

Zechuan Zhang

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EDUCATION

- **Doctorate in Pure Mathematics** Sept 2017 - June 2022
School of Mathematical Sciences, Fudan University, Shanghai, China
Advisor: Engui Fan
- **Bachelor's in Mathematics and Applied Mathematics** Sept 2013 - June 2017
School of Mathematical Sciences, Inner Mongolia University, Hohhot, China

ACADEMIC EXPERIENCE

- **University at Buffalo, State University of New York, Department of Mathematics** Aug 2022 - Jul 2024
Visiting Assistant Professor
Advisor: Gino Biondini and Babara Prinari
- **SISSA, Mathematics Area** Jul 2024 - Present
Postdoctoral Fellow
Advisor: Tamara Grava

RESEARCH INTERESTS

- Nonlinear wave equations, solitons and integrable systems, inverse scattering transform, spectral theory of differential operators, long-time asymptotics, soliton gas.

PUBLICATIONS

Published/Accepted

1. Zechuan Zhang, Taiyang Xu and Engui Fan, "On the asymptotic stability of N-soliton solutions for the defocusing mKdV equation with finite density type initial data: without stationary phase points on jump contour", *Phys. D*, 472 (2025), Paper No. 134526, 18 pp.
2. Gino Biondini, Barbara Prinari and Zechuan Zhang, "Local and global well-posedness of the Maxwell-Bloch system of equations with inhomogeneous broadening", *Adv. Nonlinear Anal.*, 13 (2024), no. 1, Paper No. 20240054, 21.
3. Taiyang Xu, Zechuan Zhang and Engui Fan, "On the Cauchy problem of defocusing mKdV equation with finite density initial data: long time asymptotics in solitonless regions", *J. Differential Equations*, 372, 55–122 (2023)
4. Zechuan Zhang and Engui Fan, "Inverse scattering transform and multiple high-order pole solutions for the Gerdjikov-Ivanov equation under the zero/nonzero background", *Z. Angew. Math. Phys.* 72, no. 4, Paper No. 153, 25 pp. (2021)
5. Zechuan Zhang and Engui Fan, "Inverse scattering transform for the Gerdjikov-Ivanov equation with nonzero boundary conditions", *Z. Angew. Math. Phys.* 71, no. 5, Paper No. 149, 28 pp. (2020)

Submitted

6. Gino Biondini and Zechuan Zhang, "Spectral theory for self-adjoint Dirac operators with periodic potentials and inverse scattering transform for the defocusing nonlinear Schrödinger equation with periodic boundary conditions", arXiv: 2311.18127 [math.AP], submitted to *Advances in Mathematics* (2024)

7. Gino Biondini, Gregor Kovačič, Alexander Tovbis, Zachery Wolski and Zechuan Zhang, "Spectral theory for non-self-adjoint Dirac operators with periodic potentials and inverse scattering transform for the focusing nonlinear Schrödinger equation with periodic boundary conditions", arXiv:2311.18127 [nlin.SI].

In preparation

8. Semiclassical dynamics and coherent soliton structures in the derivative nonlinear Schrödinger models with periodic initial conditions. Joint work with Gino Biondini, Gregor Kovačič, and Zachery Wolski.
9. Universal nature of modulation instability of periodic travelling waves with long-range perturbation and implications for long-time dynamics. Joint work with Tamara Grava, Robert Jenkins, and Xiaofan Zhang

PRESENTATIONS

- 2023 AMS Fall Eastern Sectional Meeting, session on *Nonlinear Wave Equations and Integrable Systems* Sep 2023
- University of Central Florida, Applied Math Colloquium Jan 2024
- University at Buffalo, Applied Math Seminar Feb 2024
- INI Satellite Programme "*Emergent Phenomena in Nonlinear Dispersive Waves*" Aug 2024
- 2024 International Conference on Water Waves and Bores Sep 2024
- University of Kansas, Differential Equations / Dynamical Systems / Geometric Analysis Seminar Apr 2025
- Dispersive Integrable Equations: Pathfinders in Infinite-Dimensional Hamiltonian Systems, Luminy, France Apr 2025
- Wave dynamics, integrability and beyond conference, Sardinia, Italy May 2025

PROFESSIONAL SERVICE

- Journal reviewer:
 - Studies in Applied Mathematics
 - The European Physical Journal Plus
 - Zeitschrift für angewandte Mathematik und Physik
 - Nonlinearity
 - Physica D: Nonlinear Phenomena
 - Journal of the London Mathematical Society
- Conferences:
 - 2024 Fall Southeastern Sectional Meeting, Savannah, GA: co-organizer Oct 2024

TEACHING

- **State University of New York at Buffalo, Department of Mathematics**
 - MTH 306, "Introduction to Differential Equations" Spring 2024
 - MTH 241, "Calculus III" Fall 2023
 - MTH 306, "Introduction to Differential Equations" Spring 2023
- **Fudan University, Department of Mathematics**
 - "Recitation of Calculus II" Spring 2018
 - "Recitation of Calculus I" Fall 2017