

ANDREI BIRYUK

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Research interests

- Nonlinear partial differential equations, Differential geometry, Ordinary differential equations.
- Random processes, Stochastic PDEs, Invariant measures.
- Harmonic Analysis, Viscosity solutions.
- Applied Mathematics, including Modelling, Numerical Methods.

Education

1998 – 2001

PhD in Mathematics from Heriot-Watt University, Edinburgh.

Thesis title: “Estimates for Spatial Derivatives of Solutions for Quasilinear Parabolic Equations with Small Viscosity”, supervised by Prof. S. Kuksin. In this thesis I explored analytic properties of solutions of partial differential equations, such as behavior for large time and dependence upon the initial data.

1993 – 1998

Msc In Mathematics from Moscow State University (Diploma with Honor)

Average grade : 100% .

1993 – 1998

Msc In Mathematics from the Independent University of Moscow.

Average grade : 98.4% .

1993

Graduated from Mathematical High School N4 in Krasnodar, Russia.

Positions

Sep 06 –

Postdoctoral fellow at the Center for Mathematical Analysis, Geometry, and Dynamical Systems of the Department of Mathematics of Instituto Superior Técnico, Lisbon, Portugal.

Sep 06 –

Visiting Scholar at McMaster University, Hamilton, Canada.

Aug 03 – Aug 06

Canada Research Chair Postdoctoral fellow at McMaster Univ (Hamilton). Conducting research in applied mathematics. Reporting progress in conferences and research group meetings.

Aug 03 – Jun 04

J. E. Marsden Postdoctoral fellow at the Fields Institute for Research in Mathematical Sciences, Toronto. This was a special thematic year, dedicated to PDE. Cutting edge research with well known mathematicians coming about every 2 weeks to the Fields Institute.

Jan – Aug 2003

Research Associate at Heriot-Watt University, Edinburgh. Modelling Stochastic Euler equation. Numerical Analysis. Comparing numerical results with real life models.

2001 – Dec 2002

Researcher and teaching assistant at the Independent University of Moscow. Algebra and PDE research. Writing C/C++ code for solving PDE numerically. Tutoring international students in the “Math in Moscow” program.

Teaching

2006

McMaster University. Graduate course in Complex Analysis.

2005

McMaster University. Instructor: Complex Analysis, approx. 80 students.

2004

McMaster University. Instructor: Ordinary Differential Equations, approx. 220 students.

2003 – 2004

Series of invited lecture presentations and talks for the Fields Institute graduate courses and workshops.

2001 – Dec 2002	Independent University of Moscow. Teaching assistant: Algebra. Tutoring students, grading exams. Tutor for international students in the <i>Math in Moscow</i> program.
1998 – 2001	Heriot-Watt University. Teaching assistant: Calculus. Helping students, grading tests.
1995 – 1996	Seminars on Mathematics for high-school students, Moscow State University. Tutoring students.
1995, 1996	Preparing talented high school students for the International Mathematics Olympiad. Teaching summer schools and preparing study materials. Krasnodar region, Russia. preparation materials

Awards, Honors, and Distinctions

1998-2001	U.K. Overseas Research Student Grant.
1995	Open Society (ISSEP) Soros Student Grant.
1993	Silver Medal of the International Mathematical Olympiad (Istanbul)
1993	Winner of Russian Mathematical Olympiad
1992	Winner of Russian Mathematical Olympiad
1991	Winner of Russian Physics Olympiad

Journals refereed include:

Proceedings of the Royal Society A; Numerical Methods for Partial Differential Equations; Russian Math. Surveys.

Recent Grant Support

- Fourth European Congress of Mathematics, 2004, KTH, Stockholm

Selected invited talks

- *Suitability of solutions for the Navier-Stokes system.* Kuban State University, Krasnodar, Russia, June 2006.
 - *Navier Stokes system: singular sets. Navier Stokes system: Decay of the Fourier coefficients. Solutions of the Boltzmann equation with 1D symmetry.* Three talks on Mathematical Hydrodynamics International Workshop, Russian Academy of Science, Moscow, Jun 2006.
 - *Strong solutions to the Boltzmann equation.* University California Santa-Barbara, Jan 2006.
 - Talk with Robert Brandenberger about *Variational Principle and Cosmology.* McGill, Montreal, Canada, Jan 2006.
 - *Progress in Navier-Stokes and Boltzmann equations.* Boston University, Jan 2006.
 - *Understanding the Boltzmann equation.* BIRS Workshop 05w5506, New Directions in PDE, Banff, AL, Canada, Jul 2005.
 - *Infinite energy solutions of multi-dimensional Burgers-type equations.* CMS/CSHPM Summer 2005 Meeting, University of Waterloo, Waterloo, Ontario, Jun 2005.
 - *On the lower bounds of the spatial decay of solutions for the Navier-Stokes equation.* Deterministic and stochastic Navier-Stokes equations, Palo-Alto, CA., Mar 2005.
 - *Hydrodynamics.* Kuban State University, Krasnodar, Russia, Aug 2004.
 - *On local energy dissipation for Navier-Stokes equation.* Institute of Math Modeling, Moscow, Jul 2004.
 - *Differential geometry and PDE.* Satellite working group within Workshop on Hamiltonian Dynamical systems (at CRM, Montreal), May 2004.
 - *NLS with small viscosity.* Workshop on Nonlinear Wave Equations, Toronto, Mar, 2004.
 - Numerous talks in McMaster University, Hamilton, Canada (2003-2006)
 - Numerous talks in the Fields Institute, Toronto, Canada (2003-2004)
 - *Degenerate vector fields w.r.t. generalised Burgers type equations.* Mathematical Theory of Hyperbolic Systems of Conservation Laws, Isaac Newton Institute for Mathematical Sciences, Cambridge, UK, Mar 2003.
 - *Geometry of Burgers equation and Turbulence.* University of Hull, UK, Mar 2003.
 - *On generalized multidimensional Burgers type equations.* Département de Physique Théorique de l'Université de Genève, Feb 2003.
- Numerous talks in Moscow State University and the Independent University of Moscow. (2001-2002)
- *On generalized equations of Burgers type with small viscosity.* Petrovskii Centenary Conference “Differential Equations and Related Topics”, Moscow, May 2001.
 - *Estimates for derivatives of the Burgers equations in terms of viscosity.* Analytical and Statistical Approaches to Fluid Models, Oberwolfach, Germany, Sep 2000.
 - *Spectral Properties of Solutions of the Generalized Burgers Equation.* British Applied Mathematics Colloquium (BAMC), Manchester, UK, Apr 2000.