

WEIREN ZHAO

A2-1105, New York University Abu Dhabi, Saadiyat \diamond Abu Dhabi, UAE, P.O.box. 192188

(+971)26287787 \diamond Email: wz19@nyu.edu \diamond zjzjzwr@126.com

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 thesis 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).

RESEARCH INTERESTS

Functional Analysis, Spectral Theory, Harmonic Analysis, Fluid Dynamics, Plasma Physics, PDE.

SERVICE

Referee for the journals: since 2019

- Annales Henri Poincaré; • Archive for Rational Mechanics and Analysis; • Ars Inveniendi Analytica; • Communications in Mathematical Physics; • Memoirs of the American Mathematical Society; • 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/>

PUBLICATION LIST

1. *Metastability for the dissipative quasi-geostrophic equation and the non-local enhancement.* (with H. Li).
arXiv:2107.10594.
2. *Nonlinear inviscid damping for a class of monotone shear flows in finite channel.* (with N. Masmoudi)
arXiv:2001.08564.
3. *Stability of Couette flow for 2D Boussinesq system without thermal diffusivity.* (with N. Masmoudi and B. Said-Houari).
arXiv:2010.01612.
4. *Long-time behavior of Alfvén waves in a flowing plasma: Generation of the magnetic island.* (with C. Zhai and Z. Zhang).
Archive for Rational Mechanics and Analysis, 242, pages 1317-1394 (2021)
5. *Linear damping and depletion in flowing plasma with strong sheared magnetic fields.* (with H. Liu, N. Masmoudi and C. Zhai).
Journal de Mathématiques Pures et Appliquées, accept, arXiv:2103.14614.
6. *Stability threshold of the 2D Couette flow in Sobolev spaces,* (with N. Masmoudi).
Annales de l'Institut Henri Poincaré C, Analyse Non linéaire, accept. arXiv:1908.11042.
7. *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, 270 (2021), no. 1318.
8. *Enhanced dissipation for the 2D Couette flow in critical space,* (with N. Masmoudi).
Communications in Partial Differential Equations, 45 (2020), no. 12, 1682-1701.
9. *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).
10. *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.
11. *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.
12. *Persistence of Besov regularity for a generalized drift-diffusion equation with pressure,*
Acta Applicandae Mathematicae, 154 (2018), 83-93.
13. *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.
14. *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.
15. *Local wellposedness in Sobolev space for the inhomogeneous non-resistive MHD equations on general domain,*
Communications in Contemporary Mathematics, 19 (2017), no. 6.

16. *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.
17. *Linear damping of Alfvén waves by phase mixing*, (with S. Ren).
SIAM Journal on Mathematical Analysis, 49 (2017), no. 3, 2101-2137.
18. *Integral restriction for bilinear operators*, (with M. Wang and G. Zhao).
Publicacions Matemàtiques, 60 (2016), no. 2, 485-500.
19. *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.

ACTIVITIES

- December 2021, **Speaker**, PDE Seminar, Beijing normal university, Zoom talk, Beijing, China.
- June 2021, **Speaker**, Long Time Behavior and Singularity Formation in PDEs - Part III, Zoom talk SITE NYU Abu Dhabi, UAE.
- March 2021, **Speaker**, SITE weekly workshop, Zoom talk SITE NYU Abu Dhabi, UAE.
- December 2020, **Speaker**, Analysis and PDE Seminar. Zoom talk Peking University, Beijing.
- 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

POSTDOCS BEING MENTORED

Hui Li

TEACHING

- Spring 2022: Primary Instructor, *Fundamentals of Ordinary Differential Equations (MATH-UH 1024)* at New York University Abu Dhabi.
- Fall 2021: Primary Instructor, *Multivariable Calculus with Applications to Economics (MATH-UH 1021)* at New York University Abu Dhabi.

- Spring 2022, Fall 2021: Primary Instructor, *Mathematics for Statistics and Calculus (MATH-UH 1000A)* at New York University Abu Dhabi.
- Fall 2021: Primary Instructor, *Mathematics for Statistics and Calculus (MATH-UH 1000A)* at New York University Abu Dhabi.
- Summer 2021, Spring 2021: Primary Instructor, *Calculus with Applications to Economics (MATH-UH 1013Q)* at New York University Abu Dhabi.
- Fall 2016: Teaching Assistant, *Calculus I* at Peking University.
- Fall 2012: Teaching Assistant, *Mathematical Analysis III* at Zhejiang University.