

Thomas W. Roby

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(Last updated 16 January 2024)

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My career has significant components in both pure mathematics and mathematics educational outreach.

EDUCATION

Massachusetts Institute of Technology Ph.D. in Mathematics, September 1991.

Swarthmore College BA, June 1985.

External Examination Program: graduated with High Honors in Mathematics with a minor in classical Greek. Phi Beta Kappa

EXPERIENCE

University of Connecticut	Storrs, CT
Professor of Mathematics	2023–present
Associate Professor of Mathematics	2005–2023
Director of Quantitative Learning Center	2005–2012

Taught *undergraduate* courses in linear algebra (with Honors supplement), cryptography, combinatorics, number theory, probability, proof-writing, and algebraic combinatorics; created lightboard videos and flipped a junior-level probability class to enhance student learning. Created flipped and online offerings of sophomore applied linear algebra class using lightboard video lectures (also used by Ohio State’s online course), Ximera web-based self-assessments, and worksheets. Supervised senior theses on various topics.

Taught *graduate* courses in algebraic combinatorics, enumerative combinatorics, representation theory, symmetric functions, and Coxeter groups, and Dynamical Algebraic Combinatorics.

Continued research in algebraic combinatorics and mathEd outreach; supervised doctoral students.

Directed the *Quantitative Learning Center*, which supports students in lower division quantitatively-intensive courses, during its initial phase of rapid growth. Built logistical and IT infrastructure. Supervised associate director, assistant director, and program assistant, 5–12 graduate assistants, and about 20–100 peer tutors who handled from 1800 to 18,000 annual student visits as the center grew. Oversaw annual budgets of up to about \$500,000.

Massachusetts Institute of Technology	Cambridge, MA
Research Affiliate	2012–present
Visiting Professor	2011–2012

California State University	Hayward, CA
Associate Professor	2002–2005
Assistant Professor	1997–2002

Taught a variety of undergraduate and masters level math courses (with a teaching load of 12 hours per week), and continued research in algebraic combinatorics.

PI and director of ACCLAIM professional development institutes, overseeing a budget of over \$4 million (including stipends) in FY 2001–04.

Served on statewide educational committees: STAR Test Content Review Panel and California Mathematics Project Advisory Board. Chaired the latter 9/2000–9/2005.

Founding Mathlets Editor of new MAA *Journal of Online Mathematics and its Applications (JOMA)*, 7/2000–8/2002.

University of Wisconsin Madison, WI
 Research Associate 1995–97
 Conducted research in algebraic combinatorics and collaborated on curriculum for preservice elementary teachers, developing a mathematical modeling course.

Reed College Portland, OR
 Assistant Professor of Mathematics 1993–95
 Taught a variety of undergraduate math courses. Supervised senior theses. Supplemented calculus classes with labs using Mathematica and Maple. Chosen as a fellow in the MAA’s Project NExT (New Experiences in Teaching) for 1994–95; supervised NExT mailing lists, 1995–2000.

Center for Communications Research San Diego, CA
 Consultant Summer 1994
 Researched combinatorial aspects of practical communications problems; programmed in C.

University of Tokyo Tokyo, JAPAN
 Japan Society for the Promotion of Science Fellow 1991–93
 Researched problems in combinatorics and representation theory. Achieved fluency in Japanese.

Harvard University Cambridge, MA
 Lecturer Fall 1990
 Taught the core course in quantitative reasoning and computer programming (QRA).

Massachusetts Institute of Technology Cambridge, MA
 User Consultant, Project Athena 1989–91
 Aided users of MIT’s main academic computing system; fielded questions on system problems and a wide variety of software, including typesetting and numerical analysis packages.

Tufts University Medford, MA
 Instructor 1989–90
 Taught several-variable calculus. Gave lectures and graded examinations.

Boston University Program in Mathematics for Young Scientists Boston, MA
 Recitation Leader, Head Counselor Summers 1989–91
 Group Project Leader, Teacher Program Liaison Summer 2000
 Tutored talented high-school students in number theory and abstract algebra. Oversaw the similar tutoring of 24–60 students by 9–15 other counselors. Reviewed applications and evaluated the work of counselors and students. Supervised participants’ living in dormitories. Created and supervised group research projects for high-school teachers and students.

Massachusetts Institute of Technology Cambridge, MA
 Research Assistant 1988–89
 Teaching Assistant 1985–88
 Researched problems in algebraic combinatorics under Richard Stanley.
 Taught recitation sections in calculus and complex analysis; graded homework and exams.

MathPath Mt. Holyoke, Lewis & Clark, Macalester
 Faculty Summers 2014–18
 Created and taught courses in combinatorics to talented students aged 10–14.

Hampshire College Summer Studies in Mathematics Amherst, MA
 Senior Staff Summers 1987–88
 Organized and taught courses in combinatorics, number theory, and graph theory to talented high-school students. Supervised teaching assistants.

Northfield Mount Hermon Northfield, MA
 Teaching Fellow Summer 1985

Taught Euclidean geometry, BASIC programming, and volleyball to high-school students.

Ross Summer Program in Mathematics at Ohio State University

Head Counselor

Columbus, OH

Summers 1981–83

Tutored talented high-school students in number theory and abstract algebra, organized counselor assignments and dorm activities.

MATH RESEARCH PUBLICATIONS

1. *Applications and Extensions of Fomin's Generalization of the Robinson-Schensted Correspondence to Differential Posets*, Ph.D. Thesis, Massachusetts Institute of Technology, 1991.
2. "The connection between the Robinson-Schensted correspondence for skew oscillating tableaux and graded graphs," *Discrete Math.* **139** (1995) 481–485.
3. (With G. Benkart) "Down-Up algebras," *Journal of Algebra* **209**, 305–344 (1998).
4. (With F. Sottile, J. Stroomer, J. West) "Complementary algorithms for tableaux," *Journal of Combinatorial Theory A* **96**, 127–161 (2001).
5. (With R. Merris) "The lattice of threshold graphs," *Journal of Inequalities in Pure and Applied Math* **6**, #1 (2005).
6. (With I. Terada) "A two-dimensional pictorial presentation of Berele's insertion algorithm for symplectic tableaux," *The Electronic Journal of Combinatorics* **12**(1), 2005, R4.
7. (with S. Linton, J. Propp, and J. West) "Equivalence classes of permutations under various relations generated by constrained transpositions," *Journal of Integer Sequences* **15** (2012), Article 12.9.1.
8. (with J. Propp) "Homomesy in products of two chains," *Electronic Journal of Combinatorics* **22**(3), 2015, #P3.4. <http://www.combinatorics.org/ojs/index.php/eljc/article/view/v22i3p4>.
9. (with D. Grinberg) "Iterative properties of birational rowmotion II: rectangles and triangles," *Electronic Journal of Combinatorics* **22**(3), 2015, #P3.40. <http://www.combinatorics.org/ojs/index.php/eljc/article/view/v22i3p40>.
10. (with D. Grinberg) "Iterative properties of birational rowmotion I: generalities and skeletal posets," *Electronic Journal of Combinatorics* **23**(1), 2016, #P1.33. <http://www.combinatorics.org/ojs/index.php/eljc/article/view/v23i1p33>.
11. "Dynamical algebraic combinatorics and the homomesy phenomenon," in A. Beveridge, J. Griggs, L. Hogben, G. Musiker, P. Tetali, eds., *Recent Trends in Combinatorics (IMA Volume in Mathematics and its Applications 159)*, Springer 2016, 619–652. (Invited Chapter)
12. (with Michael Joseph) "Toggling independent sets of a path graph," *Electronic Journal of Combinatorics* **25**(1), 2018, #P1.18. <http://www.combinatorics.org/ojs/index.php/eljc/article/view/v25i1p18>.
13. (with Gregg Musiker) "Paths to Understanding Birational Rowmotion on Products of Two Chains," *Algebraic Combinatorics* **2**#2 (2019), pp. 275–304. <https://alco.centre-mersenne.org/>.

14. (with Michael Joseph) “Birational and noncommutative lifts of antichain toggling and rowmotion,” *Algebraic Combinatorics* **3**#4 (2020), pp. 955–984, <https://alco.centre-mersenne.org/>.
15. (with Michael Joseph) “A birational lifting of the Stanley–Thomas word on products of two chains,” *Discrete Math & Theoretical Computer Science*, **23**(1) #17 (2021). <https://dmtcs.episciences.org/8367>, <https://doi.org/10.46298/dmtcs.6633>, <https://arxiv.org/abs/2001.03811>.
16. (with Sergi Elizalde, Matthew Plante, and Bruce Sagan) “Rowmotion on fences”, *Algebraic Combinatorics*, **6**#1, (2023), pp. 17–36. <https://alco.centre-mersenne.org/>.
17. (with D. Grinberg) “Birational rowmotion on a rectangle over a noncommutative ring,” *Combinatorial Theory*, **3** (3) (2023), #7, <https://doi.org/10.5070/C63362790>.

SUBMITTED OR IN PREPARATION

18. (with Michael La Croix) “Foatic actions of the symmetric group and fixed-point homomesy,” preprint, (2020). <https://arxiv.org/abs/2008.03292>.
19. (with Michael Joseph and Jim Propp) “Whirling injections, surjections, and other families of finite-set functions.” <https://arxiv.org/abs/1711.02411>.

REFEREED CONFERENCE PUBLICATIONS

1. (With F. Sottile, J. Stroomer, J. West) “Jeux de tableaux,” *Formal Power Series and Algebraic Combinatorics: Twelfth International Conference, FPSAC’00, Moscow, Russia, June 2000, Proceedings*, pp. 332–343.
2. (with D. Grinberg) “The order of birational rowmotion,” conference proceeding for FPSAC 2014, *Discrete Mathematics and Theoretical Computer Science*, 2014.
3. (with S. Linton, J. Propp, and J. West) “Equivalence relations of permutations generated by constrained transpositions,” presented at *22nd International Conference on Formal Power Series and Algebraic Combinatorics*, conference proceeding in *Discrete Mathematics and Theoretical Computer Science*, 2010.
4. (with J. Propp) “Homomesy in products of two chains,” presented at *25th International Conference on Formal Power Series and Algebraic Combinatorics*, Paris, conference proceeding in *Discrete Mathematics and Theoretical Computer Science*, 2013.
5. (with D. Grinberg) “The order of birational rowmotion,” presented at *26th International Conference on Formal Power Series and Algebraic Combinatorics*, Chicago, conference proceeding in *Discrete Mathematics and Theoretical Computer Science*, 2014.
6. (with M. Joseph) “Toggling independent sets of a path graph,” presented at *29th International Conference on Formal Power Series and Algebraic Combinatorics*, London, conference proceeding in *Séminaire Lotharingien de Combinatoire*, **78B**.78, 2017. <https://www.mat.univie.ac.at/~slc/wpapers/FPSAC2019/94.html>
7. (with G. Musiker) “A path formula for birational rowmotion on the product of two chains” presented at *30th International Conference on Formal Power Series and Algebraic Combinatorics*, Lebanon, NH, conference proceeding in *Séminaire Lotharingien de Combinatoire*, **80B**.37, 2018. <https://www.mat.univie.ac.at/~slc/wpapers/FPSAC2018/37-Musiker-Roby.html>

8. (with M. Joseph) “Birational antichain toggling and rowmotion,” presented at *31st International Conference on Formal Power Series and Algebraic Combinatorics*, Ljubjana, Slovenia, conference proceedings in *Séminaire Lotharingien de Combinatoire*, **82B.94**, 2019.
<https://www.mat.univie.ac.at/~slc/wpapers/FPSAC2019/94.html>.
9. (with Sergi Elizalde, Matthew Plante, and Bruce Sagan) “Rowmotion on fences”, presented at the *34th International Conference on Formal Power Series and Algebraic Combinatorics*, Bangalore, India, conference proceeding in *Séminaire Lotharingien de Combinatoire*, **86B.40**, 2022.
<https://www.mat.univie.ac.at/~slc/wpapers/FPSAC2022/40.html>.
10. (with Darij Grinberg) “Birational rowmotion over noncommutative rings”, presented at the *35th International Conference on Formal Power Series and Algebraic Combinatorics*, Davis, CA, USA, to appear in conference proceedings in *Séminaire Lotharingien de Combinatoire*.

PUBLICATIONS IN MATH EDUCATION/OUTREACH

1. “The JOMA mathlets project,” *Journal of Online Mathematics and its Applications* **1** (Jan, 2001)
<http://joma.org>.
2. “Models for fractions,” in *Harcourt Math Professional Handbook* (Orlando, 2002), pp. PH24–25.
3. (with Maletsky, E. and seven other authors) *Harcourt Math (Grades K–6)* Harcourt, Inc., Orlando, 2004.
4. (with Maletsky, E. and eight other authors) *California HSP Math (Grades K–6)* Harcourt, Inc., Orlando, 2007.
5. (with Burger, E. and seven other authors) *Holt Mathematics Course 1–2 (Grades 6–7)* Holt, Rinehart and Winston, Austin, 2007.
6. (with Burger, E. and seven other authors) *Holt California Algebra 1*, Holt, Rinehart and Winston, Austin, 2007.
7. (with Burger, E. and seven other authors) *Holt California Geometry*, Holt, Rinehart and Winston, Austin, 2007.
8. (with Maletsky, E. and seven other authors) *HSP Math (Grades K–6)*, Harcourt, Inc., Orlando, 2009.
9. (with Burger, E. and seven other authors) *Holt Mathematics Course 1–3 (Grades 6–8)*, Holt, Rinehart and Winston, Austin, 2008.
10. (with T. Deans) “Learning in the Commons,” *Inside Higher Ed*, 16 November 2009.
<http://www.insidehighered.com/views/2009/11/16/deans>
11. “Case Study: Quantitative Learning Center at UConn,” in M. Schuckers, G. Coulombe, M. O’Neill, eds., *A Handbook for Directors of Quantitative and Mathematical Support Centers*, Scholar Commons at the University of South Florida. http://scholarcommons.usf.edu/qmasc_handbook/

INVITED TALKS (SELECTED)

1. *California State University, Hayward*, “Counting on Noncommutative Algebra,” 14 March 1997.
2. *University of Victoria, BC, Canada*, “Pictorial Presentations of Schensted’s Algorithm,” 20 November 1998.
3. *Malaspina University College, Nanaimo, BC, Canada*, “Knuth-Robinson-Schensted Correspondences for the Symmetric Group of Permutations,” 23 November 1998.

4. *California State University, Hayward*, “Slide, Slide: The combinatorics of Young Tableaux,” 16 January 1998.
5. *Sonoma State University*, “Enumeracy: The Art of Literate Counting,” 17 March 1999.
6. *San Jose State University*, “The Lattice of Threshold Graphs,” 25 March 1999.
7. *Boston University PROgram in Mathematics for Young Scientists (PROMYS)*, “Enumeracy: The Art of Literate Counting,” 7 July 1999.
8. *University of California, Berkeley*, “Jeux de Tableaux,” 8 November 1999.
9. *Santa Clara University Colloquium*, “Ups and Downs in Posets and Algebras,” 2 February 2000.
10. *MIT (Cambridge, MA)*, “Jeux de Tableaux,” 12 April 2000.
11. *University of Washington (Seattle)*, “Jeux de Tableaux,” 26 April 2000.
12. *University of Tokyo (Japan)*, “Complementary Algorithms for Tableaux,” 29 May 2000.
13. *UC, Davis Colloquium*, “Differential Posets, Down-up Algebras, and the Robinson-Schensted-Fomin Machine,” 20 November 2000.
14. *Malaspina University College, Nanaimo, BC, Canada Science & Technology Lecture Series*, “Teaching Cultures in California, China, and Japan,” 4 April 2001.
15. *University of California, Berkeley*, “Ups & Downs in Posets & Algebras,” 23 April 2001.
16. *Ohio State University, Arnold Ross Reunion Conference*, “Teaching cultures in the US, China, & Japan,” 27 July 2001.
17. *Kyoto University, Research Institute for Mathematical Sciences (RIMS)*, “Complementation and Tableaux Games,” 7 November 2001.
18. *California Mathematics Council Annual Meeting (Asilomar, CA)* “Using Free Web-based Technology in the Classroom,” 1 December 2001.
19. *Presentation High School (San Jose)*, “Enumeracy: The Art of Literate Counting,” 12 March 2003.
20. *Hosei University (Tokyo, Japan)*, “K-12 Math & Science Education near Silicon Valley,” 28 March 2003.
21. *American Mathematical Society National Meeting Special Session on the Many Lives of Lattice Theory*, “Differential Posets and Down Up Algebras,” 8 January 2004.
22. *MIT Richard Stanley 60th Birthday Conference (Cambridge, MA)*, “The Lattice of Threshold Graphs and Split Graphs,” 22 June 2004.
23. *Park City Mathematics Institute (sponsored by the Institute for Advanced Study)*, “Mathematicians working with teachers in California: The ACCLAIM Experience,” 13 July 2004.
24. *Park City Mathematics Institute (sponsored by the Institute for Advanced Study)*, “Japanese Lesson Study: Teaching cultures in Japan and California,” 15 July 2004.
25. *California State University Hayward Colloquium*, “Proving Primes in Polynomial Time,” 12 November 2004.
26. *Mathematical Sciences Research Institute (Berkeley) Conference on Mathematical Circles, Contests, and Summer Programs*, “The Ross Program, HCSSiM, and ProMYS,” 18 December 2004.

27. *University of Connecticut Colloquium*, “The Lattice of Threshold Graphs, ” and “Mathematicians working with teachers in California: The ACCLAIM Experience,” 18 January 2005.
28. *Sonoma State University (CA) M*A*T*H* Colloquium*, “Graphical Degree Sequences,” 16 March 2005.
29. *California State University, East Bay*, “Mathematicians working with teachers in California: The ACCLAIM Experience,” 22 April 2005.
30. *UC Davis Combinatorics Seminar*, “A pictorial presentation of Berele’s insertion algorithm for symplectic tableaux via local rules,” 16 May 2005.
31. *Harvard University Seminar*, “Inquiry-Based Learning and the Arnold Ross Program,” 9 March 2007.
32. *UConn Early College Experience*, “Euler & Infinite Series,” 20 August 2007.
33. *Mathematical Sciences Research Institute (Berkeley)*, “Supporting students Struggling with Algebra: Lessons from UConn’s Q Center,” at workshop on *Critical Issues in Education: Teaching and Learning Algebra* 16 May 2008.
34. *UConn Math Club*, “Generating Functions: Power Series You Can Count On,” 10 September 2008.
35. (with Álvaro Lozano-Robledo) *UConn Math Education Seminar*, “Peer Tutoring at the Quantitative Learning Center,” 11 February 2009; and “UConn’s Quantitative Learning Center: Research and Future Directions,” 18 February 2009.
36. (with Álvaro Lozano-Robledo) *MAA Session on Developmental Math*, “The Quantitative Learning Center at UConn and the effects of online homework in the study habits of students” at the Joint Mathematics Meetings, 14 January 2010.
37. *UConn Algebra Seminar*, “Equivalence Relations of Permutations Generated by Constrained Transpositions,” 3 March 2010.
38. *Smith College Math Dept*, “Games on Permutations,” March 2010.
39. *New England Consortium for Quantitative Literacy XV*, Panelist on ”Math Support Centers: Common Themes”, UMass Boston, 19 March 2011.
40. *Institute for Mathematics and Education, University of Arizona*, Panelist on “Concerns of Mathematics” at *Workshop on Knowledge of Mathematics for Teaching at the Secondary Level*, 24–26 March 2011.
41. *University of Washington Combinatorics Seminar*, “Equivalence relations of permutations generated by constrained transpositions,” 27 April 2011.
42. *MIT Combinatorics Seminar*, “Equivalence relations of permutations generated by constrained transpositions,” 18 November 2011.
43. *Joint Mathematics Meetings Panel Discussion*, “Quantitative Support Centers,” 4 January 2012.
44. *Joint Mathematics Meetings Special Session on Beautiful Bijections or Clever Counting?*, “A Bijection that Counts: The Robinson-Schensted-Knuth Correspondence,” 5 January 2012.
45. *Boston Math Circle*, “See-saw swap solitaire,” 4 March 2012.
46. *University of Wisconsin Combinatorics Seminar*, “Equivalence relations of permutations generated by constrained transpositions,” 12 March 2012.
47. *Gathering for Gardner X*, “See-saw swap solitaire,” 28 March 2012.

48. *2012 SIAM Conference on Discrete Math*, Halifax, Nova Scotia, Canada, “Combinatorial ergodicity in products of chains,” 18 June 2012.
49. *University of Tokyo Combinatorics Seminar*, “Combinatorial Ergodicity,” 23 July 2012.
50. *International Institute for Advanced Study* (Kyoto, Japan), “Combinatorial Ergodicity,” at *Workshop on algebraic combinatorics related to Young diagrams and statistical physics*, 9 August 2012.
51. *American Mathematical Society Committee on Education Panel Discussion*, “Mathematics serving students in other disciplines,” 12 January 2013.
52. *University of Connecticut Math Club*, “Generating Functions: Power Series You Can Count On,” 30 January 2013.
53. *University of Connecticut Algebra Seminar*, “Combinatorial Ergodicity,” 27 March 2013.
54. *Dartmouth University Combinatorics Seminar*, “Homomesy of Order Ideals in Products of Two Chains,” 23 May 2013.
55. *Dartmouth University Colloquium*, “Combinatorial Actions and Homomesic Orbit Averages,” 23 May 2013.
56. *Sage Days 49: Free and Practical Software for (Algebraic) Combinatorics*, “Generalized toggle operations which define homomesic actions on monotone boolean, piecewise linear, and birational maps on posets,” 20 June 2013.
57. *University of Minnesota Combinatorics Seminar*, “Homomesy of Order Ideals in Products of Two Chains,” 6 September 2013.
58. *Gathering for Gardner XI* in Atlanta, GA, “The Eleven Clocks Problem,” 22 March 2014.
59. *Stanley@70 Conference at MIT*, “Rowmotion: Classical & Birational,” 25 June 2014.
60. *Canada-USA Mathcamp*, “See-Saw Swap Solitaire and Other Games on Permutations,” 29 July 2014
61. *UConn Math Club*, “Integer Partitions,” 27 October 2014.
62. *AIM Workshop on dynamical algebraic combinatorics*, “Birational Rowmotion,” 24 March 2015.
63. *University of Minnesota Combinatorics Seminar*, “Birational rowmotion: order, homomesy, and cluster connections,” 22 May 2015.
64. *UConn Algebra Seminar*, “Birational Rowmotion: order, homomesy, and cluster connections,” 11 November 2015.
65. *UConn Math Club*, “Combinatorial Triangles,” 11 November 2015.
66. *Special Session on Algebraic & Enumerative Combinatorics*, “Homomesies Lurking in the Twelfold Way,” AMS Eastern Sectional Meeting, Bowdoin College, Brunswick, ME, 25 September 2016.
67. *Special Session on Enumerative Combinatorics*, AMS Central Sectional Meeting, University of St. Thomas, Minneapolis, MN, “Homomesies Lurking in the Twelfold Way,” 28 October 2016.
68. *Erwin Schrödinger International Institute for Mathematics and Physics (ESI) Workshop on Algorithmic and Enumerative Combinatorics*, Programme on Algorithmic and Enumerative Combinatorics, University of Vienna, AUS, “A (lattice) path formula for birational rowmotion on a product of two chains,” 15 November 2017.
69. *Worcester Polytechnique Institute Discrete Math Seminar*, Worcester, MA, “Dynamical algebraic combinatorics and the Homomesy Phenomenon,” 8 February 2018.

70. *Algebraic and Enumerative Combinatorics in Okayama Conference*, Okayama University (Japan), “Paths to understanding birational rowmotion on a product of two chains,” 22 February 2018.
71. *Tsuda University Colloquium*, Tokyo, Japan, “Dynamical algebraic combinatorics and the homomesy phenomenon on independent sets of a path graph and on permutations,” v2 March 2018.
72. *Nagoya University Combinatorics Seminar*, Graduate School of Mathematics, Nagoya University (Japan), “Paths to understanding birational rowmotion on a product of two chains,” 5 March 2018.
73. *NDSU Colloquium*, “Dynamical algebraic combinatorics: Actions, orbits, and averages,” North Dakota State University, Fargo, 27 March 2018.
74. *Brandeis University Combinatorics Seminar*, Waltham, MA, “Paths to understanding birational rowmotion on a product of two chains,” 17 April 2018.
75. *UMass Discrete Math Seminar*, University of Massachusetts Amherst, Dept. of Math & Statistics, “Dynamical algebraic combinatorics: Actions, orbits, and averages,” 26 April 2018.
76. *SageDays@ICERM, Brown University*, Conference on Combinatorics and Representation Theory, “Paths to understanding birational rowmotion on a product of two chains,” 25 July 2018.
77. *University of Oregon Math Colloquium*, “Dynamical algebraic combinatorics: Actions, orbits, and averages,” University of Oregon, 26 November 2018.
78. *Okayama University Combinatorics Seminar*, Okayama, JAPAN “Dynamical algebraic combinatorics and the homomesy phenomenon: Toggling, whirling, and Bulgarian solitaire,” 26 March 2019.
79. *Okayama University Combinatorics Seminar*, Okayama, JAPAN “Paths to understanding birational rowmotion on a product of two chains,” 28 March 2019.
80. *Tsuda University 15-lecture Minicourse*, Tsuda University, Department of Math and CS, Kodaira-shi, Tokyo, JAPAN. “Enumerative combinatorics,” 8 April–17 May 2019.
81. *Nagoya University 6-lecture Minicourse*, Graduate School of Mathematics, Nagoya University, Japan. “Dynamical algebraic combinatorics: Actions, orbits, averages, sieving,” six 90-minute lectures, 7–10 May 2019.
82. *31st International Conference on Formal Power Series and Algebraic Combinatorics* (poster with M. Joseph) “Birational antichain toggling and rowmotion,” presented in Ljubjana, Slovenia, 2 July 2019.
83. *Program in Algebraic and Enumerative Combinatorics*, Institut Mittag-Leffler, Djursholm, Sweden. “Dynamical algebraic combinatorics: Actions, Orbits, Averages,” 25 February 2020.
84. *AlCoVE: an Algebraic Combinatorics Virtual Expedition* (One of the ten invited speakers), “Dynamical algebraic combinatorics and homomesy: An action-packed introduction,” 15 June 2020.
85. *Online Workshop on Dynamical algebraic combinatorics* sponsored by Banff International Research Station, “Let’s birational: Lifting periodicity and homomesy to higher realms,” 23 October 2020.
86. *Sage Days 110*, “Dynamical algebraic combinatorics & noncommutative needs,” 29 October 2020.
87. *UConn Algebra Seminar*, “Dynamical algebraic combinatorics & homomesy in higher realms,” 18 November 2020.
88. *Michigan State University Combinatorics & Graph Theory Seminar*, “An action-packed introduction to homomesy,” 17 February 2021.

89. *University of British Columbia Discrete Math Seminar*, “An action-packed introduction to homomesy,” 30 November 2021.
90. *UConn Math Club*, “Generating Functions: Power Series You Can Count On,” 26 January 2022.
91. *Dartmouth Combinatorics Seminar*, “Some recent orbits of homomesy,” 1 March 2022.
92. *AMS Special Session on The Many Lives of Lattice Theory with an Emphasis on Distributive & Semi-distributive Lattices and Combinatorics*, “Rowmotion in products of two chains,” at the *2022 Joint Mathematics Meetings (Online)*, 7 April 2022.
93. *Indian Institute of Science, 34th International Conference on Formal Power Series and Algebraic Combinatorics*, “Rowmotion on Fences,” 18 July 2022.
94. *Max Planck Institut für Mathematik in den Naturwissenschaften Leipzig, Germany*, “Dynamical Algebraic Combinatorics: Actions, Orbits, and Averages”, 14 February 2023.
95. *Dartmouth Combinatorics Seminar*, “Lifting rowmotion to higher realms,” 22 May 2023.

SERVICE

1. Founding Mathlets Editor for the Mathematical Association of America’s *Journal of Online Mathematics and its Applications*, 2001–2003. Served on JOMA advisory board, 2001–2005.
2. Member of the California Mathematics Project Advisory Board 1998–2005.
3. Chair of the California Mathematics Project Advisory Board, a position of considerable statewide leadership in mathematics education, 2000–2005.
4. Founded, directed and taught in ACCLAIM (Alameda County Collaborative for Learning and Instruction in Mathematics), a large, successful professional development program for K–12 teachers, in cooperation with Alameda County Office of Education and local school districts. ACCLAIM has served more than 2000 teachers over six years, providing in-depth content-based training in mathematics pedagogy.
5. Founding member of organizing committee for a highly successful semiannual series of local one-day research conferences, the *Bay Area Discrete Mathematics Days*, which rotate among universities in the Bay Area, 2000–2005.
6. One of 7 main organizers of the 16th Annual International Conference on Formal Power Series and Algebraic Combinatorics (FPSAC), held 28 June–2 July 2004 at the University of British Columbia (Vancouver B.C., Canada). Coordinated travel support for invited speakers and young participants.
7. With Matt Hubbard, created a comprehensive website, *Pascal’s Triangle from Top to Bottom*, on binomial coefficients that received national recognition from the Math Forum (June 2004).
8. Served on the following university-wide committees at Cal State Hayward: Committee on Research (3 years), the Library Advisory Committee (2 years), the Faculty Diversity and Equity Committee (2 years), and the Committee to Review the University Librarian and Associate University Librarian (2004).
9. *Joint Mathematics Meetings*, Co-organized and chaired an MAA panel discussion on “Inquiry-proof instructional techniques” at the JMM, New Orleans, 8 January 2011.
10. Organized a special session on “Algebraic Combinatorics” at 2012 SIAM Conference on Discrete Math, Halifax, Nova Scotia, Canada, 18–21 June 2012.

11. Co-organized a week-long workshop on *Dynamical algebraic combinatorics* at AIM (American Institute of Mathematics) funded by the NSF with James Propp, Jessica Striker, and Nathan Williams, March 2015.
12. Co-organized a Special Session on *Dynamical Algebraic Combinatorics* at the Joint Mathematics Meetings, January, 2018, with James Propp, Jessica Striker, and Nathan Williams.
13. Organized panel discussion on “Teaching-Focused Faculty at Research Institutions” at the Joint Mathematics Meetings, January, 2018.
14. AMS–MAA Committee on Teaching Assistants and Part Time Instructors (JTTAPTI), 2014–2019.
15. Association for Women in Mathematics, Education Committee, 2017–2020.
16. Co-organized and moderated a panel discussion sponsored by the AMS–MAA Committee on Teaching Assistants and Part Time Instructors on “Looking for Teaching Oriented Positions: A panel for graduate students and postdocs.”
17. Lead organizer for a 10-day online workshop on *Dynamical Algebraic Combinatorics* for over 100 participants at BIRS (Banff International Research Station) with James Propp, Jessica Striker, and Nathan Williams, 19–30 October 2020.
18. Member, MAA Committee on the Mathematical Education of Teachers (COMET), 2020–present.
19. Lead organizer for a 5-day hybrid workshop on *Dynamical Algebraic Combinatorics* for 42 participants at BIRS (Banff International Research Station) with James Propp, Jessica Striker, and Nathan Williams, 1–5 November 2021.
20. Co-organized (with Darij Grinberg) a half-day online conference on “Birational Combinatorics,” under the auspices of the Seminar on Algebraic and Combinatorial Perspectives in the Mathematical Sciences (based in Norway), 8 June 2022: <https://darijgrinberg.gitlab.io/bir2022/>.
21. Co-organizer (with Zhongyang Li, UConn; and Mei Yin, U. Denver) of an *Hot Topics* workshop on “Asymptotic Limits of Discrete Random Structures” at ICERM (Institute for Computational and Experimental Research in Mathematics), date TBD.

University-wide service at UConn

General Education Oversight Committee (GEOC), 2005–2012;

GEOC Q subcommittee (co-chair, 2005–10), 2005–2012;

Gateway Course Committee, 2006–07;

Gateway subcommittee on preparation and advising, 2006–07 (chair);

Library Learning Commons Council, 2009–2012;

Provost’s New GenEd Course Review Committee, spring 2009;

Goldwater Screening Committee, 2009;

Taught two sections each semester of INTD 182 course *Jane Austen Dances* for First Year Programs, Spring 2006–Fall 2009; Fall 2010.

Departmental service at UConn

Advisory Committee 2009–10;

Early College Experience Committee, 2008–2011;

Hiring Screening Committee, 2007–08;

Information Technology Committee (chair May 2008–May 2010);

IT Policy Committee (chair from inception, March 2009–May 2010);

Mathematical Association of America Liaison, 2012–2017;
 Newsletter Committee, 2015;
 Pi Mu Epsilon Advisor 2012–2018; 2020–present;
 Search committee for various Assistant Professor in Residence 2006, 2009 (chair), 2010, 2011;
 Undergraduate Program Committee 2005–2011;
 Visiting Assistant Professor Hiring Committee 2012–15; chair 2013–15;
 VAP/APiR Hiring Committee 2015–17; chair, 2015–16;
 Assistant Director of Schedules and Staffing, 2015–16;
 Director of Schedules and Staffing, 2016–19;
 Online Course Committee, 2016–present;
 Undergraduate Math Advisor for 57 students (2022–23).
 Undergraduate Major Assessment Taskforce, 2022–23.

DOCTORAL STUDENTS SUPERVISED

1. Michael Joseph (UConn, May 2017): “Toggling Involutions and Homomesies for Maps on Finite Sets, Noncrossing Partitions, and Independent Sets of Path Graphs.”
2. Elizabeth Sheridan-Rossi (UConn, August 2020): “Homomesy for Foatic Actions on the Symmetric Group.”
3. Matthew Plante (UConn, August, 2022): “Whirling P-partitions and rowmotion on chain-factor posets”
4. Chinmay Dharmendra, Fall 2022–present

DOCTORAL STUDENT COMMITTEES (ASSOCIATE ADVISOR)

1. Andrew Gainer-Dewar (Brandeis 2012, Gessel): “T-species, quotients, and graph enumeration.”
2. Ben Salisbury (UConn 2012, Lee): “A combinatorial description of the Gindikin-Karpelevich formula.”
3. Joel Brewster Lewis (MIT 2012, Postnikov): “Pattern avoidance for alternating permutations and reading words of tableaux.”
4. Khrystyna Serhiyenko (UConn 2015, Schiffler): “Induced and Coinduced Modules over Cluster-Tilted Algebras.”
5. Wuttisak Trongsirawat (MIT 2015, Postnikov): “Combinatorics of permutation patterns, interlacing networks, and Schur functions.”
6. Jordan Tirrell (Brandeis 2016, Gessel): “Orthogonal polynomials, lattice paths, and skew Young tableaux.”
7. Rachel D. (Shelly) Stahl (UConn 2017, Solomon): “Computability Theoretic Results for the Game of Cops and Robbers on Infinite Graphs.”
8. David J. Nichols (UConn 2017, Dzhafarov): “Effective Techniques in Reverse Mathematics.”
9. Miriam Farber (MIT 2017, Postnikov): “Arrangement of minors in the positive Grassmannian.”
10. Michelle Rabideux (UConn 2018, Schiffler): “Continued Fractions in Cluster Algebras, Lattice Paths and Markov Numbers.”
11. Katherine Moore (Dartmouth 2018, Elizalde) “Patterns in Time Series and Dynamical Systems.”

12. Noah Hughes (UConn 2021, Dzhafarov): “Applications of Computability Theory to Infinitary Combinatorics.”
13. Pakawut Jiradilok (MIT 2022, Postnikov): “Inequalities and Asymptotic Formulas in Algebraic Combinatorics.”
14. Daniel Samir Mourad (UConn 2023, Solomon): “Computability Theory: Constructive Applications of the Lefthanded Local Lemma and Characterizations of some Classes of Cohesive Powers.”

MEMBERSHIPS

American Mathematical Society (AMS)
Mathematical Association of America (MAA)
Association for Women in Mathematics (AWM)

GRANTS

1. Received state grants of \$168,000 for FY 2000, \$518,000 for FY 2001, and \$980,000 for FY 2002–04 to develop and run ACCLAIM professional development institutes for K–12 teachers with school year follow up, in cooperation with Alameda County Office of Education and local districts. Oversaw \$2.4 million in teacher stipends paid separately.
2. Received grants of \$80,000 for summer 2004, \$25,000 for AY 2004–05, and \$40,000 for Summer 2005 from the Alameda County Office of Education for ACCLAIM institutes and follow up work.
3. ACCLAIM received a grant for \$993,247 (to the Alameda County Office of Education, not CSUH) from the California Math and Science Partnership Program to support institutes and coaching work with K–12 teachers in the Hayward and Alameda school districts, co-PI, 2005.
4. Received grants of \$15,400 from the National Science Foundation and \$15,200 from the National Security Agency to support the 16th Annual International Conference on Formal Power Series and Algebraic Combinatorics (FPSAC), held June 28–July 2, 2004 at the University of British Columbia (Vancouver B.C., Canada).
5. Received a grant of \$110,000 for 2006–07 (joint with Fabiana Cardetti) from the Connecticut Department of Higher Education’s “Teacher Quality Partnership Grant Program” to work with teachers in the New Britain and Hartford school districts on algebra knowledge and pedagogy.