

Ke Zhang

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Academic Positions

University of Toronto

Assistant professor, July 2012 - present.

Fields-Ontario Post-doctoral Fellow, July 2010 - June 2012.

Department of mathematics, University of Maryland

Post-doctoral position, 07-10 academic years.

Institute for Advanced Study, Princeton, NJ

Member, Jan - April 2012.

Education

Ph.D., Mathematics, The Pennsylvania State University, 2001-2007 (Adviser: Yakov Pesin)

B.S., Applied Mathematics, Tsinghua University, China, 1997-2001

Research Interests

Hamiltonian dynamics, weak KAM theory, variational methods, Arnold diffusion;

Smooth dynamics, ergodic theory, thermodynamic formalism of inducing schemes.

Administrative Positions

Associate Chair, Department of Mathematical and Computational Sciences, University of Toronto, Mississauga, 2017.

Publications

1. Konstantin Khanin and Ke Zhang, Hyperbolic minimal orbit for randomly kicked Hamilton-Jacobi equations. *Communications in Mathematical Physics*, October 2017, Volume 355, Issue 2, pp 803–837.
2. Yakov Pesin, Samuel Senti and Ke Zhang. Thermodynamics of the Katok map. *Ergodic Theory and Dynamical Systems*, published online.
3. Vadim Kaloshin and Ke Zhang. Dynamics of the dominant Hamiltonian. *Bulletin de la SMF* (Bulletin of the French Mathematical Society), accepted 2017.

4. Jianlu Zhang and Ke Zhang. Improved stability for analytic quasi-convex nearly integrable systems and optimal speed of Arnold diffusion, *Nonlinearity*, 30 (2017), No. 7. 2918.
5. Vadim Kaloshin, Patrick Bernard and Ke Zhang, Arnold diffusion in arbitrary degrees of freedom and 3-dimensional normally hyperbolic invariant cylinders, *Acta Mathematica* (2016) 217: 1.
6. Yakov Pesin, Samuel Senti and Ke Zhang, Thermodynamics of towers of hyperbolic type. *Trans. Amer. Math. Soc.* 368 (2016), 8519-8552.
7. Kaloshin and Ke Zhang, Arnold diffusion for smooth convex systems of two and a half degrees of freedom, *Nonlinearity*, 28 (2015) no. 8, 2699.
8. Ke Zhang. Speed of arnold diffusion for analytic Hamiltonian systems. *Inventiones Mathematicae*, 186:255-290, 2011.
9. Vadim Kaloshin, Yong Zheng and Ke Zhang, Almost dense orbit on energy surface, *Proceedings of XVITH International Congress on Mathematical Physics*. Edited by Pavel Exner, published by World Scientific Publishing Co, 314-322.
10. Yakov Pesin, Samuel Senti and Ke Zhang, lifting measures to inducing Schemes. *Ergodic Theory Dynamical Systems*, 28 (2008), no. 2, 553–574.
11. Yakov Pesin and Ke Zhang, Thermodynamics of inducing schemes and liftability of measures. *Partially hyperbolic dynamics, laminations, and Teichmüller flow*, 289–305, Fields Inst. Commun., 51, Amer. Math. Soc., Providence, RI, 2007.
12. Yakov Pesin and Ke Zhang, phase transitions for uniformly expanding maps. *J. Stat. Phys.*, 122(6):1095–1110, 2006.
13. Ph.D. Thesis. Thermodynamical formalism for maps with inducing schemes. The Pennsylvania State University, 2007.

Preprints

Ke Zhang. On tangent cones of Aubry sets. Submitted.

Vadim Kaloshin and Ke Zhang. Density of convex billiards with rational caustics. arXiv:1706.07968.

Renato Iturriaga, Konstantin Khanin and Ke Zhang. Exponential convergence of solutions for random Hamilton-Jacobi equations, 2017. arXiv:1703.10218.

Vadim Kaloshin and Ke Zhang. A strong form of Arnold diffusion for three and a half degrees of freedom, 2014. (Announcement of result).

Vadim Kaloshin and Ke Zhang. A strong form of Arnold diffusion for two and a half degrees of freedom, 2012. arXiv:1212.1150.

Awards and Honors

NSERC Discovery Grant, 2013-2019.

Connaught New Researcher Award, 2012.

Member, Institute for Advanced Study, supported by NSF.

Fields-Ontario Postdoc Fellowship, Fields Institute, Toronto, Canada, 2010.

Invited Lectures

- Workshop on hyperbolic dynamics, ICTP, Trieste, Italy, June 2017.
- Quantitative methods in KPZ universality, Marseille, April 2017.
- Spring dynamics conference, University of Maryland, April 2017.
- Statistical properties of non-equilibrium dynamical systems, Shenzhen, China, August, 2016
- AIMS conference on dynamical systems, differential equations, special session 26, July 2016
- Week long mini-course, School in Conservative Dynamics, Merida, Mexico, Jan 2016.
- Global dynamics and Hamiltonian systems, Nuria, Spain, June 2015.
- Beyond Hamilton-Jacobi in Avignon, Avignon, France. 2014.
- Mathematical congress of Americas, Special session: dynamical systems. 2013.
- Workshop in dynamics, University of Maryland, 2013.
- Recent progress in Hamiltonian and Lagrangian systems. ENS Lyon, France, 2012
- Hamiltonian dynamics conference in Nanjing, Nanjing University, China, 2011.
- Dynamical systems workshop, Mathematisches Forschungsinstitut Oberwolfach, Germany, 2011.
- Workshop on dynamical systems and related topics, The Pennsylvania State University, 2010.
- Workshop on dynamical systems and related topics, The Pennsylvania State University, 2009.
- Workshop on dynamical systems and related topics, University of Maryland, 2009.
- Special session on smooth dynamical systems and ergodic theory, The 7th AIMS Conference on Dynamical Systems and Differential Equations, 2008

Teaching Experience

University of Toronto, Undergraduate

- Groups and symmetry, 2017
- Linear Algebra II, 2016
- Modelling with differential equations in Life Sciences and Medicine, 2015
- Complex variables, 2014
- Introduction to nonlinear dynamics and chaos, 2014
- Linear Algebra II, UTM, 2012, 2013
- Mat231, Calculus with several variables, Fall 2011

University of Toronto, Graduate

- Dynamical systems, 2017
- Dynamical systems, 2014

The University of Maryland

STAT 100, Introduction to Statistics, Spring 2010

MATH 412, Advanced Calculus with Applications, Spring 2009

Math 241h, Calculus III (honor section), Spring 2009

Math 141h, Calculus II (honor section), Fall 2008

Math 140, Calculus I, large lecture, Spring 2008

Math 140h, Calculus I (honor section), 2 sections, Fall 2007

The Pennsylvania State University

Math 220, Matrix Algebra, Spring 2007

Math 22, College Algebra, Fall 2006

Math 230, Calculus and Vector Analysis, Fall 2005

Math 231, Calculus of Several Variables, Spring 2005, Fall 2004 and Fall 2003

Math 251, Ordinary and Partial Differential Equations, Fall 2002