Jiaqi Zhang

Contact Information

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Mathematical and Statistical Sciences
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https://zjiaqi2018.github.io

Employment

Jul. 2020 - present	**Postdoc (Advisor: Timo Heister)** *Mathematical and Statistical Sciences, O-110 Martin Hall, Clemson University, Clemson, SC, USA* - Contributed more than 15,000 lines of code in total to deal.II and ASPECT - Work on matrix-free methods, geometric multigrid, high performance computing - Organize computational math seminars at Clemson University
Aug. 2015 - Jun. 2020	**Research/Teaching assistant** *Department of Mathematics, Virginia Tech, Blacksburg, VA, USA*
Aug. 2012 - Jun. 2015	**Research/Teaching assistant** *Department of Mathematics, University of Macau, Macau, China*

Education

Aug. 2015 - May 2020	Ph.D. in Applied Mathematics at Virginia Tech Dissertation: *Finite-element simulations of interfacial flows with moving contact lines (link)* Advisor: Professor Pengtao Yue
Aug. 2012 - Jun. 2015	Master of Science in Mathematics at University of Macau Dissertation: *A Modified Fast Dense Matrix Method for Fractional Diffusion Equations* Advisor: Professor Haiwei Sun
Sept. 2008 - Jun. 2012	Bachelor of Science in Mathematics at Shantou University

Publications

1. Zelai Xu, Jiaqi Zhang, Yuan-Nan Young, Pengtao Yue, and James J. Feng. A comparison of four boundary conditions for the fluid-hydrogel interface. *Physical Review Fluids*. in revision

2. Lei Li[#], Jiaqi Zhang[#], Zelai Xu, Yuan-Nan Young, James J. Feng, and Pengtao Yue. An arbitrary lagrangian-eulerian method for simulating interfacial dynamics between a hydrogel and a fluid. *Journal of Computational Physics*, 451:110851, 2022. (# contributed equally)

3. Daniel Arndt, Wolfgang Bangerth, Bruno Blais, Marc Fehling, Rene Gassmöller, Timo Heister, Luca Heltai, Uwe Köcher, Martin Kronbichler, Matthias Maier, Peter Munch, Jean-Paul Pelteret, Sebastian Proell, Konrad Simon, Bruno Turcksin, David Wells, and Jiaqi Zhang. The deal.II library, version 9.3. *Journal of Numerical Mathematics*, 29(3):171–186, September 2021

4. Jiaqi Zhang and Pengtao Yue. A level-set method for moving contact lines with contact

angle hysteresis. *Journal of Computational Physics*, 418:109636, 2020

5. Jiaqi Zhang and Pengtao Yue. A high-order and interface-preserving discontinuous Galerkin method for level-set reinitialization. *Journal of Computational Physics*, 378:634–664, 2019

In preparation

1. A level-set method for 3D interfacial flows with moving contact lines. (with Timo Heister and Pengtao Yue)
2. A phase-field method for three-phase system with solidification and moving contact lines. (with Yichen Li and Pengtao Yue)

Tutorial

1. Jiaqi Zhang and Timo Heister. The deal.II tutorial step-74: Symmetric interior penalty Galerkin method for Poisson's equation, January 2021

Research Interests

- Computational fluid dynamics (phase transition, fluid structure interaction)
- High performance computing (efficient large-scale parallel solver)
- Matrix-free methods
- Geometric multigrid

Teaching

Spring 2022	Instructor, MATH 3650 : Numerical Methods for Engineers
Spring 2021	Instructor, MATH 3650 : Numerical Methods for Engineers
Spring 2020	Instructor, MATH 1225: Calculus of a Single Variable
Fall 2019	Instructor, MATH 1225: Calculus of a Single Variable
Summer II 2019	Instructor, MATH 1025: Elementary Calculus I (online course)
Spring 2019	Lab Instructor, Math 1026: Elementary Calculus
Fall 2018	Instructor, MATH 1225: Calculus of a Single Variable
Spring 2018	Teaching Assistant, CS/CMDA 3634: Computer Science Foundations of Computational Science
Spring 2016	Tutor of the Tutoring Lab in Math Emporium
Fall 2015	Floor Staff in Math Emporium

Technical Skills

- Programming: C++, C, FORTRAN, DEAL.II (an open source finite element library), MPI(Message Passing Interface), OpenMP (Open Multi-Processing), OCCA (Open Concurrent Compute Abstraction), CUDA (Compute Unified Device Architecture)
- Software: Tecplot, VisIt, Paraview, MATLAB, LaTeX, Gmsh
- Operating systems: Linux, OS X

Conferences, talks, workshops

Jul. 2021	*2021 ASPECT Hackathon* Virtual two-week event, Tuesday July 6 - Friday July 16 - *Added geometric multigrid to the Newton solver (link)*
Jun. 2021	*Ninth deal.II Users and Developers Workshop* Virtual one-day meeting, June 18, 2021

Jan. 2021 *Deal.II Simplex Workshop 2021*
Virtual three-day workshop, January 13-15, 2021
- *Contributed a test by converting the deal.II Step-67 tutorial from a quadrilateral mesh to a triangular mesh (link)*

Sept. 2020 "A level-set method for moving contact line problems with comparison to phase-field simulations" (Talk)
Computational Mathematics Seminar
Clemson University, Clemson, SC, USA

Jul. 2020 *p4est 2020 HCM Summer School*
Online event July 20th–24th, 2020

May 2020 *Eighth deal.II Users and Developers Workshop*
Virtual one-day meeting, May 26, 2020

Aug. 2019 *Seventh deal.II Users and Developers Workshop*
Colorado State University, Fort Collins, CO, USA

Sept. 2019 "A level-set method for moving contact line problems with comparison to phase-field simulations" (Talk)
43rd annual meeting of the SIAM Southeastern Atlantic Section
at University of Tennessee-Knoxville, Knoxville, TN, USA

Aug. 2019 *Seventh deal.II Users and Developers Workshop*
Colorado State University, Fort Collins, CO, USA

Feb. 2019 "An interface-preserving level-set method for interfacial flows with contact lines" (Talk, **travel award**)
SIAM Conference on Computational Science and Engineering, Spokane, WA, USA

Nov. 2018 "An interface-preserving level-set method for interfacial flows with contact lines" (Talk)
71st Annual Meeting of the APS Division of Fluid Dynamics, Atlanta, GA, USA

Jul. 2017 "A high-order and interface-preserving discontinuous Galerkin method for level-set reinitialization" (Poster)
International Conference on Current Trends and Challenges in Numerical Solution of Partial Differential Equations,
Department of Mathematics, Purdue University, IN, USA

Feb. 2017 "A high-order and interface-preserving discontinuous Galerkin method for level-set reinitialization" (Poster)
SIAM Conference on Computational Science and Engineering, Atlanta, GA, USA

Jun. 2014 "A modified fast dense matrix method for fractional diffusion equations" (Talk)
The 10th East Asia SIAM Conference, Pattaya, Thailand

REVIEWER

- Journal of Computational Physics

Professional organizations

Oct. 2017 - Aug. 2018 *Secretary of SIAM Student Chapter at Virginia Tech*