

# Sergi Elizalde

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**Research Interests** Enumerative combinatorics: permutations, bijections, pattern avoidance, generating functions, lattice paths, Young tableaux; applications to dynamical systems and computational biology.

**Education** MASSACHUSETTS INSTITUTE OF TECHNOLOGY (MIT), Cambridge, MA, 2000-2004.  
Ph.D. in Mathematics, June 2004.  
Advisor: Richard Stanley.  
GPA: 4.0/4.0.

UNIVERSITAT POLITÈCNICA DE CATALUNYA (UPC), Barcelona, Spain, 1996-2000.  
B.S. in Mathematics, June 2000.  
Ranked First in Class, with final grade of A with Honors.

**Work Experience** DARTMOUTH COLLEGE, Hanover, NH.  
Full Professor, 2019–present. Department chair, 2021–present.  
Associate Professor, 2013–2019.  
Assistant Professor, 2007–2013.  
John Wesley Young Research Instructor, 2005–2007.

MEMORIAL SLOAN KETTERING CANCER CENTER, New York, summer 2019.  
Visiting Professor, *The Samuel Bakhoun Lab, Department of Radiation Oncology*.

CENTRE DE RECERCA MATEMÀTICA (CRM), Spain, winter 2007.  
Postdoctoral Fellow in the program *Enumerative Combinatorics and Random Structures*.

INSTITUT MITTAG-LEFFLER, Sweden, spring 2005.  
Postdoctoral Fellow in the program *Algebraic Combinatorics*.

MATHEMATICAL SCIENCES RESEARCH INSTITUTE (MSRI), Berkeley, CA, 2004-2005.  
Postdoctoral Fellow. Member of the programs *Hyperplane Arrangements and Applications*, Fall 2004, and *Probability, Algorithms, and Statistical Physics*, Spring 2005.

**Publications** S.E., Counting lattice paths by crossings and major index II: tracking descents via two-rowed arrays, *Sém. Lothar. Combin.* 87B (2022), Art. #2, 33 pp.

S.E. and B. Sagan, Partial Rank Symmetry of Distributive Lattices for Fences, *Ann. Comb.*, <https://doi.org/10.1007/s00026-022-00600-8>.

S.E., Counting lattice paths by crossings and major index I: the corner-flipping bijections, *Combinatorial Theory* 2 (2) (2022), #14.

R. Domagalski, S.E., J. Liang, Q. Minnich, B. Sagan, J. Schmidt and A. Sietsema, Cyclic pattern containment and avoidance, *Adv. in Appl. Math.* 135 (2022), 102320.

S.E. and E. Deutsch, The degree of asymmetry of sequences, *ECA* 2:1 (2022), Article S2R7.

S.E., Enumerating descents on quasi-Stirling permutations and plane trees, *Extended Abstracts EuroComb 2021*, Trends in Mathematics, vol 14. Birkhäuser, Cham., pp 32-37.

S.E., The degree of symmetry of lattice paths, *Ann. Comb.* 25 (2021), 877–911.

- S.E., R. Flórez and J.L. Ramírez, Enumerating symmetric peaks in non-decreasing Dyck paths, *Ars Math. Contemp.* 21 (2021) #P2.04.
- S.E., Bijections for restricted inversion sequences and permutations with fixed points, *Australas. J. Combin.* 80 (2021), 106–115.
- S.E., Descents on quasi-Stirling permutations, *J. Combin. Theory Ser. A* 180 (2021) 105429.
- S.E., Symmetric peaks and symmetric valleys in Dyck paths, *Discrete Math.* 344 (2021) 112364.
- T. Watkins, E. Lim, M. Petkovic, S.E., . . . , R. Schwarz, N. McGranahan and C. Swanton, Pervasive chromosomal instability and karyotype order during tumour evolution, *Nature* 587, 126–132 (2020).
- J.S. Auli and S.E., Wilf equivalences between vincular patterns in inversion sequences, *Appl. Math. Comput.* 388 (2020) 125514.
- S.E., A simple bijective proof of a familiar derangement recurrence, *Fibonacci Quart.* 59 (2021), 150–151.
- S.E., Measuring symmetry in lattice paths and partitions, *Sém. Lothar. Combin.* 84B (2020), Article #26, 12 pp.
- J. Bloom, S.E. and Y. Roichman, On cyclic Schur-positive sets of permutations, *Electron. J. Combin.* 27(2) (2020), #P2.6.
- J.S. Auli and S.E., Consecutive patterns in inversion sequences II: avoiding patterns of relations, *J. Integer Seq.* 22 (2019), Art. 19.7.5.
- J.S. Auli and S.E., Consecutive patterns in inversion sequences, *Discrete Math. Theor. Comput. Sci.* 21:2 (2019), #6, 22 pp.
- S.E. and K. Moore, Characterizations and enumerations of patterns of signed shifts, *Discrete Appl. Math* 277 (2020), 92–114.
- S.E. and J. Troyka, Exact and asymptotic enumeration of cyclic permutations according to descent set, *J. Combin. Theory Ser. A* 165 (2019), 360–391.
- R. Adin, S.E. and Y. Roichman, Cyclic descents for near-hook and two-row shapes, *European J. Combin.* 79 (2019), 152–178.
- S.E., A. Laughney and S. Bakhoum, A Markov chain for numerical chromosomal instability in clonally expanding populations, *PLoS Comput. Biol.* 14(9) (2018): e1006447.
- T. Dwyer and S.E., Wilf equivalence relations for consecutive patterns, *Adv. in Appl. Math.* 99 (2018), 134–157.
- S.E. and J. Troyka, The number of cycles with a given descent set, *Sém. Lothar. Combin.* 80B (2018), Article #8, 12 pp.
- E. Deutsch and S.E., A bijection between bargraphs and Dyck paths, *Discrete Appl. Math.* 251 (2018), 340–344.
- R. Adin, S.E., V. Reiner and Y. Roichman, Cyclic descent extensions and distributions, *Proceedings of the GASCom 2018 Workshop*, 32–42.
- S.E., Continued fractions for permutation statistics, *Discrete Math. Theor. Comput. Sci.* 19 (2018), #11.
- H. Crane, S. DeSalvo and S.E., The probability of avoiding consecutive patterns in the Mallows distribution, *Random Structures Algorithms* 53 (2018), 417–447.
- T. Dwyer and S.E., A necessary condition for c-Wilf equivalence, *Sém. Lothar. Combin.* 78B (2017), Article #69, 12 pp.
- K. Archer, S.E. and K. Moore, Patterns of negative shifts and signed shifts, *Sém. Lothar. Combin.* 78B (2017), Article #49, 12 pp.

- S.E. and Y. Roichman, On rotated Schur-positive sets, *J. Combin. Theory Ser. A* 152 (2017), 121–137.
- R. Adin, C. Athanasiadis, S.E. and Y. Roichman, Character formulas and descents for the hyperoctahedral group, *Adv. in Appl. Math.* 87 (2017), 128–169.
- S.E. and P. McNamara, The structure of the consecutive pattern poset, *Int. Math. Res. Not. IMRN* 7 (2018), 2099–2134.
- E. Deutsch and S.E., Statistics on bargraphs viewed as cornerless Motzkin paths, *Discrete Appl. Math.* 221 (2017), 54–66.
- S.E. and Y. Roichman, Schur-positive sets of permutations via products of grid classes, *J. Algebraic Combin.* 45 (2017), 363–405.
- M. Barnabei, F. Bonetti, S.E. and M. Silimbani, Two descent statistics over 321-avoiding centrosymmetric involutions, *Electron. J. Combin.*, 23(1) (2016), #P1.35.
- S.E. and P. McNamara, On intervals of the consecutive pattern poset, *Discrete Math. Theor. Comput. Sci. proc. BC* (2016), 431–442.
- S.E. and Y. Roichman, Schur-positivity via products of grid classes, *Discrete Math. Theor. Comput. Sci. proc. BC* (2016), 443–454.
- S.E., A survey of consecutive patterns in permutations, chapter of the book *Recent Trends in Combinatorics (IMA Volume in Mathematics and its Applications)* 601–618, Springer 2016.
- S. Burrill, S.E., M. Mishna, L. Yen, A generating tree approach to  $k$ -nonnesting partitions and permutations, *Ann. Comb.* 20 (2016), 453–485.
- S.E. and M. Rubey, Symmetries of statistics on lattice paths between two boundaries, *Adv. Math.* 287 (2016), 347–388.
- A. Laughney, S.E., G. Genovese and S. Bakhoum, Dynamics of tumor heterogeneity derived from clonal karyotypic evolution, *Cell Rep.* 12 (2015), 809–820.
- S.E. and M. Martinez, The frequency of pattern occurrence in random walks, *Discrete Math. Theor. Comput. Sci. proc. FPSAC'15* (2015), 217–228.
- S.E. and Y. Roichman, Signed arc permutations, *J. Comb.* 6 (2015), 205–234.
- S.E., Bijections for pairs of non-crossing lattice paths and walks in the plane, *European J. Combin.* 49 (2015), 25–41.
- M. Barnabei, F. Bonetti, S.E. and M. Silimbani, Descent sets on 321-avoiding involutions and hook decompositions of partitions, *J. Combin. Theory Ser. A* 128 (2014), 132–148.
- K. Archer and S.E., Cyclic permutations realized by signed shifts, *J. Comb.* 5 (2014), 1–30.
- S.E. and Y. Roichman, Arc permutations, *J. Algebraic Combin.* 39 (2014), 301–334.
- S. Cheng, S.E., A. Kasraoui and B. Sagan, Inversion polynomials for 321-avoiding permutations, *Discrete Math.* 313 (2013), 2552–2565.
- J. Bloom and S.E., Pattern avoidance in matchings and partitions, *Electron. J. Combin.* 20 (2013), #P5.
- S.E., The most and the least avoided consecutive patterns, *Proc. Lond. Math. Soc.* 106 (2013), 957–979.
- A. Burstein and S.E., Total occurrence statistics on restricted permutations, *Pure Math. Appl. (P.U.M.A.)* 24 (2013), 103–123.
- K. Archer and S.E., Periodic patterns of signed shifts, *Discrete Math. Theor. Comput. Sci. proc. AS* (2013), 873–884.
- J. Bloom and S.E., Patterns in matchings and rook placements, *Discrete Math. Theor. Comput. Sci.*

*proc. AS* (2013), 909–920.

S.E. and M. Noy, Clusters, generating functions and asymptotics for consecutive patterns in permutations, *Adv. in Appl. Math.* 49 (2012), 351–374.

S.E. and M. Rubey, Bijections for lattice paths between two boundaries, *Discrete Math. Theor. Comput. Sci. proc. AR* (2012), 827–838.

S. Burrill, S.E., M. Mishna and L. Yen, Generating trees for partitions and permutations with no  $k$ -nestings, *Discrete Math. Theor. Comput. Sci. proc. AR* (2012), 409–420.

S.E. and Y. Roichman, Arc Permutations (extended abstract), *Discrete Math. Theor. Comput. Sci. proc. AR* (2012), 259–270.

S.E., Fixed points and excedances in restricted permutations, *Electron. J. Combin.* 18 (2012), #P29.

S.E. and M. Noy, Consecutive patterns in permutations: clusters and generating functions, *Discrete Math. Theor. Comput. Sci. proc. AR* (2012), 247–258.

S.E., Permutations and  $\beta$ -shifts, *J. Combin. Theory Ser. A* 118 (2011), 2474–2497.

S.E., Allowed patterns of  $\beta$ -shifts, *Discrete Math. Theor. Comput. Sci. proc. AO* (2011), 293–304.

S.E., Descent sets of cyclic permutations, *Adv. in Appl. Math.* 47 (2011), 688–709.

E. Deutsch and S.E., Restricted simsun permutations, *Ann. Comb.* 16 (2012), 253–269.

S.E. and Y. Liu, On basic forbidden patterns of functions, *Discrete Appl. Math.* 159 (2011), 1207–1216.

E. Deutsch and S.E., Cycle-up-down permutations, *Australas. J. Combin.* 50 (2011), 187–199.

S.E., The X-class and almost-increasing permutations, *Ann. Comb.* 15 (2011), 51–68.

S.E., Improved bounds on the number of numerical semigroups of a given genus, *J. Pure Appl. Algebra* 214 (2010), 1862–1873.

E. Deutsch and S.E., The largest and the smallest fixed points of permutations, *European J. Combin.* 31 (2010), 1404–1409.

S.E., Permutations realized by shifts, *Discrete Math. Theor. Comput. Sci. proc. AK* (2009), 361–372.

S.E., The number of permutations realized by a shift, *SIAM J. Discrete Math.* 23 (2009), 765–786.

S.E. and P. Winkler, Sorting by Placement and Shift, *Proceedings of the Twentieth Annual ACM-SIAM Symposium on Discrete Algorithms, SODA* 2009.

J.M. Amigó, S.E. and M.B. Kennel, Pattern avoidance in dynamical systems, *Discrete Math. Theor. Comput. Sci. proc. AJ* (2008), 71–82.

J.M. Amigó, S.E. and M.B. Kennel, Forbidden patterns and shift systems, *J. Combin. Theory Ser. A* 115 (2008), 485–504.

S.E., Generating trees for permutations avoiding generalized patterns, *Ann. Comb.* 11 (2007), 435–458.

S.E., A bijection between 2-triangulations and pairs of non-crossing Dyck paths, *J. Combin. Theory Ser. A* 114/8 (2007), 1481–1503.

S.E. and K. Woods, Bounds on the number of inference functions of a graphical model, *Statist. Sinica* 17 (2007), 1395–1415.

S.E. and K. Woods, The probability of choosing primitive sets, *J. Number Theory* 125 (2007), 39–49.

A. Burstein, S.E. and T. Mansour, Restricted Dumont permutations, Dyck paths, and noncrossing partitions, *Discrete Math.* 306 (2006), 2851–2869.

S.E., Combinatòria i biologia: funcions d'inferència i alineació de seqüències, *Butl. Soc. Catalana Mat.* 21 (2006), n. 1, 39–52.

- S.E., Asymptotic enumeration of permutations avoiding generalized patterns, *Adv. in Appl. Math.* 36 (2006), 138–155.
- S.E., Inference functions. Chapter of the book *Algebraic Statistics for Computational Biology*, edited by L. Pachter and B. Sturmfels, Cambridge University Press, 2005.
- S.E. and F. Lam, Bounds for optimal sequence alignment. Chapter of the book *Algebraic Statistics for Computational Biology*, edited by L. Pachter and B. Sturmfels, Cambridge University Press, 2005.
- W.Y.C. Chen, E. Deutsch and S.E., Old and young leaves on plane trees, *European J. Combin.* 27 (2006), Issue 3, 414–427.
- S.E., Multiple pattern-avoidance with respect to fixed points and excedances, *Electron. J. Combin.* 11 (2004), #R51.
- S.E. and T. Mansour, Restricted Motzkin permutations, Motzkin paths, continued fractions, and Chebyshev polynomials, *Discrete Math.* 305 (2005), 170–189.
- S.E. and E. Deutsch, A simple and unusual bijection for Dyck paths and its consequences, *Ann. Comb.* 7 (2003), 281–297.
- S.E. and I. Pak, Bijections for refined restricted permutations, *J. Combin. Theory Ser. A* 105 (2004), 207–219.
- S.E. and M. Noy, Consecutive patterns in permutations, *Adv. in Appl. Math.* 30 (2003), 110–125.
- S.E., Games and Invariants. Chapter of the book *Training Sessions for the International Mathematical Olympiad* (in Catalan), Catalan Mathematical Society, Barcelona, 2000.

- Selected Presentations**
- 2022 Permutation Patterns 2022, Valparaiso, IN.  
*Invited talk*, Combinatorial and Algebraic Enumeration (a celebration of Goulden and Jackson), Waterloo, Canada.  
 University of Minnesota Combinatorics seminar.  
 University of British Columbia Discrete Math seminar, Vancouver, Canada — online.  
 Dartmouth graduate open house — online.
- 2021 *Invited talk*, BIRS workshop on Dynamical Algebraic Combinatorics, UBC Okanagan, Canada — online.  
 University of Vermont Combinatorics Seminar, Burlington, VT.  
 Dartmouth Colloquium, Hanover, NH.  
 EUROCOMB’21, Barcelona, Spain — online.  
*Invited talk*, Lattice Paths, Combinatorics and Interactions, CIRM Marseille, France — online.  
 Permutation Patterns 2021 Virtual Workshop — online.  
 Dartmouth graduate open house — online.  
 Combinatorics and Graph Theory Seminar, Michigan State University — online.
- 2020 Seminario Sabanero de Combinatoria (SeSaCo), Bogotá, Colombia — online.  
 Panelist at film discussion of “Secrets of the Surface: The Mathematical Vision of Maryam Mirzakhani”, Celebration of Women in Mathematics, Dartmouth.  
*Invited participant*, Workshop on Permutations and Probability, Banff International Research Station, Canada — online.  
 Formal Power Series and Algebraic Combinatorics (FPSAC ’20) — online.  
 Permutation Patterns (PP), Valparaiso University, IN — online.  
 University of Massachusetts at Amherst Discrete Mathematics Seminar.  
*Invited talk*, AMS-MAA Joint Mathematics Meetings, special session on Analytic and Probabilistic Combinatorics, Denver, CO.

- 2019 *Invited talk*, AMS Sectional Meeting, special session on Patterns in Permutations, Gainesville, FL.  
Virtual Colloquium, Northeast Combinatorics Network — online.  
Sloan Kettering Cancer Center, Human Oncology and Pathogenesis Program.
- 2018 *Invited talk*, Dagstuhl Seminar on Genomics, Pattern Avoidance, and Statistical Mechanics; Wadern, Germany.  
Dartmouth College SIAM student seminar.  
*Invited talk*, Oberwolfach Research Institute for Mathematics (MFO), Workshop on Enumerative Combinatorics, Oberwolfach, Germany.  
North Carolina State University Algebra and Combinatorics seminar.  
Brandeis University Combinatorics seminar.  
Dartmouth Special Colloquium for Graduate Open House.
- 2017 *Invited talk*, Erwin Schrödinger Institute (ESI), University of Vienna, Austria.  
Formal Power Series and Algebraic Combinatorics (FPSAC), London, UK.  
British Combinatorial Conference, Glasgow, Scotland.  
Dartmouth Dimensions program for admitted students (public lecture).  
MIT Combinatorics Seminar.  
LaCIM Séminaire, UQAM, Montreal.  
AMS-MAA Joint Mathematics Meetings, special session on Applications of Partially Ordered Sets in Algebraic, Topological, and Enumerative Combinatorics, Atlanta, GA.
- 2016 *Invited talk*, AMS Fall Central Sectional Meeting, special session on Enumerative Combinatorics, Minneapolis, MN.  
*Invited talk*, AMS Fall Eastern Sectional Meeting, special session on Algebraic and Enumerative Combinatorics, Bowdoin College, Brunswick, ME.  
Permutation Patterns (PP), Washington, DC.  
Formal Power Series and Algebraic Combinatorics (FPSAC), Vancouver, Canada.  
**Keynote speaker**, Graduate Student Combinatorics Conference, Clemson University.
- 2015 Sloan Kettering Cancer Center, Computational Biology Program.  
Formal Power Series and Algebraic Combinatorics (FPSAC), Daejeon, South Korea.
- 2014 *Invited talk*, IMA, U. of Minnesota, workshop on Geometric and Enumerative Combinatorics.  
*Keynote address*, JHU Center for Talented Youth.  
International Congress of Mathematicians (ICM), Seoul.  
**Plenary speaker**, VIII Jornadas de Matemática Discreta y Algorítmica, Tarragona, Spain.  
*Invited speaker*, Conference in honor of Richard P. Stanley's 70th birthday, MIT.  
*Invited talk*, Oberwolfach workshop on Enumerative Combinatorics, Germany.
- 2013 Mathematical Congress of the Americas, Guanajuato, Mexico.  
Formal Power Series and Algebraic Combinatorics (FPSAC), Paris, France.  
**Plenary speaker**, 11th International Conference on Permutation Patterns, PP 2013, Paris.  
*Invited talk*, CanaDAM, mini-symposium on Enumerative Combinatorics, Newfoundland.  
*Invited talk*, Queen Mary, University of London, Workshop on Combinatorial Probability and Statistical Mechanics, London.  
*Invited talk*, AMS-MAA Joint Mathematics Meetings, special session on Patterns in permutations and words, San Diego, CA.
- 2012 Colby College Mathematics & Statistics Colloquium.  
*Invited talk*, AMS Fall Eastern Sectional Meeting, Rochester, NY.  
Formal Power Series and Algebraic Combinatorics (FPSAC), Nagoya, Japan.  
*Invited talk*, SIAM Conference on Discrete Mathematics, mini-symposium on Algebraic Combina-

- torics, Halifax, Canada.
- Plenary speaker**, Combinatorics, Georgetown, TX.
- University of Florida Mathematics Colloquium.
- University of Miami Combinatorics Seminar.
- 2011 Formal Power Series and Algebraic Combinatorics (FPSAC), Reykjavik, Iceland.
- University of Pennsylvania Combinatorics Seminar.
- University of British Columbia Discrete Maths Seminar.
- Invited talk*, Pacific Permutation Patterns Workshop, SFU.
- Simon Fraser University Discrete Maths Seminar.
- 2010 *Invited talk*, AMS Fall Eastern Section Meeting.
- Invited talk*, SIAM Conference on Discrete Mathematics, mini-symposium on Enumerative Combinatorics.
- Conference in Honor of Doron Zeilberger's 60th Birthday, Rutgers University.
- Howard University Mathematics Colloquium.
- Keynote address*, JHU Center for Talented Youth.
- LaCIM Séminaire, UQAM, Montreal.
- MIT Combinatorics Seminar.
- Rutgers University Experimental Mathematics Seminar.
- 2009 *Invited talk*, AMS Fall Southeastern Meeting.
- Invited talk*, AMS Fall Eastern Section Meeting.
- University of Hawaii Mathematics Colloquium.
- Invited talk*, 23rd Midwest Conference on Combinatorics, Cryptography, and Computing.
- Formal Power Series and Algebraic Combinatorics (FPSAC), Linz, Austria.
- Permutation Patterns (PP), Florence, Italy.
- SIAM Symposium on Discrete Algorithms (SODA), New York.
- 2008 Universitat Politècnica de Catalunya, Seminar in non-linear dynamics.
- University of Washington Combinatorics Seminar.
- Formal Power Series and Algebraic Combinatorics (FPSAC), Valparaiso, Chile.
- Permutation Patterns (PP), Dunedin, New Zealand.
- Jornadas de Matemática Discreta y Algorítmica, Spain.
- George Washington University Combinatorics Seminar.
- 2007 *Invited talk*, AMS Fall Central Section Meeting, De Paul University.
- Invited talk*, Discrete Mathematics Day of the Northeast, Middlebury College.
- Formal Power Series and Algebraic Combinatorics (FPSAC), Tianjin, China.
- Permutation Patterns (PP), Reykjavik, Iceland.
- Invited talk*, Coloquio Latinoamericano de Álgebra, Colombia.
- Conference on Enumeration and Probabilistic Methods in Combinatorics, CRM, Spain.
- Howard University Mathematics Colloquium.
- University of Denver Mathematics Colloquium.
- University of Colorado at Boulder Mathematics Colloquium.
- UQAM Mathematics Colloquium.
- University of Vermont Mathematics Colloquium.
- Dartmouth College Mathematics Colloquium.
- University of South Carolina Mathematics Colloquium.
- University of Kentucky Mathematics Colloquium.
- 2006 Centre de Recerca Matemàtica Seminar.

- Wesleyan University, Algebra and Topology Seminar.  
 University of Vermont, Combinatorics Seminar.  
*Invited talk*, AMS Fall Southeastern Meeting.  
*Invited talk*, AMS Fall Eastern Meeting.  
 MIT Combinatorics Seminar.  
 International Congress of Mathematicians (ICM), Madrid.  
 Formal Power Series and Algebraic Combinatorics (FPSAC), San Diego, CA.  
 York University, Applied Algebra Seminar.  
 San Francisco State University Algebra-Geometry-Combinatorics Seminar.  
 U.C. Berkeley Combinatorics Seminar.  
 Dartmouth College Mathematics Colloquium.
- 2005 Formal Power Series and Algebraic Combinatorics (FPSAC), Taormina, Italy.  
*Invited talk*, Joint meeting AMS - German Math. Soc. - Austrian Math. Soc., Germany.  
 Institut Mittag-Leffler Seminar, Sweden.  
 MSRI Seminar, Berkeley, CA.  
 Bay Area Discrete Mathematics Day, San Jose State University.  
 Permutation Patterns (PP), Gainesville, Florida.  
 MIT Combinatorics Seminar.  
 Algebraic Statistics in Computational Biology Seminar, U.C. Berkeley.  
 University of Central Florida, Mathematics Department Colloquium.
- 2004 Stanford University Representation Theory and Algebra Seminar.  
 MSRI Seminar, Berkeley, CA.  
 Algebraic Statistics in Computational Biology Seminar, U.C. Berkeley.  
 U.C. San Diego Combinatorics Seminar.  
 University of Michigan Combinatorics Seminar.  
 U.C. Davis Discrete Mathematics and Representation Theory Seminar.  
 Permutation Patterns (PP), Nanaimo, Canada.  
 Formal Power Series and Algebraic Combinatorics (FPSAC), Vancouver.  
 U.C. Berkeley Combinatorics Seminar.  
 York University, Applied Algebra Seminar.
- 2003 MIT Combinatorics Seminar.  
 Formal Power Series and Algebraic Combinatorics (FPSAC), Linköping, Sweden.  
*Invited talk*, Joint International Meeting RSME-AMS, Spain.  
 Formal Power Series and Algebraic Combinatorics (FPSAC), Tempe, AZ.
- 2000 UPC Seminar of Graph Theory, Combinatorics and Applications.

## Awards and Fellowships

*Simons Foundation Collaboration Grant for Mathematicians, Paths, partitions and permutations*, Sep. 2022–Aug. 2027, PI, \$42,000.  
*Ivy+ Faculty Leadership Fellow*, 2022–23.  
*Elizabeth R. and Robert A. Jeffe 1972 Fellowship*, Dartmouth College, 2019–20.  
*Dartmouth Centers Forum Minigrant, Telling Stories for our Future*, Spring 2020, \$2,000.  
*Dean of the Faculty Award for Outstanding Mentoring and Advising*, Dartmouth College, 2018.  
*Dartmouth Conferences gift from Fannie and Alan Leslie to organize the International Conference on Formal Power Series and Algebraic Combinatorics*, 2018, PI, \$75,000.  
*DCAL Seed Grant, Alternative Spring Breaks with a Social Impact: A Collaboration with Dart-*



*mouth's Housing Communities*, 2018–19, co-PI, \$17,000.

Simons Foundation Collaboration Grant for Mathematicians, *Patterns in permutations and dynamical systems*, Sep. 2013–Dec. 2018, PI, \$35,000.

Neukom Institute CompX grant, *A mathematical model for the dynamics of tumor heterogeneity derived from clonal karyotypic evolution*, Mar. 2015–Mar. 2017, PI, \$19,000.

National Security Agency (NSA) Conference Grant, *Discrete Mathematics Days in the Northeast 2016–2017*, Apr. 2016–Aug. 2017, co-PI, \$8,000.

National Science Foundation (NSF) Conference Grant, *Conferences in Formal Power Series and Algebraic Combinatorics*, Apr. 2015–Oct. 2018, PI, \$54,896.

NSA Conference Grant, *Discrete Mathematics Days in the Northeast 2015–2016*, Apr. 2015–Aug. 2016, PI, \$8,000.

NSA Conference Grant, *Conference in Formal Power Series and Algebraic Combinatorics, 2016*, PI, \$25,000.

NSA Young Investigator Grant, *Consecutive patterns in permutations: enumeration, variations, and applications*, Feb. 2014–Feb. 2016, PI, \$40,000.

Susan and Gib Myers 1964 Faculty Fellowship, Dartmouth College, 2013–2014.

Karen E. Wetterhahn Memorial Award for Distinguished Creative or Scholarly Achievement, Dartmouth College, 2013–2014.

NSF Individual Grant DMS-1001046, *Pattern avoidance in dynamical systems*, Program in Algebra, Number Theory and Combinatorics, Jul. 2010–Jun. 2013, PI, \$150,000.

NSF Conference Grant, *Permutation Patterns 2010*, PI, \$14,460.

Junior Faculty Fellowship, Dartmouth College, 2010–2011.

Burke Research Initiation Award for Junior Faculty, Dartmouth College, 2007.

Beatriu de Pinós Postdoctoral Fellowship, Spain, 2007.

J. William Fulbright Association of Spanish Fulbright Alumni Fellowship, 2006.

Ph.D. Thesis Extraordinary Award, Universitat Politècnica de Catalunya (UPC), Barcelona, 2006.

Clay Mathematics Institute affiliate scholar, 2004–2006.

Institut Mittag-Leffler Postdoctoral Fellowship, Sweden, spring 2005.

Mathematical Sciences Research Institute Postdoctoral Fellowship, fall 2004 and spring 2005.

MAE Fellowship to study abroad, Spanish Ministry of Foreign Affairs, 2002–2003 and 2003–2004.

Second National Graduation Award in Mathematics, Ministry for Education, Spain, 2001.

“La Caixa” Foundation Fellowship, awarded by His Majesty Juan Carlos I, King of Spain, 2000.

Initiation in Research Fellowship, Higher Council of Scientific Research (CSIC, Spain), 2000.

Collaboration Fellowship from the Ministry of Education and Culture, UPC, Spain, 1999.

Silver Medal 1997, Bronze Medal 1996, Iberoamerican Mathematical Olympiad.

Record high score 1997, Winner and Gold Medal 1996, Spanish Mathematical Olympiad.

Honorable Mention, International Mathematical Olympiad, Bombay, India, 1996.

Gold Medal, Spanish Physics Olympiad, 1996.

## Professional Activities

### CONFERENCE ORGANIZATION

Member of the **Program Committee** of Permutation Patterns 2023, Dijon, France.

Special session **co-organizer**, Joint Mathematics Meetings 2022, Seattle.

Member of the **Program Committee** of FPSAC 2021 (Israel), FPSAC 2014 (Chicago), and FPSAC 2010 (San Francisco).

Special session **co-organizer**, Canadian Mathematical Society Winter Meeting, online, Dec. 2020.

Member of the **Scientific Committee** of GASCom 2022, Varese, Italy.

**Organizer** of the invited Minisymposium on Enumerative Combinatorics at CanaDAM 2019, Vancouver, May 28–31, 2019.

**Chair** of the **Organizing Committee** of FPSAC 2018, Dartmouth College, July 16–20, 2018, with 230 participants. This is the major annual international conference in algebraic combinatorics.

**Co-organizer** of the International Conference on Permutation Patterns, Dartmouth College, July 9–13, 2018, with 80 participants.

**Co-organizer** of three editions of the conference Discrete Mathematics Day of the Northeast, Dartmouth College, May 2017, Apr. 2014, and Oct. 2007.

Member of the **AMS Eastern Section Program Committee**, 2017–2019. Appointed by AMS President Robert Bryant.

Member of the **Organizing Committee** of FPSAC 2016 (Vancouver) and FPSAC 2015 (Seoul).

Member of the **Scientific Committee** of Permutation Patterns 2016, Washington, DC.

Member of the **Program Committee** of Discrete Mathematics Days 2016, Barcelona.

Special session **co-organizer**, Mathematical Congress of the Americas, Mexico, Aug. 2013.

Member of the **Steering Committee** of Discrete Math Days of the Northeast, 2011–present.

**Main organizer** of the International Conference on Permutation Patterns, Dartmouth College, Aug. 9–13, 2010, with over 70 participants.

**Co-organizer** of the conference Mechanical Puzzles Day, Dartmouth College, Feb. 2008, with over 100 participants.

#### EDITORIAL WORK

**Editorial board member** of *Discrete Mathematics & Theoretical Computer Science*, 2015–present.

**Referee** for 72 different journals and publishers: *Advances in Applied Mathematics*; *Afrika Matematika*; *AIMS Mathematics*; *Algebraic Combinatorics*; *Algorithmica*; *American Mathematical Monthly*; *Analytic Algorithmics and Combinatorics (ANALCO)*; *Analysis of Algorithms*; *Annales de l'Institut Henri Poincaré D*; *Annales Mathematicae Silesianae*; *Annals of Combinatorics*; *Ars Mathematica Contemporanea*; *Art of Discrete and Applied Mathematics*; *Australasian Journal of Combinatorics*; *Birkhäuser*; *Bulletin of the Australian Mathematical Society*; *Combinatorics, Probability and Computing*; *Contributions to Discrete Mathematics*; *CRC Press*; *Discrete Applied Mathematics*; *Discrete Mathematics*; *Discrete Mathematics and Theoretical Computer Science*; *Discrete Mathematics Letters*; *Electronic Journal of Combinatorics*; *Enumerative Combinatorics and Applications*; *EuroComb*; *European Journal of Combinatorics*; *Experimental Mathematics*; *FILOMAT*; *Formal Power Series and Algebraic Combinatorics*; *Graphs and Combinatorics*; *Information Processing Letters*; *Integers*; *Electronic Journal of Combinatorial Number Theory*; *International Journal of Algebra and Computation*; *International Journal of Foundations of Computer Science (IJFCS)*; *International Journal of Number Theory*; *International Mathematics Research Notices (IMRN)*; *Israel Journal of Mathematics*; *Journal de Théorie des Nombres de Bordeaux*; *Journal of Algebraic Combinatorics*; *Journal of Automata, Languages, and Combinatorics*; *Journal of Combinatorial Theory Series A*; *Journal of Combinatorics*; *Journal of Difference Equations and Applications*; *Journal of Integer Sequences*; *Journal of King Saud University Science*; *Journal of Mathematical Psychology*; *Journal of Mathematics and Mathematical Sciences*; *Journal of Pure and Applied Algebra*; *Latin American Theoretical Informatics Symposium (LATIN)*; *LMS Lecture Notes Series*; *Mathematica Slovaca*;

*Mathematics of Computation*; *Memorias Congreso Internacional Fibonacci*; *Moscow Mathematical Journal*; *Online journal of analytic combinatorics*; *Order*; *Probabilistic, Combinatorial and Asymptotic Methods for the Analysis of Algorithms*; *Proceedings of the AMS*; *Publicationes Mathematicae*; *Pure and Applied Mathematics*; *Pure Mathematics and Applications*; *Random Structures and Algorithms*; *Semigroup Forum*; *Séminaire Lotharingien de Combinatoire*; *SIAM Journal on Discrete Mathematics*; *SIAM Symposium on Discrete Algorithms (SODA)*; *Special Matrices*; *Theoretical Computer Science*; *Turkish Journal of Mathematics*; *International Conference on Words (WORDS)*; *World Scientific Publishing Co.*

**Reviewer** for *Mathematical Reviews*, the *National Sciences and Engineering Research Council of Canada (NSERC)*, the *Portuguese Foundation for Science and Technology (FCT)*, the *Swiss National Science Foundation (SNSF)*, and the *Icelandic Research Fund (IRF)*.

**Guest editor** of the special issue of the journal *Pure Mathematics and Applications (PuMA)* devoted to the Proceedings of the conference *Permutation Patterns*, 2011.

#### OTHER ACTIVITIES

**President** of *Xarxa FME*, the Association of Alumni and Friends of the Facultat de Matemàtiques i Estadística of the Universitat Politècnica de Catalunya, 2005–2009.

**Problem Coordinator**, International Mathematical Olympiad, Madrid, 2008.

**Deputy leader** of the Spanish Team in the Iberoamerican Math Olympiad, Colombia, 2005.

**Academy Fellow** for the *Clay Mathematics Research Academy*, Clay Mathematics Institute, Cambridge, MA, 2003–2005.

**President** of *Iberia*, the Association of Spanish people in the Boston area, with over 400 members, 2003–2004.

#### Service at Dartmouth

**Chair** of the Department of Mathematics, 2021–present.

**Associate Chair** of the Department of Mathematics, 2019–2021.

**House Professor** of East Wheelock House Community (over 400 students), 2016–present.

**Byrne Advisor**, in charge of supervising 35 undergraduates (Byrne Scholars) and guiding them through enrichment opportunities, 2016–present.

**Chair** of House Affiliation and Engagement subcommittee, 2020–2021.

**Member** of the Montgomery Fellows Steering Committee, 2018–2021.

**Member** of the Personnel Committee, Math Dept., 2020–2021.

**Member** of the Teaching Evaluation Committee, Math Dept., 2018–2019, 2020–2021.

**Member** of the Committee on Off-Campus Activities, 2020.

**Chair** of the JWY Recruiting Committee, Math Dept., 2018–2019.

**Member** of the Graduate Program Committee, Math Dept., 2015–2017, 2018–2019.

**Member** of the Graduate Admissions Committee, Math Dept., 2008–2010, 2017–2018.

**Faculty Director** of the East Wheelock student cluster, 2014–2016.

**Member** of the Tucker Council, 2013–2016.

**Chair** of the Graduate Program Committee, Math Dept., 2013–2015.

**Chair** of the Teaching Evaluation Committee, Math Dept., 2013–2014.

**Organizer** of the Dartmouth Combinatorics Seminar, 2007–present.

**Coach** of the Dartmouth Putnam team, 2008–2015.

**Member** of the Recruiting committee, Math Dept., 2013–2014.

**Member** of the Thayer Prize committee, Math Dept., 2010–2014.

**Member** of the Undergraduate Program Committee, Math Dept., 2010–2011.

**Teaching and  
advising**

**Supervisor** of 9 **Ph.D. students**: Benjamin Adenbaum (current), Yixin Kathy Lin (current), Jonathan Bloom (Ph.D. 2014), Kassie Archer (Ph.D. 2014), Megan Martinez (Ph.D. 2016), Tim Dwyer (Ph.D. 2017), Justin Troyka (Ph.D. 2018), Katherine Moore (Ph.D. 2018), Juan S. Auli (Ph.D. 2020); and 14 **undergraduate students**: Kate Kucharczuk (Byrne Fellowship 2021-22), Junqing Ivy Yan (Presidential Scholarship 2020-21), Anuraag Bukkuri (Byrne Fellowship 2017-18), Sucharita Jayanti (Independent study 2013-14), Sean Griffin (Neukom Institute Fellowship 2012-13, Undergraduate Research Grant from Dean of Faculty 2013-14), Chiara and Gaia Santiago (Presidential Scholarship 2013-14), Elaine Levey (Presidential Scholarship 2011-12), Qian Zhang (Women in Science Project 2011-12), Yangyang Liu (Senior Thesis 2008-09), Alexander Borland (Presidential Scholarship 2008-09), Emily Chang (Women in Science Project 2008-09), Vlad Dobru (Presidential Scholarship, 2008-09), Will Chen (2009).

**Instructor** of the following courses at Dartmouth College (\* indicates graduate course):

- Winter 2021: *Topics in Combinatorics*\*.
- Fall 2019: *Accelerated Multivariable Calculus*.
- Spring 2019: *Graph Theory*.
- Fall 2017: *Algebraic Combinatorics*.
- Spring 2017: *Graph Theory*.
- Fall 2016: *Topics in Combinatorics*\*.
- Fall 2014: *Multivariable Calculus*.
- Spring 2014: *Graph Theory*.
- Fall 2013: *Calculus Plus; Algebraic Combinatorics*.
- Spring 2013: *Multivariable Calculus; Combinatorics*\*.
- Winter 2013: *An Introduction to Math Beyond Calculus*.
- Spring 2012: *Current problems in Combinatorics*\*; *Multivariable Calculus*.
- Fall 2011: *Algebraic Combinatorics*.
- Winter 2011: *Combinatorics*\*; *Introduction to Combinatorics*.
- Spring 2010: *Graph Theory*.
- Winter 2010: *Introduction to Combinatorics; Abstract Algebra*.
- Winter 2009: *Abstract Algebra*.
- Fall 2008: *Introduction to Calculus; Topics in Algebra*\*.
- Winter 2008: *The Probabilistic Method*\*.
- Fall 2007: *Algebraic Combinatorics*.
- Spring 2007: *Graph Theory*.
- Fall 2006: *Topics in Combinatorics*\*; *Multivariable Calculus*.
- Summer 2006: *Discrete Probability*.
- Spring 2006: *Graph Theory; Linear Programming*.
- Fall 2005: *Introduction to Calculus; Algebraic Combinatorics*.

**Active Learning Institute**, Dartmouth Center for the Advancement of Learning, 2012.

**Recitation Instructor**, *Theory of Computation*, MIT, fall 2002 and fall 2003.

**Microteaching Workshop**, MIT, 2002.

**Instructor** in the training sessions of the Spanish team for the IMO, 1999, 2000, 2001 and 2003.

**Additional  
Studies**

**Languages spoken:** Spanish, Catalan, English (fluent); French, German, Italian (intermediate).

**Music Studies:** PROFESSIONAL CONSERVATORY OF MUSIC OF TERRASSA, Spain, 1990–2000.  
Title of *Professor of Piano, Professional Degree*, June 2000.