

Curriculum Vitae

LAUREN WILLIAMS

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 1 Oxford Street, 510 Science Center
 Cambridge, MA 02138
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Employment:

2019 – Harvard University, Dwight Parker Robinson Professor of Mathematics.
 2018 – Harvard University, Professor.
 2018 – Sally Starling Seaver Professor at the Radcliffe Institute.
 2016 – 2020 University of California, Berkeley, Professor.
 2013 – 2016 University of California, Berkeley, Associate Professor.
 2009 – 2013 University of California, Berkeley, Assistant Professor.
 2006 – 2009 Harvard University, Benjamin Peirce Assistant Professor and NSF Postdoctoral Fellow.
 2005 – 2006 University of California, Berkeley, NSF Postdoctoral Fellow, with *Bernd Sturmfels*.

Short-term positions:

2020–2021 Fellow, Radcliffe Institute for Advanced Study.
 Spring 2017 von Neumann Fellow, Institute for Advanced Study.
 Fall 2016 Visiting Professor, Columbia University.
 Fall 2009 Postdoctoral Scholar at MSRI.
 June 2009 Professeur invitée at Laboratoire d'informatique, Université Paris 6.
 Spring 2008 Viterbi Endowed Postdoctoral Scholar at MSRI.

Education:

2001 – 2005 Massachusetts Institute of Technology, Ph.D. in Mathematics received June 2005.
Advisor: Richard Stanley
 2000 – 2001 Cambridge University, Part III of the Mathematical Tripos (with Distinction)
 1996 – 2000 Harvard University, A.B. in Mathematics (*magna cum laude*)
Spring 1998 spent at the Budapest Semesters in Mathematics program.

Scientific/Academic Honors:

2022 Guggenheim fellowship
 2022 International Congress of Mathematicians, *invited speaker*
 2022 – 2026 National Science Foundation research grant DMS-2152991
 2020 Honorary member, London Mathematical Society
 2019 – 2022 National Science Foundation FRG DMS-1854316
 2019 – 2022 National Science Foundation research grant DMS-1854512
 2018 London Math Society Hardy Lectureship
 2016 – 2019 National Science Foundation research grant DMS-1600447
 2016 AWM-Microsoft Research Prize in algebra and number theory
 2014 Rose Hills Innovator award
 2014 Fondation Sciences Mathématiques de Paris Junior Chaire
 2014 Simons Fellow
 2014 Distinguished Undergraduate Teaching Award (awarded by MUSA)
 2013 France-Berkeley Fund

2013	Prytanean Faculty Award
2012	Fellow of the American Mathematical Society
2011 – 2016	National Science Foundation CAREER award DMS-1049513
2012 – 2014	Hellman Family Faculty Fund
2009 – 2011	Alfred P. Sloan Research Fellow
2009 – 2012	National Science Foundation research grant DMS-0854432
2008	Viterbi Endowed Postdoctoral Scholar at MSRI
2005	Runner up for the AIM Five-Year Fellowship
2005	National Science Foundation Postdoctoral Fellowship
2004 – 2005	National Science Foundation Graduate Fellowship
2002 – 2004	National Defense Science and Engineering Graduate Fellowship
2000 – 2002	National Science Foundation Graduate Fellowship
2004	Charles and Jennifer Johnson Prize, MIT departmental award
2004	Formal Power Series and Algebraic Combinatorics Conference Prize
1999	Barry Goldwater Scholarship
1998	Director’s Summer Program at the National Security Agency
1997	Research Experience for Undergraduates at the University of Minnesota, Duluth
1996	Presidential Scholar
1996	USA Today All-Academic Scholar
1995	Mathematical Olympiad Program
1994	Research Science Institute at the Massachusetts Institute of Technology

Research Interests:

Algebraic, enumerative, and topological combinatorics, and their connections with algebraic geometry, representation theory, and physics. In particular: total positivity, cluster algebras, statistical mechanics, tropical geometry.

Publications:

available at <http://www.math.harvard.edu/~williams>

1. (with Sylvie Corteel and Olya Mandelshtam) *Rhombic staircase tableaux and Koornwinder polynomials*, to appear in *Mathematische Zeitschrift*.
2. (with Chaim Even-Zohar, Tsviqa Lakrec, Matteo Parisi, Ran Tessler, and Melissa Sherman-Bennett) *A cluster of results on amplituhedron tiles*, to appear in *Lett. Math. Phys.*
3. (with Jon Boretsky and Chris Eur) *Polyhedral and tropical geometry of flag positroids*, *Algebra and Number Theory*, Vol 18 (2024), 1333–1374.
4. (with Matteo Parisi and Melissa Sherman-Bennett) *The $m = 2$ amplituhedron and the hypersimplex: signs, clusters, tilings, Eulerian numbers*, *Comm. AMS* 3 (2023), 329–399.
5. *The positive Grassmannian, the amplituhedron, and cluster algebras*, to appear in the Proceedings of the 2022 ICM.
6. (with Tomasz Lukowski and Matteo Parisi) *The positive tropical Grassmannian, the hypersimplex, and the $m=2$ amplituhedron*, *International Mathematics Research Notices*, 2023, no 19, 16778–16836.
7. (with Robert Moerman) *Grass(mannian) trees and forests: variations of the exponential formula, with applications to the momentum amplituhedron*, *Combinatorial Theory* 3, 2023, no 1, 28 pp.
8. *The combinatorics of hopping particles and positivity in Markov chains*, *London Mathematical Society Newsletter* (anniversary issue) No 500 (2022), 50-59.

9. (with Pavel Galashin and Alex Postnikov) *Higher secondary polytopes and regular plabic graphs*, *Advances in Mathematics* 407 (2022).
10. (with Donghyun Kim) *Schubert polynomials, the inhomogeneous TASEP, and evil-avoiding permutations*, *International Mathematics Research Notices* 2023, no 10, 8143–8211.
11. (with Sylvie Corteel, Jim Haglund, Olya Mandelshtam, and Sarah Mason) *Compact formulas for Macdonald polynomials and quasisymmetric Macdonald polynomials*, *Selecta Mathematica* 28 (2022).
12. (with Sylvie Corteel and Olya Mandelshtam) *From multiline queues to Macdonald polynomials via the exclusion process*, *American Journal of Mathematics* 144 (2022), 395–436.
13. (with David Speyer) *The positive Dressian equals the positive tropical Grassmannian*, *Transactions of the AMS* 8 (2021), 330–353.
14. (with Khrystyna Serhiyenko and Melissa Sherman-Bennett) *Combinatorics of cluster structures in Schubert varieties*, *Proceedings of the London Mathematical Society* (3) 119 (2019), no. 6, 1694–1744.
15. (with Konstanze Rietsch) *Newton-Okounkov bodies, cluster duality and mirror symmetry for Grassmannians*, *Duke Mathematical Journal*, 168 (2019), no 18, 3437–3527.
16. (with Sylvie Corteel and Olya Mandelshtam) *Cylindric rhombic tableaux and the two-species ASEP on a ring*, *Representation theory, mathematical physics, and integrable systems (birthday volume for Kolya Reshetikhin)*, *Progr. Math.* 340 (2021), 135–162.
17. (with Steven Karp and Yan Zhang; appendix additionally joint with Hugh Thomas) *Decompositions of amplituhedra*, *Annales de l’Institut Henri Poincaré D* 7 (2020), 303–363.
18. (with Sylvie Corteel) *Macdonald-Koornwinder moments and the two-species exclusion process*, *Selecta Mathematica*, 24 (2018), no 3, 2275–2317.
19. (with Sylvie Corteel and Olya Mandelshtam) *Combinatorics of the two-species ASEP and Koornwinder moments*, *Advances in Mathematics*, 321 (2017), 160–204.
20. (with Steven Karp) *The $m = 1$ amplituhedron and cyclic hyperplane arrangements*, *International Mathematics Research Notices*, (2019), no 5, 1401–1462.
21. (with Federico Ardila and Felipe Rincon) *Positively oriented matroids are realizable*, *Journal of the European Mathematical Society*, 19 (2017), 815 – 833.
22. (with Bernd Sturmfels and Emmanuel Tsukerman) *Symmetric matrices, Catalan paths, and correlations*, *Journal of Combinatorial Theory Series A*, 144 (2016), 496–510.
23. *A positive Grassmannian analogue of the permutohedron*, *Proceedings of the AMS*, 144 (2016), 2419–2436.
24. (with Clélia Pech and Konstanze Rietsch) *On Landau-Ginzburg models for quadrics and flat sections for Dubrovin connections*, *Advances in Mathematics (Zelevinsky issue)*, 300 (2016), 275–319.
25. (with Federico Ardila and Felipe Rincon) *Positroids and non-crossing partitions*, *Transactions of the AMS*, 368 (2016), 337–363.
26. (with Emmanuel Tsukerman) *Bruhat interval polytopes*, *Advances in Mathematics* 285 (2015), 766–810.
27. (with Yuji Kodama) *The full Kostant-Toda hierarchy on the positive flag variety*, *Communications in Mathematical Physics*, 335 (2015), 247–283.
28. (with Yuji Kodama) *KP solitons and total positivity for the Grassmannian*, *Inventiones Mathematicae*, 198 (2014), 637–699.

29. (with Tomohiro Sasamoto) *Combinatorics of the asymmetric exclusion process on a semi-infinite lattice*, Journal of Combinatorics, 5 (2014).
30. *Cluster algebras: an introduction*, Bulletin of the American Mathematical Society, 51 (2014), 1–26.
31. (with Yuji Kodama) *A Deodhar decomposition of the Grassmannian and the regularity of KP solitons*, Advances in Mathematics, 244 (2013), 979–1032.
32. (with Kelli Talaska) *Network parameterizations of the Grassmannian*, Algebra and Number Theory, 7 (2013), 2275–2311.
33. (with Yuji Kodama) *Combinatorics of KP solitons from the real Grassmannian*, Algebras, quivers and representations, 155–193, Abel Symp., 8, Springer, Heidelberg, 2013.
34. (with Gregg Musiker and Ralf Schiffler) *Bases for cluster algebras from surfaces*, Compositio Mathematica 149 (2013), 217–263.
35. (with Gregg Musiker) *Matrix formulae and skein relations for cluster algebras from surfaces*, International Mathematics Research Notices, 2012, article ID rns118v2.
36. (with Yuji Kodama) *KP solitons, total positivity, and cluster algebras*, Proceedings of the National Academy of Sciences, published online ahead of print May 11, 2011, doi:10.1073/pnas.1102627108.
37. (with Sylvie Corteel, Richard Stanley, and Dennis Stanton) *Formulae for Askey-Wilson moments and enumeration of staircase tableaux*, Transactions of the AMS 364 (2012), no. 11, 6009–6037.
38. (with Sylvie Corteel) *Tableaux combinatorics for the asymmetric exclusion process and Askey-Wilson polynomials*, Duke Mathematical Journal, Volume 159, Number 3, September 2011, 385–415.
39. (with Gregg Musiker and Ralf Schiffler) *Positivity for cluster algebras from surfaces*, Advances in Mathematics, Volume 227, Issue 6, August 2011, 2241–2308.
40. (with Sylvie Corteel) *Staircase tableaux, the asymmetric exclusion process, and Askey-Wilson polynomials*, Proceedings of the National Academy of Sciences, published online ahead of print March 26, 2010, doi:10.1073/pnas.0909915107.
41. (with Thomas Lam) *A Markov chain on permutations which is Schubert positive?*, Experimental Mathematics, Volume 21, Issue 2, 2012, 189–192.
42. (with Sylvie Corteel and Matthieu Josuat-Verges) *The Matrix Ansatz, orthogonal polynomials, and permutations*, Advances in Applied Mathematics, Volume 46, special issue in honor of Dennis Stanton, January 2011, 209–225.
43. (with Konstanze Rietsch) *Discrete Morse theory for totally non-negative flag varieties*, Advances in Mathematics, Volume 223, Issue 6, April 2010, 1855–1884.
44. (with Jean-Christophe Novelli and Jean-Yves Thibon) *Combinatorial Hopf algebras, noncommutative Hall-Littlewood functions, and permutation tableaux*, Advances in Mathematics, Volume 224, Issue 4, July 2010, 1311–1348.
45. (with Konstanze Rietsch) *The totally nonnegative part of G/P is a CW complex*, Transformation Groups, special issue for Kostant’s birthday, Volume 13, 2008, 839–853.
46. (with Thomas Lam) *Total positivity for cominuscule Grassmannians*, New York Journal of Mathematics, Volume 14, 2008, 53–99.
47. (with Alex Postnikov and David Speyer) *Matching polytopes, toric geometry, and the non-negative part of the Grassmannian*, Journal of Algebraic Combinatorics, Volume 30, Issue 2 (2009), 173–191.

48. (with Alex Postnikov and Vic Reiner) *Faces of generalized permutohedra*, Documenta Mathematica, Volume 13, 2008, 207–273.
49. (with Robin Chapman) *A conjecture of Stanley on alternating permutations*, Electronic Journal of Combinatorics, Volume 14 (1), 2007.
50. (with Sylvie Corteel) *A Markov chain on permutations which projects to the PASEP*, International Mathematics Research Notices, article ID mm055, 2007.
51. (with Sylvie Corteel) *Tableaux combinatorics for the asymmetric exclusion process*, Advances in Applied Mathematics, Volume 39, Issue 3, September 2007, 293–310.
52. *Shelling totally nonnegative flag varieties*, Journal für die reine und angewandte Mathematik (Crelle's Journal), Issue 609, Aug. 2007, 1–22.
53. (with Einar Steingrímsson) *Permutation tableaux and permutation patterns*, Journal of Combinatorial Theory Series A, Volume 114, Issue 2, February 2007, pages 211–234.
54. (with Federico Ardila and Victor Reiner) *Bergman complexes, Coxeter arrangements, and graph associahedra*, Séminaire Lotharingien de Combinatoire (electronic), Volume 54A, 2006 (B54Aj).
55. (with Federico Ardila and Carly Klivans) *The positive Bergman complex of an oriented matroid*, European Journal of Combinatorics, Volume 27, Issue 4, May 2006, pages 577–591.
56. (with David Speyer) *The tropical totally positive Grassmannian*, Journal of Algebraic Combinatorics, Volume 2, Number 2, September 2005, pages 189–210.
57. *Enumeration of totally positive Grassmann cells*, Advances in Mathematics, Volume 190, Issue 2, January 2005, pages 319–342.
58. *On exact n -step domination*, Ars Combinatoria, Volume LVIII, January, 2001.
59. *Enumerating up-side self-avoiding walks*, Electronic Journal of Combinatorics, Volume 3 (1), 1996.

Preprints:available at <http://www.math.harvard.edu/~williams>

1. (with Konstanze Rietsch) *Root polytopes, flow polytopes, and order polytopes*, <https://arXiv:2406.15803>.
2. (with Matteo Parisi, Ran Tessler, and Melissa Sherman-Bennett) *The magic number conjecture for the $m = 2$ amplituhedron and Parke-Taylor identities*, <https://arXiv:2404.03026>.
3. (with Arvind Ayyer and James Martin) *The inhomogeneous t -PushTASEP and Macdonald polynomials*, <https://arXiv:2403.10485>.
4. (with Chaim Even-Zohar, Tsviqa Lakrec, Matteo Parisi, Ran Tessler, and Melissa Sherman-Bennett) *Cluster algebras and tilings for the $m = 4$ amplituhedron*, <https://arXiv:2310.17727>.

Book chapters:available at <http://www.math.harvard.edu/~williams>

1. (with Sergey Fomin and Andrei Zelevinsky) *Introduction to Cluster algebras, Chapter 7*, <https://arxiv.org/abs/2106.02160>.
2. (with Sergey Fomin and Andrei Zelevinsky) *Introduction to Cluster algebras, Chapter 6*, <https://arxiv.org/abs/2008.09189>.
3. (with Sergey Fomin and Andrei Zelevinsky) *Introduction to Cluster algebras, Chapters 4-5*, <https://arxiv.org/abs/1707.07190>.
4. (with Sergey Fomin and Andrei Zelevinsky) *Introduction to Cluster algebras, Chapters 1-3*, <https://arxiv.org/abs/1608.05735>.

Conference and Seminar Talks:

- 2024 July International Congress on Mathematical Physics (plenary speaker), Strasbourg.
 June Joy of integrable combinatorics (Philippe DiFrancesco's 60th birthday), CEA Paris-Saclay.
 June Mirror symmetry for cluster varieties and representation theory, King's College London.
 June Amplitudes, Institute for Advanced Study, Princeton.
 Apr Integrability and algebraic combinatorics, Institute for pure and applied mathematics, UCLA.
 Feb Mathematical aspects of $\mathcal{N} = 4$ Super-Yang-Mills, Simons Center, Stony Brook, New York.
 Feb *Colloquium*, University of Connecticut, Storrs.
 Jan *Cluster algebras and its applications*, Mathematisches Forschungsinstitut Oberwolfach.
 Jan *Minicourse: the amplituhedron and cluster algebras*, Simons Center, Stony Brook, New York.
- 2023 Nov *Current trends in representation theory, cluster algebras, geometry*, CIRM, Luminy.
 Nov *Infinite dimensional algebra seminar*, MIT, Cambridge.
 Oct *The asymmetric simple exclusion process*, Simons Center, Stony Brook, New York.
 Sep *Polylogarithms, cluster algebras, scattering amplitudes*, Brin Research Center, College Park.
 Aug *Gallianfest: number theory and combinatorics*, University of Minnesota, Duluth.
 July *Theory and applications of total positivity*, American Institute of Mathematics, Pasadena.
 June *Algebra seminar*, Institut Henri Poincaré, Paris.
 May *Mathematical physics seminar*, Institut de physique théorique, Saclay.
 Apr. *The Amplituhedron at 10*, DIAS, Dublin.
 Apr. *Darboux seminar*, Sorbonne Université, Paris.
 Mar. *Groupe de Travail Modélisation Stochastique*, Université Paris Cité.
 Mar. *Colloquium*, Queen Mary University of London, London.
 Jan. *Cluster algebras and braid varieties*, American Institute of Mathematics, San Jose.
- 2022 Dec. *Enumerative Combinatorics*, Mathematisches Forschungsinstitut Oberwolfach.
 Dec. *Colloquium*, Department of Mathematics, University of Pisa.
 Nov. *Combinatorics and arithmetic for physics*, IHES, Bures-sur-Yvette.
 Nov. *Seminaire de combinatoire Philippe Flajolet*, Institut Henri Poincaré, Paris.
 Nov *Felix Klein Colloquium*, Max Planck Institut, Leipzig.
 Sep *Aisenstadt chair lecture series*, Centre de recherches mathématiques, Montreal.
 Sep *Bases for cluster algebras*, hybrid, Banff International Research Station, Oaxaca.
 July *String Math 2022*, hybrid, University of Warsaw.
 July *International Congress of Mathematicians*, online.
 June *virtual ICM days at MIT*, MIT, Cambridge.
 May *On the crossroads of algebra, geometry, physics; Goncharov birthday*, Yale, New Haven.
 May *Open problems in algebraic combinatorics*, University of Minnesota, Minneapolis.
 Apr. *Heilbronn Distinguished lecture series* (3 lectures), Heilbronn Institute, Bristol, UK.
 Apr. *AMS-MAA-SIAM Porter lecture*, Joint Mathematics Meetings, online.
 Jan. *Algebraic combinatorics and mathematical physics* (online), University of Rome.
- 2021 Dec. *Scattering amplitudes and cluster algebras*, Mathematisches Forschungsinstitut Oberwolfach.
 Sep. *Permutations and probability* (online), Banff International Research Station.
 Sep. *Cluster algebras research school*, 4 lectures (online), Isaac Newton Institute, Cambridge, UK.
 Aug. *SMRI algebra and geometry online seminar*, Sydney.
 Aug. *Universality and integrability in RMT and interacting particle systems*, MSRI, Berkeley.
 June *AlCoVE: an algebraic combinatorics virtual expedition*.
 June *Positive geometries for scattering amplitudes and beyond*, online.
 May *Online cluster algebra seminar*.
 Apr. *Georgia Tech Colloquium*, online.
 Apr. *University of Chicago Colloquium*, online.
 Apr. *Amplituhedron day*, online.

- Mar. *PIMS 25th anniversary network-wide colloquium*, online.
- Jan. *ICERM Introductory workshop on combinatorial algebraic geometry*, online.
- 2020 Dec. *Nonlinear algebra seminar*, online.
- Dec. *Radcliffe Institute for Advanced Study Fellow's presentation*, online.
- Sep. *Western hemisphere colloquium on geometry and physics*, online.
- Aug. *Scattering amplitudes and beyond at KITP – reunion conference*, online.
- June *Tutte distinguished lecture*, online.
- May *Zoomplitudes (Amplitudes annual conference) 2020*, online.
- Apr. *Online conference on statistical mechanics, integrable systems, and probability*.
- Apr. *Algebraic Combinatorics Online Workshop*.
- Jan. *Combinatorics seminar*, University of Michigan, Ann Arbor.
- 2019 Dec. *Canadian Math Society winter meeting* (plenary speaker), Toronto.
- Oct. *CMSA workshop on spacetime and quantum mechanics* (3 lectures), Cambridge, MA.
- Sept. *Erdos Memorial Lecture, AMS Fall Sectional meeting*, Madison, WI.
- July *SIAM conference on applied algebraic geometry* (plenary speaker), Bern.
- June *Cluster algebras, geometry, mathematical physics*, RIMS, Kyoto.
- Apr. *Coven-Wood lectures at Wesleyan*, Middletown.
- Apr. *Open Neighborhood seminar*, Harvard University, Cambridge.
- Apr. *Harvard Womxn in Math and Statistics conference*, Cambridge.
- Apr. *Discrete Math Days of the Northeast*, University of Massachusetts, Amherst.
- Mar. *Colloquium*, Temple University, Philadelphia.
- Jan. *Representation theory connections to (q, t) -combinatorics*, Banff, Canada.
- Jan. *Between topology and quantum field theory: celebrating Dan Freed's 60th birthday*, Austin.
- 2018 Dec. *Applied Mathematics colloquium*, Brown University, Providence.
- Nov. *Harvard-MIT combinatorics seminar*, Cambridge.
- Oct. *Harvard-CMSA Random matrix and probability theory seminar*, Cambridge.
- Sept. *Geometry and representation theory at the interface of Lie algebras and quivers*, Bochum.
- Sept. *Algebraic geometry northeastern series*, Brown University, Providence.
- July *Hardy Lecture*, University of Birmingham.
- July *Hardy Lecture*, University of Leeds.
- July *Hardy Lecture*, University of Edinburgh.
- July *Hardy Lecture*, University of Kent, Canterbury.
- July *Hardy Lecture*, University of Cambridge.
- July *Hardy Lecture*, University of Oxford.
- June *Hardy Lecture*, London Mathematical Society, London.
- June *Encuentro Colombiano de Combinatoria* (4 lectures), Universidad del Norte, Barranquilla.
- May *The mathematical legacy of Bert Kostant*, Massachusetts Institute of Technology, Cambridge.
- May *Colloquium*, University of California, Davis.
- May *Enumerative combinatorics*, Mathematisches Forschungsinstitut Oberwolfach.
- Mar *Cluster algebras: twenty years on*, Luminy.
- Jan *Connections for women: enumerative geometry beyond numbers*, MSRI, Berkeley.
- Jan *Special functions and combinatorics (in honor of Stanton's 65th birthday)*, San Diego.
- 2017 Oct *Geometric and topological combinatorics: modern techniques and methods*, MSRI, Berkeley.
- Sep *CA+*, University of Minnesota, Minneapolis.
- Sep *Integrability across Mathematics and Physics*, University of California, Berkeley.
- Aug *XXII Coloquio Latinoamericano*, Quito.
- June *Canadian Discrete and Algorithmic Mathematics Conference*, Toronto.
- June *Mathematical physics seminar*, Perimeter Institute, Toronto.

- May *Mid-Atlantic algebra, geometry, and combinatorics workshop*, Philadelphia.
- Apr *Scattering amplitudes: from gauge theory to gravity*, KITP, Santa Barbara.
- Apr *Colloquium*, Center for communications and computing, Princeton.
- Apr *Discrete geometry and combinatorics seminar*, Cornell University, Ithaca.
- Apr *Colloquium*, Stony Brook University, Stony Brook.
- Mar *Colloquium*, Princeton University, Princeton.
- Mar *Colloquium*, Rutgers, New Brunswick.
- Mar *Geometry, combinatorics and integrable systems seminar*, Ohio State, Columbus.
- Mar *Workshop on homological mirror symmetry*, Institute for Advanced Study, Princeton.
- Mar *Combinatorics seminar*, MIT, Cambridge.
- Feb *Workshop on asymptotic representation theory*, Institut Henri Poincaré, Paris.
- Jan *Members seminar*, Institute for Advanced Study, Princeton.
- 2016 Sep *Quantum integrable systems and stochastic processes*, Cargese.
- June *Positivity in Algebraic Combinatorics*, KIAS, Seoul.
- Mar *Hot topics: cluster algebras and wall crossing*, MSRI, Berkeley.
- Mar *Colloquium*, California Institute of Technology, Pasadena.
- Feb *Nonequilibrium dynamics of stochastic and quantum integrable systems*, KITP.
- Jan *Total positivity, representation theory and physics* (4 lectures), University of Kent, UK.
- 2015 Nov *Breakthrough Prize Symposium*, University of California, Berkeley.
- Oct *Colloquium*, University of California, Los Angeles.
- Oct *Colloquium*, University of Southern California, Los Angeles.
- Oct *Colloquium*, University of San Francisco.
- July *Workshop on positive Grassmannians*, Centre de recherches mathématiques, Montreal.
- June *SIAM symposium on orthogonal polynomials* (plenary speaker), NIST, Gaithersburg.
- Apr. *Berkeley Math-Physics meeting*, University of California, Berkeley.
- Mar. *Colloquium*, University of Washington, Seattle.
- Feb. *Mathematical physics seminar*, University of Cambridge.
- Feb. *Algebra seminar*, Université de Caen Basse Normandie, Caen.
- Jan. *Séminaire d'algèbre*, Institut Henri Poincaré, Paris.
- Jan. *Number theory and algebraic geometry seminar*, Université Paris-Sud, Orsay.
- Jan. *Wachsfest (birthday conference of Michelle Wachs)*, University of Miami, Coral Gables.
- 2014 Dec. *Grassmannian geometry of scattering amplitudes*, California Institute of Technology, Pasadena.
- Dec. *Colloquium*, Université Lyon I, Villeurbanne.
- Oct. *Seminaire de combinatoire Philippe Flajolet*, Institut Henri Poincaré, Paris.
- Sep. *New geometric structures in scattering amplitudes*, University of Oxford.
- June *Stanley 70 (birthday conference of Richard Stanley)*, MIT, Cambridge.
- June *Colloquium*, University of California, Los Angeles.
- May *Representation Theory, Integrable Systems, Quantum Fields*, Northwestern University, Evanston.
- May *Colloquium*, University of Chicago, Chicago.
- May *Brandeis-Harvard-MIT-Northeastern Colloquium*, Harvard University, Cambridge.
- May *Combinatorics seminar*, Massachusetts Institute of Technology, Cambridge.
- Apr. *Statistical Mechanics seminar*, Department of Chemistry, University of California, Berkeley.
- Mar. *Free probability and the large N Limit IV*, University of California, Berkeley.
- Mar. *Colloquium*, Columbia University, New York.
- 2013 Dec. *Cluster Algebras workshop*, Mathematisches Forschungsinstitut Oberwolfach.
- Oct. *Physics and Mathematics of Scattering Amplitudes Program*, Simons Center, Stony Brook.
- May *Geometry and Physics* (3 lectures), Centre de Recherches Mathématiques in Montréal, Québec.
- May *Solitons in water waves and applications to tsunami*, University of Texas, Edinburg.

- May *Women and Mathematics* (4 lectures), Institute for Advanced Study, Princeton.
- Mar. *Colloquium*, Washington University, St. Louis.
- Mar. *AWM Research Symposium* (plenary speaker), Santa Clara University, Santa Clara.
- Feb. *Algebra and discrete math seminar*, University of California, Davis.
- Jan. *Workshop on noncomm. algebraic geometry and representation theory*, MSRI, Berkeley.
- Jan. *Current Events Bulletin*, AMS-MAA Joint Meeting, University of California, San Diego.
- 2012 Oct. *Cluster algebras in combinatorics, algebra, and geometry*, MSRI, Berkeley.
- Oct. *Algebra, number theory, and combinatorics seminar*, University of Texas, Austin.
- Sep. *Triangle lectures in combinatorics*, North Carolina State University, Raleigh.
- Aug. *Connections workshop on cluster algebras and commutative algebra*, MSRI, Berkeley.
- Mar. *American Math Society Meeting* (plenary speaker), University of Hawaii at Manoa, Honolulu.
- Jan. *Introductory workshop: Lattice models and combinatorics*, MSRI, Berkeley.
- Jan. *Geometry-combinatorics-PDE seminar*, University of Texas, Austin.
- Jan. *Geometry-topology-combinatorics seminar*, University of Texas, Austin.
- Jan. *Algebraic combinatorics session*, AMS/MAA Joint Meeting, Boston.
- Jan. *Algebra and combinatorics seminar*, Université Lyon I, Villeurbanne, France.
- 2011 Nov. *Colloquium*, University of California, Berkeley.
- Oct. *Mathematical physics and probability*, University of California, Davis.
- Sep. *Group theory and its connections*, AWM celebration, Brown University, Providence.
- Sep. *Combinatorics seminar*, Massachusetts Institute of Technology, Cambridge.
- Sep. *Brandeis-Harvard-MIT-Northeastern Colloquium*, Northeastern University, Boston.
- Sep. *Cluster algebras, representation theory, and Poisson geometry*, Banff, Canada.
- Aug. *Minicourse on total positivity* (five lectures), MSRI, Berkeley.
- July *Tropical geometry and integrable systems*, Glasgow, UK.
- June *Combinatoire énumérative et analytique*, LIAFA, Université Paris Diderot, Paris.
- June *The Abel Symposium: Algebras, quivers and representations*, Balestrand, Norway.
- June *Formal Power Series and Algebraic Combinatorics* (plenary speaker), Reykjavik, Iceland.
- May *Examples of geometries*, Columbus, Ohio.
- May *Algebraic Combinatorics*, Banff, Canada.
- May *Colloquium*, University of Oregon, Eugene.
- Apr. *Representation theory, geometry, combinatorics seminar*, University of California, Berkeley.
- Apr. *Combinatorics seminar*, University of Michigan, Ann Arbor.
- Mar. *Combinatorics seminar*, Ohio State University, Columbus.
- Feb. *Student Probability and PDE seminar*, University of California, Berkeley.
- 2010 Dec. *Random matrix theory and its applications II*, MSRI, Berkeley.
- Nov. *Mentor lecture*, University of California, Berkeley.
- Nov. *Student discrete math seminar*, University of California, Berkeley.
- Aug. *Young Mathematicians Conference* (plenary speaker), Ohio State University, Columbus.
- July *Combinatorics and mathematical physics*, University of Queensland, Brisbane.
- June *Combinatorics seminar*, Université de Marne-la-Vallée, Champs-sur-Marne, France.
- June *Working group on cluster algebras*, Université Paris Diderot, Paris.
- June *Combinatorics seminar*, LIAFA, Université Paris Diderot, Paris.
- May *Barrett Memorial Lectures, Discrete differential geometry*, University of Tennessee.
- Apr. *Combinatorial stochastic processes*, University of California, Berkeley.
- Mar. *Combinatorial representation theory*, Mathematisches Forschungsinstitut Oberwolfach.
- Feb. *AWM Colloquium*, University of California, San Diego.
- Feb. *Combinatorics and computer science day*, University of California, Berkeley.
- Jan. *Probability seminar*, University of California, Berkeley.

- Jan. *Mathematical physics and probability*, University of California, Davis.
- 2009 Nov. *Tropical structures in geometry and physics*, MSRI, Berkeley.
- Nov. *Combinatorics seminar*, University of Washington, Seattle.
- Nov. *Discrete math seminar*, University of California, Berkeley.
- Oct. *Combinatorics seminar*, University of Minnesota, Minneapolis.
- Oct. *Algebraic representation theory seminar*, University of Minnesota, Minneapolis.
- Oct. *Workshop on two dimensional lattice models*, Institut Henri Poincaré, Paris.
- Sep. *Algebra and discrete math seminar*, University of California, Davis.
- Sep. *Representation theory, geometry, combinatorics seminar*, University of California, Berkeley.
- Aug. *Connections for women workshop on tropical geometry*, MSRI, Berkeley.
- July *Saturday in Discrete Mathematics*, Friedrich-Alexander University, Erlangen.
- July *Seminaire de Laboratoire d'informatique*, Université Paris 6, Paris.
- May *Combinatorics Seminar*, Université du Québec à Montréal, Montreal.
- Apr. *Research Seminar*, Northeastern University, Boston.
- Apr. *Harvard-MIT-Brandeis-Northeastern Colloquium*, Brandeis University, Waltham.
- Mar. *Non-negativity is a quantum phenomenon*, Mathematisches Forschungsinstitut Oberwolfach.
- Jan. *Combinatorics seminar*, University of California, Berkeley.
- Jan. *Colloquium*, Tulane University, New Orleans.
- Jan. *Colloquium*, University of Southern California, Los Angeles.
- 2008 Dec. *International conference on cluster algebras and related topics*, Morelia, Mexico.
(three lectures on total positivity)
- Nov. *Faculty Colloquium*, Harvard University, Cambridge.
- July *Combinatorics and Statistical Physics*, Erwin Schrodinger Institute, Vienna.
- June *Formal Power Series and Algebraic Combinatorics*, Valparaiso, Chile.
- May *Geometry and Combinatorics Seminar*, Stanford University, Palo Alto.
- May *Geometry-Algebra-Combinatorics Seminar*, San Francisco State University, San Francisco.
- Apr. *MSRI Evans Lecture*, University of California, Berkeley.
- Apr. *CombinaTexas*, University of Texas, El Paso.
- Apr. *MIT Women in Mathematics: a celebration*, MIT, Cambridge.
- Apr. *Combinatorial representation theory*, AMS meeting, Indiana University, Bloomington.
- Jan. *Introductory workshop on combinatorial representation theory*, MSRI, Berkeley.
- 2007 Nov. *Algebra and combinatorics seminar*, Texas A& M University, College Station.
- Oct. *Dartmouth Discrete Math Day*, Hanover, New Hampshire.
- Oct. *Geometric combinatorics*, AMS meeting, DePaul University, Chicago.
- Sept. *Combinatorics seminar*, University of Michigan, Ann Arbor.
- July *Combinatorics seminar*, Université de Marne-la-Vallée, Champs-sur-Marne, France.
- July *Formal Power Series and Algebraic Combinatorics*, Beijing, China.
- June *Interactions of Random Matrix Theory, Integrable Systems, Stochastic Processes*, Snowbird.
- May *Interactions of combinatorics and algebraic geometry*, Centre de Recherches Math., Montreal.
- May *Algebraic geometry and group actions*, Womens' program, IAS, Princeton.
- Apr. *Combinatorics/Lie Theory/Probability seminar*, University of Wisconsin, Madison.
- Apr. *Integrable systems and random matrices seminar*, Courant Institute, New York.
- Feb. *Valley geometry seminar*, Univ. of Massachusetts, Amherst.
- Jan. *Combinatorics seminar*, Ecole Polytechnique, Palaiseau, France.
- 2006 Dec. *Faculty Colloquium*, Harvard University, Cambridge.
- Nov. *Everytopic seminar*, Brandeis University, Waltham.
- Oct. *Combinatorial techniques in equivariant topology*, AMS meeting, Univ. of Connecticut, Storrs.
- Oct. *Algebraic and Analytic combinatorics*, AMS meeting, Univ. of Connecticut, Storrs.

- Oct. *Geometry-Algebra-Singularities-Combinatorics seminar*, Northeastern University, Boston.
- Oct. *Combinatorics seminar*, University of Washington, Seattle.
- Sept. *Colloquium*, University of Connecticut, Storrs.
- June *Combinatorics seminar*, LaBRI, Universite Bordeaux 1, Bordeaux, France.
- June *Permutation Patterns 2006*, Reykjavik University, Reykjavik, Iceland.
- May *Combinatorics seminar*, University of Kansas, Lawrence.
- Apr. *Combinatorics seminar*, University of California, San Diego.
- Apr. *Representation theory, geometry, combinatorics seminar*, University of California, Berkeley.
- Apr. *Combinatorics seminar*, Indiana University, Bloomington.
- Mar. *Combinatorics seminar*, Massachusetts Institute of Technology, Cambridge.
- Mar. *Applied Algebra Seminar*, York University, Toronto.
- Jan. *Colloquium*, University of Miami, Coral Gables.
- 2005 Dec. *Algebra seminar*, University of California, Santa Barbara.
- Nov. *Flavors of Groups, BIRS workshop*, Banff, Canada.
- Nov. *Algebraic combinatorics and geometry session*, AMS meeting, University of Oregon, Eugene.
- Nov. *Colloquium*, Rice University, Houston.
- Oct. *Bay Area Discrete Math Day*, University of California, Davis.
- Oct. *Representation theory seminar*, Stanford University, Palo Alto.
- Oct. *Algebraic combinatorics session*, AMS meeting, Bard College, Annandale-on-Hudson.
- Sep. *Combinatorics seminar*, University of California, Berkeley.
- Sep. *Algebra-Geometry-Combinatorics seminar*, San Francisco State University, San Francisco.
- Jun. *Formal Power Series and Algebraic Combinatorics*, University of Messina, Italy.
- Jun. *Algebraic combinatorics session*, AMS/ German Math. Society meeting in Mainz, Germany.
- May *Institute seminar*, Mittag-Leffler Institute, Djursholm, Sweden.
- Apr. *Combinatorics seminar*, University of Pennsylvania, Philadelphia.
- Apr. *Combinatorics seminar*, Massachusetts Institute of Technology, Cambridge.
- Mar. *Combinatorics seminar*, University of Minnesota, Minneapolis.
- Feb. *Colloquium*, University of Miami, Coral Gables.
- Jan. *Theory group seminar*, Microsoft Research, Seattle.
- Jan. *Tropical geometry session*, AMS/MAA National Meeting in Atlanta, Georgia.
- 2004 Oct. *Lie Theory seminar*, University of Wisconsin, Madison.
- Oct. *Theory group seminar*, Microsoft Research, Seattle.
- Oct. *Combinatorics seminar*, University of Washington, Seattle.
- Sep. *Combinatorics seminar*, University of Michigan, Ann Arbor.
- Jul. *Geometric Combinatorics at the Park City Mathematics Institute*, Park City, Utah.
- Jun. *Formal Power Series and Algebraic Combinatorics*, University of British Columbia.
- Apr. *Valley geometry seminar*, University of Massachusetts, Amherst.
- Apr. *Combinatorics seminar*, University of California, San Diego.
- Apr. *Combinatorics seminar*, University of California, Berkeley.
- Feb. *Combinatorics seminar*, Massachusetts Institute of Technology, Cambridge.
- Jan. *Lattice theory session*, AMS/MAA National Meeting in Phoenix, Arizona.
- 2003 Dec. *Working group on polytopes*, Mathematical Sciences Research Institute, Berkeley, California.
- Oct. *Amoebas and tropical geometry workshop*, American Institute of Mathematics, Palo Alto.
- Sep. *Commutative algebra and algebraic geometry seminar*, University of California, Berkeley.
- May *Zeilberger miniconference*, Massachusetts Institute of Technology, Cambridge.
- Apr. *Combinatorics, topology, convexity*, Spring School in Jerusalem.

Editorial Activities:

Editor for *Advances in Mathematics*, December 2021-present
Editor for *Selecta Mathematica*, September 2021-present
Editor for *Communications of the AMS*, December 2020-present
Editor for *International Mathematics Research Notices*, January 2020 - present
Editor for *Advances in Applied Mathematics*, February 2012 - 2022
Editor for *Combinatorial Theory*, December 2020 - present
Editor for *Journal of Combinatorial Theory Series A*, August 2014 - December 2020

Organization:

Current Developments in Mathematics, Harvard, Fall 2019 to present
The many combinatorial legacies of Richard P Stanley (birthday conference), June 2024
CMSA workshop on amplituhedra, cluster algebras, and positive geometry, May 2024
CMSA program on mathematical aspects of scattering amplitudes, spring 2024
Arbeitsgemeinschaft on cluster algebras, Oberwolfach, October 2023
Dimers: combinatorics, representation theory, and physics, CUNY, August 2023
CMSA workshop on nonlinear algebra and combinatorics from physics, April 2022
Oberwolfach mini-workshop on scattering amplitudes, cluster algebras, December 2021
ICERM semester program on combinatorial algebraic geometry, spring 2021
ICERM workshop on algebraic geometry and polyhedra, April 2021
Cluster algebras 2020 online, August 2020
Dimers in combinatorics and cluster algebras online, August 2020
Oberwolfach mini-workshop on superpotentials in algebra and geometry, February 2020
CMSA program on spacetime, quantum mechanics, total positivity and motives, fall 2019
Mirror symmetry and cluster algebras, Cambridge, UK, July 2019
SIAM session on cluster algebras and positivity, Bern, July 2019
Faces of integrability, CRM, Montreal, April 29-May 17, 2019
MIT-Harvard-Microsoft combinatorics seminar, fall 2018 to present
Combinatorics and beyond: Sergey Fomin's mathematics, Michigan, November 2018
MSRI hot topics: cluster algebras and wall-crossing, March 2016
MSRI program on cluster algebras, fall 2012
MSRI joint connections workshop on commutative algebra and cluster algebras, August 2012
Bay Area Discrete Math Day, March 2012
UC Berkeley Combinatorics seminar, spring 2006, and spring 2010 to present
ICERM Workshop on cluster algebras and statistical physics, August 2011
MSRI Graduate Workshop on cluster combinatorics and cluster algebras, August 2011
MIT Combinatorics seminar, spring 2007 to spring 2009
MSRI workshop on combinatorics and tropical geometry, fall 2009
AMS special session on matroids at San Francisco State University, April 2009
Member of the program committee for FPSAC, summer 2009

Service:

Scientific Board member, CMSA, Harvard, Fall 2019 to present
 Liaison to BP's (postdocs) at Harvard, Fall 2019 to Spring 2022
 Undergraduate major advisor, fall 2011 to spring 2014, UC Berkeley
 Faculty sponsor for Berkeley chapter of Association of Women in Math, spring 2010 to spring 2014
 Faculty sponsor for the Berkeley math tournament for high school students, fall 2011 to spring 2013
 Assistant Director of Graduate Studies, Harvard math department, fall 2007 to spring 2009
 Board of advisors for Girls' Angle, a math club for (middle-school) girls, fall 2008 to present
 Board of advisors for Math prize for girls, fall 2010 to present

Ph.D. Students supervised:

Adam Kalman (UC Berkeley, PhD 2014)
 Alfredo Najera Chavez (co-supervised with Bernhard Keller; Université Paris 7, PhD 2015)
 Olya Mandelshtam (UC Berkeley, PhD 2016)
 Steven Karp (UC Berkeley, PhD 2017)
 Anastasia Chavez (co-supervised with Federico Ardila; UC Berkeley, PhD 2017)
 Emmanuel Tsukerman (co-supervised with Bernd Sturmfels; UC Berkeley, PhD 2017)
 Felix Gotti (UC Berkeley, PhD 2019)
 Melissa Sherman-Bennett (UC Berkeley, PhD 2021)
 Mario Sanchez (co-supervised with Federico Ardila; UC Berkeley, PhD 2021)
 Donghyun Kim (UC Berkeley, PhD 2021)
 Charles Wang (Harvard, co-supervised with Bernd Sturmfels, PhD 2023)
 Jonathan Boretsky (Harvard, PhD 2024)
 Grant Barkley (Harvard, in progress)
 Johnny Gao (Harvard, in progress)
 Yuhan Jiang (Harvard, in progress)
 Amanda Burcroff (Harvard, in progress)
 Victor Wang (Harvard, in progress)
 Alan Yan (Harvard, in progress)

Postdoctoral researchers mentored:

2010-2013 Kelli Talaska, NSF Postdoctoral Fellow, UC Berkeley.
 spring 2013 Max Glick, RTG Postdoctoral Fellow, UC Berkeley.
 fall 2013 Natasha Blitvic, FQRNT Fellow, UC Berkeley.
 2013-2014 Florian Block, Humboldt Fellow, UC Berkeley.
 2013-2016 Yan Zhang, Morrey Assistant Professor, UC Berkeley.
 2015-2018 Khrystyna Serhiyenko, NSF Postdoctoral Fellow, UC Berkeley.
 2019-2021 Man-Wai (Mandy) Cheung, Benjamin Peirce Fellow, Harvard.
 2019-2021 Elana Kalashnikov, Benjamin Peirce Fellow, Harvard.
 2020-2023 Cesar Cuenca, Benjamin Peirce Fellow, Harvard.
 2021-2022 Christian Gaetz, NSF Postdoctoral Fellow, Harvard.
 2021-2023 Anna Seigal, Junior Fellow, Harvard.
 2021-2024 Chris Eur, Benjamin Peirce Fellow, Harvard.
 2021-2025 Matteo Parisi, CMSA postdoc, Harvard.
 2023-2026 Colin Defant, Benjamin Peirce Fellow, Harvard.

Undergraduate senior theses supervised:

2023-2024 AnaMaria Perez, Harvard.

2021-2022	Elbert Du, Harvard.
2020-2021	Hanna Mularczyk, Harvard.
2020-2021	Amal Mattoo, Harvard.
2019-2020	Emily Jia, Harvard.
2018-2019	Daniel Polatajko, Harvard.
2008-2009	Kevin Carde, Harvard.
2006-2007	Yan Zhang, Harvard.

Teaching Activities:

2024	Spring	Geometric and topological combinatorics (Math 287Z) at Harvard.
2023	Fall	Freshman Seminar on “Proofs from the book” at Harvard.
2022	Spring	Freshman Seminar on ASMs at Harvard.
2021	Fall	Cluster algebras, positivity, Grassmannians, and beyond (Math 251) at Harvard.
2020	Spring	Schubert calculus (Math 269) at Harvard.
2019	Fall	Freshman Seminar on ASMs at Harvard.
2019	Spring	Algebraic Combinatorics (Math 155r) at Harvard.
2018	Fall	Freshman Seminar on ASMs at Harvard.
2018	Spring	Discrete Mathematics (Math 55) at Berkeley.
2017	Fall	Hot topics in mathematics (Math 270) at Berkeley.
2016	Fall	Topics in Cluster algebras, Columbia University.
2014	Fall	Cluster algebras at Institut Henri Poincare, Paris.
2014	Spring	Discrete Mathematics (Math 55) at Berkeley.
2013	Fall	Graduate Algebraic Combinatorics (Math 249) at Berkeley.
2012	Spring	Abstract Algebra (Math 113) at Berkeley.
2011	Fall	Discrete Mathematics (Math 55) at Berkeley.
2011	Spring	Topics in algebra: cluster algebras (Math 274) at Berkeley.
2010	Fall	Discrete Mathematics (Math 55) at Berkeley.
2010	Spring	Graduate Algebraic Combinatorics (Math 249) at Berkeley.
2009	Spring	Probability (Math 154) at Harvard.
2008	Fall	Topics in Combinatorial Representation Theory (Math 277) at Harvard.
2007	Fall	Algebraic Combinatorics (Math 155r) at Harvard.
2007	Spring	Multivariable Calculus (Math 21a) at Harvard.
2006	Fall	Algebraic Combinatorics (Math 192r) at Harvard.