Jiajie Chen

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Employment

Courant Institute, New York University — New York, NY
Courant Instructor/Assistant Professor(non-tenure track) — Sep 2022 - present

Education

California Institute of Technology — Pasadena, California
Ph.D. in Applied and Computational Mathematics — Aug 2017 –June 2022
Advisor: Prof. Thomas Y. Hou

Peking University — Beijing, China
B.S. in Mathematics, Minor in Economics — Sep 2013 –July 2017
Undergrad research advisors: Profs. Pingwen Zhang, Zhifei Zhang

The Affiliated High School of SCNU — Guangzhou, China
Middle School and High School — Sep 2007 –June 2013

Awards, honors and grants

- NSF Research Grant DMS-2408098 — 2024-
- AMS-Simon travel grant (decline) — 2024
- W. P. Carey & Co. Prize for outstanding doctoral dissertations in Applied Mathematics, Caltech — 2022
- National Scholarship, Peking University — 2014
- Chinese Mathematical Olympiad (CMO), Gold Medal (Full Score) — 2013

Research Interests

Partial differential equations and probability

Publications

1. J. Chen. Vorticity blowup in compressible Euler equations in $\mathbb{R}^d, d \geq 3$. *preprint arXiv:2408.04319,* 2024.
2. J. Chen, T.Y. Hou, V.T. Nguyen, & Y. Wang. On the stability of blowup solutions to the complex Ginzburg-Landau equation in R^d. *preprint arXiv:2407.15812,* Submitted, 2024.
3. J. Chen, G. Cialdea, S. Shkoller, & V. Vicol. Vorticity blowup in 2D compressible Euler equations. *preprint arXiv:2407.06455,* Submitted, 2024.
4. J. Chen. Nearly self-similar blowup of the slightly perturbed homogeneous Landau equation with very soft potentials. *preprint arXiv:2311.11511,* Submitted, 2023.
5. J. Chen. Remarks on the smoothness of the $C^{1,\alpha}$ asymptotically self-similar singularity in the 3D Euler and 2D Boussinesq equations. *Nonlinearity 37.6 (2024).*
6. J. Chen, & T. Y. Hou. Stable nearly self-similar blowup of the 2D Boussinesq and 3D Euler equations with smooth data II: Rigorous Numerics. *preprint arXiv:2305.05660,* Submitted, 2023.

7. J. Chen, & T. Y. Hou. Stable nearly self-similar blowup of the 2D Boussinesq and 3D Euler equations with smooth data I: Analysis. *preprint arXiv:2210.07191,* Submitted, 2023.

8. J. Chen, & T. Y. Hou. On stability and instability of $C^{1,\alpha}$ singular solutions to the 3D Euler and 2D Boussinesq equations. *Comm. Math. Phys. 405, 112 (2024).*

9. J. Chen. On the regularity of the De Gregorio model for the 3D Euler equations. *J. Eur. Math. Soc., 2023.*

10. J. Chen, T. Y. Hou, & D. Huang. Asymptotically self-similar blowup of the Hou-Luo model for the 3D Euler equations. *Ann. PDE 8, 24,* 2022. https://doi.org/10.1007/s40818-022-00140-7.

11. J. Chen. On the slightly perturbed De Gregorio model on S^1. *Arch. Rational Mech. Anal. 241, 1843–1869,* 2021.

12. J. Chen, & T. Y. Hou. Finite time blowup of 2D Boussinesq and 3D Euler equations with $C^{1,\alpha}$ velocity and boundary. *Comm. Math. Phys. 383(3), 1559-1667,* 2021.

13. J. Chen. Singularity formation and global well-posedness for the generalized Constantin–Lax–Majda equation with dissipation. *Nonlinearity, 33(5), 2502,* 2020.

14. J. Chen, T. Y. Hou, & D. Huang. On the finite time blowup of the De Gregorio model for the 3D Euler equation. *Comm. Pure Appl. Math. 74(6), 1282-1350,* 2021.

15. J. Chen, P. Zhang, & Z. Zhang. Local minimizer and De Giorgi's type conjecture for the isotropic–nematic interface problem. *Calc. Var. Partial Differential Equations 57, no. 5, Paper No. 129, 19 pp*, 2018.

16. J. Chen, A. Hou, & T. Y. Hou. A pseudo knockoff filter for correlated features. *Inf. Inference 8, no. 2, 313–341*, 2019.

17. J. Chen, A. Hou, & T. Y. Hou. A prototype knockoff filter for group selection with FDR control. *Inf. Inference 9, no. 2, 271–288*, 2020.

Invited Talks

2024

- PDE seminar, Peking University, July 2024.
- PDE seminar, AMSS, Chinese Academic of Science, July 2024.
- Singularities in incompressible flows: computer-assisted proofs and physics-informed neural networks, University of Minnesota, Apr 2024.
- PDE seminar, AMSS, Chinese Academic of Science (Online), Apr 2024.
- Analysis & PDE Seminar, UCLA, March 2024.
- Analysis seminar, University of Maryland, Feb 2024.
- Analysis seminar, University of Texas at Austin, Jan 2024.

2023

- Calderón-Zygmund Analysis Seminar, University of Chicago, Nov 2023.
- Workshop on Recent Developments in Applied Mathematics and its Applications, Caltech, Nov 2023.
- "Infinite dimensional Geometry and Fluids" workshop, Banff (BIRS), Nov 2023
- Analysis seminar, Rochester University, Sep 2023.
- Minisymposium on Recent Developments in Fluid Dynamics, ICIAM 2023 Tokyo (online), Aug 2023.
- Workshop on Scientific Computing, Institute of Computational Mathematics and Scientific Engineering Computing, Chinese Academy of Sciences, Aug 2023.
- PDE Seminar, Southern University of Science and Technology, China, July 2023.

- PDE Seminar, Zhejiang University, July 2023.
- Workshop on Recent Advances in PDEs (XIV), Shanghai Jiaotong University, July 2023.
- Loo-Keng Hua Forum for Young Mathematicians, Lecture II & III, AMSS, Chinese Academic of Science, June, July 2023.
- Series of lectures, School of Mathematical Sciences, Peking University, June 2023.
- Forum for Young Mathematicians, Shenzhen University, June 2023.
- IMS PDE Seminar, Chinese University of Hong Kong, June 2023.
- Conference on Recent Advances in Mathematical Fluid Dynamics, Duke University, May 2023.
- PDE and Applied Math Seminar, University of California, Davis (online), Apr 2023.
- Loo-Keng Hua Forum for Young Mathematicians, AMSS, Chinese Academic of Science (Online), Apr 2023.
- Applied Math & Analysis Seminar, Duke University, Mar 2023.
- PDE Seminar, Penn State University, Mar 2023.
- AMS Southeastern Sectional Meeting, Georgia Tech, Mar 2023.
- Nonlinear Analysis Seminar, Rutgers University, Mar 2023.
- Chinese Webinar on Analysis & PDE, Feb 2023.

2022

- School Colloquium, Peking University (online), Dec 2022.
- IMS PDE Seminar, Chinese University of Hong Kong (online), Dec 2022.
- Analysis Seminar, NYU Courant Institute, Nov 2022.
- Analysis of Fluids and Related Topics, Princeton University, Nov 2022.
- Chinese Webinar on Analysis & PDE, Sep 2022.
- Invited lecturer of UMN Summer Workshop on Analysis of PDEs, IMA, University of Minnesota, July 2022.
- Invited member of AIM Square: Towards a 3D Euler singularity, AIM, San Jose, July 2022.
- Stanford Applied Math Seminar, Stanford University (online), Apr 2022.
- Caltech/UCLA/USC Joint Analysis Seminar, Caltech, Apr 2022.
- Workshop on recent developments in incompressible fluid dynamics, Institute for Advanced Study, Apr 2022.
- PDE Seminar, University of Minnesota, Mar 2022.

2021

- Applied Math & Analysis Seminar, Duke University, Nov 2021.
- CMX Student and Postdoc Seminar, Caltech, Oct 2021.
- Applied Math Seminar, University of New Mexico (online), Sep 2021.
- Computational and Applied Math Ph.D. Students Workshop, Peking University (online), Sep 2021.
- PDE Seminar, Seoul National University (online), Aug 2021.
- Chinese Webinar on Analysis & PDE, Aug 2021.
- Student-Run Analysis & PDE, University of California, Davis (online), Jan 2021.

2020

- Analysis Seminar, Korea Institute for Advanced Study (online), Dec 2020.
- PDE Seminar, University of Minnesota (online), Nov 2020.
- Mathematical Research Seminar, Duke Kunshan University (online), Nov 2020.
- Differential Equations Seminar, University of Michigan, Jan 2020.

2019

- Workshop on mathematics of fluid motion III: theory and computation, Korea Institute for Advanced Study, Dec 2019.
- PDE Seminar, Nonlinear PDE Center, Chung-Ang University, Korea, Dec 2019.
- Analysis and PDE Seminar, University of California, San Diego, Nov 2019.
- Analysis and PDE Seminar, Peking University, Beijing, China, Sep 2019.
- Invited member of AIM Square: Towards a 3D Euler singularity, AIM, San Jose, May 2018, Aug 2019.
- Workshop on fluid turbulence and singularities of the Euler/ Navier Stokes equations, Harvard University, Mar 2019.

2018

- Workshop on multiscale problems in materials science and biology: analysis and computation, Tsinghua Sanya International Mathematics Forum, Jan 2018.

Teaching

Instructor at New York University

- MATH-UA 263. Partial Differential Equations. Fall 2023, Spring 2024
- MATH-UA 262. Ordinary Differential Equations. Fall 2022, Spring 2023

Instructor at other institutes

- UMN Summer Workshop on Analysis of PDEs, IMA, University of Minnesota. Summer 2022

Teaching Assistant at Caltech

- ACM 109. Mathematical Modelling. Spring 2021
- ACM 217. Advanced Topics in Stochastic Analysis. Winter 2021
- ACM 204. Randomized Algorithms for Linear Algebra. Winter 2020
- CMS/ACM 117. Probability Theory and Stochastic Processes. Fall 2019, Fall 2020
- ACM 95/100b. Introductory Methods of Applied Mathematics. Spring 2019, Spring 2020
- ACM 106b. Introductory Methods of Computational Mathematics. Winter 2019
- ACM 106a. Introductory Methods of Computational Mathematics. Fall 2018

Service

Co-organizer of the CMX Student / Postdoc Seminar at Caltech, Oct 2020 – Mar 2021, Oct 2021 – Dec 2021.

Languages

English (fluent), Cantonese (native), Chinese (native).