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# Marina Prokhorova
# Curriculum Vitae


Born: Sverdlovsk (now Ekaterinburg), USSR. Maiden name: Marina Lev
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## Current Research Interests

Global analysis, elliptic operators, topology, K-theory, mathematical physics

## Education

2016 – 2020 PhD Studies (Pure Mathematics), Mathematics Department, Technion – Israel Institute of Technology (Haifa, Israel). Advisor: Simeon Reich.

1997 PhD (Applied Mathematics), Ural State University (Ekaterinburg, Russia). Advisor: Anatoly F. Sidorov. Dissertation title: "Some analytic methods of investigation of nonlinear boundary problems of mathematical physics".

1984 – 1990 Undergraduate Studies, Department of Mathematics and Mechanics, Ural State University. Graduated *Summa Cum Laude*.

## Academic Positions

2009 – 2016 Senior Researcher (part-time) at Ural State University (now Ural Federal University)

2008 – 2016 Senior Researcher at Algebra and Topology Department (Institute of Mathematics and Mechanics of Ural Branch of Russian Academy of Sciences)

1994 – 2008 Junior Researcher, Researcher, Senior Researcher at Department of Applied Problems (Institute of Mathematics and Mechanics of Ural Branch of Russian Academy of Sciences)

## Visiting Positions

11/2015, 03-05/2016 Einstein Institute of Mathematics (The Hebrew University of Jerusalem, Israel)

03/2014 Max Planck Institute for Mathematics (Bonn, Germany)

04-06/2012, 05-06/2013 Laboratory of Algebraic Geometry and its Applications (National Research University "Higher School of Economics", Moscow, Russia)

04/2011 Institute of Molecules and Materials (Radboud University, Nijmegen, Netherlands)

03-04/2010 Max Planck Institute for Mathematics (Bonn, Germany)

10-11/2007 IHES (Bur-sur-Yvette, France)

## MSc Student Advising (Ural State University)

2010 – 2011 Maxim Mornev (currently a postdoc in ETH Zürich in number theory)

2008 – 2011 Daniil Aizenshtein

## Teaching Experience

**BSc/MSc courses** (Ural State University)

2013/2014 *Differential topology* (one-year course)

2009 – 2011 *Algebraic geometry* (two-year course)

**Mini-courses**

International School-Conference for young scientists (Ekaterinburg, Russia):

2016 *Poncelet's porism and elliptic curves*

2015 *K-theory: topology, analysis, algebra*

The Summer School "Contemporary Mathematics" (Dubna, Russia):

2014 *Nonstandard analysis*
2013 *Smooth manifolds and homotopy groups of spheres*
2011 *Eight faces of the Poincare homology 3-sphere*
2010 *3-dimensional manifolds*

## Publications in Pure Mathematics and in Mathematical Physics

### Published

1. *On relative near-standardness in IST*. Siberian Math. Journal 39 (1998), no.3, 518-521.
2. *On the existence of factor sets by external equivalence relations in IST*. Siberian Math. Journal 43 (2002), no.4, 708-713.
3. *External sets properties in IST*. The Bulletin of Symbolic Logic. 8 (2002), Issue 1, 155-156.
4. (with M. I. Katsnelson) *Zero-energy states in corrugated bilayer graphene*. Physical Review B, 77 (2008), 205424.
5. *Homeomorphism problems arising in the theory of grid generation*. Proceedings of the Steklov Institute of Mathematics 261(2008), suppl. 1, S165-S182.
6. *Criteria of homeomorphism in the theory of grid generation.* Zh. Vychisl. Mat. i Mat. Fiz. 52 (2012), no.5, 878-882 (in Russian); arXiv:1504.01087 [math.GT] (in English).
7. *The spectral flow for Dirac operators on compact planar domains with local boundary conditions.* Communications in Mathematical Physics, 322 (2013), no.2, 385-414.
8. *Factorization of the Reaction-Diffusion Equation, the Wave Equation, and Other Equations*. Proceedings of the Steklov Institute of Mathematics 287 (2014), suppl. 1, S156-S166.
9. *The structure of the category of parabolic equations. I & 2.* CEUR Workshop Proceedings 1662 (2016), 121-133 & 134-147.
10. *Self-adjoint local boundary problems on compact surfaces. I. Spectral flow.* Journal of Geometric Analysis (2019), DOI 10.1007/s12220-019-00313-0; arXiv:1703.06105 [math.AP], 46 pp.
11. *Self-adjoint local boundary problems on compact surfaces. II. Family index.* To appear in the Journal of Noncommutative Geometry; arXiv:1809.04353 [math-ph], 46 pp.

### In preparation

*Family index for unbounded operators.*

## Publications in Applied Mathematics

1. *The shape of a growing dendrite*. Journal of Engineering Physics and Thermophysics 61 (1991), no.5, 1394-1400.
2. *Self-similar solutions of the Stefan problem*. Journal of Engineering Physics and Thermophysics 63 (1992), no.4, 1032-1036.
3. (with L.D. Zabezhinskii, V.V. Prokhorov, M.N. Mil'shtein, S.G. Stakheev) *Statement and personal-computer-aided realization of the conjugate problem of heat transfer in a power-technological boiler with a moving bed of dispersed heat-transfer agent*. Journal of Engineering Physics and Thermophysics 70 (1997), no.5, 744-748.
4. *Modeling of solutions of the heat equation and of the Stefan problem with dimension decrease*. Russian Acad. Sci. Docl. Math. 58 (1998), no.1, 88-90.

## Invited Talks

2014 Conference "Geometric Structures and Spectral Invariants" (Berlin, Germany)

**Seminar talks**

2020 GAMP/QMATH Seminar (University of Copenhagen, Denmark)

2019 Operator Algebras/Operator Theory Seminar (Ben Gurion University, Israel)
Geometry and Topology Seminar (University of Haifa, Israel)

2015 Seminar of Laboratory of Algebraic Geometry and its Applications
(National Research University "Higher School of Economics", Moscow, Russia),
Geometry and Topology Seminar (Weizmann Institute, Israel),
Operator and System Theory Seminar (Ben Gurion University, Israel),
Nonlinear Analysis and Optimization Seminar (Technion, Israel),
Seminar on geometry and its applications (Hebrew University of Jerusalem, Israel)

2014 Mathematical physics seminar (Angers University, France)

2013 Colloquium of the Faculty of Mathematics
(National Research University "Higher School of Economics", Moscow, Russia)

2012 Seminar of Laboratory of Algebraic Geometry and its Applications
(National Research University "Higher School of Economics", Moscow, Russia)

2010 Seminar on Algebra, Geometry and Physics (Max Planck Institute, Bonn, Germany),
Research seminar Global Analysis (University of Bonn, Germany),
Mathematical Physics seminar (Angers University, France),
Theory of Condensed Matter Seminar (Radboud University, Nijmegen, Netherlands),
Geometry and Topology Seminar (Weizmann Institute, Israel),
Nonlinear Analysis and Optimization Seminar (Technion, Israel)

2009 V.A. Rokhlin Topology Seminar
(St. Petersburg Department of Steklov Institute of Mathematics, Russia)

## Other Professional Activities

2012-2016 Member of the Program Committee of the *International School-Conference for young scientists* (Ekaterinburg, Russia)

2011 Organizer of the *International School on Algebra and Algebraic Geometry* (Ekaterinburg, Russia)

2011 Member of the Organizing Committee of the *International conference on algebra and geometry* (Ekaterinburg, Russia)

2010, 2011 Member of the Organizing Committee and of the Program Committee of the *Russian School-Conference for young scientists* (Ekaterinburg, Russia)

## Awards

2002 Research Grant of the project "Young Scientists of Russia"

1997-1999 State Research Grant of Russian Federation for young scientists

1996, 2005 Results were included in the list of the best results of the Ural Branch of Russian Academy of Sciences

1996 The Prize of the Ural Mathematical Society

1987 First Prize of the All-USSR National Undergraduates Contest in Mathematics

1987 First Prize of the Ural Undergraduates Contest in Theoretical Mechanics

1988 First Prize of the Regional (Ural, Siberia and Far East) Undergraduates Contest in Computer Sciences

1983 First Prize of the All-USSR National High School Contest in Mathematics

1984 Second Prize of the All-USSR National High School Contest in Mathematics