Junyan Zhang

CONTACT INFORMATION

Johns Hopkins University
Department of Mathematics
3400 North Charles Street
Baltimore, Maryland 21218, USA
Email: zhang.junyan@jhu.edu
Personal webpage: https://www.zhangjy9610.me

EDUCATION

Johns Hopkins University

Ph.D. Candidate, Mathematics, Aug 2017-expected May 2022.

- Thesis Title: Free-boundary problems in magnetohydrodynamics.
- Advisor: Professor Hans Lindblad.

University of Science and Technology of China (USTC)

B. Sc. in Mathematics, August 2013-June 2017.

- Undergrad Thesis: Inviscid dampimg and Asymptotic Stability of PDEs in fluids.
- Advisor: Professor Lifeng Zhao.

RESEARCH INTERESTS

PDEs of fluids. My current research focuses on the free-boundary problems in inviscid fluids (mostly compressible, with or without surface tension), e.g. water wave, relativistic fluids, and complex fluids such as MHD, elastodynamics, liquid crystal. I'm also interested in the long time behaviour, the singularity and shock formation of compressible fluids.

PUBLICATIONS & PREPRINTS

1. Chenyun Luo, Junyan Zhang. *Local Well-posedness for the Motion of a Compressible Gravity-Capillary Water Wave with Vorticity.* In preparation.
2. Xumin Gu, Chenyun Luo, Junyan Zhang. *Vanishing Surface Tension Limit of the Free-Boundary Incompressible Magnetodynamics.* In preparation.
3. Hans Lindblad, Junyan Zhang. *Anisotropic Regularity of the Free-Boundary Problem in Compressible Ideal Magnetohydrodynamics.* arxiv: 2106.12173 preprint.
4. Xumin Gu, Chenyun Luo, Junyan Zhang. *Local Well-posedness of the Free-Boundary Incompressible Magnetohydrodynamics with Surface Tension.* arxiv: 2105.00596 preprint.
5. Junyan Zhang. *Local Well-posedness and Incompressible Limit of the Free-Boundary Problem in Compressible Elastodynamics.* arxiv: 2102.07979 preprint.
6. Junyan Zhang. *Local Well-posedness of the Free-Boundary Problem in Compressible Resistive Magnetohydrodynamics.* arxiv: 2012.13931 preprint.
7. Chenyun Luo, Junyan Zhang. *Local Well-posedness for the Motion of a Compressible Gravity Water Wave with Vorticity.* Preprint, submitted on April 12, 2020.
8. Junyan Zhang. *A priori Estimates for the Free-Boundary problem of Compressible Resistive MHD Equations and Incompressible Limit.* arxiv: 1911.04928

preprint.

9. Chenyun Luo, Junyan Zhang. *A priori Estimates for the Incompressible Free-Boundary Magnetohydrodynamics Equations with Surface Tension.* **SIAM Journal on Mathematical Analysis, 53(2), 2595-2630 (2021)**.
10. Chenyun Luo, Junyan Zhang. *A Regularity Result for the Incompressible Magnetohydrodynamics Equations with Free Surface Boundary.* **Nonlinearity, 33(4), 1499-1527 (2020)**.

Referee Experience

- Archive for Rational Mechanics and Analysis (2 papers)
- Nonlinearity (1 paper)

Talks & Seminars

- *Local well-posedness and incompressible limit of free-boundary compressible elastodynamics*, Webinar on APDE, June 5 2021.
- *Local well-posedness and incompressible limit of the free-boundary compressible resistive MHD equations*, Wuhan University, Jan 10 2021.
- *Local well-posedness for the motion of compressible gravity water wave*, University of Science and Technology of China, Nov 6 2020.
- *On the free-boundary problem of MHD equations with or without surface tension*, University of Science and Technology of China, Dec 23 2019.
- *On the Incompressible MHD with or without Surface Tension*, Institute of Mathematics, Chinese Academy of Sciences, May 23 2019.

Conferences & Workshops Attended

- *Mathematics of Fluid Dynamics program*, UC Berkeley MSRI, Jan-May 2021 (online due to the COVID-19 pandemic).
- *Long Time Behavior and Singularity Formation in PDEs*, New York University Abu Dhabi, May 2020 and Dec 2020 (online due to the COVID-19 pandemic).
- *2019 Southern California Analysis and PDE Conference*, UCSD, November 2019.
- *Summer School on Mathematical General Relativity and the Geometric Analysis of Waves of Fluids*, MIT, June 2018.

Teaching Experience

Johns Hopkins University

2020 Fall	Teaching assistant, Honor Analysis I
	Teaching assistant, Ordinary Differential Equations
2020 Spring	Teaching assistant, Honor Analysis II
	Grader, Undergraduate PDEs
2019 Fall	Teaching assistant, Honor Analysis I
	Grader, Graduate Real Analysis
2019 Spring	Teaching assistant, Honor Analysis II
	Teaching assistant, Calculus II (Engineering)
2018 Fall	Teaching assistant, Calculus II (Engineering)
2018 Spring	Grader, Undergraduate PDEs
2017 Fall	Grader, Undergradute Complex Analysis, Calculus I (Engineering)

University of Science and Technology of China

	2017 Spring	Teaching assistant, Differential Equations II (Graduate PDE)
	2016 Fall	Teaching assistant, Advanced Real Analysis (Graduate)
	2016 Spring	Teaching assistant, Honor Real Analysis

HONORS AND AWARDS

Johns Hopkins University

2021	Professor Joel Dean Excellence in Teaching Award for TAs.
2017-Now	Full tuition fellowship and Teaching assistantship.

University of Science and Technology of China

2017	Outstanding Undergraduates
2016, 2017	Outstanding Teaching Assistant
2016	Huang Yu Honored Scholarship
2015	First Prize in The Chinese Mathematics Competitions
	Zhang Zong-zhi Sci-Tech Scholarship
2013, 2014	Silver Prize, Outstanding Freshmen/Undergraduates Scholarship

CITIZENSHIP Chinese (The People's Republic of China).

RELEVANT SKILLS Languages: Chinese(native), English(fluent)

REFERENCES

- **Hans Lindblad**, Professor of Department of Mathematics, Johns Hopkins University.
  Email: `lindblad@math.jhu.edu`
- **Chenyun Luo**, NTT Assistant Professor of Department of Mathematics, Vanderbilt University. Assistant Professor at Chinese University of Hong Kong (CUHK).
  Email: `chenyun.luo@vanderbilt.edu`