Xueping Zhao

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Research Interests

- Mathematical modeling, analysis and computation on non-equilibrium matter systems, especially, active matter systems in biophysics, fluid dynamics and rheology of complex fluids.
- Numerical analysis of partial differential equations (PDEs) and high-performance computing.
- Data analysis and applications of machine learning in mathematical and statistical modeling.

Employment

- **Max Planck Institute for the Physics of Complex Systems** — Dresden, Germany
  Postdoc — *May. 2019– May. 2021(expected)*
- **University of South Carolina** — Columbia, SC, USA
  Postdoc in Applied and Computational Mathematics; — *Jan. 2019 – April. 2019*

Education

- **University of South Carolina** — Columbia, SC, USA
  PhD candidate in Applied and Computational Mathematics; — *Aug. 2013 – Dec. 2018*
- **Nankai University** — Tianjin, China
  Master of Science in Computational Mathematics; — *Sep. 2010 – July. 2013*
- **Qufu Normal University** — Qufu, China
  Bachelor of Science in Applied Mathematics; — *Sep. 2006 – July. 2010*

Publications

- Jia Zhao, Xiaofeng Yang, Yuezheng Gong, **Xueping Zhao**, Jun Li, Xiaogang Yang and Qi Wang, A General Strategy for Numerical Approximations of Thermodynamically Consistent Nonequilibrium Models–Part I: Thermodynamical Systems, International Journal of Numerical Analysis and Modeling, 15(6), (2018), pp 884-918.
- **Xueping Zhao**, Tiezheng Qian and Qi Wang, Thermodynamically Consistent Hydrodynamic Models of Multi-Component Fluid Flows. Continuum Mechanics and Thermodynamics, in revision, 2018.
- **Xueping Zhao** and Qi Wang, A Second Order Fully-discrete Linear Energy Stable Scheme for a Binary Compressible Viscous Fluid Model. Journal of Computational Physics, in revision, 2018.
- Xiaobo Jing, Jun Li, **Xueping Zhao** and Qi Wang, Second Order Linear Energy Stable Schemes for Allen-Cahn Equations with Nonlocal Constraints, Journal of Scientific Computing, (2019), pp 1-38.
- **Xueping Zhao** and Qi Wang, Hydrodynamic Models for Pattern Formation in Tissues. To be submitted to Physical Review E, 2018.
- **Xueping Zhao** and Qi Wang, Analysis and Simulations of Emerging Structures Predicted by a Compressible Active Matter Model, in preparation, 2018.

Computing Skills

I have engaged in GPU computing for 4 years. Most of the codes I have developed during my graduate studies are written in CUDA and run on GPUs. I have developed two parallel computing packages using CUDA and C/C++ for GPU computing. One is for various PDEs and another is for the hierarchical clustering in data analysis.

- Package 1: Computational Complex Fluid Dynamics Solvers.
- Package 2: Weighted Correlation Network Analysis(WGCNA) Toolkits.

- Other Softwares/Languages: Matlab, R, Python, Maple.

Professional Presentations

- Co-organize a minisymposium at the Eleventh IMACS International Conference, 04/2019, Athens, GA.
  Minisymposium on *Recent Advances in Numerical Methods of PDEs and Applications in Life and Materials Science.*
- 2019 SIAM Conference on Computational Science and Engineering, 03/2019, Spokane, Washington.
  Contributed talk: *A Second Order Fully-discrete Linear Energy Stable Numerical Scheme of a Binary Compressible Viscous Fluid Model.*
- 2018 SIAM Center State Conference, 10/2018, Norman, OK.
  Invited talk: *Numerical Approximations of the Phase Field Models of compressible viscous fluid mixtures.*
- 2018 AMS Sectional Meeting, 09/2018, Newark, DE.
  Invited talk: *Thermodynamically consistent hydrodynamic phase field models for compressible fluid mixtures.*
- 2018 SC EPSCoR/IDeA State Conference, 04/2018, Columbia, SC.
  Poster: *Thermodynamically Consistent Phase Field Models of Multi-Component Compressible Fluid Flows.*
- 2017 SIAM Conference on Computational Science and Engineering, 03/2017, Atlanta, GA.
  Contributed poster: *Computational Methods to Study Pattern Formation in Tissue Growth.*
- Frontiers in Applied and Computational Mathematics, 01/2017, Providence, RI.
  Contributed poster: *Hydrodynamic Theories of Pattern Formation in Tissue Growth.*
- 2016 SIAM Conference on the Life Sciences, 07/2016, Boston, MA.
  Invited talk: *Hydrodynamic Theories of Cell Mobility in Tissues.*

Teaching Experience

Instructor/Teaching Assistant(08/2013-12/2013 and 08/2017-Present) University of South Carolina

- Math 111: Taught "College Algebra" to a class of 40 undergraduate students.
- Math 141: Conducted recitation sessions for Math 141: Calculus I; held office hours and organized review of course materials.
- Math Tutor: Tutored undergraduate students on various mathematical problems.
- Maple Labs: Demonstrated how to use "Maple" to solve mathematical problems for undergraduate students.

Awards

- SIAM Student Travel Award. ($650 * 2) 11/2016 and 09/2018
- Travel Award. (USC) ($500 * 2) 01/2017 and 09/2018
- The Outstanding First Year Graduate ACM Student Award.(USC) 04/2014

Membership

- Society for Industrial and Applied Mathematics (SIAM)
- American Mathematical Society (AMS)
- Association for Women in Mathematics (AWM)