

Dan Romik

Publication list

Date last updated: November 30, 2023

Downloadable versions of the publications listed below can be found on my publications page <https://www.math.ucdavis.edu/~romik/publications/>.

Books

- The Surprising Mathematics of Longest Increasing Subsequences. Cambridge University Press, 2015.
- Topics in Complex Analysis. De Gruyter, 2023.
- An Invitation to MadHat and Mathematical Typesetting. Association for Mathematical Research, 2023.

Selected journal publications

- On Viazovska's modular form inequalities. *Proceedings of the National Academy of Sciences (USA)* 120 (2023), article e2304891120.
- Gravitational allocation to Poisson points (joint with Sourav Chatterjee, Ron Peled and Yuval Peres). *Annals of Mathematics* 172 (2010), 617–671.
- Improved upper bounds in the moving sofa problem (joint with Yoav Kallus). *Advances in Mathematics* 340 (2018), 960–982.
- Absorbing time asymptotics in the oriented swap process (joint with Alexey Bufetov and Vadim Gorin). *Annals of Applied Probability* 32 (2022), 753–763.
- The oriented swap process (joint with Omer Angel and Alexander E. Holroyd). *Annals of Probability* 37 (2009), 1970–1998.

Journal publications (complete list)

42. On Viazovska's modular form inequalities. *Proceedings of the National Academy of Sciences (USA)* 120 (2023), article e2304891120.
41. The oriented swap process and last passage percolation (joint with Elia Bisi, Fabio Cunden and Shane Gibbons). *Random Struct. Algor.* 60 (2022), 690–715.
40. Absorbing time asymptotics in the oriented swap process (joint with Alexey Bufetov and Vadim Gorin). *Ann. Appl. Probab.* 32 (2022), 753–763.

39. Orthogonal polynomial expansions for the Riemann xi function in the Hermite, Meixner-Pollaczek, and continuous Hahn bases. *Acta Arithmetica* 200 (2021), 259–329. (A longer version of the same paper, titled “Orthogonal polynomial expansions for the Riemann xi function” exists in preprint form.)
38. Alternative summation orders for the Eisenstein series G_2 and Weierstrass \wp -function (joint with Robert Scherer). *Rocky Mountain J. Math.* 50 (2020) 1473–1482.
37. The Taylor coefficients of the Jacobi theta constant θ_3 . *Ramanujan J.* 52 (2020), 275–290.
36. Improved upper bounds in the moving sofa problem (joint with Yoav Kallus). *Adv. Math.* 340 (2018), 960–982.
35. Differential equations and exact solutions in the moving sofa problem. *Experimental Math.* 27 (2018), 316–330.
34. On the number of n -dimensional representations of $SU(3)$, the Bernoulli numbers, and the Witten zeta function. *Acta Arithmetica* 180 (2017), 111–159.
33. Bijective combinatorial proof of the commutation of transfer matrices in the dense $O(1)$ loop model (joint with Ron Peled). *Séminaire Lotharingien de Combinatoire* 73 (2015), B73b.
32. Limit shapes of bumping routes in the Robinson-Schensted correspondence (joint with Piotr Śniady). *Random Struct. Alg.* 48 (2016), 171–182.
31. Connectivity patterns in loop percolation I: the rationality phenomenon and constant term identities. *Commun. Math. Phys.* 330 (2014), 499–538.
30. Jeu de taquin dynamics on infinite Young tableaux and second class particles (joint with Piotr Śniady). *Ann. Probab.* 43 (2015), 682–737.
29. New enumeration formulas for alternating sign matrices and square ice partition functions (joint with Arvind Ayyer). *Adv. Math.* 235 (2013), 161–186.
28. Arctic circles, domino tilings and square Young tableaux. *Ann. Probab.* 40 (2012), 611–647.
27. Phase transitions in gravitational allocation (joint with Sourav Chatterjee, Ron Peled and Yuval Peres). *Geom. Funct. Anal.* 20 (2010), 870–917.
26. A formula for a doubly refined enumeration of alternating sign matrices (joint with Matan Karklinsky). *Adv. Appl. Math.* 45 (2010), 28–35.
25. More refined enumerations of alternating-sign matrices (joint with Ilse Fischer). *Adv. Math.* 222 (2009), 2004–2035.
24. The oriented swap process (joint with Omer Angel and Alexander E. Holroyd). *Ann. Probab.* 37 (2009), 1970–1998.

23. Enumeration formulas for Young tableaux in a diagonal strip (joint with Yuliy Baryshnikov). *Israel J. Math.* 178 (2010), 157–186.
22. Gravitational allocation to Poisson points (joint with Sourav Chatterjee, Ron Peled and Yuval Peres). *Annals of Math.* 172 (2010), 617–671.
21. Random sorting networks (joint with Omer Angel, Alexander E. Holroyd and Bálint Virág). *Adv. Math.* 215 (2007), 839–868.
20. The dynamics of Pythagorean triples. *Trans. Amer. Math. Soc.* 360 (2008), 6045–6064.
19. Integrals, probability and MacMahon’s theorem (joint with George Andrews, Henrik Eriksson and Fedor Petrov). *J. Comb. Theory Ser. A.* 114 (2007), 545–554.
18. Universal finitary codes with exponential tails (joint with Nate Harvey, Alexander Holroyd and Yuval Peres). *Proc. London Math. Soc.* 94 (2007), 475–496.
17. Shortest paths in the Tower of Hanoi graph and finite automata. *SIAM J. Disc. Math.* 20 (2006), 610–622.
16. The number of guillotine partitions in d dimensions (joint with Eyal Ackerman, Gill Barequet and Ron Pinter). *Inform. Proc. Lett.* 98 (2006), 162–167.
15. Random walks with k -wise independent increments (joint with Itai Benjamini and Gady Kozma). *Elec. Comm. Prob.* 11 (2006), 100–107.
14. Limit shapes for random square Young tableaux (joint with Boris Pittel). *Adv. Appl. Math.* 38 (2007), 164–209.
13. Permutations with short monotone subsequences. *Adv. Appl. Math.* 37 (2006), 501–510.
12. Waiting for a bat to fly by (in polynomial time) (joint with Itai Benjamini, Gady Kozma, László Lovász and Gábor Tardos). *Combinatorics, Probability and Computing.* 15 (2006), 673–683.
11. Roots of the derivative of a polynomial. *Amer. Math. Monthly* 112 (2005), 66–68.
10. Some formulas for the central trinomial and Motzkin numbers. *J. of Integer Sequences* 6 (2003), article 03.2.3.
9. The number of steps in the Robinson-Schensted algorithm. *Funct. Anal. Appl.* 39 (2005), 152–155.
8. On distributions computable by random walks on graphs (joint with Guy Kindler). *SIAM J. Disc. Math.* 17 (2004), 624–633. Also appeared in Proc. of the Fifteenth ACM-SIAM Symposium on Discrete Algorithms (SODA04), 124–131.

7. Integrals, partitions, and cellular automata (joint with Alexander E. Holroyd and Thomas Liggett). *Trans. Amer. Math. Soc.* 356 (2004), 3349–3368.
6. Partitions of n into $t\sqrt{n}$ parts. *Europ. J. of Combinatorics* 26 (2005), 1–17.
5. Explicit formulas for hook walks on continual Young diagrams. *Adv. Appl. Math.* 32 (2004), 625–654.
4. Projecting the surface measure of the sphere of ℓ_p^n (joint with Assaf Naor). *Ann. Inst. Henri Poincaré Prob. Stat.* 39 (2003), 241–261.
3. Some Comments on Euler’s Series for $\frac{\pi^2}{6}$, *The Math. Gazette*, July 2002, 281–284.
2. Stirling’s Approximation for $n!$: the Ultimate Short Proof? *Amer. Math. Monthly* 107 (2000), 556–557.
1. Sharp entropy bounds for discrete statistical simulation. *Statist. Probab. Lett.* 42 (1999), 219–227.

Publications in conference proceedings

- Sorting networks, staircase Young tableaux and last passage percolation (joint with Elia Bisi, Fabio Cunden and Shane Gibbons). In: Proceedings of the 32nd International Conference on Formal Power Series and Algebraic Combinatorics (FPSAC 2020). *Séminaire Lotharingien de Combinatoire* 84B.3 (2020), 12 pp.
- Local extrema in random permutations and the structure of longest alternating subsequences. In: Proceedings of the 23rd International Conference on Formal Power Series and Algebraic Combinatorics (FPSAC 2011). *Discr. Math. Theor. Comp. Sci.* Proceedings vol. AO (2011), 825–834.
- Permutations with short monotone subsequences. Proceedings of EuroComb 2005, *Discr. Math. Theor. Comp. Sci.* Proceedings vol. AE (2005), 57–62. (Extended abstract version of journal publication #13 listed above.)
- On distributions computable by random walks on graphs (joint with Guy Kindler). Proc. of the Fifteenth ACM-SIAM Symposium on Discrete Algorithms (SODA04), 124–131. (Extended abstract version of journal publication #8 listed above.)

Patents

- Method and apparatus for filtering data packets. U.S. Patent 8,355,324. Y. Baryshnikov, E. H. Grosse, D. Romik, F. X. Zane.

Software

I have developed and self-published the following mathematical software applications and packages:

- **MadHat** — mathematical typesetting software, 2021–2023.

Available at <https://madhat.design>

- Mac-based mathematical simulation apps:

- **ASM Simulator**, 2009.
- **Allocation**, 2008.
- **MacTableaux**, 2008.
- **MacSort**, 2008

Available at <https://www.math.ucdavis.edu/~romik/software/>

- Research software packages:

- **OrientedSwaps**, *Mathematica* package, 2019. Developed jointly with Elia Bisi, Fabio Cunden and Shane Gibbons.
- **SofaBounds**, Unix software application, 2017. Developed jointly with Yoav Kallus.
- **MovingSofas**, *Mathematica* package, 2016.
- **SU3-ASYM**, *Mathematica* package, 2015.
- The combinatorics of fully packed loops and Razumov-Stroganov conjectures, *Mathematica* package and slide presentation, 2014.
- **RefinedASM1234**, *Maple* package, 2012. Developed jointly with Arvind Ayer.
- **GammaDelta**, *Mathematica* package, 2012. Developed jointly with Arvind Ayer.
- **RefinedASM**, *Mathematica* package, 2009. Developed jointly with Ilse Fischer.

Available at <https://www.math.ucdavis.edu/~romik/software/>