

Igor Pak
Department of Mathematics
UCLA, Los Angeles, CA
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Employment:

July 2009 – present	UCLA , Department of Mathematics <i>Full Professor of Mathematics</i>
August 2007 – June 2009	UMN , Department of Mathematics <i>Associate Professor of Mathematics</i>
July 2005 – June 2008	MIT , Department of Mathematics <i>Associate Professor of Applied Mathematics</i>
July 2000 – June 2005	MIT , Department of Mathematics <i>Assistant Professor of Applied Mathematics</i>
Spring of 2001	MSRI , Berkeley, CA <i>Postdoctoral Fellow</i>
Jan. 1998 – June 2000	Yale University , Department of Mathematics <i>J. W. Gibbs Instructor of Mathematics</i> <u>Supervisor</u> : László Lovász (currently President, Hungarian Acad. Sci.)
Fall of 1997	MIT , Department of Mathematics <i>NSF Postdoctoral Fellow</i> <u>Supervisor</u> : Richard Stanley

Education:

1994 – 1997	Harvard University , Department of Mathematics Graduate student, Ph.D. awarded in June 1997 <u>Advisor</u> : <i>Persi Diaconis</i> (currently at Stanford)
1993 – 1994	New York University , Department of Mathematics Visiting scholar
1989 – 1993	Moscow State University , Department of Mathematics Undergraduate student <u>Advisor</u> : <i>Alexandre Kirillov</i> (currently at UPenn)

Thesis:

“*Random walks on groups: Strong uniform time approach*”
Committee: Persi Diaconis, Agoston Pisztora
Harvard University, 1997

Research Interests:

Algebraic, Enumerative, Probabilistic and Geometric Combinatorics,
Random Walks, Probabilistic Group Theory

Publications: Over 130 research articles in journals and refereed conference proceedings.

Postgraduate Grants and Fellowships:

2017-present	NSF Grant in Mathematical Sciences “Complexity of Combinatorial Sequences”
2014-2017	NSF Grant in Mathematical Sciences “Combinatorics and Complexity of Kronecker coefficients”
2010-2014	NSF Grant in Mathematical Sciences “Bijective Combinatorics of Young Tableaux”
2009-2014	Israel-USA BSF Grant (co-PI Rom Pinchasi) “Finite Point Configurations”
2004-2009	NSF Grant in Mathematical Sciences “Combinatorial Enumeration and Random Generation”
2008-2010	NSA Grant in Mathematical Sciences “Combinatorics of Partition Bijections”
2001-2004	NSF Grant in Mathematical Sciences “Combinatorics, Probability and Computation on groups”
2001-2004	NSA Grant in Mathematical Sciences “Combinatorics, Probability and Computation on groups”
Spring 2001	Mathematical Sciences Research Institute (MSRI) Fellowship MSRI, Berkeley, California
1997 – 2000	NSF Postdoctoral Research Fellowship in Mathematical Sciences

Undergraduate and Graduate Fellowships:

1995 – 1997	Hertz Foundation Fellowship in Mathematics, Fannie and John Hertz Foundation
1996 – 1997	James Whittemore Fellowship, Harvard University
1994 – 1996	Harvard Mathematics Fellowship, Harvard University
1992 – 1993	French Mathematical Society Fellowship, Moscow, Russia
1989 – 1993	Moscow State University Mathematics Scholarship, Russia

Teaching: “Combinatorial Sequences” (Spring'18, Fall'19), Fiat Lux Freshmen Seminar
“Combinatorics of the Symmetric Group” (Spring'19), UCLA Math 285
“Graph Theory” (Winter 2016), UCLA Math 180

“Enumerative Combinatorics” (Spring 2016), UCLA Math 184

“Combinatorial Theory” (Fall 2012-16, 18-19, Win 2013-18), UCLA Math 206AB

“Tilings” (Spring 2013), UCLA Math 285

“Introduction to Discrete Structures” (Fall 2012-13, Spring 2015, 2017),
UCLA Math 61

“Combinatorics” (Spring 2011, 2012, 2014), UCLA Math 180

“Combinatorics and Probability on Groups” (Winter 2011), UCLA Math 285

“Linear Algebra” (Spring 2010), UCLA Math 115

“Discrete Geometry” (Winter 2010), UCLA Math 285

“Enumerative Combinatorics” (Fall 2010), UCLA Math 285

“Elementary Probability” (Fall 2008), UMN, Math 4653

“Discrete and Polyhedral Geometry” (Fall 2008), UMN, Math 5248
(based on the book in print)

“Cryptography and Number Theory” (Fall 2007), UMN, Math 5245

“Introduction to Combinatorics and Graph Theory” (Fall 2007)
UMN, Math 4707

“Combinatorics, Probability and Computation on Finite Groups,”
innovative course (Fall 2001, 03, Spring 2006), MIT
(lectures notes by students are available on the course web page),
part of the MIT *OpenCourseWare* (OCW) project

“Convex Polytopes and Combinatorial Geometry”, topics course
(Spring 2005), MIT (lectures notes are being written as part of a book)
This course is similar to *“Geometric Combinatorics”* (Fall 2006), MIT

“Modern Combinatorics”, topics course (Fall 2005), Hebrew University

“Combinatorial Theory” (Fall 2000, 01, 03, 05), MIT
part of the MIT *OpenCourseWare* (OCW) project

“Combinatorial Analysis” (Fall 2002, 06), MIT

“Linear Algebra” (Recitations, Spring 2003, 04), MIT

“Probability Theory” (Spring 2003, 05), MIT

“Differential Equations” (Recitations, Spring 2002), MIT

“Calculus” (Recitations, Fall 2000), MIT

“Discrete Mathematics” (Fall 1999, 1998), Yale University

“*The Theory of Random Walks*” (Fall 1998), Yale University

“*Linear Algebra and Matrix Theory*” (Spring 1998), Yale University

“*Functions of a Real Variable*” (TA, Fall 1996), Harvard University

Research Supervision:

Current Postdocs: **Swee Hong Chan**, 2019 - present (Cornell Ph.D. 2019)

Past Postdocs: **Greta Panova**, 2011-4 (now tenured Assoc. Prof. at USC)
Stephen DeSalvo, 2012-7 (now Lead Data Scientist at **Activision**)
Alejandro Morales, 2014-7 (now Asst. Prof. at **UMass Amherst**)
Martin Tassy, 2014-7 (now Postdoc at **Dartmouth**)
Olya Mandelshtam, 2016-7 (now Postdoc at Brown Univ.)
Damir Yeliussizov, 2016-2018 (now Asst. Prof. at KBTU)

Current Ph.D. Students: **Bon-Soon Lin**, UCLA (Ph.D. expected in 2019)
Casey Fu, UCLA (Ph.D. expected in 2020)

Past Ph.D. students: **Sam Dittmer**, UCLA (Ph.D. June 2019)
Dahn Luu (Danny) Nguyen, UCLA (Ph.D. June 2018)
Andrew Soffer, UCLA (Ph.D. March 2016)
Scott Garrabrant, UCLA (Ph.D. December 2015)
Samuel Miner, UCLA (Ph.D. June 2015)
Anton Malyshev, UCLA (Ph.D. September 2014)
Jed Yang, UCLA (Ph.D. June 2013)
Stedman Wilson, UCLA (Ph.D. June 2012)
Matjaz Konvalinka, MIT (Ph.D. June 2008)
Sergiy Sidenko, MIT (Ph.D. June 2008)
Mike Korn, MIT (Ph.D. June 2004)

Undergraduate: 7 undergraduate summer research students over 6 years:
Summer UROP program at MIT: **Maksym Fedorchuk** (Harvard Ph.D., now Tenured Assoc. Prof. at Boston College)
Igor Ganichev (Berkeley Ph.D., now Software Engineer at Google)
Michael Lugo (UPenn Ph.D., now Sr. Data Scientist at AT&T)
Karola Mezzados (MIT Ph.D., now TT at Cornell)
Shubhangi Saraf (MIT Ph.D., now TT at Rutgers)
Abhiram Vijayarathy (MIT B.S.)
Zhongtao Wu (Princeton Ph.D., now TT at City U. Hong Kong)

Summer REU at UCLA: **Calvin Condon** (CMU B.S.)
Jason O'Neill (UCLA, now Ph.D. Candidate at UCSD)
Ken Willyard (UCLA, class of 2020)
Semih Yavuz (Bilkent and UCLA, now Ph.D. Candidate at UCSB).

Editorial: “*Discrete Mathematics*”, Associate Editor (2009-2017)
(**Area:** Enumerative and Geometric Combinatorics)

“*Transactions of American Mathematical Society*” and
“*Memoirs of American Mathematical Society*”
Associate Editor (2014-2018)
(**Area:** Combinatorics and Discrete Geometry)

“*Pacific Journal of Mathematics*”, Editor (2016-2018)

Refereeing:

Journals: Advances of Applied Math, Advances of Math, American Mathematical Monthly, Annals of Applied Probability, ARS Combinatorica, Discrete Mathematics, Combinatorica, Combinatorics, Probability & Computing, European J. Combinatorics, Functional Analysis and its Applications, Inventiones, Israel J. Mathematics, Journal of Algebra, Journal of Combinatorial Theory (Ser. A), J. of Algebraic Combinatorics, Journal of Symbolic Computation, Journal of Theoretical Probability, Linear Algebra & Applications, Memoirs of the AMS, Ramanujan Journal, Russian Mathematical Surveys, Theor. Comp. Sci, Trans. AMS, etc.

Conferences: FOCS, FPSAC, ICALP, SODA, STACS, STOC, Grigorchuk Conf. Proceedings

Grant evaluations: NSF, NSA, ISF, Swiss SF, Israel-USA Binational Science Foundation

Panel Work: NSF Combinatorics panels, NSA Discrete Mathematics panels, SODA 2007 Program Committee

Books: “*Discrete Geometry and Convex Polyhedra*”, Cambridge U. Press
to appear (430 pp., available from my web page)

Journal Publications:

1. (with A.E. Postnikov) “*Enumeration of the spanning trees of some graphs*” (Russian) Uspekhi Mat.Nauk **45** (1990), no. 3(273), 193-194; translated in Russian Math. Surveys **45** (1990), no. 3, 220-221
2. (with A.A. Kirillov) “*Covariants of the symmetric group and its analogues in A. Weil algebras*” (Russian) Funktsional. Anal. i Prilozhen. **24** (1990), no. 3, 9-13; translated in Functional Anal. Appl. **24** (1990), no. 3, 172-176
3. (with A.V. Stoyanovskii) “*Bijjective proof of the hook formula and its analogues*”(Russian) Funktsional. Anal. i Prilozhen. **26** (1992), no. 3, 80-82; translated in Functional Anal. Appl. **26** (1992), no. 3, 216-218
4. (with A.E. Postnikov) “*Resolvents for S_n -modules that correspond to skew hooks, and combinatorial applications*” (Russian) Funktsional. Anal. i Prilozhen. **28** (1994), no. 2, 72-75; translated in Functional Anal. Appl. **28** (1994), no. 2, 132-134
5. (with A.G. Kuznetsov, A.E. Postnikov) “*Increasing trees and alternating permutations*” (Russian) Uspekhi Mat. Nauk **49** (1994), no. 6(300), 79-110; translated in Russian Math. Surveys **49** (1994)

6. (with A.E. Postnikov) “*Transversal matroids and strata on a Grassmannian*” (Russian) Funktional. Anal. i Prilozhen. **29** (1995), no. 2, 84-88; translated in Funct. Anal. Appl. **29** (1995), no. 2, 140-143
7. (with A.G. Kuznetsov, A.E. Postnikov) “*Trees associated with the Motzkin numbers*”, J. Combin. Theory (Ser. A) **76** (1996), no. 1, 145-147
8. (with A.E. Postnikov) “*A generalization of Sylvester's identity*”, Discrete Math. **178** (1998), no. 1-3, 277-281
9. (with J.-C. Novelli, A.V. Stoyanovskii) “*A direct bijective proof of the hook-length formula*”, Discrete Math. Theor. Comput. Sci. **1** (1997), no. 1, 53-67 (first invited issue)
10. “*Random walks on finite groups with few random generators*”, Electron. J. Probab. **4** (1999), 11 pp.
11. “*Reduced decompositions of permutations in terms of star transpositions, generalized Catalan numbers and k -ary trees*”, Discrete Math. **204** (1999), no. 1-3, 329-335 (Special volume dedicated to J. Gould)
12. “*Ribbon tile invariants*”, Trans. Amer. Math. Soc. **352** (2000), no. 12, 5525-5561
13. (with S. Bratus) “*Fast constructive recognition of a black box group isomorphic to S_n or A_n using Goldbach conjecture*” (1997), J. Symbolic Comp. **29** (2000), no. 1, 33-57
- 13a “*On the fraction of Goldbach elements in a symmetric group*”, appendix to the previous paper, *ibid.*
14. (with R. Muchnik) “*On tilings by ribbon tetrominoes*”, J. Combin. Theory (Ser. A) **88** (1999), no. 1, 188-193
15. “*Two random walks on upper triangular matrices*”, J. Theor. Probab. **13** (2000), 1083-1100
16. (with Van H. Vu) “*On finite geometric random walks and probabilistic combinatorics*”, Discrete Appl. Math. **110** (2001), 251-272
17. (with D. Coppersmith) “*Random walk on upper triangular matrices mixes rapidly*”, Theor. Probab. Related Fields **117** (2000), no. 3, 407-417
18. (with R. Muchnik) “*On growth of Grigorchuk groups*” Intern. J. Algebra Comp. **11** (2001), 1-17
19. (with R. Muchnik) “*Percolation on Grigorchuk groups*” (1999), Comm. Algebra. **29** (2001), 661-671
20. “*Four questions on Birkhoff polytope*”, Ann. Comb. **4** (2000), no. 1, 83--90
21. “*On the number of faces of certain transportation polytopes*”, Europ. J. Comb. **21** (2000), 689-694
22. “*Hook length formula and geometric combinatorics*”, Sém. Lothar. Combin. **46** (2001/02), Art. B46f.
23. (with T. Smirnova-Nagnibeda) “*On non-uniqueness of percolation on nonamenable Cayley graphs*” Comptes Rendus de l'Académie des Sciences (Series I - Mathematics) **330** (2000), no. 6, 495-500
24. (with A. Lubotzky) “*The product replacement algorithm and Kazhdan's property (T)*”, Journal of AMS, vol. **52** (2000), no. 12, 5525-5561”
25. “*Tile invariants: New horizons*”, Theor. Comp. Sci **303** (2003), 303-331
26. (with C. Moore) “*Ribbon tile invariants from signed area*”, J. Comb. Theory, Ser A. **98** (2002), 1-16
27. (with N. Lulov) “*Rapidly mixing random walks and bounds on characters of the symmetric group*”, J. Algebraic Comb. **16** (2002), 151-163

28. "On Fine's partition theorems, Dyson, Andrews, and missed opportunities", Math. Intelligencer **25** (2003), 10-16
29. (with R. Guralnick) "On a question of B. H. Neumann", Proc. Amer. Math. Soc. **131** (2003), 2021-2025
30. (with A. Zuk) "On Kazhdan constants and mixing of random walks", Int. Math. Res. Not. **36** (2002), 1891-1905
31. (with S. Elizalde) "Bijections for refined restricted permutations", J. Comb. Theory Ser. A., **105** (2004), 207-219
32. "Partition Bijections, A Survey", Ramanujan Journal **12** (2006), 5-75.
33. "Partition Identities and Geometric Bijections", Proc. AMS. **132** (2004), 3457-3462
34. (with C. Bessenrodt) "Partition congruences by involutions", Europ. J. Combin. **25** (2004), 1139-1149
35. "The nature of partition bijections I. Involutions", Adv. in Applied Math **33** (2004), 263-289
36. (with M. Korn) "Tilings of rectangles with T-tetrominoes", Theor. Comp. Science **319** (2004), 3-27
37. (with L. Babai) "Strong bias of group generators: an obstacle to the "product replacement algorithm", J. Algorithms **50** (2004), 215-231 (special invited SODA volume)
38. (with M. Korn) "Combinatorial evaluations of the Tutte polynomial", (2006) submitted to Proc. L.M.S.
39. (with E. Miller) "Metric combinatorics of convex polyhedra: cut loci and nonoverlapping unfoldings", Discrete and Comp. Geometry **39** (2008), 339-388, special 30th anniversary issue.
40. (with E. Vallejo) "Combinatorics and geometry of Littlewood-Richardson cones", Europ. J. Combinatorics, **26** (2005), 995-1008.
41. (with M. Fedorchuk) "Rigidity and polynomial invariants of convex polytopes", Duke J. Mathematics **129** (2005), 371-404.
42. (with S. Chmutov) "The Kauffman bracket and the Bollobas-Riordan polynomial of ribbon graphs", Moscow Math. Journal **7** (2007), 409-418; special issue dedicated to A. Khovanskii.
43. (with E. Vallejo) "Reductions of Young tableau bijections", SIAM Disc. Math. **24** (2010), 113-145.
44. "Stability of partition bijections" (2007), preprint
45. (with C. Boulet) "A combinatorial proof of the Rogers-Ramanujan and Schur identities" J. Comb. Theory Ser. A. **113** (2006), 119-130.
46. "A short proof of rigidity of convex polytopes", Siberian J. Mathematics **47** (2006), 859-864.
47. "The area of cyclic polygons: Recent progress on Robbins conjecture", Adv. in Applied Math **34** (2005), 690-696; special issue in memory of David Robbins.
48. (with C. Malon) "Percolation on Finite Cayley Graphs", Combinatorics, Probability and Computing **15** (2006), 571-588.
49. (with A. Gamburd) "Expansion of product replacement graphs", Combinatorica **26** (2006), 411-429.
50. (with P. Etingof) "An algebraic extension of the MacMahon Master Theorem" Proc. A.M.S. **136** (2008), 2279-2288
51. "Inflating the cube without stretching", Amer. Math. Monthly. **115** (2008) 443-445.

52. (with R. Radoicic) “Hamiltonian paths in Cayley graphs”, Discrete Math. **309** (2009, special issue), 5501-5508.
53. (with R. Grigorchuk) “Groups of Intermediate Growth: an Introduction for Beginners”, L’Enseignement Mathématique **54** (2008), 251-272.
54. “Inflating polyhedral surfaces”, Math. Ann., under revision
55. (with M. Konvalinka) “Non-commutative extensions of the MacMahon Master Theorem”, Adv. Math. **216** (2007), 29-61.
56. (with M. Konvalinka) “Geometry and Complexity of O’Hara’s Algorithm” Adv. Applied Math. **42** (2009), 157-172
57. (with A. Redlich) “Long cycles in abc-permutations”, FAOM **2** (2008), 87-92.
58. (with J.-M. Schlenker) “Profiles of inflated surfaces” (2008), Journal of Nonlinear Mathematical Physics. **17** (2010), 145–157.
59. “The discrete square peg problem” (2008), arXiv preprint.
60. (with I. Ciocan-Fontanine and M. Konvalinka), “The weighted hook length formula” J. Combin. Theory, Ser. A. **118** (2011), 1703-1717.
62. (with E. Kopczynski and P. Przytycki) “Acute triangulations of polyhedra and R^n ”, Combinatorica, **32** (2012), 85-110.
63. (with R. Pinchasi) “How to cut out a convex polyhedron”, Contributions to Discrete Math., to appear.
64. (with R. Pinchasi) “The collapsing walls theorem”, Amer. Math. Monthly, **119** (2012), 156-160
65. (with I. Ciocan-Fontanine and M. Konvalinka), “Quantum cohomology of $Hilbn(C^2)$ and the weighted hook walk on Young diagrams”, J. Algebra **349** (2012), 256-283
66. “Testing commutativity of a group and the power of randomization”, LMS J. Comput. Math. **15** (2012), 38-143.
67. (with G. Panova) “Strict unimodality of q -binomial coefficients”, C. R. Math. Acad. Sci. Paris, **351** (2013), 415-418.
68. (with M. Konvalinka) “Triangulations of Cayley and Tutte polytopes”, Adv. Math. **245** (2013), 1-33.
69. (with J. Yang) “Tiling simply connected regions with rectangles.”, J. Combin. Theory, Ser. A. **120** (2013), 1804–1816.
70. (with J. Yang) “The complexity of generalized domino tilings”, Electron. J. Combin. **20** (2013), Paper 12, 23 pp.
71. (with D. Vilenchik) “Constructing uniquely realizable graphs”, Discrete Comput. Geom. **50** (2013), 1051–1071.
72. (with M. Kassabov) “Groups of oscillating intermediate growth.”, Annals of Math. (2) **177** (2013), 1113–1145.
73. (with I. Gorodezky) “Generalized loop-erased random walks and approximate reachability”, Random Structures Algorithms **44** (2014), 201-223.
74. (with S. Miner) “The shape of random pattern-avoiding permutations”, Adv. in Appl. Math. **55** (2014), 86–130.
75. (with G. Panova) “Unimodality via Kronecker products”, J. Algebraic Combin. **40** (2014), 1103-1120.
76. (with M. Konvalinka) “Cayley compositions, partitions, polytopes, and geometric bijections.”, J. Combin. Theory Ser. A **123** (2014), 86-91.

78. (with T. Dokos) “*The expected shape of random doubly alternating Baxter permutations*”, Online J. Anal. Comb. **9** (2014), 1-12.
79. (with S. DeSalvo) “*Log-concavity of the partition function*”, Ramanujan Journal. **34** (2015), 61-73
80. (with A. Malyshev) “*Growth in product replacement graphs of Grigorchuk groups*”, Journal of Group Theory **18** (2015), 209-235.
81. (with A. Oren and R. Pinchasi) “*On the odd area of planar sets*”, Discrete & Computational Geometry **55** (2016), 715-724.
82. (with G. Panova), “*On the complexity of computing Kronecker coefficients*”, Computational Complexity, to appear (Published Online: September 2, 2015).
83. (with R. Pemantle), “*On the longest k -alternating subsequence*”, Electron. J. Combin. **22** (2015), Paper 1.48, 7 pp.
84. (with G. Panova and E. Vallejo), “*Kronecker products, characters, partitions, and the tensor square conjectures*”, Adv. Math. **288** (2016), 702–731.
85. (with A. Sheffer and M. Tassy), “*Fast domino tileability*”, Discrete & Computational Geometry. **56** (2016), 377–394.
86. (with S. Garrabrant), “*Words in linear groups, random walks, automata and P -recursiveness*”, Journal of Combinatorial Algebra **1** (2017), 127-144 (inaugural volume).
87. (with G. Panova), “*Bounds on Kronecker and q -binomial coefficients*”, J. Combin. Theory, Ser. A. **147** (2017), 1-17.
88. (with A. Morales and G. Panova) “*Hook formulas for skew shapes II. Combinatorial proofs and enumerative applications*”, SIAM Jour. Discrete Math. **31** (2017), 1953-1989.
89. (with A. Morales and G. Panova) “*Hook formulas for skew shapes I. q -analogues and bijections*”, J. Combin. Theory, Ser. A. **154** (2018), 350-405.
90. “How to Write a Clear Math Paper: Some 21st Century Tips”, Journal of Humanistic Mathematics, **8** (2018), 301-328.
91. (with A. Morales and G. Panova) “*Why is $\pi < 2\phi$?*”, Amer. Math. Monthly. **125** (2018), no. 8, 715-723.
92. (with A. Morales and G. Panova) “*Asymptotics of the number of standard Young tableaux of skew shape*”, European J. Combin. **70** (2018), 26-49.
93. (with S. Wilson) “*Skyscraper polytopes and realizations of plane triangulations*”, J. Combin. Theory, Ser. B **127** (2017), 82-110.
94. (with G. Panova) “*On the complexity of computing Kronecker coefficients*”, Computational Complexity **26** (2017), 1-36.
95. (with A. Malyshev) “*Lifts, derandomization, and diameters of Schreier graphs of Mealy automata*”, Combinatorica **37** (2017), 733–765.
96. (with A. Morales and G. Panova) “*Asymptotics of principal evaluations of Schubert polynomials for layered permutations*”, Proc. AMS. **147** (2019), 1377–1389.
97. (with G. Panova and D. Yeliussizov) “*On the largest Kronecker and Littlewood–Richardson coefficients*”, J. Combin. Theory, Ser. A., **165** (2019), 44–77.

98. (with G. Panova and D. Yeliussizov) “*Bounds on the largest Kronecker and induced multiplicities of finite groups*”, Comm. Algebra, **47** (2019), no. 8, 3264-3279.
99. (with A. Morales and G. Panova) “*Hook formulas for skew shapes III. Multivariate and product formulas*”, Algebraic Combinatorics, to appear.
100. (with D. Nguyen) “*The computational complexity of integer programming with alternations*”, Mathematics of Operations Research, to appear (published online 7 Aug 2019).
101. (with D. Nguyen) “*Enumeration of integer points in projections of unbounded polyhedra*”, SIAM J. Discrete Math. **32** (2018), no. 2, 986-1002.
102. (with D. Nguyen) “*Short Presburger arithmetic is hard*”, SIAM J. Comput. to appear.
103. (with D. Nguyen) “*VC-dimension of short Presburger formulas*”, Combinatorica, to appear (published online 13 March 2019).
104. (with D. Nguyen) “*Complexity of short generating functions*”, Forum Math. Sigma, **6** (2018), paper E1, 37 pages.
105. (with F. Petrov and V. Sokolov) “*Hook inequalities*”, Math. Intelligencer, to appear.
106. (with S. DeSalvo) “*Limit shapes via bijections*”, Combin. Probab. Comp. **28** (2019), no. 2, 187-240.
107. (with N. Chandgotia and M. Tassy) “*Kirszbraun-type theorems for graphs*”, J. Combin. Theory, Ser. B **137** (2019), 10-24.
108. “*Combinatorial inequalities*” (inaugural “Short stories” column), Notices of the AMS, **66** (2019), no. 7, 1109-1112.
109. (with S. Dittmer and H. Lyu) “*Phase transition in random contingency tables with non-uniform margins*”, Trans. AMS, to appear.

Refereed Conference Proceedings:

1. (with A. Postnikov) “*Enumeration of trees and one amazing Representation of S_n* ”, Proc. Eighth Formal Power Series and Algebraic Combinatorics (FPSAC’96) Conf., 1996, Minneapolis, Minnesota, 385-389
2. (with A. Postnikov) “*Oscillating Tableaux, $(S_p \times S_q)$ -modules, and Robinson-Schensted-Knuth correspondence*”, *ibid.*, 391-402
3. “*When and how n choose k* ”, Proc. DIMACS Workshop on Randomization Methods in Algorithm Design (P. Pardalos et. al. Eds.), AMS DIMACS Series, vol. 43, 1998, AMS, Providence, 191-238.
4. “*Ribbon tile invariants*”, Proc. 10th FPSAC 1998 Conf., Field Institute, Toronto, Canada, 505-512.
5. “*Using stopping times to bound mixing times*”, Proc. SODA 1999, Baltimore, Maryland, 953-954.
6. (with F. Chen, L. Lovasz) “*Lifting Markov Chains to Speed up Mixing*”, Proc. 31st STOC 1999, Atlanta, Georgia, 275-281.
7. (with S. Bratus) “*On sampling generating sets of finite groups and product replacement algorithm*”, Proc. ISSAC 1999, Vancouver, Canada, 91-96.

8. “*Random walks on finite groups with few random generators are expanders*”, Proc. 7th [ESA 1999](#), Prague, Czech Republic, in [Lecture Notes in Computer Science](#) (J. Nešetřil, Ed.), vol. 1643, Springer, Berlin, 1999.
9. (with L. Babai) “*Strong bias of group generators: an obstacle to the "product replacement algorithm"*”, Proc. 11th [SODA 2000](#), San Francisco, California, 627-635.
10. “*The product replacement is polynomial*”, Proc. 41st [FOCS 2000](#), Redondo Beach, California, 476-485.
11. (with A. Gamburd) “*Expansion of product replacement graphs*”, Proc. Thirteenth ACM-SIAM Symposium on Discrete Algorithms ([SODA'02](#)), 691-696
12. “*Mixing time and long paths in graphs*”, Proc. Thirteenth ACM-SIAM Symposium on Discrete Algorithms ([SODA'02](#)), 321-328
13. (with C. Malon) “*Percolation on Finite Cayley Graphs*”, Proc. “Random Structures and Algorithms” Conference ([RANDOM 2002](#)), 91-104
14. “*On sampling integer points in polyhedra*”, in “[Foundations of Computational Mathematics: Proceedings of Smalefest 2000](#)” (F. Cucker and J. M. Rojas, Editors), World Scientific, Singapore, 2002
15. “*What do we know about product replacement algorithm?*”, in “[Groups and Computation III](#)” (W. Kantor, A. Seress, eds.), deGruyter, Berlin, 2000, 301-347
16. (with M. Konvalinka) “*Non-Commutative Extensions of Classical Determinantal Identities*”, Proc. 19th [FPSAC Conf. 2007](#), Tianjin, China
17. (with G. Panova and E. Vallejo), “*Kronecker coefficients: the tensor square conjecture and unimodality*”, Proc 26th [FPSAC 2014](#), 149–160, Assoc. Discrete Math. Theor. Comput. Sci., Nancy, 2014.
18. (with D. Nguyen), “*Enumeration of integer points in projections of unbounded polyhedra*”, Proc. [IPCO 2017](#), Lecture Notes in Computer Science, vol. 10328, Springer, Cham, 417-429.
19. (with D. Nguyen), “*Complexity of short Presburger arithmetic*”, Proc. 49th [STOC 2017](#), 812-820.
20. (with D. Nguyen), “*The computational complexity of integer programming with alternations*”, Proc. 32nd [Complexity 2017](#) (CCC), LIPIcs, Dagstuhl, Germany, 2017, 6:1–6:18.
21. (with D. Nguyen), “*Short Presburger arithmetic is hard*”, Proc. 58th [FOCS 2017](#), IEEE, 37-48.
22. (with A. Morales and G. Panova) “*Product formulas for standard tableaux of a family of skew shapes*”, Proc. 30th [FPSAC 2018](#), published in [Sém. Lothar. Combin](#) **80B** (2018), Article #84, 12 pp.
23. “*Complexity problems in enumerative combinatorics*”, in [Proc. ICM Rio de Janeiro](#), Vol. 3 (2018), pp. 3139–3166.

Unpublished Manuscripts (mostly dated):

1. (with A. Postnikov, V. Retakh) “*Noncommutative Lagrange Inversion*” (1996), unpublished manuscript, available from the Home Page.
2. (with A. Postnikov) “*Hyperplane arrangements and higher Bruhat orders*” (1995), unpublished manuscript in Russian
3. (with A. Astashkevich) “*Random walks on nilpotent and solvable groups*” (1997), unpublished manuscript
4. “*On the graph of generating sets of a simple group*” (1999), unpublished manuscript

5. “*On probability of generating a finite group*” (1999), preprint
6. (with A. Kelmans, A. Postnikov) “*Tree and forest volumes of graphs*” (1999), DIMACS preprint
7. (with G. Cooperman) “*The product replacement graph on generating triples of permutations*” (2000), preprint.
8. (with A. Henriques) “*Volume-preserving PL-maps between polyhedra*” (2004), preprint
9. (with T. Lam and E. Miller) “*On the complexity of computing the tiling group*”, a manuscript

Invited Talks:

- | | |
|---------------|--|
| August 2019 | British Combinatorics Conference, plenary talk, Birmingham, UK
“ <i>Counting linear extensions and Young tableaux</i> ” |
| June 2019 | Workshop Groups and Group Rings, St. Petersburg, Russia
“ <i>Combinatorics of the growth and cogrowth sequences</i> ”

Combinatorics Seminar, POMI, St. Petersburg, Russia
“ <i>Counting standard Young tableaux</i> ”

Discrete Geometry Seminar, IPPI, Moscow, Russia
“ <i>Counting linear extensions</i> ”

Russian Workshop on Complexity and Model Theory, plenary talk
MFTI, Moscow, Russia
“ <i>Counting integer points in polytopes</i> ” |
| May 2019 | SoCA Discrete Mathematics Symposium, CMC, Claremont, CA
“ <i>Inequalities in Algebraic Combinatorics</i> ” |
| March 2019 | Combinatorics Seminar, UC Davis
“ <i>Counting contingency tables</i> ”

Asymptotic Algebraic Combinatorics Workshop, BIRS, Banff, CA
“ <i>Future of Combinatorics</i> ” panel (joint with Dan Romik, mod. by Greta Panova)

Asymptotic Algebraic Combinatorics Workshop, BIRS, Banff, CA
“ <i>On the largest Kronecker and Littlewood-Richardson coefficients</i> ”
(joint with Damir Yeliussizov) |
| February 2019 | Applied Math Colloquium, UCLA
“ <i>Sampling Contingency Tables</i> ” |
| January 2019 | Probability Seminar, UCLA
“ <i>Counting contingency tables</i> ” |
| December 2018 | <i>Erdős Lectures</i> , Hebrew University, Jerusalem
Lecture 1: “ <i>Counting linear extensions and Young tableaux</i> ”
Lecture 2: “ <i>Counting contingency tables</i> ”
Lecture 3: “ <i>Counting integer points in polytopes</i> ” |
| October 2018 | Colloquium, USC, Los Angeles, CA
“ <i>Counting walks in groups and graphs</i> ” |

September 2018 Colloquium, GA Tech, Atlanta, GA
"Counting integer points in polytopes"

Research Horizons Seminar, GA Tech, Atlanta, GA
"What is a formula?"

August 2018 ***International Congress of Mathematicians***, Rio de Janeiro, Brazil
"Complexity problems in enumerative combinatorics"

May 2018 IPAM Reunion Conference, Lake Arrowhead, CA
"Product replacement graphs"

March 2018 Combinatorics Seminar, USC, Los Angeles, CA
"Counting standard Young tableaux"

December 2017 Combinatorics Seminar, MIT & MSFT Research, Cambridge, MA
"Counting standard Young tableaux"

Colloquium, UMass, Amherst, MA
"Product formulas for the number of Young tableaux of skew shape"

Geometry Seminar, Brown University, Providence, RI
"Tiling spaces with congruent polyhedra"

November 2017 UC Davis Algebra and Discrete Mathematics Seminar
"Product formulas for the number of Young tableaux of skew shape"

FOCS 2017, Berkeley, CA
"Short Presburger arithmetic is hard"
(joint with D. Nguyen)

October 2017 Stanford Combinatorics Seminar, Palo Alto, CA
"Counting standard Young tableaux"

Visions Seminar, MSRI, Berkeley, CA
"What is a formula?"

San Francisco State Universality AGC Seminar, San Francisco, CA
"Tiling spaces with congruent polyhedra"

Geometric and Topological Combinatorics: Modern Techniques and Methods
MSRI Workshop, Berkeley, CA
"Complexity of counting integer points"

Writing Workshop, MSRI, Berkeley, CA
"How to write a clear math paper"

September 2017 Lattice walks at the Interface of Algebra, Analysis and Combinatorics
BIRS Workshop, Banff, Canada
"The combinatorics and complexity of integer sequences"

UC Berkeley Combinatorics Seminar, Berkeley, CA
"Asymptotics of the number of standard Young tableaux of skew shape"

August 2017 Lattice Points Seminar, MSRI, Berkeley, CA

- “Complexity of counting integer points in polytopes”*
- June 2017 IPCO 2017, Waterloo, Canada
“Enumeration of integer points in projections of unbounded polyhedra”
(joint with D. Nguyen)
- STOC 2017, Montreal, Canada
“Complexity of short Presburger arithmetic”
(joint with D. Nguyen)
- Computational Complexity Conference (CCC) 2017, Riga, Latvia
“The computational complexity of integer programming with alternations”
(joint with D. Nguyen)
- May 2017 UCLA Logic Seminar
“Complexity of the short Presburger arithmetic”
- December 2016 Algebraic Techniques for Combinatorial and Computational Geometry
IPAM Reunion Workshop, Lake Arrowhead, CA
“Order and Chaos in Geometry and Number Theory” (plenary talk)
“Combinatorics and Complexity of Short Generating Functions” (sectional talk)
- October 2016 UCLA Combinatorics Seminar
“Asymptotics of the number of standard Young tableaux of skew shape”
- September 2016 Kronecker Coefficients Conference, University College, London, UK
“Bounds of Kronecker and q -binomial coefficients”
- Geometry Seminar, University of Edinburgh, UK
“What is a Formula?”
- Combinatorics Seminar, University of Glasgow, UK
“What is a Formula?”
- Optimization Seminar, Cardiff University, UK
“How to prove Steinitz's theorem”
- Colloquium, University of Liverpool, UK
“What is a Formula?”
- Workshop on Amenability, AIM, San Jose, CA
“Cogrowth of infinite groups”
- Colloquium, Claremont Mckenna College, Claremont, CA
“What is a Formula?”
- July 2016 Mathematics of J. Matousek Conference, Charles University, Prague
“Computability and Enumeration”
- June 2016 **Lecture Series** at French Summer School on tilings (Oleron, France)
“Complexity of Finite Tilings” (3 lectures)
- October 2015 Logic Colloquium, UCLA
“Probability of return or random walks on linear groups”
- September 2015 **Yandex Public Lecture**, Moscow, Russia

- “How to Count Permutations”
- Probability Seminar, IPPI, Moscow, Russia
“Random walks on linear groups”
- July 2015 Algorithmic and Enumerative Combinatorics, Summer School, Hagenberg, Austria
“Computability and Enumeration” **lecture series** (5 lectures)
- Plenary talk, FPSAC Conference, KAIST, Daejeon, Korea
“Computability and Enumeration”
- March 2015 Colloquium, USC, Los Angeles, CA
“Counting words in linear groups”
- Computability, Analysis, and Geometry
BIRS Workshop, Banff, Canada
“Words in linear groups, random walks, automata and P-recursiveness”
- February 2015 Combinatorics Seminar, Caltech, Pasadena, CA
“What are nice combinatorial sequences?”
- January 2015 Probability Seminar, UCLA
“Probability of return or random walks on linear groups”
- November 2014 Plenary talk, IMA Workshop on Geometric and Algebraic Combinatorics
“Counting with Wang tiles”
- Workshop “Combinatorics and complexity of Kronecker coefficients”
AIM, Palo Alto, CA
Introductory lecture “Open problem on Kronecker coefficients”
- September 2014 Obervolfach Workshop “Discrete Geometry”
“Iterated bisection of simplices”
- 73rd Meeting of the Séminaire Lotharingien de Combinatoire, Strobl, Austria
Invited Lecture series “New Foundation of Combinatorial Theory”
Lecture 1: “What is a formula?”
Lecture 2: “What is a combinatorial interpretation?”
Lecture 3: “What is a nice bijection?”
- Colloquium, University of Virginia
“Universality theorems in Algebra and Geometry”
- Algebra Seminar, University of Virginia
“Growth of groups and Schreier graphs”
- Philadelphia Area Combinatorics Seminar, University of Pennsylvania
“Counting irrational tilings”
- Colloquium, Temple University
“Universality theorems in Algebra and Geometry”
- Colloquium, Stony Brook University
“Universality theorems in Algebra and Geometry”
- CS Theory Seminar, Stony Brook University

“How to prove Steinitz's theorem”

August 2014 IHES Mathematics Seminar, Paris, France
“Universality theorems in Algebra and Geometry”

June 2014 Invited talk, Richard Stanley 70th Birthday Conference
“Can irrational tilings give Catalan numbers?”

IPAM Reunion Workshop, Lake Arrowhead, CA
“Triangulations”

November 2013 Colloquium, Claremont Center for the Mathematical Sciences
“Finite Tilings”

September 2013 Combinatorics Seminar, University of Washington
“The shape of random pattern avoiding permutations”

Colloquium, University of Ljubljana
“Finite tilings”

August 2013 Algebra Seminar, University of Padua, Italy
“Oscillating growth of groups”

Berlin Discrete Geometry Seminar, TU Berlin, Germany
“How to prove Steinitz's theorem “

May 2013 Combinatorics Seminar, MIT Cambridge, MA
“Combinatorics and Complexity of Kronecker Coefficients”

Colloquium, Dartmouth College
“Finite Tilings”

Combinatorics Seminar, UC Davis
“The mysterious Littlewood-Richardson coefficients “

February 2013 Probability Seminar, UCLA
“Two new random Catalan structures”

January 2013 AMS Social Session “Discrete & Computational Geometry”
 Joint Mathematical Meeting, San Diego, CA
“Triangulation problems”

AMS Social Session “Discrete Geometry and Algebraic Combinatorics”
 Joint Mathematical Meeting, San Diego, CA
“Tiling with rectangles”

AMS Social Session “q-series in Mathematical Physics and Combinatorics”
 Joint Mathematical Meeting, San Diego, CA
“Cayley's partition identity”

AMS Social Session “Topological Combinatorics”
 Joint Mathematical Meeting, San Diego, CA
“Realization of polyhedral complexes”

September 2012 Geometry Seminar, Moscow State University, Russia

- “Problems in Combinatorial Geometry”*
- Topology Seminar, Moscow State University, Russia
“Realization of polyhedral complexes”
- August 2012 Yaroslavl international conference “Discrete Geometry” dedicated to centenary of A.D.Alexandrov, Yaroslavl, Russia
“Quantitative Steinitz Problem”
- Colloquium, Institute of Mathematics NAS of Ukraine, Kiev, Ukraine
“Growth of groups”
- July 2012 Series of 3 lectures, 2012 Summer School, Yaroslavl region, Russia
 Delaunay Laboratory, Yaroslavl University
“Triangulations of Convex Polytopes”
- June 2012 IPAM Reunion Conference, Lake Arrowhead, CA
“Finite tilings, a survey“
- May 2012 Workshop in Functional Analysis, UCLA
“Groups of intermediate growth”
- April 2012 Fourth Discrete Geometry and Algebraic Combinatorics
 University of Texas at Brownsville, TX
“Geometric realization of convex polyhedra and polyhedral complexes“
- Combinatorics Seminar, UCLA
“My favorite combinatorics conjectures“
- December 2011 Globus Seminar, Independent University of Moscow, Moscow, Russia
“Enumerative Combinatorics and Probability”
- October 2011 Plenary talk, AMS Meeting, Salt Lake City, Utah
“The future of combinatorial bijections”
- September 2011 Colloquium, University of Geneva, Switzerland
“Finite tilings”
- Discrete Geometry Seminar, EPFL, Lausanne, Switzerland
“How to draw in higher dimensions “
- Algebra Seminar, University of Geneva, Switzerland
“Oscillating growth on groups”
- Combinatorics Seminar, University of Strasburg
“Combinatorics of trees and triangulations of Cayley polytopes”
- Discrete Geometry Workshop, MFO, Obervolfach, Germany
“Finite tilings”
- July 2011 Additive Combinatorics Workshop, Cambridge University Newton Institute
 Gregynog Hall, Wales, UK
“The Product Replacement Algorithm”
- June 2011 IPAM Combinatorics Semester Reunion Conference, UCLA, Lake Arrowhead, LA
“Triangulations of Cayley and Tutte polytopes”

Permutation Patters 2011, invites plenary talk
"The Future of Bijections"

May 2011 Combinatorics Seminar, UC Berkeley, CA
"Finite tilings"

February 2011 UCLA Combinatorics Seminar, UCLA
"What is known about finite tilings?"

January 2011 Topological and Geometric Combinatorics Workshop, MFO, Obervolfach, Germany
"Unique colorability and universal rigidity"

August 2010 Geometry, Topology, Algebra and Number Theory, Applications Conference
dedicated to 120th anniversary of Boris Delone
"Acute triangulations of convex polytopes"

January 2010 Topology Seminar, UCLA
"Tutte Polynomial, Generalizations and Applications"

December 2009 Geometry Seminar, Independent University
"Acute triangulations of convex polytopes and the space"

November 2009 Colloquium, UC Davis, CA
"Random standard Young tableaux"

October 2009 Colloquium, USC, Los Angeles, CA
"Acute triangulations of convex polytopes"

September 2009 IPAM Semester in Combinatorics Combinatorics Tutorials, UCLA
Lecture 1: *"Tree bijections"*
Lecture 2: *"Partition bijections"*
Lecture 3: *"Young tableaux bijections"*

August 2009 3rd Latin American Congress of Mathematicians, Santiago, Chile
"Acute triangulations of convex polytopes"

Oded Schramm Memorial Conference, Microsoft Research
"Caged eggs and the rigidity of convex polyhedra"

May 2009 Theory Computer Science Seminar, University of Chicago, IL
"Geometry and complexity of partition bijections"

April 2009 Discrete Geometry Workshop, San Padre Island, Texas
"Folding and unfolding of convex polyhedra"

Colloquium, Temple University, Philadelphia, PA
"Inflating polyhedral surfaces"

Combinatorics Seminar, Texas A & M, College Station, TX
"MacMahon's master theorem and its generalizations"

March 2009 Combinatorics Seminar, University of Bordeaux, France
"MacMahon's master theorem and its generalizations"

Geometry Seminar, University of Toulouse, France

- “The algebra and geometry of finite tilings”*
- Combinatorics Seminar, Ecole Polytechnique, Paris, France
“Geometry and complexity of partition bijections”
- Combinatorics Seminar, Marne-le-Vallée University, France
“MacMahon's master theorem and its generalizations”
- Colloquium in Algebra and Combinatorics, University of Lisbon
“Geometry and complexity of partition bijections”
- Combinatorics Seminar, University of Coimbra, Portugal
“Geometry and complexity of partition bijections”
- February 2009
- Colloquium, Georgia Institute of Technology
“Geometry and complexity of partition bijections”
- Colloquium and **Fejes Tóth Lecture**, University of Calgary, Canada
“Inflating polyhedral surfaces”
- Discrete Mathematics Seminar, University of Calgary, Canada
“Rigidity of polytopes, areas of polygons, and the Robbins conjectures”
- Colloquium, University of Texas, Brownsville, TX
“Inflating polyhedral surfaces”
- Geometry Lecture Series**, University of Texas, Brownsville, TX
Lecture 1: *“Connectivity of triangulations by elementary flips”*
Lecture 2: *“Piecewise-linear Monge maps”*
- January 2009
- Discrete Differential Geometry Workshop, MFO, Obervolfach, Germany
“Discrete square peg problem”
- Geometry and Topology Seminar, University of Chicago, Chicago, IL
“Realization of polyhedral surfaces”
- November 2008
- Combinatorics Seminar, Penn State, State College, PA
“Geometry and complexity of O'Hara's bijection”
- MASS Colloquium, Penn State, State College, PA
“The square peg problem”
- October 2008
- Colloquium, UCLA, Los Angeles, CA
“Geometry and complexity of partition bijections”
- Univerisyt of Minnesota colloquium, Minneapolis, MN
“Rigidity of polytopes, areas of polygons, and the Robbins conjectures”
- March 2008
- Geometry and Topology Conference, UT Brownsville
“The square peg problem”
- January 2008
- Colloquium, University of Illinois Urbana-Champaign
“Inflating polyhedral surfaces”
- December 2007
- Discrete and Polyhedral Geometry Workshop, AIM, Palo Alto, CA
“Rigidity and Polyhedral Geometry”

June 2007 Discrete Differential Geometry Workshop, Berlin, Germany
"Inflating and realization of polyhedral surfaces"

February 2007 Geometric Combinatorics, Oberwolfach Meeting, Germany
"Inflating polyhedral surfaces"

January 2007 Special Colloquium, University of Minnesota, Minneapolis, MN
"Inflating polyhedral surfaces"

November 2007 Colloquium, Northwestern University, Evanston, IL
"The nature of partition bijections"

November 2006 Invited plenary talk, 16th Fall Workshop on *Computational Geometry*
 Smith College, Northampton, MA
"Inflating polyhedral surfaces"

October 2006 Invited plenary talk, HMC Conference on *Enumerative Combinatorics*
 Harvey Mudd College, Claremont, CA
"The MacMahon Master Theorem"

Colloquium, University of Texas, Austin
"The nature of partition bijections"

"Geometric Combinatorics" Special Session,
 AMS meeting, Cincinnati, OH
"Inflating polyhedral surfaces"

MIT Physical Mathematics Seminar, Cambridge, MA
"The ideal pillow shape"

September 2006 Probability Seminar, Cornell University, Ithaca, NY
"Generating random group elements"

Combinatorics and Geometry Seminar, Cornell University
"Inflating polyhedral surfaces"

May 2006 Discrete Mathematics and Knot Theory Seminar, GWU, Washington, DC
"The Tutte polynomial, generalizations, and connections to knots"

April 2006 "Discrete and Convex Geometry" Special Session,
 AMS Session, Durham, NH
"Isometric submersion of polyhedral surfaces"

February 2006 "Lie Groups, Representations and Discrete Mathematics" Conference
 IAS, Princeton, NJ, *"Generating random group elements"*

January 2006 Colloquium, University of Minnesota, Minneapolis, MN
"The nature of partition bijections"

Berlin Colloquium in Discrete Mathematics
 Freie Universität Berlin, Germany
"Combinatorics and geometry of convex polyhedra"

October 2005 "Algebraic and Geometric Combinatorics" Special Session,
 AMS meeting, Annandale-on-Hudson, NY
"Something old and something new on rigidity of convex polyhedra"

“Invariants of Graphs” Special Session,
 AMS meeting, Annandale-on-Hudson, NY
 “Evaluations of the Tutte polynomial”

Discrete Geometry Seminar, NYU, New York, NY
 “The geometry of convex polyhedra”

May 2005 Colloquium, Tel Aviv University, Tel Aviv, Israel
 “Convex polytopes, rigidity, and classical geometry”

Workshop on permutation patterns, Haifa University, Haifa, Israel
 “RSK revisited”

April 2005 Discrete Mathematics Seminar, Princeton University, Princeton, NJ
 “The nature of partition bijections”

March 2005 Discrete Geometry Seminar, NYU, New York, NY
 “Convex polytopes, rigidity, and classical geometry”

February 2005 Discrete Mathematics Day Conference, Wesleyan University, CT
 “The nature of partition bijections”

January 2005 “East Coast Combinatorics Conference”, UNB, Fredericton, NB, Canada
 “The nature of partition bijections”

Colloquium, Institute of Mathematics (UNAM), Morelia, Mich. MEXICO
 “Introduction to finite tilings”

University of Geneva Colloquium, Geneva, Switzerland
 “The nature of partition bijections”

December 2004 Computer Science Colloquium, Haifa University, Haifa, Israel
 “What do combinatorialists do?”

Probability Seminar, The Technion, Haifa, Israel
 “Random walks on finite groups”

Colloquium, Ben Gurion University, Beer Sheba, Israel
 “Generating random groups elements”

November 2004 Basic Notions Seminar, Hebrew University, Jerusalem, Israel
 “The nature of partition bijections” (a series of 2 lectures)

Amitsur Algebra Seminar, Hebrew University, Jerusalem, Israel
 “The bias of group generators”

October 2004 Combinatorics Seminar, The Technion, Haifa, Israel
 “Finite tilings on a plane”

Combinatorics Seminar, Bar-Ilan University, Israel
 “Combinatorial proofs of Euler’s and Rogers-Ramanujan’s identities”

Colloquium, Hebrew University, Jerusalem, Israel
 “Convex polytopes, rigidity, and classical geometry”

Combinatorics Seminar, Hebrew University, Jerusalem, Israel

- "Finite tilings on a plane"*
- September 2004 Combinatorics Seminar, Moscow Independent University, Moscow, Russia
"The nature of partition bijections"
- "Globus Seminar", a colloquium at Moscow Independent University, Russia
"Finite tilings on a plane"
- Combinatorics and Representation Theory Seminar,
POMI, Russian Academy of Sciences, St. Petersburg, Russia
"The nature of partition bijections"
- June 2004 Richard Stanley Birthday Conference, MIT, Cambridge, MA
"Rigidity and polynomial invariants of convex polytopes"
- Algebra and Combinatorics Seminar, University of Rome 2, Italy
"Hook length formula and geometric combinatorics"
- Combinatorics Seminar, University of Florence, Italy
"The nature of Partition Bijections"
- March 2004 Combinatorics and Geometry Seminar, Steklov Institute and
Moscow State University, Moscow, Russia
"Nonoverlapping unfoldings of convex polyhedra"
- Geometry Seminar, Moscow State University, Moscow, Russia
"Rigidity of polytopes, Sabitov polynomials and the Robbins' Conjecture"
- February 2004 Combinatorics and Geometry Seminar, Cornell University
"Nonoverlapping unfoldings of convex polyhedra"
- Everyperson Seminar, Brandeis, Waltham, MA
"The nature of Partition Bijections"
- Fellowship of Ring Seminar, Brandeis
"Nonoverlapping unfoldings of convex polyhedra"
- January 2004 "Groups and Expanders", IPAM workshop
"The Product Replacement Algorithm: an update"
- AMS Joint Meeting, Phoenix, Arizona
"Combinatorial evaluations of the Tutte polynomial"
- October 2003 Geometry and Topology Seminar, University of Chicago, IL
"Nonoverlapping unfoldings of convex polyhedra"
- Basic Notions, Northeastern University, Boston, MA
"The nature of partition bijections"
- September 2003 Colloque des Sciences Mathematiques du Quebec, Montreal, Canada
"The nature of partition bijections"
- Combinatorics Seminar, UQAM, Montreal, Canada
"Hook length formula and geometric combinatorics"
- July 2003 "Groups and Probability" Conference, Budapest, Hungary
"Percolation on finite Cayley graphs"

- “XV Coloquio Latinoamericano de Algebra”, Mexico City
“Young tableau bijections”
- March 2003 “Groups and Computation IV” Conference, Columbus, Ohio
“Combinatorics and Probability on finite groups”
- January 2003 Algebra and Number Theory Seminar, Penn State
“The nature of partition bijections”
- Probability Seminar, UCLA, Los Angeles, CA
“Combinatorics and Probability on finite groups”
- December 2002 Invited lecture series, “Percolation on Groups” Conference,
 Neuchatel, Switzerland, *“Percolation on finite groups”*
- June 2002 CMS Summer Meeting, Quebec City, Canada
“Combinatorics and Algebra of Partitions Bijections”
- May 2002 Algebra Seminar, Rutgers University, New Brunswick, NJ
“Combinatorics of finite Cayley Graphs”
- Combinatorics Seminar, Princeton University, Princeton, NJ
“Hook length formula and geometric combinatorics”
- Group Theory and Topology Seminar, Vanderbilt University, Nashville, TN
“Combinatorics of finite Cayley graphs”
- March 2002 Colloquium, Department of Mathematics, SUNY Albany, New York
“Graphs, groups and expanders”
- AMS Special Section on Algebraic Combinatorics, Atlanta, Georgia
“Combinatorics of Product Replacement Graphs”
- Invited plenary talk, CombinaTexas Conference, Dayton, Texas
“Groups, graphs, and random walks”
- February 2002 Colloquium, Department of Mathematics, University of Toronto, Canada
“Graphs, groups and expanders”
- January 2002 Twelfth Annual ACM-SIAM Symposium on Discrete Algorithms (SODA)
“Mixing Time and Long Paths in Graphs”
- Twelfth Annual ACM-SIAM Symposium on Discrete Algorithms (SODA)
“Expansion of Product Replacement Graphs” (joint with A. Gamburd)
- December 2001 Everyperson Seminar, Brandeis University, Waltham, MA
“Graphs, groups and expanders”
- October 2001 Invited presentation at “Teoria Dei Gruppi e Applicazioni”, Brescia, Italy
“Cayley graphs and expanders”
- Combinatorics Seminar, MIT, Cambridge, MA
“Hook length formula and geometric combinatorics”
- July 2001 Durham Symposium “Groups, Geometry and Combinatorics”, Durham, UK
“The product replacement algorithm”

- May 2001
- Colloquium, Institute of Mathematics (UNAM), Morelia, Mich. MEXICO
"Computation on Groups: A Survey"
- Algebra Seminar, Institute of Mathematics (UNAM), Morelia, MEXICO
"Hook length formula and geometric combinatorics"
- Fifth Joint AMS-SMM meeting, Morelia, Mich. MEXICO
"Combinatorics and Graph Theory" Special Session
"Ribbon Tile Invariants"
- Theory Seminar, Microsoft Research, Microsoft Corp., Redmont, WA
"Blind algorithms and Markov chains"
- Joint session of Algebra and Combinatorics Seminar
University of Washington, Seattle, WA
"Hook length formula and geometric combinatorics"
- April 2001
- Algebra Seminar, Department of Mathematics, Caltech, Pasadena, CA
"Probability on generating sets of groups"
- Discrete Mathematics and Optimization Seminar, UC Davis, CA
"Mixing of Markov chains and their liftings"
- Mathematical Physics Seminar, Department of Mathematics, UC Davis, CA
"Everything you always wanted to know about RSK"
- Joint session of Group Algorithms and Probability Seminars
Department of Mathematics, University of Oregon, Eugene, OR
"Generating random group elements"
- March 2001
- Geometric Group Theory Seminar, Department of Mathematics, UC Berkeley
"Graphs on generating sets of groups"
- Probability and Statistics Seminar, Stanford University, CA
"Blind algorithms and Markov chains"
- Number Theory Seminar, Department of Mathematics, UC Berkeley
"Computation on groups and Goldbach conjecture"
- Probability Seminar, Department of Statistics, UC Berkeley, Berkeley, CA
"Mixing of self-reducible Markov chains"
- Combinatorics Seminar, UC Berkeley, Berkeley, CA
"The hook length formula"
- February 2001
- Random Walks and Statistical Physics Workshop
Erwin Schrödinger Institute (ESI), Vienna, AUSTRIA
"Random walks on groups and stopping times"
- Combinatorics Seminar, Graduate Center, CUNY, New York, NY
"Ribbon Tile Invariants"
- January 2001
- Colloquium, Statistics Department, Harvard University, Cambridge, MA
"Mixing of Markov Chains: What Can Be Proved"

IAP Lecture Series, Department of Mathematics, MIT, Cambridge, MA
“Combinatorics of Tilings”

December 2000 Workshop “Probabilistic Methods in Group Theory”, CCNY, New York, NY
“Testing group properties: Probabilistic and algorithmic approaches”

Magnus Group Theory Seminar, Graduate Center, CUNY, New York, NY
“Probability on finite groups”

November 2000 IEEE 41st Annual Symposium on Foundations of Computer Science (FOCS)
 Redondo Beach, CA, *“The product replacement algorithm is polynomial”*

October 2000 Combinatorics Seminar, Department of Mathematics, MIT, Cambridge, MA
“Ribbon tile invariants. The prequel and the sequel.” The series of two lectures.

September 2000 Theory of Computation Seminar, Laboratory of Computer Science,
 MIT, Cambridge, MA, *“Generating random elements in finite groups
 And the product replacement algorithm”*

July 2000 Research Seminar, IAS/Park City Mathematics Institute, Princeton, NJ
“Computation on groups: birds eye view”

“International Conference on Foundations of Computational Mathematics
 Celebrating Steve Smale's 70th birthday”, City University of Hong Kong, HK
“Generating random group elements”

Number Theory Seminar, University of Bordeaux-I, France
“Computation on groups and Goldbach Conjecture”

June 2000 Combinatorics Colloquium, Laboratory for Research in Computer Science
 University of Bordeaux-I, France, *“Ribbon Tile Invariants”*

The Fifth International Petrozavodsk Conference "Probabilistic Methods
 in Discrete Mathematics", Petrozavodsk, Russia
“Combinatorics and Probability on Finite Groups”

May 2000 “Asymptotic Group Theory and Related Topics” Conference, Institute
 of Advanced Studies, Hebrew University of Jerusalem, Israel
“On the product replacement algorithm”

April 2000 Probability Seminar, Duke University, Durham, NC
“Probability and computation on groups”

February 2000 Colloquium, Rutgers University, New Brunswick, NJ
“Combinatorics, probability and computation on groups”

Invited Presentation, University of Cambridge, UK
“Recent progress on Product Replacement Algorithm”

Colloquium, University of Utah, Salt Lake City, UT
“Combinatorics, probability and computation on groups”

January 2000 MSRI Workshop on Noncommutative Algebra, Berkeley, California
“Generating random elements in finite groups”

Colloquium, University of California at Davis

- “Combinatorics, probability and computation on groups”*
- Colloquium, Rice University, Houston, TX
“Combinatorics, probability and computation on groups”
- Colloquium, University of Washington at Seattle
“Combinatorics, probability and computation on groups”
- Theory Seminar, Microsoft Research, Redmond, WA
“On Product Replacement Algorithm”
- Colloquium, University of Illinois at Chicago
“Combinatorics, probability and computation on groups”
- Eleventh Annual ACM-SIAM Symposium on Discrete Algorithms (SODA)
“Strong Bias of Group Generators: an Obstacle to the “Product Replacement Algorithm” (joint with L. Babai)
- December 1999 Colloquium, Texas A&M University
“Combinatorics, probability and computation on groups”
- November 1999 Series of Lectures at CUNY and New York Algebra Seminar, New York City
“Probability on finite and infinite groups”
- October 1999 Mathematics Department Colloquium, Cornell University, Ithaca, New York
“Probability of generating a group”
- DIMACS Workshop on Pseudorandomness and Explicit Combinatorial Constructions, Rutgers University, New Brunswick, New Jersey
“Generating random group elements by product replacement algorithm”
- July 1999 International Symposium on Symbolic and Algebraic Computation (ISSAC)
“On sampling generating sets of finite groups product replacement algorithm” (joint with S. Bratus)
- Seventh European Symposium on Algorithms (ESA), Prague, Czech Republic
“Random Cayley graphs with $O(\log G)$ generators are expanders”
- Symposium on Computation in Group Theory and Geometry, University of Warwick, Coventry, UK
“Probability and growth of groups”
- June 1999 “Groups and Computation” Conference, Ohio State U, Columbus, Ohio
“What do we know about product replacement algorithm?”
- Eleventh Formal Power Series and Algebraic Combinatorics Conference (FPSAC) Barcelona, Spain: *“Mixing of finite geometric random walks and cutoff phenomenon”* (joint with Van Vu)
- May 1999 Thirty-First Annual ACM Symposium on Theory of Computing (STOC) Atlanta, Georgia: *“Lifting Markov Chains to Speed up Mixing”*
- April 1999 Combinatorics Seminar, Royal Institute of Technology, Stockholm, Sweden
“Ribbon Tile Invariant and Thurston’s Algorithm”
- Algebra Seminar, Hebrew University of Jerusalem, Jerusalem, Israel

- “On probability of generating a finite group”*
- Combinatorics Seminar, Department of Mathematics, Bar Ilan University, Israel
“Hook-length formula and Robinson-Schensted-Knuth correspondence”
- Colloquium, Department of Mathematics, Bar Ilan University, Israel
“Old and New Results on Domino Tilings”
- March 1999 Theoretical Computer Science Seminar, University of Chicago, Illinois
“Generating random group elements by random walks”
- Algebra Seminar, University of Chicago, Illinois
“Probability on groups”
- February 1999 Dynamical Systems Seminar, Yale University, New Haven, Connecticut
“Product replacement algorithm and random walks on $SL(n, Z)$ ”
(a series of two talks)
- Special Lecture, Stanford University, Palo Alto, California
“Random walks on groups: Stopping time technique”
- MIT Combinatorics Seminar, MIT, Cambridge, Massachusetts
“Mixing of random walks and random matroid processes”
- Mathematics Colloquium, University of Arizona, Tucson
“Mixing of Random Walks”
- Algebra & Number Theory Seminar, University of Arizona, Tucson
“Random Walks on Groups”
- January 1999 Tenth Annual ACM-SIAM Symposium on Discrete Algorithms (SODA)
“Using Stopping Times to Bound Mixing Times”
- Joint Mathematics Meeting (AMS, MAA, SIAM) San Antonio, Texas
“Random walks on groups: how fast they mix and how to speed them up”
- November 1998 Mathematical Physics Seminar, Rutgers University, New Jersey
“Random walk on finite groups and asymmetric exclusion processes”
- Mathematical Sciences Seminar, IBM Research, Yorktown Heights, New York
“Mixing of random walks”
- October 1998 Probability Seminar, City University of New York (CUNY)
“Stopping time technique”
- September 1998 Discrete Mathematics Seminar, Yale University, New Haven, Connecticut
“Random walks of finite groups with few random generators mix rapidly”
- July 1998 Probability Seminar, University of Wisconsin, Madison, Wisconsin
“Random walks on groups: strong uniform time approach”
- June 1998 Tenth International Conference on Formal Power Series and Algebraic
Combinatorics (FPSAC), Fields Institute, Toronto, Canada
“Ribbon tile invariants”
- April 1998 Princeton University Combinatorics Seminar, Princeton, New Jersey

“Ribbon Tile Invariants”

- March 1998 Theory Seminar in Computer Science, UC Berkeley, California
“Random walks on groups: new results and applications”
Discrete Mathematics Seminar, Yale University, New Haven, Connecticut
“Tilings problems and invariants of ribbon tiles”
- February 1998 Algebra Seminar, Yale University, New Haven, Connecticut
“Old and new results in representation theory of symmetric groups”
(the series of two talks)
- December 1997 DIMACS Workshop on Randomized Algorithms,
Rutgers University New Brunswick, New Jersey
“Recognition of the black box group isomorphic to symmetric group”
- October 1997 Northeastern University Theory Seminar in Computer Science
Boston, Massachusetts: *“Stopping times and random walk on groups”*
- Combinatorics Seminar, MIT, Cambridge, Massachusetts
“Ribbon Tile Invariants”
- March 1997 DIMACS Workshop in Discrete Probability, Rutgers University, New Jersey
“Random walks on finite groups”
- January 1997 Joint Mathematics Meeting (AMS, MAA, SIAM) San Diego, California
“Strong uniform time approach” (cancelled due to the weather conditions)
- November 1996 Combinatorics Seminar, Northeastern University, Boston, Massachusetts
“Partition identities, bijections and Groebner bases”
- Combinatorics Seminar, MIT, Cambridge, Massachusetts
“New Bijective Proof of the Hook Length Formula”
- October 1996 Theory Seminar in Computer Science, Cornell University, Ithaca, New York
“Generating random matrices over the finite field”
- Probability Seminar, Cornell University, Ithaca, New York
“Random walks on groups: strong uniform time approach”
- AT&T Laboratories, Murray Hill, New Jersey
“Random walks on groups: strong uniform time approach”
- September 1996 Combinatorics Seminar, University of Michigan, Ann Arbor, Michigan
“All you always wanted to know about the Parking Representation”
- June 1996 Eighth Formal Power Series and Algebraic Combinatorics Conference (FPSAC)
University of Minnesota, Minneapolis, Minnesota
“One Amazing Representation of the Symmetric Group”
- Eighth SIAM Conference in Discrete Mathematics (DM)
John Hopkins University, Baltimore, Maryland
“New Bijective Proof of the Hook Length Formula”
- June 1995 Seventh Formal Power Series and Algebraic Combinatorics Conference
(FPSAC) Paris, France: *“Noncommutative Lagrange Inversion”*

(co-organizer)

May 2001

“*Algebraic Combinatorics*” Special Section,
Joint AMS-SMM Meeting, Mexico City, Mexico

Long Term Visits:

Win'20, Program Participant, IML, Stockholm, Sweden
Fall'17 Research Professorship, MSRI, Berkeley, CA
Fall'04 Sabbatical at Hebrew University, Jerusalem, Israel

UC Service:

PPFP Academic Retreat, Lake Arrowhead, CA (April 2017)
“Presentations & Constructive Evaluation” lecture series
Jobs in the sciences and diversity issues panels

UCLA Mathematics Department Service:

Staff Search (2013-2016, 2018-2019)
Colloquium Chair (2015-2016)
Graduate Studies (2012-2014, 2018-2019)
Graduate Advising (2014-2017)
Graduate Admissions (2012-2014)
ATC and Thesis committees (20+ students in Math and CS)

UCLA Senate Service:

Undergraduate Council (2012-2015)
Committee on Curriculum (2014-2016)
Committee on Instructional Technology (2012-2014)
Ad hoc Committee on Online Teaching (Spring 2014)
Co-wrote UCLA Online Education Policy (Spring 2014)
Eight Year Review of OID (Fall 2013)
Eight Year Review of Political Science (Winter 2015)

Past Service:

Graduate committee, UMN (Academic year 2008-09)
Hiring Committee, UMN (Academic year 2008-09)
Postdoctoral Search Committee, UMN (Academic year 2007-08)
MIT Combinatorics Seminar Organizer (twice a week, 2001-07)
Johnson Prize Committee, MIT (Spring 2003, 04)
Graduate Admissions, MIT (Spring 2003, 04, 05)
Thesis committees (Boulet, Bushueva, Elizalde, Korn, Liu, Radoicic, Varvak)
Senior thesis: Timothy Justin, UMN (Fall 2008)

UCLA Math Circle Lectures:

“*Inscribed Figures*” (2 lectures, Spring 2013)
“*Spherical Geometry*” (2 lectures, Fall 2010)

Personal:

Born in Moscow, Russia
Naturalized US citizen

Last Updated:

August 29, 2019