

Curriculum Vitae of Vadim Gorin

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Born in 1986 in Moscow.

Education:

- Graduated from school 57 (Moscow) in 2003.
- 2003-2008, Moscow State University. B.S., M.S. in Mathematics.
- 2008-2011, Moscow State University; Independent University of Moscow; Utrecht University. *Candidate of sciences* and *PhD* in mathematics (2011).
Advisors: Grigori Olshanski, Boris Gurevich, Erik P. van den Ban, and Alexander Gnedin

Employment:

- Associate Professor at University of Wisconsin – Madison (2020-)
- Assistant Professor at Massachusetts Institute of Technology (2015–2020)
on leave at University of Wisconsin – Madison (2019–2020)
- CLE Moore Instructor at Massachusetts Institute of Technology (2012–2014)
- Postdoctoral Fellow at MSRI, University of California Berkeley (01/2012–05/2012)
- Researcher, Institute for Information Transmission Problems of Russian Academy of Sciences (since 2011)
- Junior Researcher, The Hydrological and Meteorological Research Centre (2007–2012)

Awards, scholarships and grants:

- Medal of Russian Academy of Sciences for young scientists (in 2018 competition)
- NSF Grant DMS-1855458 (DMS-1949820) (2019–2022)
- Young Scientist Prize of International Union of Pure and Applied Physics (2018)
- NEC Corporation Fund for Research in Computers and Communications (2017-2019)
- NSF Grant DMS-1664619: Focused Research Group “Integrable Probability”, joint with J. Baik, A. Borodin, I. Corwin, and L. Petrov (2017-2021)
- Sloan Research Fellowship (2016)
- Prize of Moscow Mathematical Society (2014)
- NSF Grant DMS-1407562 (2014-2017)
- RFBR-CNRS grants 10-01-93114 (2010 - 2012) and 11-01-93105 (2011-2013)
- Scholarship of “Dynasty” foundation for young mathematicians (2011)
- Grant “Development of the scientific potential of the higher school” (2010 - 2011)
- RFBR grant 07-01-91209 (2007-2009)
- Awards and scholarships in graduate/undergraduate years: IUM-Simons foundation scholarship (2011), Scholarship of the government of Russia (2010), scholarship of Independent University of Moscow (2009), A.N. Kolmogorov scholarship (2007-2008), silver prize of The Twelfth Moebius Contest (2008), winner of The Eleventh Moebius Contest (2007), silver prize of The Leonhard Eulers Foundation Contest (2007),

Editorial:

- Section editor, *Annales Henri Poincaré* (2017-)
- Associate editor, *Annals of Probability* (2018-)

Book:

- Lectures on random lozenge tilings, Cambridge University Press, 2021, 250pp.

Research articles:

Published papers (in chronological order):

1. Non-intersecting paths and Hahn orthogonal polynomial ensemble, *Functional Analysis and its Applications*, 42 (2008), no. 3, 180–197. arXiv: 0708.2349
2. Noncolliding Jacobi processes as limits of Markov chains on the Gelfand- Tsetlin graph. *Journal of Mathematical Sciences* (New York) 158 (2009), no. 6, 819–837 (translated from *Zapiski Nauchnykh Seminarov POMI*, Vol. 360 (2008), pp. 91–123). arXiv: 0812.3146
3. Shuffling algorithm for boxed plane partitions (joint paper with A.Borodin). *Advances in Mathematics*, 220 (2009), no. 6, 1739–1770. arXiv: 0804.3071
4. Disjointness of representations arising in harmonic analysis on the infinite-dimensional unitary group, *Functional Analysis and its Applications*, 44 (2010), no. 2, 14–32. arXiv: 0805.2660
5. q -Distributions on boxed plane partitions (joint paper with A. Borodin and E. Rains). *Selecta Mathematica, New Series*, 16 (2010), no. 4, 731–789, arXiv:0905.0679
6. The q -Gelfand-Tsetlin graph, Gibbs measures and q -Toeplitz matrices, *Advances in Mathematics*, 229 (2012), no. 1, 201–266, arXiv:1011.1769
7. Estimation of multivariate observation-error statistics for AMSU-A data (joint paper with M. Tsyrlunikov), *Monthly Weather Review*, 139 (2011) no. 12, 3765–3780.
8. A pattern theorem for random sorting networks (joint paper with O. Angel and A. Holroyd), *Electronic Journal of Probability*, 17 (2012), no. 99, 1–16. arXiv:1110.0160
9. Are atmospheric-model tendency errors perceivable from routine observations? (joint paper with M. Tsyrlunikov), *COSMO Newsletter*, no. 13: April 2013, 3–18, www.cosmo-model.org.
10. Markov processes of infinitely many nonintersecting random walks (joint paper with A. Borodin), *Probability Theory and Related Fields*, 155 (2013), no. 3–4, 935–997. arXiv:1106.1299
11. Block characters of the symmetric groups (joint paper with A. Gnedin and S. Kerov), *Journal of Algebraic Combinatorics*, 38 (2013), no. 1, 79–101. arXiv:1108.5044
12. Record-dependent measures on the symmetric groups (joint paper with A. Gnedin), *Random Structures and Algorithms*, 46, no. 4 (2015), 688–706. arXiv:1202.3680
13. Limits of Multilevel TASEP and similar processes (joint paper with M. Shkolnikov), *Annales de l'Institut Henri Poincaré, Probabilités et Statistiques*, 51, no. 1 (2015), 18–27. arXiv:1206.3817
14. Finite traces and representations of the group of infinite matrices over a finite field (joint paper with S. Kerov, A. Vershik), *Advances in Mathematics*, 254 (2014), 331–395. arXiv:1209.4945.
15. Lectures on integrable probability (joint paper with A. Borodin). In: Probability and Statistical Physics in St. Petersburg, Proceedings of Symposia in Pure Mathematics, Vol. 91, 155–214. AMS 2016. arXiv:1212.3351
16. Asymptotics of symmetric polynomials with applications to statistical mechanics and representation theory (joint paper with G. Panova), *Annals of Probability*, 43, no. 6, (2015) 3052–3132. arXiv:1301.0634.
17. General beta Jacobi corners process and the Gaussian Free Field (joint paper with A. Borodin), *Communications on Pure and Applied Mathematics*, 68, no. 10 (2015), 1774–1844. arXiv:1305.3627.
18. Observables of Macdonald processes (joint paper with A. Borodin, I. Corwin and S. Shakirov), *Transactions of American Mathematical Society*. 368 (2016), 1517–1558. arxiv:1306.0659.
19. From Alternating Sign Matrices to the Gaussian Unitary Ensemble, *Communications in Mathematical Physics*, 332, no. 1 (2014), 437–447, arXiv:1306.6347.
20. Representations of classical Lie groups and quantized free convolution (joint paper with A. Bufetov), *Geometric and Functional Analysis (GAFA)*, 25, no. 3 (2015), 763–814, arXiv:1311.5780

21. Multilevel Dyson Brownian motions via Jack polynomials (joint paper with M. Shkolnikov), *Probability Theory and Related Fields*, 163, no. 3 (2015), 413-463. arXiv:1401.5595
22. Stochastic six-vertex model (joint paper with A. Borodin, I. Corwin), *Duke Mathematical Journal*, 165, no. 3 (2016), 563-624. arXiv:1407.6729
23. Interacting particle systems at the edge of multilevel Dyson Brownian motions (joint paper with M. Shkolnikov), *Advances in Mathematics*, 304 (2017), 90-130, arXiv:1409.2016
24. Stochastic monotonicity in Young graph and Thoma theorem (joint paper with A. Bufetov), *International Mathematics Research Notices* 2015 (23): 12920-12940. (2015). arXiv:1411.3307
25. Determinantal measures related to big q-Jacobi polynomials (joint paper with G. Olshanski), *Functional Analysis and Its Applications*, 49, no. 3 (2015), 214-217.
26. A quantization of the harmonic analysis on the infinite-dimensional unitary group (joint paper with G. Olshanski), *Journal of Functional Analysis*, 270, 375-418 (2016). arXiv:1504.06832
27. Gaussian asymptotics of discrete β -ensembles (joint paper with A. Borodin and A. Guionnet), *Publications mathématiques de l'IHÉS* 125, no. 1 (2017), 1-78. arXiv:1505.03760
28. Stochastic Airy semigroup through tridiagonal matrices (joint paper with M. Shkolnikov), *Annals of Probability*, 46, no. 4 (2018), 2287-2344. arXiv:1601.06800
29. Bulk universality for random lozenge tilings near straight boundaries and for tensor products, *Communications in Mathematical Physics* 354, no. 1 (2017), 317-344. arXiv:1603.02707
30. Fluctuations of particle systems determined by Schur generating functions (joint paper with A. Bufetov), *Advances in Mathematics* 338, no. 7 (2018), 702-781. arXiv:1604.01110
31. Moments match between the KPZ equation and the Airy point process (joint paper with A. Borodin), *SIGMA* 12 (Special issue in honor of P. Deift and C. Tracy; 2016), 102. arXiv:1608.01557
32. Universality of local statistics for noncolliding random walks (joint paper with L. Petrov), *Annals of Probability*, 47, no. 5 (2019), 2686-2753. arXiv:1608.03243
33. Spherically Symmetric Random Permutations (joint paper with A. Gnedin), *Random Structures and Algorithms*, 55, no. 2 (2019), 342-355. arXiv:1611.01860
34. Interlacing adjacent levels of β -Jacobi corners processes (joint paper with L. Zhang), *Probability Theory and Related Fields*, 172, no. 34 (2018), 915-981. arXiv:1612.02321
35. Random sorting networks: local statistics via random matrix laws (joint paper with M. Rahman), *Probability Theory and Related Fields*, 175, no. 1-2 (2019), 45-96. arXiv:1702.07895
36. Crystallization of random matrix orbits (joint paper with A. Marcus), *International Mathematics Research Notices*, 2020, no. 3 (2020), 883-913. arXiv:1706.07393
37. Fourier transform on high-dimensional unitary groups with applications to random tilings (joint paper with A. Bufetov), *Duke Mathematical Journal*, 168, no. 13 (2019), 2559-2649. arXiv:1712.09925
38. The KPZ equation and moments of random matrices (joint paper with A. Sodin), *Journal of Mathematical Physics, Analysis, Geometry* 14, no. 3 (2018), 286-296. (Special issue in honor of V.A. Marchenko.) arXiv:1801.02574
39. A stochastic telegraph equation from the six-vertex model (joint paper with A. Borodin), *Annals of Probability* 47, no. 6 (2019), 4137-4194. arXiv:1803.09137
40. Product matrix processes as limits of random plane partitions (joint paper with A. Borodin, E. Strahov), *International Mathematics Research Notices*. 2020, no. 20 (2020), 6713-6768. arXiv:1806.10855
41. q-deformed Character Theory for Infinite-Dimensional Symplectic and Orthogonal Groups (joint paper with C. Cuenca), *Selecta Mathematica*, 26 (2020), article 40. arXiv:1812.06523
42. Gaussian fluctuations for products of random matrices (joint paper with Y. Sun), to appear in *American Journal of Mathematics*. arXiv:1812.06532
43. The Elliptic Tail Kernel (joint paper with C. Cuenca and G. Olshanski), to appear in *International Mathematics Research Notices*. arXiv:1907.11841

44. Shift-invariance for vertex models and polymers (joint paper with A. Borodin, M. Wheeler), to appear in *Proceedings of the London Mathematical Society*. arXiv:1912.02957
45. Absorbing time asymptotics in the oriented swap process (joint paper with A. Bufetov, D. Romik), to appear in *Annals of Applied Probability*. arXiv:2003.06479

Preprints:

46. Cointegration in large VARs (joint paper with A. Bykhovskaya). arXiv:2006.14179
47. Universal objects of the infinite beta random matrix theory (joint paper with V. Kleptsyn). arXiv:2009.02006
48. Matrix addition and the Dunkl transform at high temperature (joint paper with F. Benaych-Georges and C. Cuenca). arXiv:2105.03795
49. Gaussian Unitary Ensemble in random lozenge tilings (joint paper with A. Aggarwal). arXiv:2106.07589

Other publications:

50. What can be made out of cubes? (in Russian), *Quantum*, 2012, no. 3, <http://kvant.mccme.ru/2012/03/>.
51. Grigori Iosifovich Olshanski (devoted to the 70th anniversary) by A. M. Borodin, Alexander I. Bufetov, Alexey I. Bufetov, A. M. Vershik, V. E. Gorin, A. I. Molev, V. F. Molchanov, R. S. Ismagilov, A. A. Kirillov, M. L. Nazarov, Yu. A. Neretin, N. I. Nessonov, A. Yu. Okounkov, L. A. Petrov, S. M. Horoshknin. *Uspekhi Mat. Nauk*, 74:3(447) (2019), 193–213. English translation: *Russian Mathematical Surveys* 74:3 (2019), 555–577

Teaching:

- Instructor for MATH 733, 734 (Theory of Probability), MATH 740 (Symmetric functions), MATH 833 (Topics in Stochastic Processes) at UW-Madison
- Instructor for 18.01, 18.02 (Calculus), 18.100 (Real Analysis), 18.175 (Theory of Probability), 18.177 (Topics in Stochastic Processes: Integrable probability) at MIT (2012-2019)
- Graduate level mini-courses on various aspects of Integrable Probability at: Institute Henri Poincaré (Paris, 2017), Courant Institute (New York, 2017), Northwestern Probability Summer School (Evanston, 2018), Cornell Probability Summer School (Ithaca, 2019), Integrability and Combinatorics at Finite Temperature summer school (MATRIX - Online, 2021)

Student supervision:

- Undergraduate Research Projects at MIT: Juan Ortiz Rhoton, Zachary Izzo, Lingfu Zhang, Panagiotis Lolas, Yunkun Zhou, Shreyas Balaji, Brin Harper, Elizabeth Han
- Graduate students at MIT: Andrew Ahn (MIT Johnson Prize, 2020)
- PRIMES projects at MIT: Arthur Kozlovski (Mentor – A. Knizel), Gopal Goel (Prizes of Intel ISEF 2018 and the Regeneron Science Talent Search 2021; Mentor – A. Ahn)
- Graduate students at UW-Madison: Jiaming Xu
- PhD Thesis committee: Alexander Moll (Chair — A. Borodin), Florent Bekerman (Chair — A. Guionnet), Ewain Gwynne (Chair — S. Sheffield), Evgeni Dimitrov (Chair — A. Borodin), Cesar Cuenca (Chair — A. Borodin), Andrew Ahn (Chair), Tianyu Liu (Chair — Jin-Yi Cai), Xiao Shen (Chair — T. Seppalainen)

Organization:

- Member of organizing committee of various mathematical olympiads. In 2011 team leader of the organizing committee of Moscow Mathematical Olympiad for 8th grade.

- (Co-)Organizer of MIT probability seminar (2012-2019)
- (Co-)Organizer of MIT integrable probability working group (2014-2019)
- (Co-)Organizer of Charles River Lectures on Probability and Related Topics (2014– 2019)
- (Co-)Organizer of KITP conference “Non-equilibrium dynamics of stochastic and quantum integrable systems” (2016)
- Organizer of the invited session “Integrable probability” of the conference SPA-2017.
- Member of Institute of Mathematical Statistics Committee on New Researchers - 2016
- Member of Scientific committee for the conference FPSAC-2017
- (Co-)Organizer of the program “Non-equilibrium Systems and Special Functions” in MATRIX Institute (2018)
- (Co-)Organizer of the invited session “The Gaussian Free Field and random geometry” at AMS Sectional meeting (2018)
- (Co-)Organizer of the workshop Integrable Probability - Boston (2018)
- (Co-)Organizer of the workshop “Gaussian Fields in Random matrix theory” in the Institute Mittag-Leffler, Sweden (2018)
- Scientific committee for the Virginia Integrable Probability Summer School (2019)
- (Co-)Organizer of the workshop “Representation Theory, Probability, and Symmetric Functions” at MIT (2019)
- (Co-)Organizer of UW-Madison Probability seminar (2019-)
- Organizer of Russian Integrable Probability Seminar (2020-, online)
- (Co-)Organizer of the workshop Integrable Probability - New York (2020; moved to online)
- (Co-)Organizer of Midrasha Mathematicae on “Random Schroedinger Operators and Random Matrices” at the Israel Institute of Advanced Studies in Jerusalem (2022)
- (Co-)Organizer of UW-Madison Math Colloquium (2020-)
- Committee of the competition for the best student probability paper run by Higher School of Economics (2021)

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