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Jiajun Tong

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Academic Positions

Sept. 2021 – **Assistant Professor**, *Beijing International Center for Mathematical Research (BICMR), Peking University*, China

July 2018 – June 2021 **Hedrick Assistant Adjunct Professor**, *University of California, Los Angeles*, USA
- Mentor: Prof. Inwon C. Kim

Education

Sept. 2013 – May 2018 **Ph.D. in Mathematics**, *Courant Institute, New York University*, USA
- Advisor: Prof. Fang-Hua Lin
- Thesis: On the Stokes Immersed Boundary Problem in Two Dimensions

Sept. 2009 – July 2013 **B.S. in Applied and Computational Mathematics**, *Peking University*, China
- Advisor: Prof. Pingwen Zhang
- Thesis: Mean-Field Simulations of Quasicrystalline Phases in ABC Star Block Terpolymer Systems

Research Interests

Partial differential equations and applied analysis, especially evolution free boundary problems, the incompressible Euler equation and related fluid models, and calculus of variations.

Publications

[1] De Huang, Jiajun Tong, and Xiuyuan Wang. Self-similar finite-time blowups with singular profiles of the generalized Constantin-Lax-Majda model: theoretical and numerical investigations. *arXiv preprint arXiv:2603.25104*, 2026. *Submitted*.

[2] Jiajun Tong and Dongyi Wei. The immersed boundary problem in 2-D: the Navier-Stokes case. *arXiv preprint arXiv:2511.16189*, 2025. *Submitted*.

[3] De Huang and Jiajun Tong. Steady contiguous vortex-patch dipole solutions of the 2D incompressible Euler equation. *Archive for Rational Mechanics and Analysis*, 249(46), 2025.

[4] Jiajun Tong and Yuming Paul Zhang. Convergence of free boundaries in the incompressible limit of tumor growth models. *Journal de Mathématiques Pures et Appliquées*, 203:103752, 2025.

[5] Jiajun Tong and Dongyi Wei. Geometric properties of the 2-D Peskin problem. *Annals of PDE*, 10(24), 2024.

[6] De Huang, Jiajun Tong, and Dongyi Wei. On self-similar finite-time blowups of the De Gregorio model on the real line. *Communications in Mathematical Physics*, 402:2791–2829, 2023.

[7] Jiajun Tong. Global solutions to the tangential Peskin problem in 2-D. *Nonlinearity*, 37(1):015006, 2024.

[8] Matt Jacobs, Inwon Kim, and Jiajun Tong. Tumor growth with nutrients: Regularity and stability. *Communications of the American Mathematical Society*, 3:166–208, 2023.

[9] Matt Jacobs, Inwon Kim, and Jiajun Tong. Darcy's law with a source term. *Archive for Rational Mechanics and Analysis*, 239(3):1349–1393, 2021.

[10] Matt Jacobs, Inwon Kim, and Jiajun Tong. The L^1-contraction principle in optimal transport. *The Annali della Scuola Normale Superiore di Pisa, Classe di Scienze*, XXIII:1871–1919, 2022.

[11] Inwon Kim and Jiajun Tong. Interface dynamics in a two-phase tumor growth model. *Interfaces and Free Boundaries*, 23(2):191–304, 2021.

[12] Zhiyuan Geng and Jiajun Tong. Regularity of minimizers of a tensor-valued variational obstacle problem in three dimensions. *Calculus of Variations and Partial Differential Equations*, 59, 57, 2020.

[13] Jiajun Tong. Regularized Stokes immersed boundary problems in two dimensions: Well-posedness, singular limit, and error estimates. *Communications on Pure and Applied Mathematics*, 74(2):366–449, 2021.

[14] Jiajun Tong and Michael J. Shelley. Directed migration of microscale swimmers by an array of shaped obstacles: modeling and shape optimization. *SIAM Journal on Applied Mathematics*, 78(5):2370–2392, 2018.

[15] Zaihui Gan, Fang-Hua Lin, and Jiajun Tong. On the viscous Camassa-Holm equations with fractional diffusion. *Discrete & Continuous Dynamical Systems - A*, 40(6):3427–3450, 2020.

[16] Fang-Hua Lin and Jiajun Tong. Solvability of the Stokes immersed boundary problem in two dimensions. *Communications on Pure and Applied Mathematics*, 72(1):159–226, 2019.

[17] Megan S. Davies Wykes, Xiao Zhong, Jiajun Tong, Takuji Adachi, Yanpeng Liu, Leif Ristroph, Michael D. Ward, Michael J. Shelley, and Jun Zhang. Guiding microscale swimmers using teardrop-shaped posts. *Soft Matter*, 13:4681–4688, 2017.

[18] Kai Jiang, Jiajun Tong, and Pingwen Zhang. Stability of soft quasicrystals in a coupled-mode Swift-Hohenberg model for three-component systems. *Communications in Computational Physics*, 19(3):559–581, 2016.

[19] Kai Jiang, Jiajun Tong, Pingwen Zhang, and An-Chang Shi. Stability of two-dimensional soft quasicrystals in systems with two length scales. *Physical Review E*, 92(4):042159, 2015.

Grants

Dec. 2021 – Nov. 2026 National Key R&D Program of China, No. 2021YFA1001500, Principal Investigator

Honors and Awards

2023 Peking University Boya Young Fellow, PKU

Apr. 2019 Best Poster Award, Southern California Applied Mathematics Symposium (SOCAMS 2019)

2017 – 2018 Dean's Dissertation Fellowship, Graduate School of Arts and Science, NYU

2013 – 2017 *Henry M. MacCracken* Fellowship, Graduate School of Arts and Science, NYU

July 2013 Outstanding Graduate in Beijing

Aug. 2012 Gold Medalist in Team Contest, and Silver Medalist in Individual Contest of Applied and Computational Mathematics, S.-T. Yau College Student Mathematics Contests

Seminars and Conferences Organized

Aug. 2026 Advances in Mathematical Fluid Dynamics 2026, Peking University

June 2025 Advances in Mathematical Fluid Dynamics, Peking University

Dec. 2023 Recent Advances in Fluid Dynamics: Singularity, Regularity and Mixing, Duke Kunshan University

Sep. 2021 – PDE/Analysis Seminar, BICMR & SMS, Peking University

Research Talks

Feb. 2026 Analysis and PDE Seminar, National University of Singapore

Dec. 2025 Frontiers in Fluid and Kinetic Partial Differential Equations (online), Academy of Mathematics and Systems Science, Chinese Academy of Sciences

Nov. 2025 Advances in Fluid Equations, Duke Kunshan University

Nov. 2025 PDE Seminar, East China Normal University

July 2025 PDE Seminar, Academy of Mathematics and Systems Science, Chinese Academy of Sciences

May 2025 7th Workshop on Mathematical Fluid Dynamics, Westlake University

May 2025 International Conference on Partial Differential Equations, NYU Shanghai

May 2025 PDE Seminar, Seoul National University

Feb. 2025 Analysis Seminar (online), Academia Sinica

Jan. 2025 Seminar, The Hong Kong Polytechnic University

Jan. 2025 Departmental Colloquia, City University of Hong Kong

Jan. 2025 Mathematics Seminar Series, Great Bay University

Jan. 2025 Workshop on Nonlinear Analysis, Beijing Normal University at Zhuhai

Dec. 2024 PDE Seminar, Beijing Normal University

Nov. 2024 Workshop on Mixing, Enhanced Dissipation and Stability Effects in Fluid Dynamics, Tianyuan Mathematics Research Center

Nov. 2024 PDE Seminar, Zhejiang Normal University

Oct. 2024 Analysis and PDE Seminar, Peking University

Aug. 2024 Analysis and PDE Seminar, Zhejiang University

Apr. 2024 PDE Seminar, Fudan University

Apr. 2024 Conference on Analysis in Fluids, Kinetic Theory, and Waves, Fuzhou University

Mar. 2024 Miniworshop on Partial Differential Equations, Capital Normal University

Nov. 2023 Online Workshop on PDEs in Applications (online), Fudan University

Nov. 2023 Workshop on Advances in PDEs, Beihang University

Nov. 2023 2nd Workshops on Mathematical Fluid Dynamics, Westlake University

Oct. 2023 PDE Seminar, Shanghai Jiao Tong University

June 2023 PDE Seminar, Morningside Center of Mathematics, Chinese Academy of Sciences

May 2023 PDE Seminar Series, NYU-ECNU Institute of Mathematical Sciences at NYU Shanghai

Oct. 2022 New Trends in Mathematical Biology (online), Duke Kunshan University

Oct. 2022	Workshop on Analysis and PDEs (online), Shanghai Jiao Tong University
June 2022	Analysis Research Interaction Team Seminar, Beijing International Center for Mathematical Research, Peking University
Dec. 2021	PDE Seminar (online), University of Electronic Science and Technology of China
Dec. 2021	PDE Seminar, Academy of Mathematics and Systems Science, Chinese Academy of Sciences
Dec. 2021	Workshop on Nonlinear PDE Theory and Applications (online), Capital Normal University
Oct. 2021	Hua Loo-Keng Youth Lecture in Mathematics, Academy of Mathematics and Systems Science, Chinese Academy of Sciences
May 2021	Seminar (online), Zhejiang University
Dec. 2020	2020 Winter Young Mathematician Forum at Shanghai Jiao Tong University (online)
Dec. 2020	Seminar (online), Fudan University
Nov. 2020	Seminar (online), National University of Singapore
Nov. 2020	PDE/Analysis Seminar (online), Beijing International Center for Mathematical Research, Peking University
Oct. 2020	Analysis of Fluids and Related Topics Seminar (online), Princeton University
Sep. 2020	PDE Seminar (online), Purdue University
Sep. 2020	Young Mathematician Lecture Series (online), National University of Singapore
Feb. 2020	Analysis and PDE Seminar, UCLA
Dec. 2019	SIAM Conference on Analysis of Partial Differential Equations (PD19), La Quinta, USA
Nov. 2019	Participating Analysis Seminar, UCLA
May 2019	Applied and Computational Mathematics Seminar, University of Wisconsin – Madison
Feb. 2018	Applied Mathematics Colloquium, Columbia University
Jan. 2018	Geometry & Analysis Seminar, Columbia University
Jan. 2018	Participating Analysis Seminar, UCLA
Nov. 2017	PDE Seminar, NYU-ECNU Institute of Mathematical Sciences at NYU Shanghai
Oct. 2017	PDE Seminar, Zhejiang University
Oct. 2017	2017 Fall Program on Analysis of PDE (Week 6), Shanghai Center for Mathematical Sciences, Fudan University
Nov. 2016	69th Annual Meeting of the APS Division of Fluid Dynamics, Portland, USA

Teaching

PKU

Spring 2026	Mathematical Analysis (II)
Fall 2025	Mathematical Analysis (I)
Spring 2025	Advanced Mathematics A (II), and 3+X Undergraduate Seminar (joint with De Huang)
Fall 2024	Advanced Mathematics A (I)
Spring 2024	Mathematical Analysis (II)
Fall 2023	Mathematical Analysis (III), and 3+X Undergraduate Seminar (joint with De Huang)
Spring 2023	Topics in Analysis and PDE: Free Boundary Problems
Fall 2022	Advanced Mathematics A (I)

Spring 2022 Advanced Mathematics A (II)

UCLA

Spring 2021 Math 131A Analysis (Lec 1), and Math 135 Ordinary Differential Equations (Lec 2)

Winter 2021 Math 134 Linear and Nonlinear Systems of Differential Equations (Lec 1)

Fall 2020 Math 135 Ordinary Differential Equations (Lec 3)

Spring 2020 Math 136 Partial Differential Equations (Lec 1)

Winter 2020 Math 151A Applied Numerical Methods (Lec 1 & 2)

Fall 2019 Math 151A Applied Numerical Methods (Lec 1)

Spring 2019 Math 151A Applied Numerical Methods (Lec 1)

Winter 2019 Math 132H Complex Analysis (Honors) (Lec 1)

Fall 2018 Math 151A Applied Numerical Methods (Lec 1 & 2)

Mentoring

PKU *Graduate students*

Zhuojian Yang (since Fall 2025)

Undergraduate students

Siyu Chen (since Spring 2025)

Yicheng Dong (since Spring 2025)

Hao Chen (since Spring 2025)

Xiaopeng Zheng (since Spring 2024, The Peskin problem with mass)

Zirui Wang (since Fall 2023, The multi-phase Muskat problem)

Haoran Liu (Fall 2023 – Spring 2025, Maximum principle in the Muskat problem)

Jiehui Zhai (Fall 2023 – Spring 2024, Mathematical theory of mean-field games)

Yao Liu (Spring 2022 – Spring 2024, The Peskin problem with mass)

UCLA *Undergraduate students*

Mingxin Li (Winter 2021, Real Analysis; Spring 2021, Numerical Analysis of Free Boundary Problems in Fluid Dynamics)

Jiayun Meng (Spring 2020, Real Analysis; Summer 2020, Complex Analysis and Functional Analysis; Spring 2021, Free Boundary Problems in Fluid Dynamics)

Xu Tang (Spring 2019, Basics of Monte Carlo Method)