# Curriculum Vitae of Vadim Gorin

https://www.stat.berkeley.edu/~vadicgor/ Born in 1986. vadicgor@gmail.com

# **Employment:**

- Associate Professor of Statistics and Mathematics at University of California, Berkeley (2022-)
- Associate Professor of Mathematics at University of Wisconsin Madison (2020-2022)
- Assistant Professor of Mathematics 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 (2011-2022)
- Junior Researcher, The Hydrological and Meteorological Research Centre (2007–2012)

# Editorial:

- Section editor, Annales Henri Poincaré (2017-)
- Associate editor, Annals of Probability (2018-2023)
- Guest editor for a special issue of Journal of Physics A on "Limit shapes and fluctuations in statistical physics" (2022-2024)

# Awards, scholarships and grants:

- NSF Grant DMS 2246449 (2022-2025)
- Medal of Russian Academy of Sciences for young scientists (in 2018 competition)
- NSF Grant DMS-1855458 (DMS-1949820) (2019-2022)
- BSF Grant 2018248, joint with A. Borodin, E. Strahov (2019-2023)
- 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 Euler's Foundation Contest (2007),

# 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

### Book:

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

### **Research articles:**

Published papers (in chronological order):

- Non-intersecting paths and Hahn orthogonal polynomial ensemble, Functional Analysis and its Applications, 42 (2008), no. 3, 180–197. arXiv: 0708.2349
- Noncolliding Jacobi processes as limits of Markov chains on the Gelfand- Tsetlin graph. Journal of Mathematica Sciences (New York) 158 (2009), no. 6, 819–837 (translated from Zapiski Nauchnykh Seminarov POMI, Vol. 360 (2008), pp. 91–123). arXiv: 0812.3146
- Shuffling algorithm for boxed plane partitions (joint paper with A.Borodin). Advances in Mathematics, 220 (2009), no. 6, 1739–1770. arXiv: 0804.3071
- 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
- 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
- The q-Gelfand-Tsetlin graph, Gibbs measures and q-Toeplitz matrices, Advances in Mathematics, 229 (2012), no. 1, 201–266, arXiv:1011.1769
- Estimation of multivariate observation-error statistics for AMSU-A data (joint paper with M. Tsyrulnikov), *Monthly Weather Review*, 139 (2011) no. 12, 3765–3780.
- 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. Tsyrulnikov), COSMO Newsletter, no. 13: April 2013, 3–18, www.cosmo-model.org.
- 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
- Limits of Multilevel TASEP and similar processes (joint paper with M. Shkolnikov), Annales de l'Institut Henri Poincare, Probabilites 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.
- 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.
- From Alternating Sign Matrices to the Gaussian Unitary Ensemble, Communications in Mathematical Physics, 332, no. 1 (2014), 437–447, arXiv:1306.6347.
- 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
- 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
- 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
- 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
- Spherically Symmetric Random Permutations (joint paper with A. Gnedin), Random Structures and Algorithms, 55, no. 2 (2019), 342–355. arXiv:1611.01860
- Interlacing adjacent levels of β-Jacobi corners processes (joint paper with L. Zhang), Probability Theory and Related Fields, 172, no. 3-4 (2018), 915–981. arXiv:1612.02321
- 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
- 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
- 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
- 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), American Journal of Mathematics, 144, no. 2 (2022), 287–393. arXiv:1812.06532
- 43. The Elliptic Tail Kernel (joint paper with C. Cuenca and G. Olshanski), *International Mathematics Research Notices*, 2021, no. 19, (2021), 14922–14964. arXiv:1907.11841

- 44. Shift-invariance for vertex models and polymers (joint paper with A. Borodin, M. Wheeler), Proceedings of the London Mathematical Society, 124, no. 2 (2022), 182–299. arXiv:1912.02957
- 45. Absorbing time asymptotics in the oriented swap process (joint paper with A. Bufetov, D. Romik), Annals of Applied Probability, 32, no. 2 (2022), 753–763. arXiv:2003.06479
- Cointegration in large VARs (joint paper with A. Bykhovskaya), Annals of Statistics, 50, no. 3 (2022), 1593–1617. arXiv:2006.14179
- 47. Universal objects of the infinite beta random matrix theory (joint paper with V. Kleptsyn), Journal of the European Mathematical Society, 26, no. 9 (2024), 3429-3496. arXiv:2009.02006
- Matrix addition and the Dunkl transform at high temperature (joint paper with F. Benaych-Georges and C. Cuenca), *Communications in Mathematical Physics*, 394 (2022), 735–795. arXiv:2105.03795
- 49. Gaussian Unitary Ensemble in random lozenge tilings (joint paper with A. Aggarwal), Probability Theory and Related Fields, 184 (2022), 1139–1166. arXiv:2106.07589
- 50. Asymptotics of Cointegration Tests for High-Dimensional VAR(k) (joint paper with A. Bykhovskaya), to appear in *Review of Economics and Statistics*. arXiv:2202.07150
- Dynamical Loop Equation (joint paper with J. Huang), Annals of Probability, 52, no. 5 (2024), 1758–1863. arXiv:2205.15785
- 52. Random sorting networks: edge limit (joint paper with J. Xu), to appear in Annales de l'Institut Henri Poincaré: Probability and Statistics. arXiv:2207.09000
- 53. Six-Vertex Model and Random Matrix Distributions (joint paper with M. Nicoletti), to appear in *Bulletin of the American Mathematical Society*. arXiv:2309.12495
- 54. Boundary statistics for the six-vertex model with DWBC (joint paper with K. Liechty), to appear in *Communications on Pure and Applied Mathematics*, arXiv:2310.12735

### Preprints:

- 55. High-dimensional canonical correlation analysis (joint paper with A. Bykhovskaya). arXiv:2306.16393
- 56. Six-vertex model with rare corners and random restricted permutations (joint paper with R. Kenyon). arXiv:2408.14446
- 57. Airy<sub> $\beta$ </sub> line ensemble and its Laplace transform (joint paper with J. Xu and L. Zhang). arXiv:2411.10829
- 58. Canonical Correlation Analysis: review (joint paper with A. Bykhovskaya). arXiv:2411.15625
- Eigenvalues of Heckman-Polychronakos operators (joint paper with C. Dunkl). arXiv:2412.01938

### Other publications:

- 60. What can be made out of cubes? (in Russian), *Quantum*, 2012, no. 3, http://kvant.mccme.ru/2012/03/.
- 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 18.01, 18.02 (Calculus), 18.100 (Real Analysis), 18.175 (Theory of Probability), 18.177 (Topics in Stochastic Processes: Integrable probability) at MIT
- Instructor for MATH 733, 734 (Theory of Probability), MATH 740 (Enumerative Combinatorics and Symmetric Functions), MATH 833 (Topics in Stochastic Processes), MATH 531 (Probability theory, undergraduate) MATH 632 (Introduction to Stochastic Processes, undergraduate) at UW-Madison

- Instructor for STAT 206/MATH 223 (Topics in Probability and Stochastic processes: Eigenvalues of random matrices), STAT 260 (Topics in Probability and Statistics: Non-stationary dynamics), STAT 134 (Concepts of Probability) at UC-Berkeley.
- Graduate level mini-courses on various aspects of Integrable Probability at: Institute Henri Poincare (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), The multiple facets of the six-vertex model (ENS Lyon, 2022), Summer School on Dimers: Combinatorics, Representation Theory and Physics (CUNY, 2023), PKU Thematic Semester Program on Stochastics (Beijing, 2023), UMichigan Random Matrix school (Ann Arbor, 2024),

# Student supervision:

- Undergraduate Research Projects: Juan Ortiz Rhoton, Zachary Izzo, Lingfu Zhang, Panagiotis Lolas, Yunkun Zhou, Shreyas Balaji, Brin Harper, Elizabeth Han, Amber He Wei, Jiayi Li
- PRIMES projects: Arthur Kozlovski (Mentor A. Knizel), Gopal Goel (Prizes of Intel ISEF 2018 and the Regeneron Science Talent Search 2021; Mentor A. Ahn)
- Graduate students: Andrew Ahn (MIT Johnson Prize, 2020), Jiaming Xu (UW Excellence in Research Award, 2023), Gabriel Ramirez Raposo
- PhD Thesis committee: Alexander Moll (2016, Chair A. Borodin), Florent Bekerman (2017, Chair A. Guionnet), Ewain Gwynne (2018, Chair S. Sheffield), Evgeni Dimitrov (2018, Chair A. Borodin), Cesar Cuenca (2019, Chair A. Borodin), Andrew Ahn (2020, Chair), Tianyu Liu (2020, Chair Jin-Yi Cai), Xiao Shen (2021, Chair T. Seppalainen), Yulia Alexandr (2023, Chairs Bernd Sturmfels, Serkan Hoşten), Jiaming Xu (2023, Co-Chair with Benedek Valko), Yuchen Wei (2025, Chair K.Matveev)

# **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 (2019-2022)
- Organizer of Russian Integrable Probability Seminar (2020-2021, online)

- (Co-)Organizer of the workshop Integrable Probability New York (2020; moved to online)
- (Co-)Organizer of UW-Madison Math Colloquium (2020-2022)
- Committee for the best student probability paper HSE competition (2021)
- (Co-)Organizer of Midrasha Mathematicae on "Random Schroedinger Operators and Random Matrices" at the Israel Institute of Advanced Studies in Jerusalem (2023)
- (Co-)Organizer of the IPAM program "Geometry, statistical mechanics, integrability" (2024)
- (Co-)Organizer of IPAM workshop "Integrability and Algebraic Combinatorics" (2024)
- (Co-) Organizer of workshop "Representation theory and probability" in Leipzig (2024)
- Member of Scientific Committee of the Sydney Mathematical Research Institute (2023-)

Modified: April 2024.