

# Natalia Tsilevich

I have recently resigned from **St. Petersburg Department of Steklov Institute of Mathematics** (where I have worked for 21 years and had a permanent position of senior researcher) and joined **University of Haifa** for a temporary research position.

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## Research Interests:

- Asymptotic representation theory, asymptotic combinatorics.

## Family Status:

- Married, 2 children (aged 23 and 16).
- Husband: Edward A. Hirsch, theoretical computer scientist.

## Education and Degrees:

- **Habilitation (Doctor of Sciences in Mathematics)**, St. Petersburg Department of Steklov Institute of Mathematics, 2015.  
Thesis: *Asymptotic theory of unitary representations of symmetric groups and its applications*.  
Referees: Boris Feigin, Yuri Neretin, Nicolai Reshetikhin.
- **Ph.D. in Mathematics**, St. Petersburg Department of Steklov Institute of Mathematics, 1998.  
Thesis: *Poisson–Dirichlet measures and virtual permutations*.  
Advisor: Anatoly Vershik.  
Referees: Grigori Olshanski, Vladimir Sudakov.
- **M.Sc. in Mathematics (summa cum laude)**, St. Petersburg State University, 1995.  
Thesis: *Statistics of virtual permutations*.  
Advisor: Anatoly Vershik.  
Referee: Sergey Kerov.

## Previous positions:

- 2001–2022: St. Petersburg Department of Steklov Institute of Mathematics, Russian Academy of Sciences, Laboratory of Representation Theory and Dynamical Systems; last position: Senior Researcher (permanent).
- 1999–2001 (full-time), 2001–2020 (part-time): St. Petersburg State University; last position: Associate Professor.

### Short-Term Research Visits:

- Weizmann Institute of Sciences, Rehovot, Israel, 2022.
- Northeastern University, Boston, USA, 2010.
- Isaac Newton Institute for Mathematical Sciences, Cambridge, UK, 2003.
- University of Bielefeld, Bielefeld, Germany, 2001.
- University of Bielefeld, Bielefeld, Germany, 2000.
- Weizmann Institute of Sciences, Rehovot, Israel, 1998.
- Institut de Mathématiques de Luminy, Luminy, Marseille, France, 1997.

### Professional Membership:

- St. Petersburg Mathematical Society (1998 – present).

### Awards:

- Young Mathematician Prize of the St. Petersburg Mathematical Society, 1999.

### Teaching Experience:

Since 1999, I have been teaching a number of courses at St. Petersburg State University. Some of the courses I taught:

- *Symmetric Functions* (graduate) at the Department of Mathematics and Computer Science (student evaluations: 5.0 out of 5.0),
- *Representation Theory of Symmetric Groups* (graduate) at the Department of Mathematics and Computer Science (student evaluations: 5.0 out of 5.0),
- *Complex Analysis* (undergraduate) at the Department of Mathematics and Mechanics,
- *Involution Algebras* (undergraduate) at the Department of Mathematics and Mechanics,
- *Ergodic Theory* (undergraduate student research seminar) at the Department of Mathematics and Mechanics.

### Editorial Boards:

- European Journal of Mathematics, editor, 2014 – present.
- Notes of Mathematical Seminars of St.Petersburg Department of Steklov Institute of Mathematics, coeditor for the series Representation Theory, Dynamical Systems, Combinatorial Methods, 2007–2022.
- Central European Journal of Mathematics, editor, 2010–2014.

### Organization of Conferences:

- Representations, Dynamics, Combinatorics: in the Limit and Beyond, St. Petersburg, Russia, 2014.
- Representation Theory, Dynamical Systems, and Asymptotic Combinatorics, St. Petersburg, Russia, 2004.

## Grants:

- RSF 21-11-00152 (2021), senior investigator.
- 15+ RFBR and “Leading Scientific School” grants (1996–2019), participant.
- CRDF RUM1-2622-ST.042 (2005–2007), participant.
- International Science Foundation grant MQV-000 (1995), individual.

## List of Publications:

1. *The Schur–Weyl graph and Thoma’s theorem* (with A.M.Vershik). *Funct. Anal. Appl.* 55, No. 3, 198–209 (2021).
2. *Ergodicity and totality of partitions associated with the RSK correspondence* (with A.M.Vershik). *Funct. Anal. Appl.* 55, No. 1, 26–33 (2021).
3. *The intrinsic hyperplane arrangement in an arbitrary irreducible representation of the symmetric group* (with A.M.Vershik and S.Yuzvinsky). *Arnold Math. J.* 6 (2020), 173–187.
4. *Groups generated by involutions of diamond-shaped graphs, and deformations of Young’s orthogonal form* (with A.M.Vershik). *J. Math. Sci. (N.Y.)* 247 (2020), 657–662.
5. *On the decomposition of tensor representations of symmetric groups* (with P.P.Nikitin and A.M.Vershik). *Algebras and Representation Theory* 22, No. 4 (2019), 895–908.
6. *On the dual complexity and spectra of some combinatorial functions.* *J. Math. Sci. (N.Y.)* 232, No. 2 (2018), 170–176.
7. *On the relation of some combinatorial functions to representation theory* (with A.M.Vershik). *Funct. Anal. Appl.* 51, No. 1 (2017), 22–31.
8. *The serpentine representation of the infinite symmetric group and the basic representation of the affine Lie algebra  $\widehat{sl}_2$*  (with A.M.Vershik). *Lett. Math. Phys.* 105, No. 1 (2015), 11–25.
9. *Infinite-dimensional Schur–Weyl duality and the Coxeter–Laplace operator* (with A.M.Vershik). *Comm. Math. Phys.* 327, No. 3 (2014), 873–885.
10. *On the behavior of the periodic Coxeter Laplacian in some representations related to the antiferromagnetic asymptotic mode and continual limits.* *J. Math. Sci. (N.Y.)* 181 (2012), 914–920.
11. *Spectral properties of the periodic Coxeter Laplacian in the two-row ferromagnetic case.* *J. Math. Sci. (N.Y.)* 174 (2011), 58–70.
12. *Induced representations of the infinite symmetric group* (with A.M.Vershik). *Pure Appl. Math. Quart.* 3, No. 4 (2007), 1005–1026.
13. *Induced representations of the infinite symmetric group and their spectral theory* (with A.M.Vershik). *Doklady Math.* 75, No. 1 (2007), 1–4.
14. *Markov measures on Young tableaux and induced representations of the infinite symmetric group* (with A.M.Vershik). *Prob. Theory Appl.* 51, No. 1 (2006), 211–223.
15. *On different models of representations of the infinite symmetric group* (with A.M.Vershik). *Adv. Appl. Math.* 37 (2006), 526–540.

16. *Quantum inverse scattering method for the  $q$ -boson model and symmetric functions*. *Funct. Anal. Appl.* 40, No. 3 (2006), 207–217.
17. *On the Fourier transform on the infinite symmetric group* (with A.M.Vershik). *J. Math. Sci. (N.Y.)* 138, No. 3 (2006), 5663–5673.
18. *The Markov–Krein correspondence in several dimensions* (with S.V.Kerov). *J. Math. Sci. (N.Y.)* 121, No. 3 (2004), 2345–2359.
19. *Remarks on the Markov–Krein identity and quasi-invariance of the gamma process* (with A.M.Vershik and M.Yor). *J. Math. Sci. (N.Y.)* 121, No. 3 (2004), 2303–2310.
20. *Fock factorizations, and decompositions of the  $L^2$  spaces over general Lévy processes* (with A.M.Vershik). *Russian Math. Surveys* 58, No. 3 (2003), 427–472.
21. *An infinite-dimensional analogue of the Lebesgue measure and distinguished properties of the gamma process* (with A.M.Vershik and M.Yor). *J. Funct. Anal.* 185, No. 1 (2001), 274–296.
22. *Quasi-invariance of the gamma process and multiplicative properties of the Poisson–Dirichlet measures* (with A.M.Vershik). *C. R. Acad. Sci. Paris* 329, Serie I (1999), 163–168.
23. *Stationary random partitions of positive integers*. *Prob. Theory Appl.* 44, No. 1 (2000), 60–74.
24. *Distribution of the mean value for certain random measures*. *J. Math. Sci. (N.Y.)* 96, No. 5 (1999), 3616–3623.
25. *Stick breaking process generates virtual permutations with Ewens distribution* (with S.V.Kerov). *J. Math. Sci. (N.Y.)* 87, No. 6 (1997), 4082–4093.
26. *Distribution of cycle lengths of infinite permutations*. *J. Math. Sci. (N.Y.)* 87, No. 6 (1997), 4072–4081.

## **Translations:**

My favorite professional hobby is translating math and popular science books.

### **Russian to English translations:**

1. B.Makarov and A.Podkorytov, *Smooth Functions and Maps*. Springer, 2020.
2. S.Lvovski, *Principles of Complex Analysis*. Springer, 2020.
3. S.Natanzon, *Complex Analysis, Riemann Surfaces and Integrable Systems*. Springer, 2019.
4. M.E.Kazaryan, S.K.Lando, and V.V.Prasolov, *Algebraic Curves: Towards Moduli Spaces*. Springer, 2018.
5. B.Makarov and A.Podkorytov, *Real Analysis: Measures, Integrals and Applications* (Chapters 1–4, Appendices). Springer, 2013.
6. S.V.Kerov, *Asymptotic Representation Theory of the Symmetric Group and its Applications in Analysis*. *Translations of Mathematical Monographs*, Vol. 219. American Mathematical Society, 2003.

### **English to Russian translations:**

1. H.Weyl, *Mind and Nature*. MCCME, Moscow, 2019.
2. P.Etingof *et al.*, *Introduction to Representation Theory*. MCCME, Moscow, 2019.
3. S.L.Glashow, *From Alchemy to Quarks: The Study of Physics as a Liberal Art*. MCCME, Moscow, 2018.
4. M.Gromov, *The Ring of Mysteries: Universe, Mathematics, Mind*. MCCME, Moscow, 2017.

5. T.Tao, *Structure and Randomness*. MCCME, Moscow, 2014.
6. M.L.Mehta, *Random Matrices*. MCCME, Moscow, 2012.
7. D.Fuchs and S.Tabachnikov, *Mathematical Omnibus* (Chapters 3 and 8). MCCME, Moscow, 2011.
8. D.Mumford, C.Series, and D.Wright, *Indra's Pearls: The Vision of Felix Klein* (Introduction, Chapters 1 and 2). MCCME, Moscow, 2011.
9. J.F.C.Kingman, *Poisson Processes*. MCCME, Moscow, 2007.
10. R.Stanley, *Enumerative Combinatorics*, Vol. 2 (partially). Mir, Moscow, 2005.