Henares (Madrid, SPAIN), 2 September 2006.
  - Banff International Research Station, Canada, 6 March 2006.
- "The Möbius function of partitions with restricted block sizes"
  - University of British Columbia, 21 March 2006.
- "The **cd**-index, polytopes and Gorenstein* lattices"
  - Banff International Research Station, Canada, 6 March 2006.

2005:

- "Counting pattern avoiding permutations via integral operators"
  - University of Montana, 1 November 2005.
  - Cornell University, 6 October 2005.
  - University of Kentucky, 12 September 2005.
- "Linear inequalities for flag f-vectors of polytopes"
  - Colloquium, University of Montana, 3 November 2005.
- "The mathematics of juggling"
  - University of Montana, 1 November 2005.
- "Combinatorics and topology"
  - University of Kentucky, 16 August 2005.
- "The Tchebyshev transform"
  - Indiana University, 26 April 2005.
  - University of Minnesota, 15 April 2005.
  - Mittag-Leffler, Sweden, 15 March 2005.
- "Enumerative properties of Ferrers graphs"
  - Graduate Student Combinatorics Conference, University of Minnesota, Keynote speaker, 17 April 2005
- "Lifting inequalities for polytopes"
  - Colloquium, University of Linköping, Sweden, 23 March 2005.
- "Juggling"
  - Freshmen writing seminar, University of Kentucky, 26 January 2005.

2004:

- "The Tchebyshev transform"
  - University of Kentucky, 1 November 2004.
- "Two theorems and a lemma"
  - The Graduate Colloquium, University of Kentucky, 22 September 2004.
- "Geometric transforms of posets and associated coalgebras"
  - Banff International Research Station, Canada, 31 August 2004.

2003:

- "Combinatorial conjectures for the holidays"
  - University of Kentucky, 8 December 2003.
- "Inequalities for zonotopes"
  - AMS meeting, Binghamton, NY, 12 October 2003.
- "A brief introduction to polytopes"
  - University of Kentucky, 19 August 2003.
- "The topology of the independence complex"
  - 15th International Conference on Formal Power Series and Algebraic Combinatorics, University of Linköping, 26 June 2003.
- "Lifting the toric g-inequalities for polytopes"
  - 15th International Conference on Formal Power Series and Algebraic Combinatorics, University of Linköping, 25 June 2003.
- "Enumerative properties of Ferrers graphs"
  - University of Kentucky, 22 September 2003.
- "Lifting inequalities for polytopes"
  - Workshop in Combinatorial and Discrete Geometry at Mathematical Sciences Research Institute, 21 November 2003.
  - Oberwolfach, Germany, 9 April 2003.
  - Northeastern University, 20 February 2003.
  - MIT, 19 February 2003.
  - University of Kentucky, 13 February 2003.
- "Juggling"
  - Henry Clay High School, Lexington, 29 April 2003.

2002:

- "Lifting inequalities for polytopes"
  - Binghamton University, 9 October 2002.
  - University of Minnesota, 5 August 2002.
- "The Greene–Nijenhuis–Wilf proof of the hook formula"
  - University of Kentucky, 20 November 2002.

- "Inequalities for polytopes and some rather recent results"
  - 14th International Conference on Formal Power Series and Algebraic Combinatorics, University of Melbourne, 8 July 2002.
- "Inequalities for polytopes"
  - Washington University in St. Louis, 25 March 2002.
  - AMS meeting, Montréal, Canada, 3 May 2002.
  - AMS meeting, Ann Arbor, Michigan 3 March 2002.
  - AMS meeting, San Diego, California, 8 January 2002.

2001:

- "Juggling"
  - The Undergraduate Math Club, University of Kentucky, 29 August 2001.
- "Recent progress on inequalities for polytopes"
  - University of Kentucky, 9 October 2001.
- "Very recent progress on inequalities for polytopes"
  - MIT, 13 August 2001.
- "Counting faces in the extended Shi arrangement"
  - AMS sectional meeting, University of Kansas, 30 March 2001.

2000:

- "Non-shellable 3-spheres and 3-balls"
  - University of Kentucky, 24 October 2000.
- "An introduction to shellings"
  - University of Kentucky, 10 October 2000.
- "Maximizing the descent statistic"
  - Colloquium talk, University of Kentucky, 28 September 2000.
- "Two permutation set statistics"
  - Invited speaker at LACIM 2000 Conference, Université du Québec à Montréal, Canada, 8 September 2000.
- "To shell or not to shell"
  - Research Experiences for Undergraduates, Cornell University, 31 July 2000.
- "Non-shellable 3-spheres and the bridge index"
  - University of Stockholm, Sweden, 29 March 2000.
  - AMS meeting, Washington, D.C., 22 January 2000.
- "Inequalities for the **cd**-index"
  - Colloquium talk, University of Georgia, 14 February 2000.
  - Colloquium talk, University of Illinois at Chicago, 11 February 2000.
  - Colloquium talk, College of William and Mary, 8 February 2000.
  - Colloquium talk, University of Iowa, 2 February 2000.
  - Colloquium talk, University of Kentucky, 28 January 2000.
  - Colloquium talk, University of Pittsburgh, 13 January 2000.
  - Colloquium talk, University of California Davis, 10 January 2000.

1999:

- "Generic canonical forms for polynomials and tensors"
  - University of Stockholm, Sweden, 25 October 1999.
- "Three evaluations of the Hankel determinant of exponential polynomials"
  - University of Stockholm, Sweden, 29 September 1999.
- "Maximizing the descent statistic"
  - University of Stockholm, Sweden, 1 September 1999.
  - Temple University, 27 January 1999.
- "Inequalities for the **cd**-index"
  - Oberwolfach, Germany, 12 April 1999.
  - AMS sectional meeting, University of Florida at Gainesville, 13 March 1999.

1998:

- "Inequalities for the **cd**-index"
  - University of Pennsylvania, 20 October 1998.
  - MIT, 16 September 1998.
- "The **cd**-index"
  - Working Seminar in Algebraic Combinatorics, Institute for Advanced Study, series of three lectures, 7 October through 21 October 1998.
- "Baxter's theorem: an application of topology to combinatorics"
  - Research Experiences for Undergraduates, Cornell University, 8 July 1998.
- "Tilings"
  - The Undergraduate Math Club, Cornell University, 29 April 1998.
- "Valuations and mixed volumes"
  - Eötvös University, Budapest, Hungary, 17 March 1998.
- "Coproducts and geometric operations"
  - Eötvös University, Budapest, Hungary, 17 March 1998.
- "Polytopes and hyperplane arrangements"
  - Colloquium talk, Dartmouth College, 23 February 1998.
  - Colloquium talk, College of William and Mary, 16 February 1998.
  - Colloquium talk, Michigan State University, 9 February 1998.
  - Colloquium talk, University of Washington, 2 February 1998.
  - Colloquium talk, University of Kansas, 15 January 1998.
  - Colloquium talk, University of Florida at Gainesville, 12 January 1998.

1997:

- "Generic canonical forms for polynomials and tensors"
  - Chalmers University of Technology, Sweden, 2 June 1997.

- "Polytopes and hyperplane arrangements"
  - Colloquium talk, Georgia Institute of Technology, 13 November 1997.
  - Mid-Atlantic Day for Combinatorics and Probability, Johns Hopkins University, one of four invited speakers, 7 November 1997.
- "The blind bartender's problem"
  - The Undergraduate Math Club, Cornell University, 19 November 1997.
- "The **cd**-index of zonotopes and hyperplane arrangements"
  - AMS sectional meeting, University of Montréal, Canada, 27 September 1997.
- "Valuations and the characteristic polynomial"
  - Combinatorics and Algebraic Geometry Seminar, Cornell University, 8 September 1997.
- "Tree counting and Lagrange inversion formula"
  - Research Experiences for Undergraduates, Cornell University, 9 July 1997.
- "The **cd**-index and zonotopes"
  - AMS sectional meeting, Wayne State University, 3 May 1997.
- "Exponential generating functions and the theory of species"
  - Working Seminar in Algebraic Combinatorics, Cornell University, series of four lectures, 3 February 1997 through 3 March 1997.

1996:

- "The **c**-2**d**-index of oriented matroids and hyperplane arrangements"
  - Mathematical Sciences Research Institute, 23 October 1996.
- "Two theorems and a lemma"
  - The Olivetti Club, Cornell University, 17 September 1996.
- "Juggling"
  - The Undergraduate Math Club, Cornell University, 4 September 1996.
- "The **cd**-index, coproducts and zonotopes"
  - The Tutte colloquium, University of Waterloo, Canada, 12 July 1996.
- "Coproducts and the **cd**-index"
  - 8th International Conference on Formal Power Series and Algebraic Combinatorics, University of Minnesota, 25 June 1996 (with Margaret A. Readdy).
  - Rotafest, MIT, 20 April 1996.
  - Geometry and Topology Seminar, Cornell University, 11 April 1996.
- "The game of Nim"
  - The Undergraduate Math Club, Cornell University, 24 April 1996.

1995:

- "Apolarity and canonical forms"
  - The Oliver Club, Cornell University, 28 September 1995.
- "Juggling"
  - The Undergraduate Math Club, Cornell University, 20 September 1995.

- "Juggling and the affine Weyl group $\widetilde{A}_n$"
  - Combinatorics and Algebraic Geometry Seminar, Cornell University, 11 September 1995.
- "Juggling and applications to q-analogues"
  - Research Experiences for Undergraduates, Cornell University, 17 July 1995.
- "Generalizations of Baxter's theorem"
  - Combinatorics and Algebraic Geometry Seminar, Cornell University, 3 April 1995.
- "Simple and multiplex juggling sequences"
  - Colloquium talk, University of Missouri at Columbia, 14 February 1995.
- "Sheffer posets and r-signed permutations"
  - MIT, 8 March 1995.

1994:

- "Juggling and applications to q-analogues"
  - 6th International Conference on Formal Power Series and Algebraic Combinatorics, DIMACS, Rutgers, 23 May 1994 (with Margaret A. Readdy).
- "Generalizations of Baxter's theorem"
  - Université de Montréal, Canada, 2 November 1994.
  - Università di Milano, Italy, 22 September 1994.
- "Sheffer posets and r-signed permutations"
  - AMS sectional meeting, University of Richmond, 13 November 1994.
  - Royal Institute of Technology (KTH), Sweden, 15 September 1994.
  - Université du Québec à Montréal, Canada, 6 May 1994.
- "Simple and multiplex juggling sequences"
  - Concordia University, Montréal, Canada, 18 July 1994.
  - University of Pennsylvania, 15 March 1994.
  - MIT, 9 March 1994.
  - Université de Montréal, Canada, 14 February 1994.
- "Juggling patterns"
  - University of Stockholm, Sweden, 12 September 1994.

1993:

- "Counting trees on partitions"
  - Université du Québec à Montréal, Canada, 22 October 1993.
- "Colored species, plethysm and Lagrange inversion formula"
  - Université du Québec à Montréal, Canada, 17 September 1993.
- "Plethystic trees and Lagrange inversion formula"
  - MIT, 6 May 1993.

1992:

- "Counting trees on partitions"
  - MIT, 13 November 1992.

- "Apolarity and canonical forms for homogeneous polynomials"
  - Brandeis, 18 March 1992.

1991:

- "The blind bartender's problem"
  - AT&T Bell Laboratories, Murray Hill, 8 August 1991.

Publications

Refereed journal publications

[1] *"Heron's formula from a Pythagoras-type theorem,"* The Mathematical Gazette **68** (1984), 124–126.

[2] *"Apolarity and canonical forms for homogeneous polynomials,"* European Journal of Combinatorics **14** (1993), 157–181 (with Gian-Carlo Rota).

[3] *"Schröder parenthesizations and chordates,"* Journal of Combinatorial Theory, Series A **67** (1994), 127–139 (with Miguel Méndez).

[4] *"A bijective proof of infinite variated Good's inversion,"* Advances in Mathematics **103** (1994), 221–259 (with Miguel Méndez).

[5] *"Generalizations of Baxter's theorem and cubical homology,"* Journal of Combinatorial Theory, Series A **69** (1995), 233–287 (with Gábor Hetyei).

[6] *"The blind bartender's problem,"* Journal of Combinatorial Theory, Series A **70** (1995), 249–266 (with Chris M. Skinner).

[7] *"Sheffer posets and r-signed permutations,"* Annales des Sciences Mathématiques du Québec **19** (1995), 173–196 (with Margaret A. Readdy).

[8] *"The* **r***-cubical lattice and a generalization of the* **cd***-index,"* European Journal of Combinatorics **17** (1996), 709–725 (with Margaret A. Readdy).

[9] *"Juggling and applications to q-analogues,"* Discrete Mathematics **157** (1996), 107–125, special issue on Algebraic Combinatorics (with Margaret A. Readdy).

[10] *"On posets and Hopf algebras,"* Advances in Mathematics **119** (1996), 1–25.

[11] *"Playing Nim on a simplicial complex,"* Electronic Journal of Combinatorics **3**, R9 (1996), 33pp (with Einar Steingrímsson).

[12] *"The* **c***-2***d***-index of oriented matroids,"* Journal of Combinatorial Theory, Series A **80** (1997), 79–105 (with Louis J. Billera and Margaret A. Readdy).

[13] *"Mixed volumes and slices of the cube,"* Journal of Combinatorial Theory, Series A **81** (1998), 121–126 (with Margaret A. Readdy and Einar Steingrímsson).

[14] *"On valuations, the characteristic polynomial and complex subspace arrangements,"* Advances in Mathematics **134** (1998), 32–42 (with Margaret A. Readdy).

[15] *"The* **cd***-index of zonotopes and arrangements,"* in Mathematical essays in honor of Gian-Carlo Rota (B. E. Sagan and R. P. Stanley, eds.), Birkhäuser, Boston, 1998, pages 23–40 (with Louis J. Billera and Margaret A. Readdy).

[16] *"Coproducts and the* **cd***-index,"* Journal of Algebraic Combinatorics **8** (1998), 273–299 (with Margaret A. Readdy).

[17] *"Maximizing the descent statistic,"* Annals of Combinatorics **2** (1998), 111–129 (with Swapneel Mahajan).

[18] *"On apolarity and generic canonical forms,"* Journal of Algebra **213** (1999), 167–194.

[19] *"Canonical forms of two by two by two matrices,"* Journal of Algebra **213** (1999), 195–224.

[20] *"On flag vectors, the Dowling lattice and braid arrangements,"* Discrete and Computational Geometry **21** (1999), 389–403 (with Margaret A. Readdy).

[21] *"Cutting polytopes and flag f-vectors,"* Discrete and Computational Geometry **23** (2000), 261–271 (with Dan Johnston, Rajmohan Rajagopalan and Margaret A. Readdy).

[22] *"The Hankel determinant of exponential polynomials,"* American Mathematical Monthly **107** (2000), 557–560.

[23] *"A bijective answer to a question of Zvonkin,"* Annals of Combinatorics **4** (2000), 195–197.

[24] *"Flags and shellings of Eulerian cubical posets,"* Annals of Combinatorics **4** (2000), 199–226 (with Gábor Hetyei).

[25] *"Monotonicity of the* **cd***-index for polytopes,"* Mathematische Zeitschrift **233** (2000), 421–441 (with Louis J. Billera).

[26] *"The excedance set of a permutation,"* Advances in Applied Mathematics **24** (2000), 284–299 (with Einar Steingrímsson).

[27] *"A combinatorial proof of the log-concavity of the numbers of permutations with k runs,"* Journal of Combinatorial Theory, Series A **90** (2000), 293–303 (with Miklós Bóna).

[28] *"Yet another triangle for the Genocchi numbers,"* European Journal of Combinatorics **21** (2000), 593–600 (with Einar Steingrímsson).

[29] *"The toric h-vectors of partially ordered sets,"* Transactions of the American Mathematical Society **352** (2000), 4515–4531 (with Margaret Bayer).

[30] *"The Dowling transform of subspace arrangements,"* Journal of Combinatorial Theory, Series A **91** (2000), 322–333 (with Margaret A. Readdy).

[31] *"Non-constructible complexes and the bridge index,"* European Journal of Combinatorics **22** (2001), 475–491 (with Masahiro Hachimori).

[32] *"k-Eulerian posets,"* Order **18** (2001), 227–236.

[33] *"A probabilistic approach to the descent statistic,"* Journal of Combinatorial Theory, Series A **98** (2002), 150–162 (with Michael Levin and Margaret A. Readdy).

[34] *"The asymptotics of almost alternating permutations,"* Advances in Applied Mathematics **28** (2002), 421–437.

[35] *"Homology of Newtonian coalgebras,"* European Journal of Combinatorics **23** (2002), 919–927 (with Margaret Readdy).

[36] *"Determinants involving q-Stirling numbers,"* Advances in Applied Mathematics **31** (2003), 630–642.

[37] *"Inequalities for* **cd***-indices of joins and products of polytopes,"* Combinatorica **23** (2003), 427–452 (with Harold Fox).

[38] *"A conceptual proof of Cramer's rule,"* Mathematics Magazine **77** (2004), 308.

[39] *"Enumerative properties of Ferrers graphs,"* Discrete and Computational Geometry, special issue in honor of Louis J. Billera **32** (2004), 481–492 (with Stephanie van Willigenburg).

[40] *"Lifting inequalities for polytopes,"* Advances in Mathematics **193** (2005), 205–222.

[41] *"Inequalities for zonotopes,"* in Mathematical Sciences Research Institute Publication on Combinatorial and Computational Geometry, (J. E. Goodman, J. Pach and E. Welzl, eds.), Cambridge University Press, Cambridge, England, 2005, pages 277–286.

[42] *"Decoding the Hamming code,"* Math Horizons, special issue on Codes, Cryptography and National Security, **13** (2006), 16–17.

[43] *"The topology of the independence complex,"* European Journal of Combinatorics **27** (2006), 906–923 (with Gábor Hetyei).

[44] *"Classification of the factorial functions of Eulerian binomial and Sheffer posets,"* Journal of Combinatorial Theory, Series A **114** (2007), 339–359 (with Margaret Readdy).

[45] *"The Möbius function of partitions with restricted block sizes,"* Advances in Applied Mathematics **39** (2007), 283–292 (with Margaret Readdy).

[46] *"Decomposition theorem for the* **cd***-index of Gorenstein* posets,"* Journal of Algebraic Combinatorics **26** (2007), 225–251 (with Kalle Karu).

[47] *"Exponential Dowling structures,"* European Journal of Combinatorics **30** (2009), 311–326 (with Margaret Readdy).

[48] *"Cyclotomic factors of the descent set polynomial,"* Journal of Combinatorial Theory, Series A **116** (2009), 247–264 (with Denis Chebikin, Pavlo Pylyavskyy and Margaret Readdy).

[49] *"Affine and toric hyperplane arrangements,"* Discrete and Computational Geometry **41** (2009), 481–512 (with Margaret Readdy and Michael Slone).

[50] *"A geometric approach to acyclic orientations,"* Order **26** (2009), 283–288 (with Michael Slone).

[51] *"Explicit expressions for the extremal excedance set statistics,"* European Journal of Combinatorics **31** (2010), 270–279 (with Eric Clark).

[52] *"Asymptotics of the Euler number of bipartite graphs,"* Advances in Applied Mathematics **44** (2010), 155–167 (with Yossi Farjoun).

[53] *"The Tchebyshev transforms of the first and second kind,"* Annals of Combinatorics **14** (2010), 211–244 (with Margaret Readdy).

[54] *"The complex of non-crossing diagonals of a polygon,"* Journal of Combinatorial Theory, Series A **117** (2010), 642–649 (with Benjamin Braun).

[55] *"The f-vector of the descent polytope,"* Discrete and Computational Geometry **45** (2011), 410–424 (with Denis Chebikin).

[56] *"Excedances of affine permutations,"* Advances in Applied Mathematics, special issue in honor of Dennis Stanton **46** (2011), 175–191 (with Eric Clark).

[57] *"On the non-existence of an R-labeling,"* Order **28** (2011), 437–442 (with Margaret Readdy).

[58] *"A spectral approach to pattern-avoiding permutations,"* Journal of Combinatorics **2** (2011), 305–353 (with Sergey Kitaev and Peter Perry).

[59] *"The geometric formulation of the law of Aboav–Weaire in two and three dimensions,"* Journal of Physics A: Mathematical and Theoretical **45** (2012), 065001, 1–17 (with Menachem Lazar and Jeremy Mason).

[60] *"The Frobenius complex,"* Annals of Combinatorics **16** (2012), 215–232 (with Eric Clark).

[61] *"Descent pattern avoidance,"* Advances in Applied Mathematics **49** (2012), 375–390 (with JiYoon Jung).

[62] *"The topology of restricted partition posets,"* Journal of Algebraic Combinatorics **37** (2013), 643–666 (with JiYoon Jung).

[63] *"The excedance algebra,"* Discrete Mathematics **313** (2013), 1429–1435 (with Eric Clark).

[64] *"Level Eulerian posets,"* Graphs and Combinatorics **29** (2013), 857–882 (with Gábor Hetyei and Margaret Readdy).

[65] *"Hamiltonian cycles on Archimedean solids are twisting free,"* American Mathematical Monthly **121** (2014), 158–161.

[66] *"The cubical matching complex,"* Annals of Combinatorics **18** (2014), 75–81.

[67] *"Manifold arrangements,"* Journal of Combinatorial Theory, Series A **125** (2014), 214–239 (with Margaret Readdy).

[68] *"On the generating function for consecutively weighted permutations,"* European Journal of Combinatorics **41** (2014), 262–265.

[69] *"A sign-reversing involution for an extension of Torelli's Pfaffian identity,"* Discrete Mathematics **332** (2014), 69–74 (with N. Bradley Fox).

[70] *"The average reliability of a graph,"* Discrete Appl. Math. **177** (2014), 19–33 (with Jason Brown and Danielle Cox).

[71] *"A poset view of the major index,"* Advances in Applied Mathematics **62** (2015), 1–14 (with Margaret Readdy).

[72] *"Number of cycles in the graph of* 312*-avoiding permutations,"* Journal of Combinatorial Theory, Series A **129** (2015), 1–18 (with Sergey Kitaev and Einar Steingrímsson).

[73] *"Euler flag enumeration of Whitney stratified spaces,"* Advances in Mathematics **268** (2015), 85–128 (with Mark Goresky and Margaret Readdy).

[74] *"An unbiased marriage theorem,"* American Mathematical Monthly **122** (2015), 59.

[75] *"The descent set polynomial revisited,"* European Journal of Combinatorics **51** (2016), 47–68 (with N. Bradley Fox).

[76] *"Coxeter arrangements in three dimensions,"* Beiträge zur Algebra und Geometrie **57** (2016), 1–7 (with Caroline Klivans and Nathan Reading).

[77] *"The signed descent set polynomial revisited,"* Discrete Mathematics **339** (2016), 2263–2266 (with N. Bradley Fox).

[78] *"Cyclically consecutive permutation avoidance,"* SIAM Journal of Discrete Mathematics **30** (2016), 1385–1390.

[79] *"The Gaussian coefficient revisited,"* Journal of Integer Sequences **19** (2016), Article 16.7.8 (with Margaret Readdy).

[80] *"Parking cars of different sizes,"* American Mathematical Monthly **123** (2016), 1045–1048 (with Alex Happ).

[81] *"The van der Waerden complex,"* Journal of Number Theory **172** (2017), 287–300 (with Likith Govindaiah, Peter S. Park and Margaret Readdy).

[82] *"A restricted growth word approach to partitions with odd/even size blocks,"* Journal of Integer Sequences **20** (2017), Article 17.5.5 (with Dustin Hedmark and Cyrus Hettle).

[83] *"Parking cars after a trailer,"* The Australasian Journal of Combinatorics **70** (2018), 402–406 (with Alex Happ).

[84] *"q-Stirling identities revisited,"* Electronic Journal of Combinatorics **25** (2018), 18pp (with Yue Cai and Margaret Readdy).

[85] *"On the powers of the descent set statistic,"* Advances in Applied Mathematics **96** (2018), 1–17 (with Alex Happ).

[86] *"Filters in the partition lattice,"* Journal of Algebraic Combinatorics **47** (2018), 403–439 (with Dustin Hedmark).

[87] *"Simion's type B associahedron is a pulling triangulation of the Legendre polytope,"* Discrete and Computational Geometry **60** (2018), 98–114 (with Gábor Hetyei and Margaret Readdy).

[88] *"Prisms and pyramids of shelling components,"* Annals of Combinatorics **22** (2018), 769–779.

[89] *"A bijective answer to a question of Simion,"* Journal of Integer Sequences **22** (2019), Article 19.1.2 (with Gábor Hetyei and Margaret Readdy).

[90] *"The boustrophedon transform for descent polytopes,"* Annals of Combinatorics **23** (2019), 67–72 (with Alex Happ).

[91] *"Counting faces in the extended Shi arrangement,"* Advances in Applied Mathematics **109** (2019), 55–64.

[92] *"The antipode of the noncrossing partition lattice,"* Advances in Applied Mathematics **110** (2019), 76–85 (with Alex Happ).

[93] *"On the difference of odd/even cubatures,"* Journal of Approximation Theory **246** (2019), 62–64.

[94] *"Some combinatorial identities appearing in the calculation of the cohomology of Siegel modular varieties,"* Algebraic Combinatorics **2** (2019), 863–878 (with Sophie Morel and Margaret Readdy).

[95] *"The Wästlund partition in higher dimensions,"* American Mathematical Monthly **127** (2020), 175–178.

[96] *"The Frobenius Coin Problem – A Cylindrical Approach,"* The Mathematical Intelligencer **42** (2020), 78–79.

[97] *"The expectation of the Vandermonde product squared for uniform random variables,"* Advances in Applied Mathematics **118** (2020), 102030.

[98] *"Balanced and Bruhat graphs,"* Annals of Combinatorics **24** (2020), 587–617 (with Margaret Readdy).

[99] *"A counting proof for when* 2 *is a quadratic residue,"* American Mathematical Monthly **127** (2020), 750–751 (with Karthik Chandrasekhar and Frits Beukers).

[100] *"The r-signed Birkhoff transform,"* Discrete Mathematics **344** (2021), 112214.

[101] *"The number of spanning trees of the Bruhat graph,"* Advances in Applied Mathematics **125** (2021), 102150.

[102] *"Classification of uniform flag triangulations of the boundary of the full root polytope of type A,"* Acta Mathematica Hungarica **163** (2021), 462–511 (with Gábor Hetyei and Margaret Readdy).

[103] *"Bounds on the number of compatible k-simplices matching the orientation of the $(k-1)$-skeleton of a simplex,"* Combinatorica **41** (2021), 209–236 (with Karthik Chandrasekhar).

[104] *"Fano, Galois, Hamming and a card trick,"* The College Mathematics Journal **52** (2021), 274–280.

[105] *"Bounding monochromatic triangles using squares,"* Mathematics Magazine **94** (2021), 383–386.

[106] *"A generalization of combinatorial identities for stable discrete series constants,"* The Journal of Combinatorial Algebra **6** (2022), 109–183 (with Sophie Morel and Margaret Readdy).

[107] *"Sharing pizza in n dimensions,"* Transactions of the American Mathematical Society **375** (2022), 5829–5857 (with Sophie Morel and Margaret Readdy).

[108] *"Pizza and 2-structures,"* Discrete and Computational Geometry **70** (2023), 1221–1244 (with Sophie Morel and Margaret Readdy).

[109] *"The Ehrhart and face polynomials of the graph polytope of a cycle,"* European Journal of Combinatorics **118** (2024), 103906.

[110] *"Catalan–Spitzer permutations,"* Enumerative Combinatorics and Applications **4** (2024), Article S2R15 (with Gábor Hetyei and Margaret Readdy).

[111] *"A determinant for cyclically consecutive* 123*-avoiding permutations,"* to appear in Journal of Combinatorics.

[112] *"Baxter's Theorem – An Application of Topology,"* to appear in Mathematics Magazine.

[113] *"Sperner via Vandermonde,"* to appear in The Mathematical Intelligencer.

[114] *"Generating functions for the cd-indices of simplices and cubes,"* to appear in Enumerative Combinatorics and Applications.

Submitted papers

[115] *"Ehrhart-Macdonald reciprocity extended,"* submitted to Contributions to Discrete Math (with Matthias Beck). arXiv:math/0504230

[116] *"Standard Young tableaux via iterated integrals,"* submitted to European Journal of Combinatorics (with Guoce Xin).

[117] *"On the flag enumeration of the subspace lattice,"* submitted to European Journal of Combinatorics (with Cyrus Hettle).

[118] *"Box polynomials and the excedance matrix,"* submitted to Discrete Mathematics (with Alex Happ, Dustin Hedmark and Cyrus Hettle).

[119] *"A bijective proof of a Cauchy-type identity,"* submitted to The Australasian Journal of Combinatorics (with JiYoon Jung).

[120] *"Conjectures for cutting pizza with Coxeter arrangements,"* submitted to Experimental Mathematics.

[121] *"Two classes of level Eulerian posets,"* submitted to Discrete Mathematics.

[122] *"Cyclotomic enumeration of polynomials,"* submitted to Annals of Combinatorics.

Papers in preparation

[123] *"Quotient inequalities for Gorenstein* lattices,"* in preparation.

[124] *"Edge labeled posets,"* in preparation (with Gábor Hetyei and Margaret Readdy).

[125] *"On the Stanley symmetric function of a graph,"* in preparation (with Stephanie van Willigenburg).

[126] *"Eulerian formal power series,"* in preparation (with Gábor Hetyei and Margaret Readdy).

[127] *"Lectures on polynomials,"* manuscript, February 1995 (with Gábor Hetyei and Gian-Carlo Rota).

Refereed conference proceedings and technical reports

[128] *"Sheffer posets and r-signed permutations,"* Research Report No. 222, May 6th 1994, at Département de Mathématiques et d'Informatique at UQAM (with Margaret A. Readdy).

[129] *"The* **r***-cubical lattice and a generalization of the* **cd***-index,"* Research Report No. 245, March 31st 1995, at Département de Mathématiques et d'Informatique at UQAM (with Margaret A. Readdy).

[130] *"The* **r***-cubical lattice and a generalization of the* **cd***-index,"* Conference Proceedings of 7th International Conference on Formal Power Series and Algebraic Combinatorics (May 1995, Université de Marne-la-Vallée) 173–184 (with Margaret A. Readdy).

[131] *"Juggling and applications to q-analogues,"* Conference Proceedings of 6th International Conference on Formal Power Series and Algebraic Combinatorics (May 1994, DIMACS/Rutgers) 135–144 (with Margaret A. Readdy).

[132] *"Mixed volumes and slices of the cube,"* Technical Report No. 1997:31, at Department of Mathematics, Chalmers University of Technology and Göteborg University (with Margaret A. Readdy and Einar Steingrímsson).

[133] *"Coproducts and the* **cd***-index,"* Conference Proceedings of 8th International Conference on Formal Power Series and Algebraic Combinatorics (June 1996, University of Minnesota) 151–162 (with Margaret A. Readdy).

[134] *"The* **cd***-index of Eulerian cubical posets,"* Conference Proceedings of 7th International Conference on Formal Power Series and Algebraic Combinatorics (May 1995, Université de Marne-la-Vallée) 161–172 (with Gábor Hetyei).

[135] *"The excedance set of a permutation,"* Technical Report No. 1998:51, at Department of Mathematics, Chalmers University of Technology and Göteborg University (with Einar Steingrímsson).

[136] *"Yet another triangle for the Genocchi numbers,"* Technical Report No. 1999:7, at Department of Mathematics, Chalmers University of Technology and Göteborg University (with Einar Steingrímsson).

[137] *"Counting faces in the extended Shi arrangement* $\widehat{\mathcal{A}}_n^r$*,"* Conference Proceedings of 13th International Conference on Formal Power Series and Algebraic Combinatorics (May 2001, Arizona State University) 149–158.

[138] *"Inequalities for polytopes and zonotopes,"* Conference Proceedings of 14th International Conference on Formal Power Series and Algebraic Combinatorics (July 2002, University of Melbourne) 255–265.

[139] *"The topology of the independence complex,"* Conference Proceedings of 15th International Conference on Formal Power Series and Algebraic Combinatorics (June 2003, University of Linköping) (with Gábor Hetyei), conference cd.

[140] *"Lifting the toric g-vector inequalities,"* Conference Proceedings of 15th International Conference on Formal Power Series and Algebraic Combinatorics (June 2003, University of Linköping) 164–175.

[141] *"Classification of the factorial functions of Eulerian binomial and Sheffer posets,"* Conference Proceedings of 18th International Conference on Formal Power Series and Algebraic Combinatorics (June 2006, University of California, San Diego) (with Margaret Readdy), conference cd.

[142] *"A spectral approach to pattern-avoiding permutations,"* Conference Proceedings of 18th International Conference on Formal Power Series and Algebraic Combinatorics (June 2006, University of California, San Diego) (with Sergey Kitaev and Peter Perry), conference cd.

[143] *"Affine and toric hyperplane arrangements,"* Conference Proceedings of 20th International Conference on Formal Power Series and Algebraic Combinatorics (June 2008, Universidad de Talca, Chile) (with Margaret Readdy and Michael Slone), conference cd.

[144] *"The Frobenius Complex,"* Conference Proceedings of 22nd International Conference on Formal Power Series and Algebraic Combinatorics (August 2010, San Francisco) (with Eric Clark) 522–533.

[145] *"The topology of restricted partition posets,"* Conference Proceedings of 23rd International Conference on Formal Power Series and Algebraic Combinatorics (June 2011, Reykjavik, Iceland) (with JiYoon Jung) 281–292.

[146] *"Euler flag enumeration of Whitney stratified spaces,"* Conference Proceedings of 25th International Conference on Formal Power Series and Algebraic Combinatorics (June 2013, Paris, France) (with Mark Goresky and Margaret Readdy).

[147] *"Realizing Simion's type B associahedron as a pulling triangulation of the Legendre polytope,"* Séminaire Lotharingien de Combinatoire **78B** (2017), Art. 32, 12 pp. (with Gábor Hetyei and Margaret Readdy).

[148] *"Refined face count in uniform triangulations of the Legendre polytope,"* Séminaire Lotharingien de Combinatoire **82B** (2020), Art. 13, 12 pp. (with Gábor Hetyei and Margaret Readdy).

[149] *"Pizza and 2-structures,"* Séminaire Lotharingien de Combinatoire **89B** (2023), Art. 48, 12 pp. (with Sophie Morel and Margaret Readdy).

Miscellaneous

[150] Solution to monthly problem 10654, *Pairs with equal squares,* in *American Mathematical Monthly* **107** (2000), page 368.

[151] Solution to monthly problem 10753, *Leaves of ordered trees,* in *American Mathematical Monthly* **108** (2001), page 873 (composite solution with J. W. Moon).

[152] Monthly problem 11099, in *American Mathematical Monthly* **111** (2004), page 625–626 (with Matthias Beck and Tom Zaslavsky). The solution appeared in *American Mathematical Monthly* **113** (2006), 464–465.

[153] Monthly problem 11234, in *American Mathematical Monthly* **113** (2006), page 568 (with Jim Brennan). The solution appeared in *American Mathematical Monthly* **115** (2008), 169–170.

[154] *"Advertise!"* FOCUS, **26** (2006), August/September issue, number 6, 28–29.

[155] Solution to monthly problem 11668, *A parity problem for derangements,* in *American Mathematical Monthly* **121** (2014), pages 743–744.

[156] Solution to monthly problem 11987, *Maximal antichains under componentwise strict order,* in *American Mathematical Monthly* **126** (2019), page 285.

[157] Quickies problem and solution 1100, *Regions between two parallel lines,* in *Mathematics Magazine* **93** (2020), pages 151 and 158.

[158] Solution to monthly problem 12248, *An identity from the Pfaffian,* in *American Mathematical Monthly* **130** (2023), pages 190–191.

[159] *"Juggling",* problem submitted to Problems section of American Mathematical Monthly,

Integer sequences

The following sequences in "The On-Line Encyclopedia of Integer Sequences" by N. J. A. Sloane

[160] Sequence A6873, *Number of alternating 4-signed permutations:* 1, 1, 7, 47, 497, 6241, 95767, 1704527, 34741217, 796079041, 20273087527, ... (with Margaret A. Readdy).

[161] Sequence A7286, *Number of alternating 3-signed permutations:* 1, 1, 5, 26, 205, 1936, 22265, 297296, 4544185, 78098176, 1491632525, ... (with Margaret A. Readdy).

[162] Sequence A7788, *Number of augmented André 3-signed permutations:* 1, 1, 4, 19, 136, 1201, 13024, 165619, 2425216, 40132801, 740882944, ... (with Margaret A. Readdy).

[163] Sequence A0698, *Number of shellings of an n-cube, divided by* $2^n n!$*:* 1, 2, 10, 74, 706, 8162, 110410, 1708394, 29752066, 576037442, 12277827850, ... (with Gábor Hetyei).

[164] Sequence A034428, *Number of permutations on n elements having the descent pattern: up, up, down, up, down, ...:* 1, 1, 3, 9, 35, 155, 791, 4529, 28839, 201939, 1542739, 12767689, 113794603, ... (with Swapneel Mahajan).

[165] Sequence A108917, *Number of knapsack partitions of n:* 1, 1, 2, 3, 4, 6, 7, 11, 12, 17, 19, 29, 25, 41, 41, 58, 56, 84, 75, 117, 99, 149, 140, 211, 172, 259, 237, 334, 292, 434, ... (with Margaret Readdy).

[166] Sequence A171462, *Number of hands a bartender needs to have in order to win at the blind bartender's problem with n glasses in a cycle:* 0, 1, 2, 2, 4, 4, 6, 4, 6, 8, 10, 8, 12, 12, 12, 8, 16, 12, 18, 16, 18, 20, 22, 16, 20, 24, 18, 24, 28, 24, 30, 16, 30, 32, 30, 24, 36, 36, 36, 32, 40, 36, 42, 40, 36, 44, 46, 32, 42, 40, 48, 48, 52, 36, 50, 48, 54, 56, 58, 48, 60, 60, 54, 32, 60, 60, 66, 64, 66, 60, 70, 48, 72, ... (with Chris Skinner).

[167] Sequence A227918, *Sum over all permutations beginning and ending with ascents, and without double ascents on n elements and each permutation contributes* 2 *to the power of the number of double descents:* 1, 0, 5, 22, 137, 956, 7653, 68874, 688745, 7576192, 90914309, 1181886014, 16546404201, 248196063012, ... (with Ji-Yoon Jung).

[168] Sequence A230071, *Sum over all permutations without double ascents on n elements and each permutation contributes* 2 *to the power of the number of double descents:* 2, 6, 26, 130, 782, 5474, 43794, 394146, 3941462, 43356082, 520272986, 6763548818, 94689683454, 1420345251810, 22725524028962, ... (with Ji-Yoon Jung).

[169] Sequence A232864, *Number of permutations of n elements not cyclically containing the consecutive pattern 123:* 1, 1, 2, 3, 12, 45, 234, 1323, 8856, 65529, 543510, 4937031, 49030596, 526930677, 6101871426, 75686176035, 1001517264432, 14079895613937, ...

[170] Sequence A291902, *Sums of the cubes of the descent set statistics for permutations on n elements:* 1, 2, 18, 360, 14460, 994680, 109021500, 17815754880, 4147063256448, 1323985303267200, 562636176102554400, 310405397451855552000, ... (with Alex Happ).

[171] Sequence A291903, *Sums of the fourth powers of the descent set statistics for permutations on n elements:* 1, 2, 34, 1576, 190216, 46479536, 21246061600, 16505196258944, 20569621110703360, 39048520577674054912, ... (with Alex Happ).

[172] Sequence A340398, *Number of spanning trees in the Bruhat graph of the symmetric group:* 1, 1, 81, 22799473113563136, ...

Teaching Experience

University of Kentucky (8/00–present)

- *Applicable Algebra* Math 340/CS 340 (1–4/24).
- *Elementary Modern Algebra I* Math 361 (1–4/24).
- Large lecture of *Multivariable Calculus* Math 213 (8–12/23).
- *Differential Equations* Math 214 (1–4/23).
- *Applicable Algebra* Math 340/CS 340 (1–4/23).
- *Differential Equations* Math 214 (8–12/22).
- Large lecture of *Calculus I* Math 113 (1–4/22).
- *Applicable Algebra* Math 340/CS 340 (1–4/22).
- The graduate course *Topics in Algebraic and Geometric Combinatorics* Math 714 (8–12/21).
- *Combinatorics and Graph Theory* Math 415/CS 415, online due to Corona epidemic (8–12/20).
- *Introduction to Optimization* Math 416, online due to Corona epidemic (8–12/20).
- Large lecture of *Calculus I* Math 113, second half online due to Corona epidemic (1–4/20).
- The graduate course *Enumerative Combinatorics* Math 614, second half online due to Corona epidemic (1–4/20).
- *Differential Equations* Math 214 (8–12/19).
- *Applicable Algebra* Math 340/CS 340 (1–4/19).
- *Combinatorics and Graph Theory* Math 415/CS 415 (8–12/18).
- The graduate course *Hopf Algebras* Math 715 (8–12/18).
- *Applicable Algebra* Math 340/CS 340 (1–4/18).
- *Honors Multivariable Calculus* Math 213 (8–12/17).
- *Differential Equations* Math 214 (8–12/17).
- *Differential Equations* Math 214 (1–4/17).
- *Applicable Algebra* Math 340/CS 340 (1–4/17).
- The graduate course *Combinatorics* Math 514 (8–12/16).
- *Applicable Algebra* Math 340/CS 340 (1–4/16).
- The graduate course *Enumerative Combinatorics* Math 614 (1–4/16).

- Independent study with graduate student Cyrus Hettle entitled "Affine permutations" (1–4/16).
- Large lecture of *Calculus I* Math 113 (8–12/15).
- The graduate course *The partition lattice* Math 714 (8–12/15).
- *Applicable Algebra* Math 340/CS 340 (1–4/14).
- *Advanced Multivariable Calculus* Math 472 (1–4/14).
- *Real Analysis* Math 471 (8–12/13).
- The graduate course *Combinatorics* Math 515 (8–12/13).
- Independent study with undergraduate student Cyrus Hettle entitled "The subspace lattice and permutation enumeration" (8–12/13).
- *Applicable Algebra* Math 340/CS 340 (1–4/13).
- The graduate topics course *Permutations* Math 714 (1–4/13).
- *Differential Equations* Math 214 (8–12/12).
- *Combinatorics and Graph Theory* Math 415/CS 415 (8–12/12).
- *Differential equations* Math 214 (1–4/12).
- *Applicable Algebra* Math 340/CS 340 (1–4/12).
- Independent study with graduate student Brad Fox entitled "Level Eulerian posets" (1–4/12).
- Large lecture of *Calculus I* Math 113 (8–12/11).
- The graduate course *Combinatorics* Math 515 (8–12/11).
- Independent study with undergraduate student Hannah L. Atkinson entitled "Combinatorics" (8–12/11).
- *Applicable Algebra* Math 340/CS 340 (1–4/10).
- The graduate topics course *Combinatorics, Commutative Algebra and Topology of Simplicial Complexes* Math 714 (1–4/10).
- Independent study with undergraduate student Robert Schneider entitled "Identities and the Dirichlet convolution" (1–4/10).
- *Differential equations* Math 214 (8–12/09).
- *Combinatorics and Graph Theory* Math 415/CS 415 (8–12/09).
- *Applicable Algebra* Math 340/CS 340 (1–4/09).
- The graduate topics course *Symmetric Functions* Math 714 (1–4/09).
- Large lecture of *Calculus I* Math 113 (8–12/08).

- *Combinatorics and Graph Theory* Math 415/CS 415 (8–12/08).
- *Applicable Algebra* Math 340/CS 340 (1–4/08).
- The graduate course *Enumerative Combinatorics* Math 614 (1–4/08).
- *Differential equations* Math 214 (8–12/07).
- The graduate topics course *Polytopes* Math 714 (8–12/07).
- Independent study with Eric Clark entitled "Bijective proofs for excedance set statistic" (8–12/07).
- *Applicable Algebra* Math 340/CS 340 (1–4/06).
- The graduate topics course *Lattice Point Enumeration* Math 714 (1–4/06).
- *Analytic Geometry and Trigonometry* Math 110 (8–12/05).
- The graduate topics course *Posets and permutations* Math 714 (8–12/05).
- *Applicable Algebra* Math 340/CS 340 (1–4/05).
- The graduate course *Enumerative Combinatorics* Math 614 (1–4/05).
- *Linear Algebra* Math 332 (8–12/04).
- *Combinatorics and Graph Theory* Math 415/CS 415 (8–12/04).
- Independent study with Michael Slone entitled "Homology of Newtonian coalgebras" (1–4/04).
- *Applicable Algebra* Math 340/CS 340 (1–4/04).
- The graduate topics ourse *Geometric Probability* Math 714 (1–4/04).
- Large lecture of *Calculus I* Math 113 (8–12/03).
- The graduate topics course *Polytopes* Math 715 (8–12/03).
- Taught and developed the new undergraduate course *Combinatorics and Graph Theory* Math 415/CS 415 (1–4/03).
- The graduate topics course *Topics in Linear Algebra* Math 765 (1–4/03).
- Large lecture of *Multivariable Calculus* Math 213 (8–12/02).
- The graduate course *Linear Algebra* Math 565 (8–12/02).
- *Applicable Algebra* Math 340/CS 340 (1–4/02).
- Two sections of *Linear Algebra* Math 332 (8–12/01).
- Large lecture of *Finite Mathematics and its Applications* Math 162 (1–4/01).
- Taught and developed the new undergraduate course *Applicable Algebra* Math 340/CS 340 (1–4/01).

- The graduate topics course *Enumerative Combinatorics* Math 715 (8–12/00).

Royal Institute of Technology (8/99–12/99)

- *Linear Algebra* (9–10/99).
- *Differential equations and transforms* (9–12/99).
- *Differential and integral calculus* (9–12/99).

Cornell University (7/95–8/98)

- *Multivariable Calculus* Math 222 (2–5/98).
- Taught one section of *Calculus for Engineers* Math 191 and course czar of all four sections (9–12/97).
- *Algebra and Number Theory* Math 332 (9–12/97).
- *Calculus for Engineers* Math 193 (1–5/97).
- Taught and developed the new undergraduate course *Applicable Algebra* Math 336 (1–5/97).
- The graduate course *Topics in Algebra* Math 631 (9–12/96).
- *Honors Calculus* Math 121 (9–12/96).
- Two sections of *Multivariable Calculus* Math 222 (2–5/96).
- Two sections of *Calculus for Engineers* Math 193 (9–12/95).

Massachusetts Institute of Technology (8/88–7/93)

- Mentor for five high school students in Research Science Institute in the MIT Mathematics Department, a joint program between MIT and Center for Excellence in Education (7/93).
- Teaching Assistant for *Introduction to Discrete Applied Mathematics* for Prof. Dan Kleitman (9–12/92).
- Teaching Assistant for graduate *Stochastic Processes* for Prof. Gian-Carlo Rota (2–5/92).
- Teaching Assistant for graduate *Combinatorial Theory* for Prof. Richard Stanley (9–12/91).
- Tutor at Experimental Study Group, MIT, for *Differential Equations* (2–5/91).
- Teaching Assistant for graduate *Stochastic Processes* for Prof. Greta Ljung (2–5/90, 9–12/90).

Committees and Service

University of Kentucky (8/00–present)

Service to the Department of Mathematics

- Undergraduate committee (9/18–present).
- Department newsletter (and banner stories) committee (9/16–present).
- Appointed member of the executive committee (9/13–5/14).
- Chair of the salary committee (8/13–5/14).
- Salary committee (10/12–5/14).
- Promotion and tenure committee (10/08–9/09).
- Royster research professorship committee (while on sabbatical) (9/06–5/07).
- Hiring committee (while on sabbatical) (9/06–5/07).
- Executive committee (9/05–5/06).
- Hiring committee (9/01–5/02).
- Web committee (9/00–5/01).
- Executive committee (9/00–5/01).

Service to the Arts and Sciences College

- Member of the college advisory committee for mathematics and natural sciences (07/17–06/20).
- Outside member of the college advisory committee for the social sciences (07/13–06/14).

Service to the graduate program

- Visited Morehead State University and spoke about graduate studies in mathematics at the University of Kentucky, 12 November 2009.
- Faculty stage manager for the Graduate Student Combinatorics Conference March 27–29, 2009.
- Participated in the Joint 2007 Michigan Undergraduate Mathematics and Midwest Systems Biology Conference in order to recruit graduate students to the Department of Mathematics at the University of Kentucky (10/07).
- Prelim committee for the Discrete Math exam (2/03–present).
- Chair of the prelim committee for the Discrete Math (4/04–present).

- Chair of the doctoral committees of
  - Michael Slone, 28 April, 2004 – 11 April, 2008.
  - Eric Clark, 16 February, 2009 – 8 April, 2011.
  - JiYoon Jung, 29 April, 2009 – 19 April, 2012.
  - Brad Fox, 27 November, 2012 – 23 April, 2015.
  - Dustin Hedmark, 23 April, 2015 – 18 April, 2017.
  - Alex Happ, 21 April, 2015 – 5 April, 2018.
  - Karthik Chandrasekhar, 7 November, 2016 – 15 April, 2019.

- The doctoral committees of
  - **2003:** Jakayla Robbins, 17 April, 2003; Kyoungmi Kim, 21 April, 2003; Laura Schmidt, 22 April, 2003; Robert Riehemann, June 2003; Gareth Bendall, 26 November, 2003.
  - **2004:** Matt Menzel, 19 April, 2004; Venkata Giruka, 23 September 2004.
  - **2006:** Philip Busse, 27 April 2006; Patricia Muldoon, October 2006.
  - **2007:** Daniel Wells, 3 December, 2007.
  - **2008:** Carlos Nicolas, 7 July, 2008.
  - **2012:** Yue Cai, 19 November 2012.
  - **2019:** William Gustafson, 26 November 2019.
  - **2020:** Matias Von Bell, 4 March 2020.
  - **2021:** Benjamin Reese, 15 March 2021; Allison Fitisone, 14 October 2021.

- Chair of the masters exams of
  - **2003:** John Eveland, 24 November, 2003; Jennifer Rowe, 1 December, 2003.
  - **2004:** Adam Feldhaus, 9 April, 2004; Scott Godefroy, 21 April, 2004.
  - **2006:** Daniel Wells, 19 April, 2006.
  - **2008:** JiYoon Jung, 15 April, 2008.
  - **2014:** Alex Happ, 23 April, 2014; Dustin Hedmark, 30 April, 2014.
  - **2016:** Cyrus Hettle, 19 April, 2016.
  - **2021:** Nelson Penn, Department of Computer Science, cochair with Miroslaw Truszczynski, 22 April, 2021.

- The masters exams of
  - **2002:** Cathy Mania, 23 September, 2002; David Harness, 10 April, 2002; Jennifer Rice, 12 April, 2002.
  - **2003:** Bryson Perry, 14 March, 2003; Ron Williams, 1 May, 2003; Michael Slone, 11 July, 2003.
  - **2004:** Matthew Brown, 12 April, 2004.
  - **2005:** Patricia Muldoon, 18 April, 2005; Keith Kohrs, 22 April, 2005.
  - **2006:** Carlos Nicolas, 17 April, 2006.
  - **2008:** Matt Zeckner, 6 October, 2008.
  - **2010:** Katie Ouellette, 20 April, 2010.
  - **2011:** Robert Davis, 17 October, 2011; Brad Fox, 28 November, 2011.
  - **2013:** Sarah Nelson, 8 April, 2013.
  - **2017:** Yanxi Li, 17 April, 2017.
  - **2018:** Susanna Lange, 6 December, 2018.
  - **2020:** Benjamin Reese, 24 February, 2020.

- **2021:** Allison Fitisone, 30 March, 2021; Nelson Penn (Computer Science), 22 April, 2021.

◦ The language exams of
- **2001:** Gareth Bendall, March 2001; Jakayla Robbins, April 2001.

Service to the undergraduate program

◦ Gave the talk "Mathematical magic" at the All Math Meeting, 22 February 2016. See the link `https://math.as.uky.edu/magic-math-department` for an article about this event and links to videos of the math magic tricks performed. This story was also picked up by UKNow.

◦ Gave the talk "The mathematics of juggling" during the College of Arts and Sciences' Geek Week 2010 with my (fearless) graduate student Eric Clark. This time the juggling part also included apples, bags of ketchup and fire. See the article "Juggling the equation" on the front page of the Kentucky Kernel (April 8, 2010), also the link `http://kykernel.com/2010/04/07/juggling-the-equation-arts-and-sciences-event-demonstrates-math/`. 7 April, 2010.

◦ Gave the talk "The mathematics of juggling" during the College of Arts and Sciences' Geek Week 2009 and demonstrated juggling together with my (fearless) graduate student Eric Clark. This event attracted an audience of size 163 consisting mainly of undergraduates, but also graduate students, visitors and faculty. Lecture posted on YouTube, see also the link `http://www.math.uky.edu/~jrge/Mathematics_of_Juggling_2009.html`. 8 April, 2009.

◦ Undergraduate advisor (9/08–5/10, 9/12–present).

◦ Research project with undergraduate student Michael Raba on a probabilistic method on solving Sudoko puzzles. (6/08–7/08).

◦ During Arts & Sciences' Geek Week 2006 organized and showed five times the Walt Disney movie "Donald in Mathmagic Land" staring Donald Duck, complete with popcorn (2/06).

◦ Trainer of the Putnam team (9/02–5/03).

◦ Math Club advisor (9/02–12/03).

Service to the mathematical community

◦ Member of the external team for the Academic Program Review of the Department of Mathematics of the George Washington University (3/20–5/20).

Outreach

◦ Coorganized a table at the University of Kentucky Curiosity Fair: Exploring Surfaces. Joint with Margaret Readdy. November 1st, 2023.

- Coorganizing the Kentucky Mathematics Carnival at the University of Kentucky with Margaret Readdy, April 29, 2023. See the website: `https://sites.google.com/view/thekentuckymathcarnival`
- The story on the department's webpage: `https://math.as.uky.edu/nothing-his-sleeve-mathematician-creates-card-trick-illustrate-key-concepts-information-correction`, November 2021.
- Speaker at the Edythe J. Hayes Middle School, 'I Love Math Day 2020!', 14 February, 2020.
- Coorganizing the Julia Robinson Mathematics Festival at the University of Kentucky with Margaret Readdy.
  - The first two Math Festival were held at the Jacobs Science Building, 4 November, 2017 and 3 November, 2018.
  - The third Math Festival was held at Central Public Library in Lexington, KY, 23 November, 2019.
- Made the video "Happy Valentine's Day!" about cutting the Double Möbius strip into two pieces. See the link `http://vimeo.com/202387181/43b563bef0`.
- Professor assistant to the Henry Clay High School's Math Club. (9/15–present).
- Organized a session entitled "Mathmagic" for the Discovery Day at Cassidy Elementary School, 5th grade. Coorganized with Margaret Readdy, 30 October, 2015.
- Volunteered to help one hour per week in Ms. Frye's first grade mathematics class at Cassidy Elementary School, Lexington. (8/11–6/12).
- Founder and organizer of *Math Movie of Month*, showing six math related movies during the academic year. Duties include choosing the movie program, designing posters, advertising the movies, and running the movies, including a mathematical preshow. The advertising includes writing to nearby local colleges and universities, other departments at the University of Kentucky, and local middle and high schools. See the webpage `http://www.math.uky.edu/~movies`. (8/08–5/10, 8/11–12/11, 1/13–5/13 & 8/15–present).
- Organized a session entitled "Mathematical puzzles" for the Cassidy Arts and Science Extravaganza at Cassidy Elementary School. For Kindergarten through 3rd grade. Coorganized with Margaret Readdy, 30 October, 2009.
- University of Kentucky High School Mathematics Day. Gave a magic show for high school students entitled "Mathematical magic", with my two assistants Eric Clark and JiYoon Jung. 17 October, 2009.
- University of Kentucky High School Mathematics Day. Organized and ran an interactive session on building polyhedra for high school students. 8 November 2008.
- Gave a mathematics talk at the Henry Clay High School, Lexington, 29 April, 2003.

Cornell University (7/95–8/98)

- Faculty advisor of eleven undergraduate students in the College of Arts and Sciences, including four math majors (9/96–5/98).
- Math Club advisor (9/96–5/98).
- Co-organizer of Research Experiences for Undergraduates Program in Mathematics. Advised three students in research in algebraic combinatorics (6–8/97).
- Advanced Placement Committee (8/96–5/97).

Memberships in Professional Organizations

- American Mathematical Society.
- Mathematical Association of America.