Leonid Petrov. Brief CV

Full version is at `https://lpetrov.cc/research/petrovCV.pdf`

Department of Mathematics, University of Virginia
`petrov@virginia.edu`
`https://lpetrov.cc`

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).

Appointments

Fall 2021: Research Professor
MSRI Program "Universality and Integrability in Random Matrix Theory and Interacting Particle Systems"

Since 2019: Associate Professor, Department of Mathematics, University of Virginia.

2014–2019: 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

2020–2025: Simons Collaboration Grant for Mathematicians 709055 "Distributional symmetries in stochastic systems", $42,000.

2019: The 2020 Bernoulli prize for an outstanding survey article in probability (jointly with Alexei Borodin for the paper *Integrable probability: From representation theory to Macdonald processes*)

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).

2017–2021: 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)

[39] (∗) Matthew Nicoletti, Leonid Petrov. *Irreversible Markov Dynamics and Hydrodynamics for KPZ States in the Stochastic Six Vertex Model*, `arXiv:2201.12497 [math.PR]`.

[38] (∗) Amol Aggarwal, Alexei Borodin, Leonid Petrov, Michael Wheeler. *Free Fermion Six Vertex Model: Symmetric Functions and Random Domino Tilings*, `arXiv:2109.06718 [math.PR]`.

[37] Leonid Petrov. *Refined Cauchy identity for spin Hall-Littlewood symmetric rational functions*, Journal of Combinatorial Theory Ser. A, vol. 184 (2021), 105519. `arXiv:2007.10886` `[math.CO]`.

[36] Matteo Mucciconi, Leonid Petrov. *Spin q-Whittaker polynomials and deformed quantum Toda*, Communications in Mathematical Physics, to appear. `arXiv:2003.14260` `[math.PR]`.

[35] Leonid Petrov, Mikhail Tikhonov. *Parameter symmetry in perturbed GUE corners process and reflected drifted Brownian motions*, Journal of Statistical Physics, 181 (2020), 1996–2010. `arXiv:1912.08671` `[math.PR]`.

[34] Leonid Petrov. *Parameter permutation symmetry in particle systems and random polymers*, SIGMA 17 (2021), 021, 34 pages. `arXiv:1912.06067` `[math.PR]`.

[33] Leonid Petrov. *PushTASEP in inhomogeneous space*, Electronic Journal of Probability, vol. 25 (2020), paper no. 114. `arXiv:1910.08994` `[math.PR]`.

[32] Leonid Petrov, Axel Saenz. *Mapping TASEP back in time*, Probability Theory and Related Fields, online first (2021). `arXiv:1907.09155` `[math.PR]`.

[31] Alexey Bufetov, Matteo Mucciconi, Leonid Petrov. *Yang-Baxter random fields and stochastic vertex models*, Advances in Mathematics 388 (2021), 107865. `arXiv:1905.06815` `[math.PR]`.

[30] Ivan Corwin, Konstantin Matveev, Leonid Petrov. *The q-Hahn PushTASEP*, International Mathematics Research Notices (2019), rnz106. `arXiv:1811.06475` `[math.PR]`.

[29] Alisa Knizel, Leonid Petrov, Axel Saenz. *Generalizations of TASEP in discrete and continuous inhomogeneous space*, Communications in Mathematical Physics 372 (2019), no. 3, pp 797–864. `arXiv:1808.09855` `[math.PR]`.

[28] Christian Gromoll, Mark Meckes, Leonid Petrov. *Quenched Central Limit Theorem in a Corner Growth Setting*, Electronic Communications in Probability (2018), Vol. 23, paper no. 101, 1-12. `arXiv:1804.04222` `[math.PR]`.

[27] Alexey Bufetov, Leonid Petrov. *Yang-Baxter field for spin Hall-Littlewood symmetric functions*, Forum of Mathematics Sigma 7 (2019), e39. `arXiv:1712.04584` `[math.PR]`.

[26] Michael Damron, Leonid Petrov, David Sivakoff. *Coarsening model on Zd with biased zero-energy flips and an exponential large deviation bound for ASEP*, Communications in Mathematical Physics 362 (2018), no. 1, 185–217. `arXiv:1708.05806` `[math.PR]`.

[25] Sevak Mkrtchyan, Leonid Petrov. *GUE corners limit of q-distributed lozenge tilings*, Electronic Journal of Probability, Volume 22 (2017), paper no. 101, 24 pp. `arXiv:1703.07503` `[math.PR]`.

[24] Alexei Borodin, Leonid Petrov. *Inhomogeneous exponential jump model*, Probability Theory and Related Fields 172 (2018), 323-385. `arXiv:1703.03857` `[math.PR]`.

[23] Daniel Orr, Leonid Petrov. *Stochastic higher spin six vertex model and q-TASEPs*, Advances in Mathematics 317 (2017), 473-525. `arXiv:1610.10080` `[math.PR]`.

[22] Vadim Gorin, Leonid Petrov. *Universality of local statistics for noncolliding random walks*, Annals of Probability (2019), Vol. 47, No. 5, 2686-2753. `arXiv:1608.03243` `[math.PR]`.

[21] Alexei Borodin, Leonid Petrov. *Lectures on Integrable probability: Stochastic vertex models and symmetric functions*, Lecture Notes of the Les Houches Summer School, Volume 104, July 2015. `arXiv:1605.01349` `[math.PR]`.

[20] Alexei Borodin, Leonid Petrov. *Higher spin six vertex model and symmetric rational functions*, Selecta Mathematica 24 (2018), no. 2, 751-874. `arXiv:1601.05770` `[math.PR]`.

[19] Konstantin Matveev, Leonid Petrov. *q-randomized Robinson-Schensted-Knuth correspondences and random polymers*, Annales de l'Institut Henri Poincare D: Combinatorics, Physics and their Interactions 4 (2017), no. 1, 1-123. `arXiv:1504.00666` `[math.PR]`.

[18] Ivan Corwin, Leonid Petrov. *Stochastic higher spin vertex models on the line*, Communications in Mathematical Physics 343 (2016), no. 2, 651-700. `arXiv:1502.07374` `[math.PR]`.

[17] Alexei Borodin, Ivan Corwin, Leonid Petrov, Tomohiro Sasamoto. *Spectral theory for interacting particle systems solvable by coordinate Bethe ansatz*, Communications in Mathematical Physics 339 (2015), no. 3, 1167–1245. `arXiv:1407.8534` `[math-ph]`.

[16] Alexey Bufetov, Leonid Petrov. *Law of Large Numbers for Infinite Random Matrices over a Finite Field*, Selecta Mathematica 21 (2015), no. 4, 1271–1338. `arXiv:1402.1772` `[math.PR]`.

[15] Alexei Borodin, Leonid Petrov. *Integrable probability: From representation theory to Macdonald processes*, Probability Surveys, 11 (2014), 1-58. `arXiv:1310.8007` `[math-ph]`.

[14] Alexei Borodin, Ivan Corwin, Leonid Petrov, Tomohiro Sasamoto. *Spectral theory for the q-Boson particle system*, Compositio Mathematica, 151 (2015), no. 1, 1-67. `arXiv:1308.3475` `[math-ph]`.

[13] Ivan Corwin, Leonid Petrov. *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] Alexei Borodin, Leonid Petrov. *Nearest neighbor Markov dynamics on Macdonald processes*, Advances in Mathematics, 300 (2016), 71-155. `arXiv:1305.5501` `[math.PR]`.

[11] Leonid Petrov. *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] Leonid Petrov. *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] Leonid Petrov. *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] Leonid Petrov. *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] Leonid Petrov. *On Measures on Partitions Arising in Harmonic Analysis for Linear and Projective Characters of the Infinite Symmetric Group*, Proceedings of the international conference "50 years of IITP". `arXiv:1107.0676 [math.CO]`.

[6] Leonid Petrov. *Pfaffian Stochastic Dynamics of Strict Partitions*, Electronic Journal of Probability 16 (2011), 2246-2295. `arXiv:1011.3329 [math.PR]`.

[5] Leonid Petrov. *Random Strict Partitions and Determinantal Point Processes*, Electronic Communications in Probability 15 (2010), 162-175. `arXiv:1002.2714 [math.PR]`.

[4] Leonid Petrov. *Random Walks on Strict Partitions*, Journal of Mathematical Sciences 168 (2010), no. 3, 437-463. `arXiv:0904.1823 [math.PR]`.

[3] Leonid Petrov. *Limit Behavior of Certain Random Walks on Strict Partitions*, Russian Mathematical Surveys 64 (2009), no. 6, 1139-1141.

[2] Leonid Petrov. *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] Leonid Petrov. *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.

Other works

[1] Sihan Li, Andrew Mecca, Jeewoo Kim, Giusy Caprara, Elizabeth Wagner, Ting-Ting Du, Leonid Petrov, Wenhao Xu, Runjia Cui, Ivan Rebustini, Bechara Kachar, Anthony Peng, and Jung-Bum Shin, *Myosin-VIIa is expressed in multiple isoforms and essential for tensioning the hair cell mechanotransduction complex*. Nature Communications, 11, Article number: 2066 (2020). `https://www.nature.com/articles/s41467-020-15936-z`.

Organization and service

2020, 2022: (**postponed then canceled due to COVID-19**) Special Session on Integrable Probability at the 2020 AMS Spring Southeastern Sectional Meeting at University of Virginia. March 13-15, 2020; March 11-13, 2022, `http://www.ams.org/meetings/sectional/2273_program.html`

2021: Program "Integrability and combinatorics at finite temperature" at MATRIX Institute, Australia (virtual), June 7-18, 2021, `https://www.matrix-inst.org.au/events/integrability-and-com`

2020: Online conference on Statistical Mechanics, Integrable Systems and Probability, April 27 - May 1, 2020, `http://mtikhonov.com/smisp/`

2020: (**postponed due to COVID-19**) Program "Integrability and combinatorics at finite temperature" at MATRIX Institute, Australia, June 1-19, 2020, `https://www.matrix-inst.org.au/events/integrability-and-combinatorics-at-finite-temperature/`

2019: Virginia Integrable Probability Summer School, May 27 - June 8, 2019, `http://vipss.int-prob.org/`

2018-19: Reading seminar on Integrable Probability, `https://lpetrov.cc/reading-2019/`

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)

Complex Variables; Introduction to Probability; Introduction to Stochastic Processes; Calculus III; Particle Systems (graduate topics course); Random matrices (graduate topics course); Real Analysis and Linear Spaces (graduate).

Northeastern University (2011–2014)

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

Editing and reviewing

- Member of the editorial board at "Mathematical Physics, Analysis and Geometry" (`https://www.springer.com/journal/11040`) and "Combinatorial Theory" (`https://escholarship.org/uc/combinatorial_theory/`).

- Program committee member for FPSAC (Formal Power Series and Algebraic Combinatorics), 2017 and 2021.

- I regularly referee scholarly journal papers submitted to numerous journals, including Ann. Prob., Adv. Math., Adv. Appl. Math., Comm. Math. Phys., Intern. J. Math., Arkiv för Mat., SIGMA, J. Alg. Comb., Comm. Pure Appl. Math., Intern. Math. Res. Notices, J. Appl. Probab., J. Comb. Theory A, Symp. Th. Aspects of Comp. Sci., J. of Stat. Physics, Electron. Comm. Probab.

- I am a regular reviewer for the Mathematical Reviews database.

- I reviewed grant proposals for several funding agencies.

Informatic skills

LaTeX, `Mathematica`, `git`, `Python`, `html/jekyll` and web design, `UNIX`, Computer experimentation, Probabilistic visualization, Cloud computing.

Last updated: February 15, 2022
`https://lpetrov.cc`