Polina Vytnova

Curriculum vitae

Contact details

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Current position

October 2016 – Research Associate, University of Warwick

Research interests

Dynamical Systems, Ergodic Theory; Mathematical Methods in Dynamo Theory;
Dynamical Zeta Functions and Their Applications.

Previous positions

September 2017 Visiting Researcher, Institute Mittag–Leffler, Stockholm
January 2015 – September 2016 Research Assistant, Queen Mary University of London
February 2016 – May 2016 ICERM Postdoctoral Researcher, Brown University
September 2015 – December 2015 Visiting Researcher, IMPAN, Warsaw
September 2014 – January 2015 Visiting Researcher, Imperial College London

Education

2010–2014 Postgraduate student, The University of Warwick, Mathematics Institute
PhD Thesis supervisor: Dr Oleg Kozlovski
PhD Thesis title: Kinematic Fast Dynamo Problem.
2009–2010 Master student, Utrecht University, Department of Mathematics, MRI Master Class Numerical Bifurcation Analysis of Dynamical Systems
Research project supervisor: Prof. Yuri Kuznetsov
Research project title: Numerical analysis of the accumulation of strong $1:2$ resonances in Generalized Hénon Maps.
2003–2009 Master of Science, Independent University of Moscow
M. Sc. thesis supervisor: Prof. George Shabat
M. Sc. thesis title: On non-archimedean dynamical systems
January–February 2006 Participation in the student exchange program IUM — ENS–Paris

Publications

1. Zeros of the Selberg zeta function for symmetric infinite area hyperbolic surfaces. (with M. Pollicott) Geom Dedicata (2018). https://doi.org/10.1007/s10711-018-0386-6
2. Rigorous computation of diffusion coefficients for expanding maps. (with O. Jenkinson and M. Pollicott) *J. Stat. Phys.* 170 (2018), no. 2, 221–253.
3. Critical points for the Hausdorff dimension of pairs of pants. (with M. Pollicott) *Groups Geom. Dyn.* 11 (2017), no. 4, 1497–1519.
4. Linear response and periodic points. (with M. Pollicott) *Nonlinearity* 29 (2016), no. 10, 3047–3066.
5. Estimating singularity dimension. (with M. Pollicott) *Math. Proc. Cambridge Philos. Soc.* 158 (2015), no. 2, 223–238.
6. On dynamical systems with 2-adic time. (with V. Dremov, and G. Shabat) // *Proceedings of The Steklov Institute of Mathematics*, 2009, Vol. 265, pp. 101–109
7. On the chaotic properties of quadratic maps over non-archimedean fields. (with V. Dremov and G. Shabat) // *AIP Conf. Proc.* — March 29, 2006, Issue 1, pp.43–54

Papers to appear and Preprints

1. Heuristic analysis of symmetric tori, to appear in the proceedings of the international conference "Statistical Properties of Nonequilibrium Dynamical Systems"; ShenZhen, China, 2016; *20pp*. Final version: https://www.mccme.ru/~polly/files/holedTorusConjectures.pdf.
2. The Bowen–Series coding and zeros of zeta functions. *Lecture notes.* (with M. Pollicott) to appear in the proceedings of the international conference "Statistical Properties of Nonequilibrium Dynamical Systems"; ShenZhen, China, 2016; *36pp*. Final version: https://www.mccme.ru/~polly/files/ShenZhenLecturesFinal.pdf
3. Planar fast dynamo with Cantor hyperbolic set. (with O. Kozlovski) preprint *32pp*; to be submitted by July 2019; current working version: https://www.mccme.ru/~polly/files/p3.pdf
4. Fast dynamo on the real plane (with O. Kozlovski) preprint *63pp*; to be submitted by May 2019; current working version: https://www.mccme.ru/~polly/files/p2.pdf
5. Toy dynamo model on the real line (with O. Kozlovski) preprint *60pp*; to be submitted by February 2019; current working version: https://www.mccme.ru/~polly/files/p1.pdf

Grants

2014–2015 London Mathematical Society Anniversary Grant, UK;
2010–2013 Warwick Postgraduate Research Scholarship, UK;
2009–2010 Mathematical Research Institute Scholarship, The Netherlands.

Selected Talks

1. "Illusions: curves of zeros of the Selberg zeta functions", Berkeley, USA, November 2018; pdf handout: https://www.mccme.ru/~polly/files/zetazeroshandout.pdf.
2. "Zero set of the Selberg zeta function for a symmetric pair of pants", Rennes, France, September 2018.
3. "Kinematic fast dynamo problem. What's new.", SusTech, ShenZhen, China, June 2018
4. "Lyapunov spectrum and around", Institute Mittag-Leffler, Stockholm, October 2017
5. "Estimating characteristic parameters of hyperbolic systems", Warwick, January 2017; pdf handout: https://www.mccme.ru/~polly/files/ETDS2.pdf.
6. "A study of the zero set of a Selberg zeta function" Warwick, April 2017.
7. "Linear response and periodic points". International conference "Ergodic theory of dynamical systems", Bedlewo, Poland, November 2015; pdf handout: https://www.mccme.ru/~polly/files/linearResponseHandout.pdf.
8. "Hausdorff dimension of limit sets using zeta functions". International conference "Fractal Geometry and Dynamics", Bedlewo, Poland, October 2015; pdf handout: https://www.mccme.ru/~polly/files/bedlewoHandout.pdf.
9. "Kinematic fast dynamo problem". International conference "Rocky Mountains Dynamical Systems", Utah, June 2015; pdf handout: https://www.mccme.ru/~polly/files/utahHandout.pdf.
10. "Estimating fast dynamo growth rate using zeta functions". International conference "Analysis and geometry of resonances", CIRM, Marseille, France, March 2015.
11. "Kinematic fast dynamo problem for 2D maps". One Day ETDS Meeting, London, December 2014.
12. "Towards a realistic Fast Dynamo". Beijing University, China, August 2014.
13. "Kinematic fast dynamo problem for planar maps". International conference "Topological and geometric methods in low-dimensional dynamical systems"; Moscow, Russia; May 2014.
14. "A toy model of fast dynamo". International Conference "Non-Equilibrium Statistical Mechanics and The Theory of Extreme Events", Reading, January 2013.
15. "An invitation to non-archimdean dynamics", Crash course; Warwick, March–April 2012.
16. "Renormalization methods in bifurcation theory", Utrecht, March 2010.
17. "On dynamical systems with 2-adic time" (joint work with V. Dremov, G. Shabat). The Third International conference on p-Adic Mathematical Physics, Moscow, October 2007;
18. "On the chaotic properties of quadratic maps over non-archimedean fields" (joint work with V. Dremov, G. Shabat). The second International Conference on p-Adic Mathematical Physics, Belgrad, September 2005;

Teaching

University of Warwick, Lecturer:
Spring 2019 "Metric Spaces", MA222, 2nd year module, about 50 BSc students across math sciences;
Autumn 2017 "Complex Function Theory", MA4K3, 4th year/PhD level module on Hardy spaces about 15 students, typical for 4th year at Warwick.

University of Warwick, Teaching Assistant:
2011–2013 Complex Analysis; Differentiation; Ergodic Theory; Experimental Mathematics; Fractal Geometry; Hyperbolic Geometry; Math by Computer; Spinors, Tensors, and Rotations; supervisions for 2nd year math students and 1st year non-math students.

The Independent University of Moscow, Teaching Assistant:
2007–2009 Algebra, Calculus, Topology (1st and 2nd year) .

IT Experience and Skills

2008–2009 The Landau Institute of Theoretical Physics, basic system administration (Linux, Windows, email server support, security, software & hardware installation).
Programming languages: C/C++, CUDA, Fortran with MPFR, Java, PHP, Python.
Mathematics-oriented software: Matlab, Mathematica, Maple, Maxima, Octave.
Numerical analysis of dynamical systems: Auto, DDE-Biftool, Content, DStools, Matcont.

Languages spoken

- Russian (native);
- English (fluent);
- French (Advanced).