

ZHAO YANG

Email: yangzhao@amss.ac.cn

Zhongguancun East Road No.55, Haidian, Beijing China

EMPLOYMENT

Academy of Mathematics and Systems Science CAS, China 08/2022-current

- associate professor

University of Illinois Urbana-Champaign, USA 08/2019-08/2022

- J.L Doob research assistant professor
Mentors: Professors Vera Hur and Jared Bronski

EDUCATION

Indiana University, Bloomington, USA

- Doctor of Philosophy, Mathematics 08/2013-05/2019
Advisor: Prof. Kevin Zumbrun
Thesis: Traveling waves in an inclined channel and their stability
College of Arts and Sciences Dissertation Research Fellowship (2018-2019)

- Master of Science, Applied Statistics 08/2016-05/2018

Fudan University, Shanghai, China 09/2009-06/2013

- Bachelor of Science, Mathematics and Applied Mathematics

INTERESTS

Nonlinear Partial Differential Equations:

- traveling waves and their stability; application to fluid dynamics, combustion, and detonation.
- hyperbolic system of balance laws; free surface water wave equations.
- rigorous analysis; analytical and numerical verification of stability conditions; numerical simulations of wave phenomena; computer-assisted proof.
- software: Matlab, Clawpack, Python; parallel computing; batch jobs.

PUBLICATIONS

1. M. Johnson, P. Noble, L. M. Rodrigues, Z. Yang, and K. Zumbrun, *Spectral stability of inviscid roll-waves*, Commun. Math. Phys. 367, 265-316 (2019). [Link](#)
2. Z. Yang and K. Zumbrun, *Convergence as period goes to infinity of spectra of periodic traveling waves toward essential spectra of a homoclinic limit*, Journal de Mathématiques Pures et Appliquées, 132, 27-40, (2019). [Link](#)
3. Z. Yang and K. Zumbrun, *Stability of hydraulic shock profiles*, Arch Rational Mech Anal, 235, 195-285 (2020). [Link](#)
4. A. Sukhtayev, Z. Yang, and K. Zumbrun, *Spectral stability of hydraulic shock profiles*, Physica D: Nonlinear Phenomena, 405, 132360 (2020). [Link](#)

5. S. Jung, Z. Yang, and K. Zumbrun, *Stability of strong detonation waves for Majda's model with general ignition functions*, Quart. Appl. Math., 79, 357-365, (2021). [Link](#)
6. V. Hur and Z. Yang, *Unstable Stokes waves*, preprint, arXiv:2010.10766. [Link](#)
7. Z. Yang, *An alternative proof of modulation instability of Stokes waves in deep water*, preprint, arXiv:2109.12101. [Link](#)
8. B. Braker, J. Bronski, V. Hur, and Z. Yang, *Asymptotic stability of sharp fronts. I One bound state implies stability*, preprint, arXiv:2112.04700. [Link](#)
9. V. Hur and Z. Yang, *Unstable gravity-capillary waves*, preprint. [Link to appear](#)

CURRENT WORK

1. Z. Yang and K. Zumbrun, *Phase-asymptotic stability of Lax or undercompressive viscous shock waves under $L^1 \cap H^3$ perturbations*, in preparation.
2. M. Johnson, L. M. Rodrigues, Z. Yang, and K. Zumbrun, *Stability of roll-waves in the presence of vorticity*, in preparation.
3. Z. Yang and K. Zumbrun, *Existence and Stability of hydraulic shock profiles of Richard-Gavrilyuk Model*, in preparation.
4. L. M. Rodrigues, Z. Yang, and K. Zumbrun, *Convective-wave solutions of the Richard-Gavrilyuk model for inclined shallow water flow*, in preparation.
5. D. Marchesin, A. Mailybaev, Z. Yang, and K. Zumbrun, *Stability of degenerate traveling waves of 2×2 balance system*, in preparation.
6. T-Y. Xiao, V. Hur, and Z. Yang, *Unstable Stokes waves with constant vorticity*, in preparation.

INVITED TALKS

| | |
|---------------------|---------------------------------------|
| Mar. 29-Apr. 1 2022 | Waves2022, Athens |
| Jan. 13, 2022 | PDE seminar, BYU (online) |
| Oct. 9-10, 2021 | AMS sectional meeting, Omaha (online) |
| Feb. 12, 2021 | PDE seminar, Brown (online) |
| Feb. 17, 2021 | PDE seminar, IU |
| Nov. 30, 2020 | PDE seminar, IU |
| April 22, 2019 | PDE seminar, IU |
| Jan. 29, 2019 | HADES seminar, UIUC |
| Oct. 29, 2018 | PDE seminar, IU |
| July 12, 2018 | SIAM annual meeting, Portland |

TEACHING AND GRADING

| | |
|--------------|--|
| 2022, Spring | M444 <i>Elementary Real Analysis</i> , instructor |
| | M447 <i>Real Variables</i> , instructor |
| 2021, Fall | M285 <i>Introduction to Differential Equations</i> , instructor |
| 2021, Summer | M446 <i>Applied Complex Variables</i> , instructor |
| 2021, Spring | M553 <i>Partial Differential Equations</i> , instructor |
| | M444 <i>Elementary Real Analysis</i> , instructor |
| 2020, Fall | M558 <i>Methods of Applied Mathematics</i> , instructor |
| 2020, Summer | M416 <i>Abstract Linear Algebra</i> , instructor |
| 2020, Spring | M285 <i>Introduction to Differential Equations</i> , instructor (two sessions) |
| 2019, Fall | M416 <i>Abstract Linear Algebra</i> , instructor |
| 2017, Fall | M311 <i>Calculus III</i> , recitation |
| 2017, Spring | M371 <i>Elementary Computational Method</i> , grading |
| | M540 <i>Partial Differential Equations I</i> , grading |
| 2016, Fall | M413 <i>Introduction to Analysis I</i> , grading |
| | M471 <i>Numerical Analysis I</i> , grading |
| 2016, Summer | M211 <i>Calculus I</i> , recitation |
| 2016, Spring | M211 <i>Calculus I</i> , recitation (two sessions) |
| 2015, Fall | M212 <i>Calculus II</i> , recitation (two sessions) |
| 2015, Summer | M119 <i>Brief Survey of Calculus I</i> , instructor |
| 2015, Spring | M211 <i>Calculus I</i> , recitation (two sessions) |
| 2014, Fall | M413 <i>Introduction to Analysis I</i> , grading (two sessions) |
| 2014, Spring | M415 <i>Elementary Complex Variables with Applications</i> , grading |
| | S343 <i>Honor Introduction to Differential Equation</i> , grading |
| 2013, Fall | M303 <i>Linear Algebra for Undergraduates</i> , grading (two sessions) |