Leonid Petrov

Education

Ph.D. (2010), Institute for Information Transmission Problems (Moscow, Russia)
M.Sc. (2007), Moscow State University (Moscow, Russia)

Professional History

Associate Professor (2019–current), University of Virginia, Charlottesville, VA, USA.
Research Professor (Fall 2021), MSRI Program "Universality and Integrability in Random Matrix Theory and Interacting Particle Systems."
Visiting Assistant Professor (2017–18), MIT, Cambridge, MA, USA.
Assistant Professor (2014–19), University of Virginia, Charlottesville, VA, USA.
Research Instructor (2011–14), Northeastern University, Boston, MA, USA.

Major Field(s) of Research

Probability
Combinatorics
Mathematical Physics

Grant History (since 2013)

NSF DMS grant 2153869 "Random Systems from Symmetric Functions and Vertex Models", $320,654 (2022–25)
4-VA at UVA Collaborative Research Grant program "Randomness by algebraic structures", $30,000 (2022–23)
Simons Collaboration Grant for Mathematicians 709055 "Distributional symmetries in stochastic systems", $42,000 (2020–25)
PI, NSF DMS–1839534 "Workshop on Representation Theory, Combinatorics, and Geometry", $15,000
PI, NSF DMS-1664617 "FRG: Collaborative Research: Integrable Probability", $193,453 (UVA part) (2017–22)
Co-PI, NSF DMS-1663552 "2017 Seminar on Stochastic Processes", $46,020.00 (2016–17)
EDF Fellowship of the University of Virginia (2014–15)
AMS/NSF Travel Grant Award for ICM 2014 (2014)

Awards/Honors

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*)
The 2015 Prize of the Moscow Mathematical Society

Number of PhD Students

Current: 1 (Mikhail Tikhonov, 2020–25)

National and International Service

Organized AMS Special sessions (2020, 2022) and JMM Special Session (2024)
Organizing a section at Mathematical Congress of the Americas (2025)
Organized Virginia Integrable Probability Summer School (2019, 2024)
Oranized multiple conferences and workshops at MIT (2018), University of Virginia (2017, 2018, 2023, 2024)
Organized online conferences and workshop (2020–21) during the COVID pandemic, including the first ever workshop on probability in April 2020.

Member of the editorial board at "Mathematical Physics, Analysis and Geometry", "Combinatorial Theory", and "Electronic Journal/Communications of Probability". Program committee member for FPSAC (Formal Power Series and Algebraic Combinatorics) conference (2017, 2021, 2024).
Regularly review papers for multiple journal and for the MathSciNet database
NSF panelist (2023); review grants for multiple agencies around the world
Broadening access to AI tools for working mathematicians by sharing best practices and participating in panel discussions (2023).

Selected Publications and Preprints

(1) [applied work] 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).

(2) Amol Aggarwal, Matthew Nicoletti, Leonid Petrov. *Colored Interacting Particle Systems on the Ring: Stationary Measures from Yang–Baxter Equation*, `arXiv:2309.11865 [math.PR]`.

(3) Svetlana Gavrilova, Leonid Petrov. *Tilted biorthogonal ensembles, Grothendieck random partitions, and determinantal tests*, `arXiv:2305.17747 [math.PR]`.

(4) Leonid Petrov, Mikhail Tikhonov. *Asymptotics of noncolliding q-exchangeable random walks*, J. Phys. A: Math. Theor. 56 365203. `arXiv:2303.02380 [math.PR]`.

(5) Leonid Petrov, Axel Saenz. *Rewriting History in Integrable Stochastic Particle Systems*, `arXiv:2212.01643 [math.PR]`.

(6) Amol Aggarwal, Alexei Borodin, Leonid Petrov, Michael Wheeler. *Free Fermion Six Vertex Model: Symmetric Functions and Random Domino Tilings*, Selecta Math., 29, article 36 (2023).

(7) Leonid Petrov. *Refined Cauchy identity for spin Hall-Littlewood symmetric rational functions*, Journal of Combinatorial Theory Ser. A, vol. 184 (2021), 105519.

(8) Leonid Petrov, Axel Saenz. *Mapping TASEP back in time*, Probability Theory and Related Fields, 182, pages 481-530 (2022).

(9) 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.

(10) 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.

(11) Alexey Bufetov, Leonid Petrov. *Yang-Baxter field for spin Hall-Littlewood symmetric functions*, Forum of Mathematics Sigma 7 (2019), e39.

(12) 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.

(13) Vadim Gorin, Leonid Petrov. *Universality of local statistics for noncolliding random walks*, Annals of Probability (2019), Vol. 47,

(14) Alexei Borodin, Leonid Petrov. *Higher spin six vertex model and symmetric rational functions*, Selecta Mathematica 24 (2018), no. 2, 751-874.

(15) Ivan Corwin, Leonid Petrov. *Stochastic higher spin vertex models on the line*, Communications in Mathematical Physics 343 (2016), no. 2, 651-700.

(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.

(17) Alexei Borodin, Leonid Petrov. *Integrable probability: From representation theory to Macdonald processes*, Probability Surveys, 11 (2014), 1-58.

(18) Alexei Borodin, Ivan Corwin, Leonid Petrov, Tomohiro Sasamoto. *Spectral theory for the q-Boson particle system*, Compositio Mathematica, 151 (2015), no. 1, 1-67.

(19) Alexei Borodin, Leonid Petrov. *Nearest neighbor Markov dynamics on Macdonald processes*, Advances in Mathematics, 300 (2016), 71-155.

(20) Leonid Petrov. *Asymptotics of Random Lozenge Tilings via Gelfand-Tsetlin Schemes*, Probability Theory and Related Fields, 160 (2014), no. 3, 429-487.