Xiaoqian Xu

Zu Chongzhi Center of Mathematics and Computational Sciences
No. 8 Duke Ave.
Duke Kunshan University
Kunshan, China

Office Tel: (0512) 3665 7602
Email: xiaoqian.xu@dukekunshan.edu.cn
Homepage: `https://sites.duke.edu/xiaoqian/`

EMPLOYMENT

Senior Research Scientist, Zu Chongzhi Center of Mathematics and Computational Sciences, Duke Kunshan University, Jan 2021-present
Assistant Professor, Duke Kunshan University, Jul 2019-present
Postdoctoral Associate, Carnegie Mellon University, Sep 2016-Jun 2019
Postdoc Fellow, ICERM, Brown University, Jan 2017-Jun 2017

EDUCATION

Ph.D., Mathematics, University of Wisconsin -– Madison, May 2016
Advisors: Alexander Kiselev and Andrej Zlatoš
Thesis: *Singularities and mixing in fluid mechanics.*
M.S., Mathematics, University of Wisconsin — Madison, May 2014
B.S., Mathematics (Prof. Shing-Tung Yau Honors Class), July 2011, Zhejiang University, China
Advisor: Silei Wang

RESEARCH INTERESTS

Partial Differential Equations, Active Scalar, Time-fractional Equations, Math Biology

PUBLICATIONS (authors listed in alphabetical order)

1. J.-G. Liu, T. Witelski, X. Xu and J. Zhang, *A Three-dimensional tumor growth model and its boundary instability*, arXiv preprint arXiv:2401.04954 (2024).

2. H. Li, Z. Xiang, and X. Xu. *Suppression of blow-up in Patlak-Keller-Segel-Navier-Stokes system via the Poiseuille flow*, arXiv preprint arXiv:2312.01069 (2023).

3. Y. Feng, M. Tang, X. Xu, and Z. Zhou. *Tumor boundary instability induced by nutrient consumption and supply*, Zeitschrift für angewandte Mathematik und Physik 74, no. 3 (2023): 107.

4. Y. Feng, L. Li, J.-G. Liu, and X. Xu. *Existence of weak solutions to p-Navier-Stokes equations.* arXiv preprint arXiv:2302.09223 (2023). To appear in Discrete and Continuous Dynamical Systems - Series B.

5. Y. Feng, and X. Xu. *Dissipation enhancement of cellular flows in general advection diffusion equations*, arXiv preprint arXiv:2210.16801 (2022).

6. Y. Feng, B. Hu, and X. Xu. *Suppression of epitaxial thin film growth by mixing*, Journal of Differential Equations 317 (2022): 561-602.

7. G. Iyer, X. Xu, A. Zlatos, *Convection-Induced Singularity Suppression in the Keller-Segel and

Other Non-linear PDEs, Trans. Amer. Math. Soc. 374 (2021), 6039-6058

8. Y. Feng, B. Hu, X. Xu, and Y. Zhang. *Global existence of a non-local semilinear parabolic equation with advection and applications to shear flow*, arXiv preprint arXiv:2107.05081 (2021).

9. Y. Feng, B. Hu, and X. Xu. *Dissipation enhancement for a degenerated parabolic equation*, arXiv preprint arXiv:2104.12578 (2021).

10. T. Do, A. Kiselev, X. Xu, *Stability of Blow-up for a 1D model of axisymmetric 3D Euler*, Journal of Nonlinear Science 28, no. 6 (2018): 2127-2152.

11. Y. Feng, L. Li, J.-G. Liu, and X. Xu. *A note on one-dimensional time fractional ODEs*, Applied Mathematics Letters 83 (2018): 87-94.

12. L. Li, X. Xu, and S. E. Spagnolie. *A locally gradient-preserving reinitialization for level set functions*, Journal of Scientific Computing 71 (2017): 274-302.

13. Y. Feng, L. Li, J. Liu, X. Xu, *Continuous and discrete one dimensional autonomous fractional ODEs*, Discrete & Continuous Dynamical Systems-B (2017): 603-630.

14. A. Kiselev, X. Xu, *Suppression of chemotactic explosion by mixing*, Archive for Rational Mechanics and Analysis 222.2 (2016): 1077-1112.

15. X. Xu, *Fast growth of the vorticity gradient in symmetric smooth domains for 2D incompressible ideal flow*, Journal of Mathematical Analysis and Applications 439.2 (2016): 594-607.

16. T. Do, V. Hoang, M. Radosz, X. Xu, *One-dimensional model equations for hyperbolic fluid flow*, Nonlinear Analysis: Theory, Methods & Applications 140 (2016): 1-11.

17. G. Iyer, A. Kiselev, X. Xu, *Lower bounds on the mix norm of passive scalars advected by incompressible enstrophy-constrained flows*, Nonlinearity 27 (2014) 973-985.

18. S. Li, X. Xu, and G. Wang. *Design for triangular rational Bezier harmonic and biharmonic surfaces*, Journal of Zhejiang University(Science Edition) 39, no. 2 (2012).

HONORS AND AWARDS

- Kunshan Government Research Fund, 2022, 2023 (twice).
- Shanghai Jiao Tong University National Key Lab Open Fund, Co-PI, 2022, 2023 (twice).
- Synear and Wang-Cai Seed Grant (DKU), Co-PI, 2022.
- National Natural Science Foundation of China, Youth Program. Jan 2022-Dec 2024.
- Key program of Ministry of Science and Technology of China - Young Scientists Program. Co-PI with PI Zhennan Zhou (Peking University), co-PI Liu Liu (Chinese University of Hong Kong). Dec 2021-Nov 2026
- Kunshan Shuangchuang Program, Kunshan, Dec 2021.
- DKU Faculty Scholarship and Travel Award (FSTA), Duke Kunshan University, 2021/22
- Jiangsu Shuangchuang PhD, Jiangsu Province, 2020
- Vilas Conference Presentation Fund, University of Wisconsin-Madison, 2016

- Excellence in Research Award, Department of Mathematics, University of Wisconsin-Madison, 2015
- Chancellor's Opportunity Award, University of Wisconsin-Madison, 2012
- Excellent Graduates of Zhejiang Province, 2011
- Li & Fung fellowship, 2010
- Science and Technology Innovation Programs funds for college students of Zhejiang Province, 2010
- Special scholarship for freshman of Zhejiang University, 2007

INVITED TALKS

- Workshop in Analysis and its Applications, Fudan University, Shanghai, May 24-26, 2024
- PDE seminar, Nanjing University of Aeronautics and Astronautics, Nanjing, May 20, 2024
- Shanghai PDE seminar, Shanghai Normal University, Shanghai, March 30, 2024
- Analysis seminar, Southern University of Science and Technology, December 7, 2023
- PDE seminar, National University of Singapore, November 8, 2023
- Workshops on Mathematical Fluid Dynamics, Westlake University, October 30, 2023
- Fluid conference, Beijing Institute of Technology, October 14, 2023
- HKSIAM Biennial Conference, CUHK, September 1, 2023
- Summer school short course on Fluid equations, Zhejiang University, July 17-21
- Jeju Fluid Workshop, Jeju Island, July 25, 2023
- PDE seminar, Academy of Mathematics and Systems Science, May 16, 2023
- Analysis seminar, University of Electronic Science and Technology of China, March 16, 2023
- Analysis seminar, SJTU, Online, Nov 28, 2022
- Workshop on Mathematical Modeling, Analysis, and Computation in Biological Systems, SJTU (online), Nov 12-13, 2022
- Workshop on Geometric Measure Theory in PDE, Sichuan University, August 27, 2022
- PDE seminar, AMSS, Online, July 4
- Analysis seminar, Beijing Technology and Business University, Online, March 31
- Mathematical Sciences Colloquium, UNIST, Online, March 24
- Conference on Analysis and Differential Equations, SJTU and Soochow University, Nov
- Workshop on PDE, SJTU, Nov
- Seminar, Xihua University, Oct 2021
- Summer school short course, University of Electronic Science and Technology of China, Aug 2021
- Workshop on Free Boundary and Stability Problems, Hangzhou, Jul 2021
- Seminar, IAPCM, Jun 2021
- Seminar, Beihang University, Jun 2021
- Seminar, Wuhan University, May 2021
- Analysis & PDE Webinar, Online, April 2021
- Seminar, Peking University, Dec 2020

- Suzhou Area Youth Mathematicians Workshop, Kunshan, Nov 2020
- Seminar, Shanghai Jiaotong University, Nov 2020
- AMS Fall Eastern Virtual Sectional Meeting, special session on turbulence and mixing in fluid dynamics, Oct 2020
- Seminar, University of Electronic Science and Technology of China, Chengdu, Nov 2019
- Seminar, Sichuan University, Chengdu, Nov 2019
- Seminar, Sichuan Normal University, Chengdu, Nov 2019
- AMS Sectional Meeting: Special Session on Nonlocality in Models for Kinetic, Chemical, and Population Dynamics, University of Michigan, Ann Arbor, Oct 2018
- PDE Seminar, Duke University, Mar 2018
- AMS Joint Mathematics Meeting: AMS Special Session on Mathematical Fluid Mechanics: Analysis and Applications, Jan 2018
- Seminar, Zhejiang University, Dec 2017
- PDE Seminar, Brown University, Feb 2017
- Young Researchers Workshop, Duke University, Nov 2016
- Colloquium, Missouri University of Science and Technology, Oct, 2016
- CNA seminar, Carnegie Mellon University, Sep 2016
- Colloquium, University of Wisconsin-Milwaukee, Apr 2016
- Analysis Seminar, University of Wisconsin-Milwaukee, Apr 2016
- AMS Sectional Meeting: Special Session on PDE Analysis in Fluid Flows, University of Georgia, Athens, Mar 2016
- Special Seminar, University of Alberta, Feb 2016
- AMS Joint Mathmatics Meeting: AMS Special Session on Equations of Fluid Motion, Seattle, WA, Jan 2016
- Analysis Seminar, University of Wisconsin-Madison, Oct 2015
- AMS Sectional Meeting: Special Session on Nonlinear Conservation Laws and Applications, University of Nevada, Las Vegas, Apr 2015
- Fifth Annual Oklahoma PDE Workshop, Feb 2015
- Young Researchers Workshop: Multiscale phenomena: modeling, analysis and computation, College Park, MD, Oct 2014

ACADEMIC VISITS

Missouri University of Science and Technology, Nov 2019
Duke University, Mar 2018
Rice University, Dec 2015
Caltech, Oct 2015
Rice University, Aug 2014 - July 2015
Carnegie Mellon University, Apr 2014
Carnegie Mellon University, Feb 2013
University of Hong Kong (undergraduate transfer program), January-June 2010

PROFESSIONAL DEVELOPMENT

- Math session coordinator of Summer Academy in DKU, Aug 2023
- Public talk at Duke Math Meet, Kunshan, Aug 2020, Aug 2022
- MAA MathFest 2015, Great Talks for a General Audience: Coached Presentations by Graduate Students, Marriott Wardman Park, Washington, DC, Aug 2015
- Coordinator of a student seminar in Analysis for sophomores, Zhejiang University, 2010

SERVICE

- Referee for Journal of Functional Analysis, SIAM Journal of Mathematical Analysis, SIAM Journal of Applied Math, Nonlinearity, Journal of Nonlinear Science, Journal of Differential Equations, Annals of Partial Differential Equations, Communications in Mathematical Sciences etc.
- Host and organizer of more than 60 Zu Chongzhi Center Seminars at DKU, 2019-2023.
- Organizer of Workshop on Recent advances in fluid dynamics: singularity, regularity and mixing, Dec 2023
- Organizer of Workshop on Advances in Applied Mathematics and Its Application, Oct 2023
- Organizer of Joint Workshop with Shanghai Jiaotong University, Jan 2022, Apr 2023
- Organizer of Workshop on New Trends in Mathematical Biology, Oct 2022
- Member of University Colloquium Committee, 2021-present
- Member of IRB, Duke Kunshan University, 2020-2022
- Organizer of Workshop on Dissipated System, Oct 2021
- Organizer of Pi Day events, Mar 2021
- Member of Falculty Council, Fall 2020
- Organizer of the launching program of Zu Chongzhi Math center and Workshop on Frontiers in Mathematics and Its Application Oct 2019
- Organizer of AIM SQuaREs program: Towards a 3D Euler singularity, May 2018, Aug 2019
- Co-organizer of Special Session "Nonlocal PDEs in Fluid Dynamics" in AMS Sectional Meeting, Sep 2017
- Mentor of Directed Reading Program at Uuniversity of Wisconsin-Madison, 2015 Fall
- Judge in MAA Student Paper Sessions, Aug 2015
- Judge in Rice Undergraduate Research Symposium, Apr 2015
- Co-organizer of Mega Math Meet, May 2014
- Volunteer of International Congress of Chinese Mathematicians (ICCM) , Hangzhou, China, Dec 2007