Leonid Petrov

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Research interests

Probability, Mathematical Physics, Algebraic Combinatorics, Representation Theory.

Education

2007–2010: Ph.D. studies,
Institute for Information Transmission Problems (Moscow, Russia).
Advisor: Grigori Olshanski.
Thesis "Markov Chains on Partitions and Infinite–Dimensional Diffusion Processes".

2002–2007: Diploma with excellence,
Lomonosov Moscow State University (Russia),
Department of Mathematics and Mechanics, Chair of Probability.

1997–2002: Moscow High School No. 2.

Employment

since 2014: Assistant Professor
at Department of Mathematics, University of Virginia, Charlottesville, VA, USA.

2011–2014: Research Instructor
at Department of Mathematics, Northeastern University, Boston, MA, USA.

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

Scholarships/prizes/funding

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 Moebius Contest.

2009: Alexander Kuznetsov/Independent University of Moscow graduate student scholarship.

2005, 2006: V. Potatin federal scholarship for academic excellence, leadership and creativity.

Publications

[20] (with Alexei Borodin) *Higher spin six vertex model and symmetric rational functions* (2016), arXiv:1601.05770 [math.PR].

[19] (with Konstantin Matveev) *q-randomized Robinson–Schensted–Knuth correspondences and random polymers* (2015), arXiv:1504.00666 [math.PR]. Submitted.

[18] (with Ivan Corwin) *Stochastic higher spin vertex models on the line* (2015), To appear in Comm. Math. Phys. 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* (2013), arXiv:1305.5501 [math.PR]. To appear in Advances in Mathematics.

[11] *The Boundary of the Gelfand-Tsetlin Graph: New Proof of Borodin-Olshanski's Formula, and its q-analogue* (2012), 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* (2012), Annals of Probability 43 (2014), no. 1, 1–43, arXiv:1206.5123 [math.PR].

[9] *Asymptotics of Random Lozenge Tilings via Gelfand-Tsetlin Schemes* (2012), 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.

Talks and conferences

Seminar talks

2016, January	University of Wisconsin, Madison
2015, December	MSU (Meeting of the Moscow Mathematical Society)
2015, October	Penn/Temple Probability Seminar
2015, August	Institute for Information Transmission Problems (Dobrushin Lab Seminar)
2015, May	Imperial College London

2015, March	University of Michigan
2014, November	Virginia Tech
2014, September	Duke University
2014, February	MIT
2014, January	Purdue University University of British Columbia (2 talks)
2013, December	University of Colorado, Boulder Penn State University Worcester Polytechnic Institute University of Virginia Carnegie Mellon University (2 talks)
2013, November	University of Minnesota (2 talks) Penn State University (2 talks)
2013, October	University of Southern California University of California, Los Angeles Rutgers University
2013, June	Institute for Information Transmission Problems (Dobrushin Lab Seminar)
2013, March	Independent University of Moscow (General Seminar "Globus")
2013, February	Arizona State University
2012, October	Princeton University Columbia University
2012, September	MIT
2012, August	Institute for Information Transmission Problems (Yakov Sinai's Seminar)
2012, March	New York University
2011, October	Brown University University of Michigan
2011, May	Alfréd Rényi Institute of Mathematics

Budapest University of Technology and Economics

2008, October St. Petersburg Department of Steklov Mathematical Institute

In addition to that, I have presented results of my research in a number of talks given at various research seminars in Moscow, Russia (at Moscow State University, Institute for Information Transmission Problems, Independent University of Moscow, etc.) in 2005–2011, at Northeastern University, Boston, MA, USA in 2011–2014, and at University of Virginia, Charlottesville, VA, USA since 2014.

Conference talks

20. Workshop on Classical and Quantum Integrable Systems, Institute for High Energy Physics, July 2015, Protvino, Russia. Tutorial lecture *"Integrable probability and Bethe ansatz"*.

19. "Random Interfaces and Integrable Probability" workshop (part of "Statistical Mechanics, Integrability and Combinatorics" program), Galileo Galilei Institute for Theoretical Physics, June 2015, Florence, Italy.

18. "Random Polymers and Algebraic Combinatorics" workshop, Mathematical Institute of the University of Oxford, May 2015, Oxford, UK.

17. "Limit shapes" workshop, ICERM, April 2015, Providence, RI, USA. Video of the talk available online at `http://icerm.brown.edu/video_archive/videos/sp_s15_w3/Solving_interacting_particle_systems_by_Fourier-like_transforms_]_Leonid_Petrov,_University_of_Virginia.php`

16. Central Spring AMS Sectional Meeting at Michigan State University, March 2015, East Lansing, MI, USA. *Invited special session talk*.

15. Columbia–Princeton Probability Day, March 2015, Princeton, NJ, USA. I was one of the two junior speakers at a one-day seminar series, with a talk *"Eigenfunctions of stochastic integrable particle systems"*.

14. Inhomogeneous Random Systems conference, Henri Poincaré Institute, January 2015, Paris, France.

13. International Congress of Mathematicians, August 2014, Seoul, South Korea. *Contributed talk*.

12. Workshop "From Macdonald Processes to Hecke Algebras and Quantum Integrable Systems" at Henri Poincaré Institute, May 2014, Paris, France.

11. Workshop "Random Matrices and Jacobi Operators" at Mittag-Leffler Institute, May 2014, Stockholm, Sweden.

10. Columbia / Courant Joint Probability Seminar Series on Kardar-Parisi-Zhang Universality. I was one of the three speakers of the seminar series, with a talk *"Markov Dynamics on Macdonald Processes"*. October 2013, New York, NY, USA.

9. Cornell Probability Summer School, July 2013, Ithaca, NY, USA. *Tutorial sessions for the lecture course of A. Borodin, and a short talk.*

8. Random Tilings Workshop at the Simons Center for Geometry and Physics, February 2013, Stony Brook, NY, USA.

7. MSRI "Random Spatial Processes" program, April 2012, Berkeley, CA, USA.

6. Interacting Particle Systems, Growth Models, and Random Matrices Workshop at the University of Warwick, March 2012, Warwick, UK.

5. International conference "50 years of IITP", July 2011, Moscow, Russia.

4. EURANDOM Workshop YEP VIII 2011 "Stochastic Models for Population Dynamics", March 2011, Eindhoven, Netherlands.

3. Mathematics – XXI century. PDMI 70th anniversary, September 2010, St. Petersburg, Russia.

2. PIMS/UBC School in Probability, June 2009, UBC, Vancouver, Canada.

1. Summer School "Large N Limits", August 2008, Bitche, France.

Visits / membership in programs

4. Program "New Approaches to Non-equilibrium and Random Systems: KPZ Integrability, Universality, Applications and Experiments" at the Kavli Institute for Theoretical Physics (University of California,m Santa Barbara), February–March 2016, Santa Barbara, CA, USA (3 weeks).

3. Program "Statistical Mechanics, Integrability and Combinatorics", Galileo Galilei Institute for Theoretical Physics, June 2015, Florence, Italy (1 month).

2. Collaboration with Ivan Corwin and Konstantin Matveev, Columbia University, March 2015, New York, NY, USA (3 days).

1. Visit to Alfréd Rényi Institute of Mathematics, May 2011, Budapest, Hungary (1 week).

Other events participated

15. 37th Midwest Probability Colloquium, Northwestern University, October 2015, Evanston, IL, USA.

14. Workshop "Analytic Tools in Probability and Applications", IMA, April 2015, Minneapolis, MN, USA.

13. Seminar on Stochastic Processes 2015 (*with participation in a panel discussion*), April 2015, University of Delaware, Newark, DE, USA.
12. Workshop on Moduli Spaces, Derived Geometry, and Geometric Representation Theory, November 2014, University of North Carolina at Chapel Hill, NC, USA.
11. 2014 Charles River Lectures on Probability Theory and Related Topics, October 2014, Harvard University, Boston, MA, USA.
10. Workshop "Stochastic Analysis: Around the KPZ Universality Class" at Mathematisches Forschungsinstitut Oberwolfach, June 2014, Oberwolfach, Germany.
9. 2013 Charles River Lectures on Probability Theory and Related Topics, October 2013, MIT, Boston, MA, USA.
8. Summer School "KPZ equation and rough paths", June 2013, Lebesgue Center of Mathematics, Rennes, France.
7. 2012 Charles River Lectures on Probability Theory and Related Topics, October 2012, Microsoft Research, Boston, MA, USA.
6. St. Petersburg School in Probability and Statistical Physics, June 2012, St. Petersburg, Russia.
5. Algebraic Geometry Northeastern Series (AGNES) Workshop, October 2011, Stony Brook, NY, USA.
4. Clay Institute Summer School "Probability and Statistical Physics in Two and more Dimensions", July 2010, Buzios, Brazil.
3. Midrasha Mathematicae: The Mathematics of Oded Schramm, December 2010, Hebrew University, Jerusalem, Israel.
2. Summer School "Structures in Lie Representation Theory", August 2009, Jacobs University, Bremen, Germany.
1. PROMYS summer program at Boston University for high school students, Boston, MA, USA, 2001.

Teaching

Spring 2016: University of Virginia.
MATH 8380 — Random matrices.

Fall 2015: University of Virginia.
MATH 3100 — Introduction to Probability.

Spring 2015: University of Virginia.
MATH 5110 — Introduction to Stochastic Processes.

Fall 2014: University of Virginia.
MATH 3100 — Introduction to Probability.

Spring 2014: Northeastern University.
MATH 7241 — Probability 1 (graduate).

Fall 2013: Northeastern University.
MATH 3081 — Probability and Statitics, 2 sections.

Spring 2013: Northeastern University.
MATH 4581 — Statistics and Stochastic Processes.

Fall 2012: Northeastern University.
MATH 1342 — Calculus II for Sci&Eng (honors section). Part of a novel Department of Mathematics' teaching experiment with "inverted" sections: the instructor assigns watching video-lectures accompanying the textbook for homework, and spends class-time going over problems and clarifying the material.

MATH 7382 — Topics in Probability (graduate): an expository introductory-level graduate course on solvable probabilistic models, including tools of algebraic combinatorics and representation theory.

Spring 2012: Northeastern University.
MATH 3081 — Probability and Statitics, 2 sections.

Fall 2011: Northeastern University.
MATH 1342 — Calculus II for Sci&Eng.

Spring 2011: "Math in Moscow" programme in English for international students at the Independent University of Moscow. A course in Combinatorics.

2007—2008: Moscow High School No. 17. Teacher of mathematics.

Other

I co-organize the Probability Seminar and the Undergraduate Math Club at the University of Virginia.

I regularly referee scholarly journal papers submitted to journals such as 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. Also I am a regular reviewer for the Mathematical Reviews database.

Informatic skills : LaTeX, `Mathematica`, Computer experimentation, Probabilistic visualization, `git`, `SVN`, `Python`, `C/C++`, `Qt`, `html`, `UNIX`.

Personal

Date of birth: November 5, 1985
Languages: English (fluent), Russian (native)
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Last updated: January 31, 2016
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