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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, calculus of variations, and fluid dynamics

Publications

[1] 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.

[2] Matt Jacobs, Inwon Kim, and Jiajun Tong. The L^1-contraction principle in optimal transport. *arXiv preprint arXiv:2006.09557*, 2020. To appear in *The Annali della Scuola Normale Superiore di Pisa, Classe di Scienze.*

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

[4] 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.

[5] 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.

[6] 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.

[7] 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.

[8] 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.

[9] 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.

[10] 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.

[11] 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.

Honors and Awards

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

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

Talks

May 2021 Seminar (virtual), Zhejiang University, China

Dec. 2020 2020 Winter Young Mathematician Forum at Shanghai Jiao Tong University (virtual), China

Dec. 2020 Seminar (virtual), Fudan University, China

Nov. 2020 Seminar (virtual), National University of Singapore, Singapore

Nov. 2020 PDE/Analysis Seminar (virtual), Beijing International Center for Mathematical Research, Peking University, China

Oct. 2020 Analysis of Fluids and Related Topics Seminar (virtual), Princeton University, NJ, USA

Sep. 2020 PDE Seminar (virtual), Purdue University, IN, USA

Sep. 2020 Young Mathematician Lecture Series (virtual), National University of Singapore, Singapore

Feb. 2020 Analysis and PDE Seminar, UCLA, Los Angeles, CA, USA

Dec. 2019 SIAM Conference on Analysis of Partial Differential Equations (PD19), La Quinta, CA, USA

Nov. 2019 Participating Analysis Seminar, UCLA, Los Angeles, CA, USA

May 2019 Applied and Computational Mathematics Seminar, University of Wisconsin – Madison, Madison, WI, USA

Feb. 2018 Applied Mathematics Colloquium, Columbia University, New York, NY, USA

Jan. 2018 Geometry & Analysis Seminar, Columbia University, New York, NY, USA

Jan. 2018 Participating Analysis Seminar, UCLA, Los Angeles, CA, USA

Nov. 2017 PDE Seminar, NYU-ECNU Institute of Mathematical Sciences at NYU Shanghai, Shanghai, China

Oct. 2017 Seminar, Zhejiang University, Hangzhou, China

Oct. 2017 2017 Fall Program on Analysis of PDE (Week 6), Shanghai Center for Mathematical Sciences, Fudan University, Shanghai, China

Nov. 2016 69th Annual Meeting of the APS Division of Fluid Dynamics, Portland, OR, USA

Teaching

At UCLA *As Course Instructors*

Spring 2021 Math 131A Analysis (Lec 1)

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)

Undergraduate Mentoring

At UCLA 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)