

# Leonid Petrov. Brief CV

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## Research areas

Probability, Mathematical Physics, Algebraic Combinatorics, Representation Theory.

## Education

2010: Ph.D., Institute for Information Transmission Problems.

2007: Diploma, Lomonosov Moscow State University, Department of Mathematics and Mechanics (Chair of Probability).

## Employment

since 2014: Assistant Professor, Department of Mathematics, University of Virginia.

2017–2018: Visiting Assistant Professor, Department of Mathematics, MIT.

2011–2014: Research Instructor, Department of Mathematics, Northeastern University.

2009–2011: Research associate, Dobrushin Mathematics Laboratory, Institute for Information Transmission Problems, Moscow, Russia (on leave since 2011).

## Scholarships/prizes/funding

2018-2019: PI, NSF DMS conference grant 1839534 “Workshop on Representation Theory, Combinatorics, and Geometry”, amount \$15,000.

2017: Simons Foundation Collaboration Grant for Mathematicians. Recommended for funding but not awarded due to the receipt of the NSF DMS grant 1664617 (as per the rules of Collaboration Grants).

2017–2020: PI, NSF DMS grant 1664617 “FRG: Collaborative Research: Integrable Probability”. Joint with PIs Jinho Baik (University of Michigan), Alexei Borodin, Vadim Gorin (MIT), and Ivan Corwin (Columbia University). Amount: \$193,453 (UVA part).

- 2016–2017: Co-PI, NSF DMS conference grant 1663552 “2017 Seminar on Stochastic Processes”.
- 2015: Prize of the Moscow Mathematical Society.
- 2014–2015: EDF Fellowship of the University of Virginia.
- 2014: AMS/NSF Travel Grant Award for ICM 2014.
- 2011–2013: RFBR–CNRS grant 11-01-93105 “Representation theory and noncommutative geometry”.
- 2010–2012: RFBR–CNRS grant 10-01-93114 “New models of Markov processes on point configurations. Applications to stochastic queueing networks”.
- 2010: Dynasty foundation fellowship for young scientists.
- 2010: Silver prize of The Fourteenth Möbius Contest.
- 2009: Alexander Kuznetsov/Independent University of Moscow graduate student scholarship.
- 2005, 2006: V. Potatin federal scholarship for academic excellence, leadership and creativity.

## Publications (\* — preprints)

- [30] (\*) (with Ivan Corwin and Konstantin Matveev) *The  $q$ -Hahn PushTASEP*, arXiv:1811.06475 [math.PR].
- [29] (\*) (with Alisa Knizel and Axel Saenz-Rodriguez) *Generalizations of TASEP in discrete and continuous inhomogeneous space*, arXiv:1808.09855 [math.PR]. Submitted.
- [28] (with Christian Gromoll, Mark Meckes) *Quenched Central Limit Theorem in a Corner Growth Setting*, arXiv:1804.04222 [math.PR]. To appear in Electron. Comm. Probab.
- [27] (\*) (with Alexey Bufetov) *Yang-Baxter field for spin Hall-Littlewood symmetric functions*, arXiv:1712.04584 [math.PR]. Submitted
- [26] (with Michael Damron and David Sivakoff) *Coarsening model on  $\mathbb{Z}^d$  with biased zero-energy flips and an exponential large deviation bound for ASEP*, arXiv:1708.05806 [math.PR]. To appear in Comm. Math. Phys.
- [25] (with Sevak Mkrtychyan) *GUE corners limit of  $q$ -distributed lozenge tilings*, Electron. J. Probab. 22 (2017), paper no. 101, 24 pp, arXiv:1703.07503 [math.PR].
- [24] (with Alexei Borodin) *Inhomogeneous exponential jump model*, Probab. Th. Rel. Fields 172 (2018) 323-385, arXiv:1703.03857 [math.PR].
- [23] (with Daniel Orr) *Stochastic higher spin six vertex model and  $q$ -TASEPs*, Advances in Mathematics 317 (2017), 473-525, arXiv:1610.10080 [math.PR].

- [22] (with Vadim Gorin) *Universality of local statistics for noncolliding random walks* (2016), arXiv:1608.03243 [math.PR]. To appear in *Ann. Probab.*
- [21] (with Alexei Borodin) *Lectures on Integrable probability: Stochastic vertex models and symmetric functions* (2016), arXiv:1605.01349 [math.PR]. Lecture Notes of the Les Houches Summer School, Volume 104, July 2015.
- [20] (with Alexei Borodin) *Higher spin six vertex model and symmetric rational functions* (2016), *Selecta Math.* 24 (2018), no. 2, 751–874, arXiv:1601.05770 [math.PR].
- [19] (with Konstantin Matveev)  *$q$ -randomized Robinson–Schensted–Knuth correspondences and random polymers* (2015), *Annales de l’Institut Henri Poincaré D: Combinatorics, Physics and their Interactions* 4 (2017), no. 1, 1–123, arXiv:1504.00666 [math.PR].
- [18] (with Ivan Corwin) *Stochastic higher spin vertex models on the line*, *Comm. Math. Phys.* 343 (2016), no. 2, 651–700, DOI: 10.1007/s00220-015-2479-5, arXiv:1502.07374 [math.PR].
- [17] (with Alexei Borodin, Ivan Corwin, and Tomohiro Sasamoto) *Spectral theory for interacting particle systems solvable by coordinate Bethe ansatz*, *Comm. Math. Phys.* 339 (2015), no. 3, 1167–1245, DOI: 10.1007/s00220-015-2424-7, arXiv:1407.8534 [math-ph].
- [16] (with Alexey Bufetov) *Law of Large Numbers for Infinite Random Matrices over a Finite Field*, *Selecta Math.* 21 (2015), no. 4, 1271–1338, arXiv:1402.1772 [math.PR].
- [15] (with Alexei Borodin) *Integrable probability: From representation theory to Macdonald processes*, *Probability Surveys* 11 (2014), 1–58, arXiv:1310.8007 [math.PR].
- [14] (with Alexei Borodin, Ivan Corwin, and Tomohiro Sasamoto) *Spectral theory for the  $q$ -Boson particle system*, *Compositio Mathematica* 151 (2015), no. 1, 1–67, arXiv:1308.3475 [math-ph].
- [13] (with Ivan Corwin) *The  $q$ -PushASEP: A New Integrable Model for Traffic in  $1+1$  Dimension*, *Journal of Statistical Physics*, 160 (2015), no. 4, 1005–1026, arXiv:1308.3124 [math.PR].
- [12] (with Alexei Borodin) *Nearest neighbor Markov dynamics on Macdonald processes*, *Advances in Mathematics*, 300 (2016), 71–155. Special volume honoring Andrei Zelevinsky. arXiv:1305.5501 [math.PR].
- [11] *The Boundary of the Gelfand-Tsetlin Graph: New Proof of Borodin-Olshanski’s Formula, and its  $q$ -analogue*, *Moscow Mathematical Journal* 14 (2014) no. 1, 121–160, arXiv:1208.3443 [math.CO].
- [10] *Asymptotics of Uniformly Random Lozenge Tilings of Polygons. Gaussian Free Field*, *Annals of Probability* 43 (2014), no. 1, 1–43, arXiv:1206.5123 [math.PR].
- [9] *Asymptotics of Random Lozenge Tilings via Gelfand-Tsetlin Schemes*, *Probability Theory and Related Fields* 160 (2014), no. 3, 429–487, arXiv:1202.3901 [math.PR].

- [8]  $\mathfrak{sl}(2)$  Operators and Markov Processes on Branching Graphs, *Journal of Algebraic Combinatorics* 38 (2013), no. 3, 663–720, arXiv:1111.3399 [math.CO].
- [7] On Measures on Partitions Arising in Harmonic Analysis for Linear and Projective Characters of the Infinite Symmetric Group (2011), Proceedings of the international conference “50 years of IITP”, arXiv:1107.0676 [math.CO].
- [6] Pfaffian Stochastic Dynamics of Strict Partitions, *Electronic Journal of Probability* 16 (2011), 2246–2295, arXiv:1011.3329 [math.PR].
- [5] Random Strict Partitions and Determinantal Point Processes, *Electronic Communications in Probability* 15 (2010), 162–175, arXiv:1002.2714 [math.PR].
- [4] Random Walks on Strict Partitions, *Journal of Mathematical Sciences* 168 (2010), no. 3, 437–463, arXiv:0904.1823 [math.PR].
- [3] Limit Behavior of Certain Random Walks on Strict Partitions, *Russian Mathematical Surveys* 64 (2009), no. 6, 1139–1141.
- [2] A Two-parameter Family of Infinite-dimensional Diffusions in the Kingman Simplex, *Functional Analysis and Its Applications* 43 (2009), no. 4, 279–296, arXiv:0708.1930 [math.PR].
- [1] Asymptotic Behavior of a Certain Collection of Particles on a Line Under Synchronization, Proceedings of the XXVIII Conference of Young Scientists of Department of Mechanics and Mathematics of the Lomonosov Moscow State University (2006), 152–156, in Russian.

## Organization and service

- 2019: Virginia Integrable Probability Summer School, May 27 - June 8, 2019, <http://vipss.int-prob.org/>
- 2018: Workshop on Representation Theory, Combinatorics, and Geometry at UVA, October 19-21, 2018, <http://math.virginia.edu/ims/workshop-fall-2018/>
- 2018: Conference “Integrable Probability Boston 2018 (IntProb Boston)” at MIT, May 14-18, 2018, <http://frg.int-prob.org/conference2018/>
- 2017+: Developer of the website and forum for the FRG “Integrable Probability”, <http://frg.int-prob.org/>
- 2017+: Developer of the University of Virginia Math Department website, <http://math.virginia.edu/>
- 2017: Conference “Seminar on Stochastic Processes 2017” at UVA, March 8-11, 2017, <http://faculty.virginia.edu/ssp17/>
- 2016-17: Reading seminar on Integrable Probability, <https://lpetrov.cc/2016/12/reading-seminar/>

2014-17: University of Virginia Probability Seminar, <http://math.virginia.edu/seminars/probability/>

2014-17: Undergraduate Math Club at the University of Virginia, <http://math.virginia.edu/seminars/mathclub/>

## Teaching

*University of Virginia (since 2014)*

Introduction to Probability; Introduction to Stochastic Processes; Calculus III; Random matrices (graduate topics course).

*Northeastern University (2011–2014)*

Calculus II for Sci&Eng; Probability and Statistics; Statistics and Stochastic Processes; Probability 1 (graduate course); Topics in Probability (graduate topics course).

## Informatic skills

L<sup>A</sup>T<sub>E</sub>X, Mathematica, git, Python, html/jekyll and web design, UNIX, Computer experimentation, Probabilistic visualization, Cloud computing.

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