

WEIREN ZHAO

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EMPLOYMENT

September 2020 - present, Assistant Professor in Mathematics, New York University Abu Dhabi, UAE.

September 2018 - August 2020, Postdoctoral fellow, Department of Mathematics, New York University Abu Dhabi, UAE.

June 2016 - June 2018, Postdoctoral fellow, School of Mathematical Sciences, Peking University, China.

- *1st-class General Financial Grant from the China Postdoctoral Science Foundation.(2017)*
- *Boya Postdoctoral Fellowship.(2016)*

EDUCATION

2011 - 2016, Ph.D. in Mathematics, Zhejiang University, China

- Advisors: Silei Wang, Jiecheng Chen
- Thesis Title: *Harmonic analysis and its application in free boundary problem for Euler equations*

The essay studies the local well-posedness in low regularity Sobolev spaces and the blow-up criterion of the free boundary problem for 2-D Euler equation in the case that the initial vorticity does not vanish. Moreover, it also studies the splash singularity and constructs a kind of smooth initial data, which leads to splash singularity at finite time.

1st-class award honor for graduate (2011-2012).

2007 - 2011, B.S. in Mathematics and Applied Mathematics, Zhejiang University, China

Scholarship for outstanding merits (2007-2008, 2008-2009, 2009-2010).

ACTIVITIES

October 2020, **Speaker**, Applied PDEs seminar. Zoom talk Imperial College London, UK.

October 2020, **Speaker**, Webinar on APDE. Zoom talk.

April 2020, **Speaker**, PDE Seminar via Zoom. Zoom talk Shanghai Tech University.

October 2019, **Speaker**, Seminar. Shanghai Tech University, Shanghai.

August 2019, **Speaker**, Seminar. Zhejiang University, Hangzhou.

September 2018, **Speaker**, Math Colloquium. New York University Abu Dhabi, Abu Dhabi, UAE.

May 2017, **Speaker**, Conference on harmonic analysis and its application. University of Science and Technology of China, Hefei.

November 2016, **Speaker**, Conference on harmonic analysis and its application. Zhejiang University of Technology, Hangzhou

October 2015, **Speaker**, Conference on harmonic analysis and its application. Jiangxi Normal University, Nanchang

August 2013-June 2014, September-October 2015, **Visitor**, Peking University, Beijing

June-July 2012, **Participant**, 2012 CNRS-NSFC joint summer institutes of mathematics. Peking University, Beijing

PUBLICATION LIST

1. *Stability of Couette flow for 2D Boussinesq system without thermal diffusivity*, (with N. Masmoudi and B. Said-Houari).
arXiv:2010.01612.
2. *Nonlinear inviscid damping for a class of monotone shear flows in finite channel*, (with N. Masmoudi)
arXiv:2001.08564.
3. *Stability threshold of the 2D Couette flow in Sobolev spaces*, (with N. Masmoudi).
arXiv:1908.11042.
4. *Enhanced dissipation for the 2D Couette flow in critical space*, (with N. Masmoudi).
Communications in Partial Differential Equations, online. arXiv:1908.11035.
5. *Long time behavior of Alfvén waves in a flowing plasma: mathematical analysis on the generation of the magnetic island*. (with C. Zhai and Z. Zhang).
arXiv:1809.08544.
6. *Local well-posedness and break-down criterion of the incompressible Euler equations with free boundary*, (with C. Wang, Z. Zhang and Y. Zheng).
Memoirs of the American Mathematical Society, accept. arXiv:1507.02478.
7. *Linear inviscid damping and enhanced dissipation for the Kolmogorov flow*, (with D. Wei and Z. Zhang).
Advances in Mathematics 362 (2020), 106963, 103 pp. (see arXiv:1711.01822 for full details).
8. *Linear inviscid damping and vorticity depletion for shear flows*, (with D. Wei and Z. Zhang).
Annals of PDE, 5 (2019), no. 1, Paper No. 3, 101 pp.
9. *Linear inviscid damping for a class of monotone shear flow in Sobolev spaces*, (with D. Wei and Z. Zhang).
Communications on Pure and Applied Mathematics, 71 (2018), no. 4, 617-687.
10. *Persistence of Besov regularity for a generalized drift-diffusion equation with pressure*,
Acta Applicandae Mathematicae, 154 (2018), 83-93.
11. *Commutator estimates for the Dirichlet-to-Neumann map of Stokes systems in Lipschitz domains*, (with Q. Xu and S. Zhou).
Journal of Mathematical Analysis and Applications, 458 (2018), no. 1, 219-241.
12. *Orthogonality of the bilinear Fourier multiplier in the modulation spaces* (in Chinese), (with W. Guo and G. Zhao).
SCIENTIA SINICA Mathematica in Honor of the 85th birthday of Professor Silei Wang. 48 (2018), No. 10, 1289-1302.
13. *Local wellposedness in Sobolev space for the inhomogeneous non-resistive MHD equations on general domain*,
Communications in Contemporary Mathematics, 19 (2017), no. 6.
14. *Global well-posedness for the 2D dissipative quasi-geostrophic equations in Modulation spaces*, (with J. Chen).
Mathematical Methods in the Applied Sciences, 40 (2017), no. 12, 4246-4258.
15. *Linear damping of Alfvén waves by phase mixing*, (with S. Ren).
SIAM Journal on Mathematical Analysis, 49 (2017), no. 3, 2101-2137.
16. *Integral restriction for bilinear operators*, (with M. Wang and G. Zhao).
Publicacions Matemàtiques, 60 (2016), no. 2, 485-500.

17. *Fujita-Kato theorem for the 3-D inhomogeneous Navier-Stokes equations*, (with D. Chen and Z. Zhang).
Journal of Differential Equations 261 (2016), no. 1, 738-761.

RESEARCH INTERESTS

Functional Analysis, Spectral Theory, Harmonic Analysis, Fluid Dynamics, Plasma Physics, Partial Differential Equations.

SERVICE

Referee for the journals: since 2019

Annales Henri Poincaré;

Archive for Rational Mechanics and Analysis;

Communications in Mathematical Physics;

Nonlinearity;

Nonlinear Analysis: Real World Applications;

Proceedings of the Royal Society A: Mathematical, Physical and Engineering Sciences;

SIAM Journal on Mathematical Analysis;

Transactions of the American Mathematical Society;...

Verification: <https://publons.com/researcher/3121221/weiren-zhao/peer-review/>

TEACHING

- Fall 2012: Teaching Assistant for *Mathematical Analysis III* at Zhejiang University.
- Fall 2016: Teaching Assistant for *Calculus I* at Peking University.