Junyan Zhang

CONTACT INFORMATION

Johns Hopkins University
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EDUCATION

Johns Hopkins University (JHU)

Ph.D. in Mathematics, August 27, 2017∼May 22, 2022 (expected).

- Dissertation: The Free-Boundary Problems in Inviscid Magnetohydrodynamics with or without Surface Tension.
- Advisor: Professor Hans Lindblad.

University of Science and Technology of China (USTC)

B.Sc. in Mathematics, August 14, 2013∼June 21, 2017.

- 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 waves, relativistic fluids, MHD, elastodynamics, etc, and also the related problems about the nonlinear stability of vortex sheets/contact discontinuities. I'm also interested in the formation/stability/evolution of various kinds of singularities, and the long time behaviours (or stability of certain equilibria) 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. *Zero Surface Tension Limit of the Free-Boundary Incompressible Magnetodynamic Equations.* arxiv: 2109.05400 preprint.
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.* arxiv: 2109.02822 preprint, first 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 Services

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

Talks & Seminars

- *Anisotropic regularity of free-boundary compressible ideal MHD*:
  Institute of Mathematical Sciences, The Chinese University of Hong Kong, Oct 14 2021;
  Analysis & PDE Seminar, UC Berkeley, Oct 25 2021;
  PDE Seminar, Vanderbilt University, Nov 5 2021;
  Analysis of Fluids Seminar, Princeton University, Feb 17 2021 (expected).
- *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

Johns Hopkins University

2022 Spring	TA, Honor Analysis II
	TA, Ordinary Differential Equations
2021 Fall	TA, Introduction to Proofs
	Grader, Graduate Real Analysis
2020 Fall	TA, Honor Analysis I
	TA, Ordinary Differential Equations
2020 Spring	TA, Honor Analysis II
	Grader, Undergrad PDEs
2019 Fall	TA, Honor Analysis I
	Grader, Graduate Real Analysis
2019 Spring	TA, Honor Analysis II
	TA, Calculus II (Engineering)
2018 Fall	TA, Calculus II (Engineering)
2018 Spring	Grader, Undergraduate PDEs
2017 Fall	Grader, Undergrad Complex Analysis, Calculus I (Engineering)

University of Science and Technology of China

2017 Spring	TA, Differential Equations II (Graduate PDE)
2016 Fall	TA, Advanced Real Analysis (Graduate)
2016 Spring	TA, 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`
- **Zhouping Xin**, Executive Director & William M. W. Mong Professor of Mathematics, The Institute of Mathematical Sciences, The Chinese University of Hong Kong.
  Email: `zpxin@ims.cuhk.edu.hk`
- **Chenyun Luo**, Assistant Professor of Department of Mathematics, The Chinese University of Hong Kong.
  Email: `cluo@math.cuhk.edu.hk`
- **Richard Brown**, Director of Undergraduate Studies and Teaching Professor of Department of Mathematics, Johns Hopkins University.
  Email: `richardbrown@jhu.edu`