Ke Zhang

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Academic Positions

2018 - present Associate Professor, University of Toronto
2012 - 2018 Assistant Professor, University of Toronto
2010 - 2012 Fields-Ontario Post-doctoral fellow, University of Toronto
2007 - 2010 Post-doctoral fellow, University of Maryland
Others Member, Institute of Advanced Study, 2012

Education

Ph.D. Mathematics The Pennstate University, 2001 - 2007
B.S Applied Mathematics Tsinghua University, 1997 - 2001

Research Interests

- Hamiltonian systems, weak KAM theory, Arnold diffusion, Hamilton-Jacobi equations
- Smooth and hyperbolic dynamics, thermodynamic formalism

Administrative Positions

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

Publications

1. Vadim Kaloshin and Ke Zhang.

    - Arnold diffusion for smooth systems of two-and-a-half degrees of freedom.
    - Book to be published by Annals of Mathematics Studies (2020). arXiv.

2. Renato Iturriaga, Konstantin Khanin and Ke Zhang.

    - Exponential convergence of solutions for random Hamilton-Jacobi equations.

- Stochastics and Partial Differential Equations: Analysis and Computations , published online (2019), 36pp, DOI, arXiv.

3. Alex Blumenthal, Jacopo De Simoi and Ke Zhang.

   - Diffusion limit for a slow-fast standard map.
   - Communications in Mathematical Physics, published online (2019), 22pp. DOI, arXiv.

4. Yakov Pesin, Samuel Senti and Ke Zhang.

   - Thermodynamics of the Katok map.
   - Ergodic Theory and Dynamical Systems , March 2019, Volume 39, Issue 3, pp 764-794. DOI, arxiv.

5. Vadim Kaloshin and Ke Zhang.

   - Density of convex billiards with rational caustics.
   - Nonlinearity , 31 (2018), No 11, 5214 - 5234. Journal, arXiv.

6. Vadim Kaloshin and Ke Zhang.

   - Dynamics of the dominant Hamiltonian.
   - Bulletin de la SMF (Bulletin of the French Mathematical Society), 146(3), 2018, 517-574. Journal, arxiv

7. Ke Zhang.

   - On tangent cones of Aubry sets.
   - Annales de la Faculté des Sciences de Toulouse , accepted (2017), 12pp. arxiv

8. 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. DOI, arxiv

9. 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. DOI, arxiv

10. 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. Journal, arxiv.

11. Yakov Pesin, Samuel Senti and Ke Zhang.

- Thermodynamics of towers of hyperbolic type.
- Trans. Amer. Math. Soc. , 368 (2016), 8519-8552. Journal, arxiv.

12. Vadim Kaloshin and Ke Zhang.

    - Arnold diffusion for smooth convex systems of two and a half degrees of freedom.
    - Nonlinearity , 28 (2015) no. 8, 2699. Journal

13. Ke Zhang.

    - Speed of Arnold diffusion for analytic Hamiltonian systems.
    - Inventiones Mathematicae , 186:255-290, 2011. Journal.

14. 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.

15. Yakov Pesin, Samuel Senti and Ke Zhang.

    - Lifting measures to inducing Schemes.
    - Ergodic Theory Dynamical Systems , 28 (2008), no. 2, 553–574. DOI, arxiv

16. 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. PDF.

17. Yakov Pesin and Ke Zhang.

    - Phase transitions for uniformly expanding maps.
    - J. Stat. Phys. , 122(6):1095–1110, 2006. Journal

Preprints

1. Jianyu Chen, Huyi Hu, Yakov Pesin, Ke Zhang.

   - The essential coexistence phenomenon in Hamiltonian dynamics arXiv:1901.07713 (2019)

Awards and Honors

- NSERC Discovery Grant, 2013-2019.
- Connaught New Researcher Award, 2012.
- Member, Instute for Advanced Study, supported by NSF.
- Fields-Ontario Postdoc Fellowship, Fields Institute, Toronto, Canada, 2010.

Invited Lectures

- Differential Equations and Applications, Krakow, Poland, 2019
- International Congress of Chinese Mathematicians, Tsinghua Unviersity, Beijing, 2019
- SIAM Conference in Dynamical Systems, Snowbird, Utah, 2019
- Arnold Diffusion, series of lectures, MSRI, October 2018.
- Introduction to Arnold Diffusion II, Hamiltonian systems program, MSRI, August 2018.
- Perspectives in Hamiltonian Systems, Venice, Italy, June 2018.
- Emerging Topics in Hamitonian Systems. IAS, Princeton, NJ, April 2018.
- Workshop in Hamiltonian Systems. Ascona, Switzerland, November 2017.
- 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, Avigion, France. 2014.
- Mathematical congress of Americas, Special session: dynamical systems. 2013.
- Workshop in dynamics, University of Maryland, 2013.
- Recent progress is 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