Chao Wang

Contact Information

School of Mathematical Sciences, Peking University,
No.5 Yiheyuan Road, Beijing, 100871, P. R. China
Email: wangchao@math.pku.edu.cn
Tel: (86)15810330497

Employment

- February 2022 – Now, Associate Professor, Peking University
- October 2015 – Now, Assistant Professor, Peking University
- October 2013 – Sep 2015, Simons Post-Doctor, Peking University
  Advisor: Prof. Zhifei Zhang
- October 2012 – September 2013, Post-Doctor, University Paris 7
  Advisor: Prof. David Gerard-Varet and Prof. Christophe Lacave

Education

- Ph.D. in Institute of Mathematics, Academy of Mathematics and Systems Science, Chinese Academy of Sciences, Beijing, 2012
  Advisor: Prof. Ping Zhang and Prof. Zhifei Zhang
- B. S. in Department of Mathematics, Nanjing University, Nanjing, P. R. China, 2007

Research Interests

Partial Differential Equations: Mathematical fluid mechanics, Navier-Stokes equations, Euler equations, Water wave equations, Boundary Layer

Papers

1. Local well-posedness of the capillary-gravity water waves with acute contact angles, (with Mei Ming), **submitted**.
2. On the global small solution of 2-D Prandtl system with initial data in the optimal gevrey class (with Yuxi Wang, Ping Zhang), **submitted**.
3. Large-time behavior for compressible Navier-Stokes-Fourier system in the whole space (with L. He, J. Huang), **J. Math. Fluid Mech.** 24 (2022), no. 2, Paper No. 31, 26 pp.
4. On the hydrostatic approximation of the MHD equations in a thin strip (with Yuxi Wang), **SIAM J. Math. Anal.** 54 (2022), no. 1, 1241–1269.
5. Local well-posedness to the vacuum free boundary problem of full compressible Navier-Stokes equations in R^3 (with Yuhui Chen, Jingchi Huang, Zhengzhen Wei), **J. Differential Equations** 300 (2021), 734–785.
6. Gevrey stability of hydrostatic approximate for the Navier-Stokes equations in a thin domain (with Yuxi Wang, Zhifei Zhang), **Nonlinearity** 34 (2021), no. 10, 7185–7226.
7. Local well-posedness and break-down criterion of the incompressible Euler equations with free boundary (with Zhifei Zhang, Weiren Zhao, Yunrui Zheng), **Mem. Amer. Math. Soc.** 270 (2021), no. 1318, v+119 pp.
8. Water waves problem with surface tension in a corner domain II: the local well-posedness (with Mei Ming), **Comm. Pure Appl. Math.** 74 (2021), No.2, 225–285.

9. Water wave problem with surface tension in a corner domain I: a priori estimates with constrained contact angle (with Mei Ming), **SIAM J. Math. Anal.** 52 (2020), no. 5, 4861–4899.

10. Zero-viscosity limit of the Navier-Stokes equations in a simply-connected bounded domain under the analytic setting (with Yuxi Wang), **J. Math. Fluid Mech.**, 22 (2020), no. 1, Paper No. 8, 58 pp.

11. Global stability of large solutions to the 3-D compressible Naiver-Stokes equations (with L. He, J. Huang), **Arch. Ration. Mech. Anal.**, 234 (2019), no. 3, 1167–1222.

12. A note on the regularity of the holes for permeability property through a perforated domain for the 2D Euler equations (with C. Lacave), **Sci. China Math.** 62 (2019), no. 6, 1121–1142.

13. Zero-viscosity limit of the Navier-Stokes equations in the analytic setting (with Yuxi Wang, Zhifei Zhang), **Arch. Ration. Mech. Anal.** 224 (2017), no. 2, 555–595.

14. Elliptic estimates for DN operator on corner domains(with M. Ming), **Asymptot. Anal.** 104 (2017), no. 3-4, 103–166.

15. Break-down criterion for the water-wave equation (with Zhifei Zhang), **Sci. China Math.** 60 (2017), no. 1, 21–58. .

16. The Cauchy problem on large time for surface-waves-type Boussinesq systems II (With J. Saut and L. Xu), **SIAM J. Math. Anal.** 49 (2017), no. 4, 2321–2386.

17. The influence of boundary conditions on the contact problem in a 3D Navier-Stokes Flow (with D. Gerard-Varet, M. Hillairet), **J. Math. Pures Appl.** (9) 103 (2015), no. 1, 1–38.

18. Uniqueness for the 2-D Euler equations on domains with corners (with C. Lacave, E. Miot), **Indiana Univ. Math. J.** 63 (2014), no. 6, 1725–1756.

19. Strong solutions for the fluid-solid systems in a 2-D domain, **Asymptot. Anal.** 89 (2014), no. 3-4, 263–306.

20. Global well-posedness of compressible Navier-Stokes equations for some classes of large initial data (with Wei Wang, Zhifei Zhang), **Arch. Ration. Mech. Anal.** 213 (2014), no. 1, 171–214.

21. Global Weak Solutions to the compressible Navier-Stokes equations in the exterior domain with spherically symmetric Data (with L. Jiang), **Acta Appl. Math.** 121 (2012), 197–211.

22. A new proof of Wu's theorem on vortex sheets (with Zhifei Zhang), **Sci. China Math.** 55 (2012), no. 7, 1449–1462.

23. Global well-posedness for the 2-D Boussinesq system with the temperature-dependent viscosity and thermal diffusivity (with Zhifei Zhang), **Adv. Math.** 228 (2011), no. 1, 43–62.

24. A Beale-Kato-Majda criterion for three dimensional compressible viscous heat-conductive flows (with Yongzhong Sun, Zhifei Zhang), **Arch. Ration. Mech. Anal.** 201 (2011), no. 2, 727–742.

25. A Beale-Kato-Majda blow-up criterion for the 3-D compressible Navier-Stokes equations (with Yongzhong Sun, Zhifei Zhang), **J. Math. Pures. Appl.** 95 (2011), no. 1, 36–47.

Supervision

- Master and PhD Students:

  Wenzhi Wu (PhD, 2022-);

  Penkun Zheng (PhD, co-supervision with Prof. Zhifei Zhang, 2015-2020);

  Guojun Wen (Master, 2016-2019)

- Post-Doctors:

  Shulin Shen (2022-2024);

  Xiaonan Hao (2021-2023);

  Yuxi Wang (2018-2020): Now Assistant Pr. in Sichuan University

  Yue Wang (2017-2019): Now Assistant Pr. in Captial Normal University

Invited Talks (Selected)

- International Workshop on Multiphase Flows: Analysis, Modelling and Numerics (Waseda University, Tokyo, Japan, November, 2021):*On the motion of interfaces of compressible and incompressible fluids with surface tension – A priori estimates.*
- Germany-Japan Workshop on Problems Related to Free Boundaries and Moving Contact Lines(Waseda University, Tokyo, Japan, August, 2021): *Water waves problem with surface tension in a corner domain.*
- International Workshop on Multiphase Flows Analysis, Modelling and Numerics (Waseda University, Tokyo, Japan, November, 2019): *Water waves problem with surface tension in a corner domain.*
- Workshop on applied analysis (CityU, 2018): *Global stability of large solutions to the 3-D compressible Naiver-Stokes equations.*
- IMS PDE Seminar (CUHK, 2018):*Water waves problem with surface tension in a corner domain.*
- The annual conference of Chinese Mathematical Society (Huhhot, 2016): *Elliptic estimates for DN operator on corner domains.*
- The first conference for the young researchers from China Mainland and Hongkong (Southern University of Science and Technology, 2016) *Zero-Viscosity Limit of the Navier-Stokes Equations in the Analytic Setting.*
- AIMS Conference Series on Dynamical Systems and Differential Equations (Madrid, 2014): *Uniqueness for the 2-D Euler equations on domains with corners* .
- Congres SMAI 2013 (Seignosse, 2013): *The vortex sheets of 2D Euler equations* .
- Nonlinear Analysis and PDE Seminar (IHP, 2013): *The blow-up criterion for the compressible Navier-Stokes equations.*
- Workshop on "Instabilities in Hydrodynamics" (University Paris 7, 2012): *A new proof of Wu's theorem on vortex sheets.*

Grants (PI)

- NSFC no. 12126407, 2022
- NSFC no. 12071008, 2021
- NSFC no. 11701016, 2018
- The special General Financial Grant from the China Post-doc Science Foundation, 2015
- The first-class General Financial Grant from the China Post-doc Science Foundation, 2014

Other Professional Activities

- Journal Refereed: Arch. Rational Mech. Anal., SIAM J. Math. Anal., J. Differential Equations, Nonlinearity, Discrete Contin. Dyn. Syst.