

CURRICULUM VITAE

Shan Zhao

Contact Information

- Mailing address:
Department of Mathematics, University of Alabama, PO Box 870350, Tuscaloosa, AL 35487-0350.
- Tel: 205-348-5072
- Fax: 205-348-7067
- E-mail: szhao@ua.edu
- Web page: <https://szhao.people.ua.edu/>

Education

- Ph.D., Scientific Computing, National University of Singapore, (July, 2003).
Dissertation: *Aspects of Discrete Singular Convolution for Scientific and Engineering Computing.*
- B.Sc., Mathematics, Lanzhou University, P.R. China (July, 1997).

Academic Positions

- **Professor**, Department of Mathematics, University of Alabama. (8/2015–).
- **Adjunct Professor**, Physics and Astronomy Department, Clemson University (7/2020–7/2021).
- **Associate Professor**, Department of Mathematics, University of Alabama. (8/2011–8/2015).
- **Visiting Associate Professor**, Beijing Computational Science Research Center, China, (8/2013–3/2014).
- **Assistant Professor**, Department of Mathematics, University of Alabama. (8/2006–8/2011).
- **Assistant Professor**, (Non-Tenure-Track), Department of Mathematics, Michigan State University. (1/2004–8/2006).
- **Visiting Research Instructor**, Department of Mathematics, Michigan State University. (8/2003–1/2004).
- **Research Assistant**, Department of Computational Science, National University of Singapore. (8/2002–8/2003).

Research Experience and Interests

- **Mathematical biology:** Mathematical methods for molecular biology; Implicit solvent models; Biomolecular solvation analysis; Ensemble averaged electrostatics; Regularization for singular charges; PDE modeling of molecular surface; Variational multiscale models; Fast molecular surface triangulation.
- **Scientific computing:** Material interface problems; Electrostatic analysis; Biomolecular simulations; Computational electromagnetics and optics; Short wave problems; Heat transfer.

- **Numerical Methods for Partial differential equations:** $O(N \log N)$ fast algorithms for PDEs; High order finite difference methods; Discontinuous Galerkin method; Weak Galerkin method; Wavelet collocation method; Discrete singular convolution (DSC) method; Matched interface and boundary (MIB) method; Alternating direction implicit (ADI) methods; Locally one-dimensional (LOD) methods; Operator splitting methods.

Research Grants

- **Summer Research Group Initiative**, Department of Mathematics, University of Alabama, \$4,000. PI: Yuanzhen Shao, Co-PI: Shan Zhao; GSU Collaborator: Zhan Chen. Summer 2024.
- **NSF DMS Applied Mathematics program:** DMS-2306991, “Collaborative Research: A new diffuse-interface approach to ensemble average solvation energy: modeling, analysis and computation”, Lead PI: Yuanzhen Shao, Co-PI: Shan Zhao; GSU PI: Zhan Chen. Total budget: \$250,000, UA portion: \$185,000, 8/1/2023 - 7/31/2026.
- **UA CCBM Pilot Innovation Fund**, “A Combined Computational and Experimental Approach for Potential Neurodegenerative Disease Therapeutics”, PI: Yuping Bao, Co-PI: Shan Zhao. \$25,000. 1/1/2023 - 12/31/2024.
- **Leadership Board Fellowship**, College of Arts and Sciences, University of Alabama. \$15,000, 10/01/2021 - 09/30/2024.
- **NSF DMS Computational Mathematics program:** DMS-2110914, “Collaborative Research: Implicit solvent modeling and fast algorithm development for simulating solutes with atomic polarizable multipoles”, Lead PI: Shan Zhao, SMU PI: Weihua Geng. Total budget: \$448,203, UA portion: \$248,987, 8/01/2021 - 7/31/2024.
- **NIH: R01GM093937**, “Maintenance and development of DelPhi and associated resources”, PI: Alexov Emil (Clemson), Co-Investigator: Shan Zhao. Total budget: \$1,469,495, UA subaward: \$299,120, 4/01/2022 - 2/28/2026. Terminated on 2/29/2024 because the PI at Clemson received another NIH grant.
- **NSF DMS Mathematical Biology program:** DMS-1812930, “Collaborative Research: A regularized Poisson Boltzmann model for fast computation of the ensemble average polar solvation energy”, Lead PI: Shan Zhao, Clemson PI: Alexov Emil, Total budget: \$430,000, UA portion: \$230,000, 8/15/2018 - 7/31/2022.
- **NSF DMS CBMS Conference program:** DMS-1836318, “CBMS Conference: Mathematical Molecular Bioscience and Biophysics”, PI: Shan Zhao, Co-PI: Weihua Geng, \$35,000, 09/01/2018 - 2/29/2020.
- **NSF ICERM Topical Workshop program:** “Computational Aspects of Time Dependent Electromagnetic Wave Problems in Complex Materials”, PI: Vrushali Bokil, Co-PIs: Y. Cheng, S. Hagness, F. Li, F. Teixeira, S. Zhao. \$25,000, 06/25/2018 - 06/29/2018.
- **Simons Foundation Collaboration Grants for Mathematicians program:** Award ID: 524151, “High order operator splitting methods for biomolecular simulations”, PI: Shan Zhao, \$42,000, 09/01/2017 - 08/31/2022. Terminated at 08/31/2019 due to receipt of an NSF research grant.
- **UA Research Stimulation Program (RSP) Award:** “Locally-one-dimensional (LOD) finite difference simulations for complex material interfaces: algorithm and applications”, Single PI, \$87,754; 2014 - 2016.
- **NSF DMS Computational Mathematics Program:** DMS-1318898, “Matched alternating direction implicit (ADI) schemes for solving the nonlinear Poisson-Boltzmann equation with complex dielectric interfaces”, PI: Shan Zhao; Co-PI: Weihua Geng. \$250,000,

08/15/2013 - 08/14/2017.

- **NSF DMS Computational Mathematics Program:** DMS-1016579, “Modeling, algorithms and computation of electromagnetic wave interacting with dispersive interface”, Single PI, \$150,000, 08/15/2010 - 08/01/2014.
- **UA Research Grants Committee (RGC) Award:** “Development of a unified framework for time stepping”, Single PI, \$5,000, 05/15/2010 - 05/14/2012.
- **NSF DMS Computational Mathematics Program:** DMS-0609844, “Fast simulation of wave scattering and propagation in inhomogeneous media with complex geometries”, Single PI, \$73,074, 09/01/2006 - 08/31/2010.
- **NSF DMS Mathematical Biology Program:** DMS-0616704, “Mathematical modeling of biomolecular surfaces”, PI: G.W. Wei; Co-PIs: P. Bates, and S. Zhao, \$303,310, 08/01/2006 - 07/31/2009.

Honors, Awards and Scholarships

- **Leadership Board Fellow**, College of Arts and Sciences, University of Alabama, 2021.
- **Distinguished Paper Award**, International Consortium of Chinese Mathematicians, Dec. 2020. Paper being awarded: “W. Geng and S. Zhao, A two-component Matched Interface and Boundary (MIB) regularization for charge singularity in implicit solvation, *Journal of Computational Physics*, **351**, 25-39, (2017).”
- **Excellence in Academic Advising**, University of Alabama, 2019.
- **Outstanding Reviewer**, Journal of Computational Physics, Elsevier, 2015.
- **Invited Speaker**, 17 national and international conferences.
- **Research Scholarship**, 1999 - 2002, National University of Singapore.
- **Undergraduate Scholarship**, 1993 - 1997, Lanzhou University, China.
- **Success Prize**, Mathematical Modeling Contest, 1996, Gansu Province, China.

Editorial Boards

- **Editor-in-Chief:** Computational and Mathematical Biophysics, (2024 -)
- **Associate Editor:** International Journal of Numerical Analysis and Modeling, (2023 -)
- **Editor:** Journal of Computational Biophysics and Chemistry, (2022 -)
- **Editor:** Computation, (2017 -)
- **Guest Editor:** Communications in Information & Systems, (2018 - 2024)
- **Journal Editor:** Computational and Mathematical Biophysics, (2018 - 2024)
- **Guest Editor:** Mathematical Biosciences and Engineering, (2020 - 2021)
- **Journal Editor:** Molecular Based Mathematical Biology, (2014 - 2017)
- **Associate Editor:** Molecular Based Mathematical Biology, (2012 - 2013)
- **Editor:** Journal of Applied Mathematics, (2011 - 2016)
- **Guest Editor:** The Scientific World Journal, 2014.
- **Guest Editor:** International Journal of Biomedical Imaging, 2010 and 2011.

Professional Activities

- **Funding Proposal Panelist and Reviewer:** NSF Program of Computational Mathematics; NSF Program of Mathematical Biology; NSF Program of Foundations of Emerging Technologies; NSF Program of Geophysics; NSF Program of focused research groups in the mathematical science; NASA EPSCoR Program; National Research and Development Agency (Chile).

- **External Reviewer for Tenure and Promotion:**
 School of Physical and Mathematical Sciences, Nanyang Technological University, Singapore, (2022).
 Department of Mathematics, Oklahoma State University, (2021).
 Department of Mathematics and Statistics, University of North Carolina at Charlotte (2018).
 Department of Mathematics and Statistics, University of Calgary, Canada, (2017).
 Department of Mathematics and Statistics, University of North Carolina at Charlotte (2016).
 Department of Mathematics, Mississippi State University (2014).
- **Conference Organizer:**
Chair, Annual University of Alabama System Applied Mathematics Joint Meeting, University of Alabama, 2016, 2019, 2023.
Chair, NSF-CBMS Conference on Mathematical Molecular Bioscience and Biophysics, The University of Alabama, May 13 - 17, 2019.
Co-Organizer, SIAM Conference on the Life Sciences, Minneapolis, August 6 - 9, 2018.
Co-Organizer, ICREM Workshop on Computational Aspects of Time Dependent Electromagnetic Wave Problems in Complex Materials, Brown University, June 25 - 29, 2018.
- **Minisymposium Organizer:** for 13 national and international conferences.
- **Online Seminar Organizer:**
 Online biweekly seminar on Mathematical Molecular Bioscience, Sept. 2022 - May 2023
 Online biweekly seminar on Mathematical Molecular Bioscience and Biophysics, May 2021 - May 2022
- **Reviewer:** for 63 Journals and MathSciNet

- **Member:**
 Society for Industrial and Applied Mathematics (SIAM).
 American Mathematical Society (AMS).
- **Community Service:**
 Tuscaloosa MATHSCOUNTS Chapter Committee (2019 - 2022).
 Volunteer, Math coach, Eastwood Middle School, Cottondale, AL. 2022
 Judge, UA STEM Showcase, Feb. 2021.
- **External Committee Service:**
 Self-Review Committee, UAH Department of Mathematics, 2021.
 International Advisory Committee, International Conference on Mathematical Modeling and Scientific Computing (ICMMS-2018), July, 2018, IIT Indore, Indore, India.
- **University Committee Service:**
 UA-UAB-UAH Joint Applied Mathematics PhD Program Committee, Chair (2016 - 2017, 2019 - 2021, 2023 - 2024) and Permanent member (2014 -).
 UA Academic Program Review Council, (2022 -)
 UA Faculty Senate Alternate, (2020 - 2022).
 Founding Faculty Advisor, Badminton Club of the University of Alabama, (2011 - 2020).
 UA Research Grants Committee, (2014 - 2017).
 Undergraduate Research Judge, Undergraduate Research/Creative Activity Poser and Oral Presentation Competitions, April 9, 2007.
- **College of Arts and Sciences Committee Service:**

Academy for Undergraduate Research of the College of Arts and Sciences, (2014 - 2019)
Diversity Committee of the College of Arts and Sciences, (2014 - 2017)

- **Departmental Committee Service:**

Departmental High-Performance Computing Committee (Chair), 2022 -
Departmental Long Range Planning Committee, 2017 -
Departmental Colloquium Committee (Chair), 2015 -
Graduate Admission and Scholarship Committee, 2015 -
Department Tenure, Promotion, and Retention Committee, 2012 -
Department RCAP/FTTI Hiring Committee (Chair), Summer 2023.
Department Hiring Committee, 2020 - 2021
Department Hiring Committee (Chair), 2019 - 2020
Math 238 Course Coordinator, Fall 2018.
Calculus II Course Coordinator, Fall 2017.
Department Hiring Committee (Chair), 2016 - 2017
Applied Math Seminar Coordinator, 2014 - 2017
Applied Math Tracks committee, 2016.
Math Department Chair Searching Committee, 2014 - 2015
Math Servers Upgrade Committee (Chair), 2014.
Department Hiring Committee, 2012 - 2013.
Department Graduate Course Committee, Fall, 2012
Department Hiring Committee, 2011 - 2012.
Department Hiring Committee, 2010 - 2011.
Department Hiring Committee, 2009 - 2010.
Committee for Calculus I Pilot Program, Spring, 2009.

Advising and Supervision

- **Host of long term visitors:**

Prof. Yang Li, Department of Accounting, China Women's University, Beijing, China.
(Jan. 2020 - Dec. 2020).
Prof. Lunji Song, School of Mathematics and Statistics, Lanzhou University, China. (July
2014 – Aug. 2015).
Prof. Guangqing Long, School of Mathematics Sciences, Guangxi Teachers Education
University, China. (Dec. 2012 – June 2013).

- **Postdoctoral Advisor**

Dr. Lunji Song, Department of Mathematics, University of Alabama, Aug. 2015 - Aug.
2016
Dr. Chuan Li, Department of Mathematics, University of Alabama, Aug. 2014 - Aug.
2015
Dr. Can Li, Beijing Computational Science Research Center, China. 2014.

- **Math Major Undergraduate Advisor**

11 students, spring 2024
13 students, fall 2023
8 students, spring 2023
9 students, fall 2022
13 students, spring 2022
16 students, fall 2021

17 students, spring 2020

29 students, fall 2019

- **Undergraduate Research Mentor**

Ryan Engle, Major in Mathematics, University of Alabama, Spring 2024

Aidan Winiewicz, Major in Mathematics, University of Alabama, Spring 2022

Evan Abel, Major in Mathematics, University of Alabama, Aug. 2020 – Dec. 2020

Benjamin Jones, Major in Mathematics, University of Alabama, Aug. 2017 – July 2020

David Hanggi, Major in Physics, University of Alabama, Jan. 2019 – May 2019

Qiangang Fu, Major in Mathematics, University of Alabama, Jan. 2017 – May 2017

Joseph Gallagher, Major in Mathematics, University of Alabama, Oct. 2015 – May 2017

Andrew W. Davis, Major in Mathematics, University of Alabama, Oct. 2015 – Sept. 2016

Leighton Wilson, Major in Mathematics, University of Alabama, August 2012 – May 2015

Christ Gutturomsson, Major in Mathematics, University of Alabama, 2014 - 2015

Robin Wu, double major in Chemical Engineering and Mathematics, University of Alabama, 2010

- **PhD Committee Chair:**

Matthias Dogbatsey, Department of Mathematics, University of Alabama, 2023 –

Idowu Ijaodoro, Department of Mathematics, University of Alabama, 2022 –

Sylvia Amihere, Department of Mathematics, University of Alabama, 2020 –

Yimin Ren, Department of Mathematics, University of Alabama, 2020 –

Siwen Wang, Department of Mathematics, University of Alabama, Graduated May 2021.

Hongsong Feng, Department of Mathematics, University of Alabama, Graduated May 2021.

Sheik A. Ullah, Department of Mathematics, University of Alabama, Graduated August 2019.

Zhihan Wei, Department of Mathematics, University of Alabama, Graduated December 2018.

Tania Hazra, Department of Mathematics, University of Alabama, Graduated August 2018.

Duc Nguyen, Department of Mathematics, University of Alabama, Graduated August 2015.

Wufeng Tian, Department of Mathematics, University of Alabama, Graduated August 2014.

Pengfei Yao, Department of Mathematics, University of Alabama, Graduated August 2011.

- **MSc Committee Chair:**

Mark McGowan, Department of Mathematics, University of Alabama, Graduated May 2022.

Benjamin Jones, Department of Mathematics, University of Alabama, Graduated May 2021.

Arum Lee, Department of Mathematics, University of Alabama, Graduated May 2019.

Leighton Wilson, Department of Mathematics, University of Alabama, Graduated May 2015.

Guoqiao Wang, Department of Mathematics, University of Alabama, Graduated May 2010.

- **PhD Committee Member:** 30 students

- **MSc Committee Member:** 23 students
- **External Examiner of PhD Dissertation:** 3 students

Teaching

- **University of Alabama**

- Spring 2024, Math 311, Introduction to Scientific Computing and Problem Solving, 26 students
- Spring 2024, Math 537, Topics in Applied Mathematics, 14 students
- Spring 2024, Math 598, Non-Dissertation Research, 2 students
- Spring 2024, Math 698, Non-Dissertation Research, 1 student
- Spring 2024, Math 699, Dissertation Research, 2 students
- Fall 2023, Math 311, Introduction to Scientific Computing and Problem Solving, 28 students
- Fall 2023, Math 598, Non-Dissertation Research, 2 students
- Fall 2023, Math 699, Dissertation Research, 2 students
- Spring 2023, Math 510, Numerical Linear Algebra, 8 students
- Spring 2023, Math 598, Non-Dissertation Research, 2 students
- Spring 2023, Math 699, Dissertation Research, 2 students
- Fall 2022, Math 610, Iterative Methods for Sparse Linear Systems, 2 students
- Fall 2022, Math 699, Dissertation Research, 2 students
- Spring 2022, Math 355, Theory of Probability, 22 students
- Spring 2022, Math 410, Numerical Linear Algebra, 27 students
- Spring 2022, Math 598, Non-Dissertation Research, 1 student
- Spring 2022, Math 699, Dissertation Research, 3 students
- Fall 2021, Math 511, Numerical Analysis I, 7 students
- Fall 2021, Math 238, Differential Equations I, 20 students
- Fall 2021, Math 598, Non-Dissertation Research, 1 student
- Fall 2021, Math 698, Non-Dissertation Research, 1 student
- Fall 2021, Math 699, Dissertation Research, 1 student
- Spring 2021, Math 611, Numerical Methods for PDEs, 5 students
- Spring 2021, Math 598, Non-Dissertation Research, 1 student
- Spring 2021, Math 599, Thesis Research, 1 student
- Spring 2021, Math 698, Non-Dissertation Research, 1 student
- Spring 2021, Math 699, Dissertation Research, 2 students
- Fall 2020, Math 598, Non-Dissertation Research, 2 students
- Fall 2020, Math 698, Non-Dissertation Research, 1 student
- Fall 2020, Math 699, Dissertation Research, 2 students
- Spring 2020, Math 512, Numerical Analysis II, 9 students
- Spring 2020, Math 699, Dissertation Research, 2 students
- Fall 2019, Math 511, Numerical Analysis I, 14 students
- Fall 2019, Math 343, Applied Differential Equations II, 14 students
- Fall 2019, Math 699, Dissertation Research, 2 students
- Spring 2019, Math 300-001, Introduction to Numerical Analysis, 10 students
- Spring 2019, Math 300-002, Introduction to Numerical Analysis, 25 students
- Spring 2019, Math 598 Non-Dissertation Research, 1 student
- Spring 2019, Math 698 Non-Dissertation Research, 1 student
- Spring 2019, Math 699 Dissertation Research, 3 students

Fall 2018, Math 238, Differential Equations I, 54 students
Fall 2018, Math 611, Numerical Methods for PDEs, 5 students
Fall 2018, Math 699, Dissertation Research, 5 students
Spring 2018, Math 301, Discrete Mathematics, 30 students
Spring 2018, Math 410/510-002 Numerical Linear Algebra, 21+9 students
Spring 2018, Math 698 Non-Dissertation Research, 3 student
Spring 2018, Math 699 Dissertation Research, 3 students
Fall 2017, Math 126-001 Calculus II, 185 students
Fall 2017, Math 126-002 Calculus II, 185 students
Fall 2017, Math 698 Non-Dissertation Research, 2 student
Fall 2017, Math 699 Dissertation Research, 3 students
Spring 2017, Math 300-001 Introduction to Numerical Analysis, 50 students
Spring 2017, Math 512-001 Numerical Analysis II, 11 students
Spring 2017, Math 499 Undergraduate Research Experience, 1 student
Spring 2017, Math 698 Non-Dissertation Research, 1 student
Spring 2017, Math 699 Dissertation Research, 2 students
Fall 2016, Math 125-002 Calculus I, 96 students
Fall 2016, Math 125-003 Calculus I, 116 students
Fall 2016, Math 499 Undergraduate Research Experience, 1 student
Fall 2016, Math 698 Non-Dissertation Research, 1 student
Fall 2016, Math 699 Dissertation Research, 2 students
Spring 2016, Math 237-002, Introduction to Linear Algebra, 55 students
Spring 2016, Math 410/510-001 Numerical Linear Algebra, 34+10 students
Spring 2016, Math 499 Undergraduate Research Experience, 2 students
Spring 2016, Math 699 Dissertation Research, 2 students
Fall 2015, Math 125-002 Calculus I, 72 students
Fall 2015, Math 125-003 Calculus I, 72 students
Fall 2015, Math 698-003 Non-Dissertation Research, 2 students
Spring 2015, Math 125-005 Calculus I, 68 students
Spring 2015, Math 512-002 Numerical Analysis, 15 students
Spring 2015, Math 599 Thesis Research, 1 student
Spring 2015, Math 699 Dissertation Research, 1 student
Fall 2014, Math 237-005 Introduction to Linear Algebra, 40 students
Fall 2014, Math 237-006 Introduction to Linear Algebra, 37 students
Fall 2014, Math 599 Thesis Research, 1 student
Fall 2014, Math 699 Dissertation Research, 1 student
Spring 2014, Math 699 Dissertation Research, 2 students
Fall 2013, Math 699 Dissertation Research, 2 students
Spring 2013, Math 512 Numerical Analysis II, 11 students
Spring 2013, Math 699 Dissertation Research, 2 students
Fall 2012, Math 125 Calculus I, 88 students
Fall 2012, Math 300 Introduction to Numerical Analysis, 33 students
Fall 2012, Math 698 Non-Dissertation Research, 2 students
Fall 2012, Math 699 Dissertation Research, 1 students
Spring 2012, Math 512 Numerical Analysis II, 4 students
Spring 2012, Math 410 Numerical Linear Algebra, 25 students

Spring 2012, Math 698 Non-Dissertation Research, 2 students
 Spring 2012, Math 699 Dissertation Research, 2 students
 Fall 2011, Math 247 Honors Calculus III, 38 students
 Fall 2011, Math 238 Applied Differential Equations, 33 students
 Fall 2011, Math 699 Dissertation Research, 1 student
 Spring 2011, Math 512 Numerical Analysis II, 10 students
 Spring 2011, Math 237 Introduction to Linear Algebra, 31 students
 Spring 2011, Math 699 Dissertation Research, 2 students
 Fall 2010, Math 411/511 Numerical Analysis I, 14+16 students
 Fall 2010, Math 126 Calculus II, 43 students
 Fall 2010, Math 699 Dissertation Research, 2 students
 Spring 2010, Math 125 Calculus I, 66 students
 Spring 2010, Math 300 Introduction to Numerical Analysis, 27 students
 Spring 2010, Math 699 Dissertation Research, 2 students
 Fall 2009, Math 237 Applied Matrix Theory, 33 students
 Fall 2009, Math 238 Applied Differential Equations, 28 students
 Fall 2009, Math 699 Dissertation Research, 2 students
 Spring 2009, Math 125 Calculus I, 38 students
 Spring 2009, Math 238 Applied Differential Equations, 28 students
 Spring 2009, Math 699 Dissertation Research, 2 students
 Fall 2008, Math 125 Calculus I, 29 students
 Fall 2008, Math 238 Applied Differential Equations, 23 students
 Spring 2008, Math 126 Calculus II, 28 students,
 Spring 2008, Math 300 Introduction to Numerical Analysis, 29 students
 Fall 2007, Math 125 Calculus I, 20 students
 Fall 2007, Math 238 Applied Differential Equations, 28 students
 Spring 2007, Math 300 Introduction to Numerical Analysis, 22 students
 Spring 2007, Math 410/510 Numerical Linear Algebra, 13+7 students
 Fall 2006, Math 125 Calculus I, 27 students

- **Michigan State University**

MTH 132, Calculus I, Fall 2003, Fall 2004, and Fall 2005.

MTH 235, Differential Equations, Spring 2004, Spring 2005, and Spring 2006.

- **National University of Singapore**

Teaching Assistant: Numerical Methods I, 2000; Scientific Problem Solving and Computation, 2000, 2001; Symbolic Computation, 2001; Computational Techniques for Quantum Systems, 2002;

Mentor: Two honors projects; Four undergraduate research projects.

Journal Publications

- [1] G.W. Wei, and S. Zhao, Synchronization and information processing by an on-off coupling. *Physical Review E*, **65**, 056210, (2002).
- [2] S. Zhao and G.W. Wei, Comparison of the discrete singular convolution and three other numerical schemes for solving Fisher's equation. *SIAM Journal on Scientific Computing*, **25**, 127-147, (2003).

- [3] Z.H. Shao, G.W. Wei, and S. Zhao, DSC time-domain solution of Maxwell's equations. *Journal of Computational Physics*, **189**, 427-453, (2003).
- [4] S. Zhao and G.W. Wei, Jump process for the trend estimation of time series. *Computational Statistics and Data Analysis*, **42**, 219-241, (2003).
- [5] G. Bao, G.W. Wei, and S. Zhao, Local spectral time-domain method for electromagnetic wave propagation. *Optics Letters*, **28**, 513-515, (2003).
- [6] G. Bao, G.W. Wei, and S. Zhao, Numerical solution of the Helmholtz equation with high wavenumbers. *International Journal for Numerical Methods in Engineering*, **59**, 389-408, (2004).
- [7] S. Zhao and G.W. Wei, Tensor product derivative matching for wave propagation in inhomogeneous media. *Microwave and Optical Technology Letters*, **43**, 69-77, (2004).
- [8] S. Zhao and G.W. Wei, High-order FDTD methods via derivative matching for Maxwell's equations with material interfaces. *Journal of Computational Physics*, **200**, 60-103, (2004).
- [9] S. Zhao, G.W. Wei and X. Yang, DSC analysis of free-edged beams by an iteratively matched boundary method. *Journal of Sound and Vibration*, **284**, 487-493, (2005).
- [10] S.N. Yu, S. Zhao, and G.W. Wei, Local spectral time-splitting method for first and second order partial differential equations. *Journal of Computational Physics*, **206**, 727-780, (2005).
- [11] S. Zhao and G.W. Wei, Option valuation by using discrete singular convolution. *Applied Mathematics and Computation*, **167**, 383-418, (2005).
- [12] Y.C. Zhou, S. Zhao, M. Feig, and G.W. Wei, High order matched interface and boundary method for elliptic equations with discontinuous coefficients and singular sources, *Journal of Computational Physics*, **213**, 1-30, (2006).
- [13] Ge Wang, Haiou Shen, Wenxiang Cong, Shan Zhao, and G.W. Wei, Temperature modulated bioluminescence tomography, *Optics Express*, **14(17)**, 7852-7871, (2006).
- [14] G.W. Wei and S. Zhao, On the validity of "A proof that the discrete singular convolution (DSC)/Lagrange-distributed approximation function (LDAF) method is inferior to high order finite differences", *Journal of Computational Physics*, **226**, 2389-2392, (2007).
- [15] S. Zhao, On the spurious solutions in the high-order finite difference methods, *Computer Methods in Applied Mechanics and Engineering*, **196**, 5031-5046, (2007).
- [16] P. Bates, G.W. Wei, and S. Zhao, Minimal molecular surfaces and their applications, *Journal of Computational Chemistry*, **29**, 380-391, (2008).
- [17] S. Zhao, Full-vectorial matched interface and boundary (MIB) method for the modal analysis of dielectric waveguides, *IEEE/OSA Journal of Lightwave Technology*, **26**, 2251-2259, (2008).

- [18] S. Zhao and G.W. Wei, Matched interface and boundary (MIB) for the implementation of boundary conditions in high-order central finite differences, *International Journal for Numerical Methods in Engineering*, **77**, 1690-1730, (2009).
- [19] S. Rosencrans, X. Wang, W. Winter, and S. Zhao, Measuring the insulating ability of anisotropic thermal conductors via principal Dirichlet eigenvalue, *European Journal of Applied Mathematics*, **20**, 231-246, (2009).
- [20] S. Zhao, High order vectorial analysis of waveguides with curved dielectric interfaces, *IEEE Microwave and Wireless Components Letters*, **19**, 266-268, (2009).
- [21] P. Bates, Z. Chen, Y. Sun, G.W. Wei, and S. Zhao, Geometric and potential driving formation and evolution of biomolecular surfaces, *Journal of Mathematical Biology*, **59**, 193-231, (2009).
- [22] S. Zhao, High order matched interface and boundary methods for the Helmholtz equation in media with arbitrarily curved interfaces, *Journal of Computational Physics*, **229**, 3155-3170, (2010).
- [23] S. Zhao, A fourth order finite difference method for waveguides with curved perfectly conducting boundaries, *Computer Methods in Applied Mechanics and Engineering*, **199**, 2655-2662, (2010).
- [24] S. Zhao, High order FDTD methods for transverse electromagnetic systems in dispersive inhomogeneous media, *Optics Letters*, **36**, 3245-3247, (2011).
- [25] Pengfei Yao and S. Zhao, A new boundary closure scheme for the multiresolution time-domain (MRTD) method, *IEEE Transaction on Antennas and Propagation*, **59**, 3305-3312, (2011).
- [26] S. Zhao, Pseudo-time coupled nonlinear models for biomolecular surface representation and solvation analysis, *International Journal for Numerical Methods in Biomedical Engineering*, **27**, 1965-1981, (2011).
- [27] Zhan Chen, S. Zhao, Jaehun Chun, Dennis G. Thomas, Nathan A. Baker, Peter W. Bates, and G.W. Wei, Variational approach for nonpolar solvation analysis, *Journal of Chemical Physics*, **137**, 084101, (2012).
- [28] Weihua Geng and S. Zhao, Fully implicit ADI schemes for solving the nonlinear Poisson-Boltzmann equation, *Molecular Based Mathematical Biology*, **1**, 109-123, (2013).
- [29] Steve Rosencrans, Xuefeng Wang, and S. Zhao, Estimating eigenvalues of an anisotropic thermal tensor from transient thermal probe measurements, *Discrete and Continuous Dynamical Systems*, **33**, 5441-5455, (2013).
- [30] L. Mu, J. Wang, G.W. Wei, X. Ye, and S. Zhao, Weak Galerkin methods for second order elliptic interface problems, *Journal of Computational Physics*, **250**, 106-125, (2013).
- [31] S. Zhao, Operator splitting ADI schemes for pseudo-time coupled nonlinear solvation simulations, *Journal of Computational Physics*, **257**, 1000-1021, (2014).

- [32] Duc D. Nguyen and S. Zhao, High order FDTD methods for transverse magnetic modes with dispersive interfaces, *Applied Mathematics and Computation*, **226**, 699-707, (2014).
- [33] L. Mu, J. Wang, X. Ye, and S. Zhao, A numerical study on the weak Galerkin method for the Helmholtz equation, *Communication in Computational Physics*, **15**, 1461-1479, (2014).
- [34] Wufeng Tian and S. Zhao, A fast ADI algorithm for geometric flow equations in biomolecular surface generation, *International Journal for Numerical Methods in Biomedical Engineering*, **30**, 490-516, (2014).
- [35] S. Zhao and G.W. Wei, A unified discontinuous Galerkin framework for time integration, *Mathematical Methods in the Applied Sciences*, **37**, 1042-1071, (2014).
- [36] Duc D. Nguyen and S. Zhao, Time-domain matched interface and boundary (MIB) modeling of Debye dispersive media with curved interfaces, *Journal of Computational Physics*, **278**, 298-325, (2014).
- [37] S. Zhao, A matched alternating direction implicit (ADI) method for solving the heat equation with interfaces, *Journal of Scientific Computing*, **63**, 118-137, (2015).
- [38] Duc D. Nguyen and S. Zhao, A new high order dispersive FDTD method for Drude material with complex interfaces, *Journal of Computational and Applied Mathematics*, **285**, 1-14, (2015).
- [39] W. Deng, X. Zhufu, J. Xu, and S. Zhao, A new discontinuous Galerkin method for the nonlinear Poisson-Boltzmann equation, *Applied Mathematics Letters*, **49**, 126-132, (2015).
- [40] Can Li and S. Zhao, Efficient numerical schemes for fractional water wave models, *Computers and Mathematics with Applications*, **71**, 238-254, (2016).
- [41] Y. Zhang, D.D. Nguyen, K. Du, J. Xu, and S. Zhao, Time-domain numerical solutions of Maxwell interface problems with discontinuous electromagnetic waves, *Advances in Applied Mathematics and Mechanics*, **8**, 353-385, (2016).
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- [48] L. Song and S. Zhao, Symmetric interior penalty Galerkin approaches for two-dimensional parabolic interface problems with low regularity solutions, *Journal of Computational and Applied Mathematics*, **330**, 356-379, (2018).
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- [59] H. Feng and S. Zhao, FFT-based high order central difference schemes for three-dimensional Poisson's equation with various types of boundary conditions, *Journal of Computational Physics*, **410**, 109391, (2020).
- [60] S. Ahmed Ullah and S. Zhao, Pseudo-transient ghost fluid methods for the Poisson-Boltzmann equation with a two-component regularization, *Applied Mathematics and Computation*, **380**, 125267, (2020).
- [61] C. Li, Z. Wei, G. Long, C. Campbell, S. Ashlyn, and S. Zhao, Alternating direction ghost-fluid methods for solving the heat equation with interfaces, *Computers and Mathematics with Applications*, **80**, 714-732,(2020).
- [62] H. Feng and S. Zhao, A fourth order finite difference method for solving elliptic interface problems with the FFT acceleration, *Journal of Computational Physics*, **419**, 109677, (2020).
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- [65] H. Feng, G. Long, and S. Zhao, FFT-based high order central difference schemes for Poisson's equation with staggered boundaries, *Journal of Scientific Computing*, **86**, 7, (2021).
- [66] S. Wang, E. Alexov, and S. Zhao, On regularization of charge singularities in solving the Poisson-Boltzmann equation with a smooth solute-solvent boundary, *Mathematical Biosciences and Engineering*, **18(2)**, 1370 - 1405, (2021).
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- [68] K. Liu, L. Song, and S. Zhao, A new over-penalized weak Galerkin method. Part I: Second order elliptic problems, *Discrete and Continuous Dynamical Systems Series B*, **26**, 2411-2428, (2021).
- [69] C. Li, G. Long, Y. Li, and S. Zhao, Alternating Direction Implicit (ADI) Methods for Solving Two Dimensional Parabolic Interface Problems with Variable Coefficients, *Computation*, **9(7)**, 79, (2021).
- [70] H. Feng and S. Zhao, A multigrid based finite difference method for solving parabolic interface problem, *Electronic Research Archive*, **29**, 3141-3170, (2021).
- [71] Yiming Ren, Hongsong Feng, and Shan Zhao, A FFT accelerated high order finite difference method for elliptic boundary value problems over irregular domains, *Journal of Computational Physics*, **448**, 110762, (2022).

- [72] T. Hazra and S. Zhao, Physics-guided multiple regression analysis for calculating electrostatic free energies of proteins in different reference states, *Communications in Information & Systems*, **22**, 187-221, (2022).
- [73] Siwen Wang, Yuanzhen Shao, Emil Alexov, and Shan Zhao, A regularization approach for solving the super-Gaussian Poisson-Boltzmann model with heterogeneous dielectric functions, *Journal of Computational Physics*, **464**, 111340, (2022).
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- [76] Y. Ren and S. Zhao, A FFT accelerated fourth order finite difference method for solving three-dimensional elliptic interface problems, *Journal of Computational Physics*, **477**, 111924, (2023).
- [77] C. Li, Y. Ren, G. Long, E. Boerman, and S. Zhao, A fast Sine transform accelerated high order finite difference method for parabolic problems over irregular domains, *Journal of Scientific Computing*, **95**, 49, (2023).
- [78] S. Zhao, I. Ijaodoro, M. McGowan, and E. Alexov, Calculation of electrostatic free energy for the nonlinear Poisson-Boltzmann model based on the dimensionless potential, *Journal of Computational Physics*, **497**, 112634, (2024).
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- [80] Y. Ren, S. Amihere, W. Geng, and S. Zhao, Comparison of three matched interface and boundary (MIB) schemes for solving the nonlinear Poisson-Boltzmann equation, *Communications in Information & Systems*, accepted, (2024)

Preprints

- [1] H. Yang, S. Zhao, and G. Long, A MAC grid based FFT-AMIB solver for incompressible Stokes flows with interfaces and singular forces, submitted, (2024)
- [2] Y. Shao, Z. Chen, and S. Zhao, Modeling and analysis of ensemble average solvation energy and solute-solvent interfacial fluctuations, submitted, (2024).
- [3] Y. Shao, Z. Chen, and S. Zhao, A p-Laplacian approach and its analysis for the calculation of ensemble average solvation energy, submitted, (2024).
- [4] Y. Ren and S. Zhao, A fourth order multigrid method for solving elliptic interface problems with variable coefficients, submitted, (2024).

- [5] C. Li, S. Zhao, B. Pentecost, Y. Ren, and Z. Guan, A fourth-order Cartesian grid method with FFT acceleration for elliptic and parabolic problems on irregular domains and arbitrarily curved boundaries, preprint, (2024)

Conference Publications and Non-peer-reviewed Journal Publications

- [1] S. Zhao, and G.W. Wei, The discrete singular convolution for pricing the European and American options, Proceedings of Second International ICSC Symposium on Computational Intelligence: Methods and Applications, L.I. Kuncheva, ed., ICSC Academic Press, Canada/The Netherlands, pp. 387-393, (2001).
- [2] G. Bao, G.W. Wei, and S. Zhao, A new algorithm for solving the Helmholtz equation with high wavenumbers, Proceeding of the third International Workshop on Scientific Computing and Applications, ed. by Y.Y. Lu, W.W. Sun, and T. Tang, Science Press, Beijing, pp. 55-67, (2004).
- [3] G. Bao, G.W. Wei, and S. Zhao, A wavelet-collocation approach for computational electromagnetics, Proceeding of the 20th Annual Review of Progress in Applied Computational Electromagnetics, Paper No. 92004100466, (2004).
- [4] G. Bao, G.W. Wei, and S. Zhao, A wavelet-collocation method for solving the Helmholtz equation with high wavenumbers, Proceeding of the 20th Annual Review of Progress in Applied Computational Electromagnetics, Paper No. 92004100467, (2004).
- [5] S. Zhao and G.W. Wei, High-order FDTD methods via derivative matching for electromagnetic computation involving material interfaces, Proceeding of the 20th Annual Review of Progress in Applied Computational Electromagnetics, Paper No. 92004100468, (2004).
- [6] G.W. Wei, Lalita Udpa, Yang Wang, and S. Zhao, Editorial: Mathematical Methods for Images and Surfaces, *International Journal of Biomedical Imaging*, **2010**, 918467, (2010).
- [7] Weihong Guo, Lalita Udpa, Yang Wang, G.W. Wei, and S. Zhao, Editorial: Mathematical Methods for Images and Surfaces 2011, *International Journal of Biomedical Imaging*, **2012**, 419647, (2012).
- [8] Y.-B. Yuan, Y.D. Gao, and S. Zhao, Editorial: Machine learning in intelligent video and automated monitoring, *The Scientific World Journal*, **2015**, 570145, (2015).
- [9] Fengzhu Sun, Guowei Wei, Stephen S.-T. Yau, and Shan Zhao, Preface: Special issue on bioinformatics and biophysics in honor of professor Michael Waterman on his 80th birthday, *Communications in Information and Systems*, **22**, 303-304, (2022).

Software Packages

- Regularized Matched Interface and Boundary Poisson-Boltzmann Solver. <https://s2.smu.edu/wgeng/research/rMIB.html> (2018).
- Nonlinear electrostatic free energy of a Kirkwood sphere. https://szhao.people.ua.edu/uploads/9/0/8/4/90844682/npb_kirkwood_energy.m (2022).

Meetings and Symposia

- AMS Southeastern Sectional Meeting, Florida State University, March 23 - 24, 2024.
- The 35th Annual University of Alabama System Applied Mathematics Joint Meeting, University of Alabama, Nov. 11, 2023.
- The 8th Annual Meeting of SIAM Central States Section, University of Nebraska - Lincoln, October 7 - 8, 2023.
- AMS Southeastern Sectional Meeting, Georgia Institute of Technology, March 18 - 19, 2023.
- The 34th Annual University of Alabama System Applied Mathematics Joint Meeting, University of Alabama at Huntsville, Nov. 5, 2022.
- AMS Southeastern Sectional Meeting, University of Tennessee at Chattanooga, Oct. 15 - 16, 2022.
- SIAM Conference on the Life Sciences, Pittsburgh, July 11 - 14, 2022.
- The Second International Conference on Computational Methods and Applications in Engineering, Mississippi State University, May 7 - 8, 2022.
- American Chemical Society (ACS) Spring Meeting, San Diego, March 20 - 24, 2022.
- The Fourth Conference on Computational and Mathematical Bioinformatics and Biophysics (online), Tsinghua Sanya International Mathematics Forum, Sanya, China, Dec. 12 - 15, 2021.
- The 33rd Annual University of Alabama System Applied Mathematics Joint Meeting, University of Alabama at Birmingham, Nov. 6, 2021.
- Conference on Fast Direct Solvers (Online), Purdue University, October 23 - 24, 2021.
- The 44th SIAM Southeastern Atlantic Section (SEAS) conference, Auburn University, September 18 - 19, 2021.
- The Third Conference on Computational and Mathematical Bioinformatics and Biophysics (online), Tsinghua Sanya International Mathematics Forum, Sanya, China, Dec. 20 - 24, 2020.
- The 3rd Annual Symposium of Southeast Center for Mathematics and Biology (online), Georgia Institute of Technology, Dec. 7 - 10, 2020.
- Workshop on Numerical Algorithms and Their Applications in Big Data Science (online), Lanzhou University, China, August 1 - 2, 2020.
- The 2nd Annual Symposium of Southeast Center for Mathematics and Biology, Georgia Institute of Technology, Feb. 17 - 18, 2020.
- The 32nd Annual University of Alabama System Applied Mathematics Joint Meeting, University of Alabama, Nov. 16, 2019.
- Conference on Computational Mathematics and Applications (CCMA), University of Nevada, Las Vegas, USA, October 25 - 27, 2019.
- The 43rd annual meeting of the SIAM Southeastern Atlantic Section, University of Tennessee - Knoxville, USA, Sept. 20 - 22, 2019.
- Advanced Numerical Methods for Scientific Computation, Southern University of Science and Technology, Shenzhen, China, June 15 - 17, 2019.
- International Conference on Mathematical Modeling and Numerical Methods, Qingdao, China, May 30 - June 2, 2019
- NSF-CBMS Conference on Mathematical Molecular Bioscience and Biophysics, The University of Alabama, May 13 - 17, 2019.
- 31th Annual University of Alabama System Applied Mathematics Joint Meeting, Univer-

- sity of Alabama, Huntsville, Nov. 10, 2018.
- SIAM Conference on the Life Sciences, Minneapolis, August 6 - 9, 2018.
 - Computational Aspects of Time Dependent Electromagnetic Wave Problems in Complex Materials, ICERM, Brown University, June 25 - 29, 2018
 - Mathematics in Action (MiA2018): Modeling and analysis in molecular biology and electrophysiology, Suzhou, China, June 16 - 18, 2018.
 - Modeling, Analysis, Simulations and Applications of Inter-Facial Dynamics and FSI Problems, Tsinghua Sanya International Mathematics Forum, Sanya, China, June 4 - 8, 2018.
 - 30th Annual University of Alabama System Applied Mathematics Joint Meeting, University of Alabama at Birmingham, Nov. 4, 2017.
 - The 3rd Annual Meeting of SIAM Central States Section, Colorado State University, Sept. 29 - Oct. 1, 2017.
 - Workshop of Mathematics Biophysics and Molecular Biosciences, Tsinghua Sanya International Mathematics Forum, Sanya, China, Dec. 19 - 23, 2016.
 - 20th IMACS World Congress, Xiamen, China, Dec. 10 - 14, 2016.
 - 29th Annual University of Alabama System Applied Mathematics Joint Meeting, University of Alabama, Nov. 5, 2016.
 - The second Annual Meeting of SIAM Central States Section, University of Arkansas at Little Rock, Sept. 30 - Oct. 2, 2016.
 - SIAM Conference on the Life Sciences, Boston, July 11 - 14, 2016.
 - The Tenth International Conference on Scientific Computing and Applications, Fields Institute, Toronto, Canada, June 6 - 10, 2016.
 - 40th Annual SIAM Southeastern Atlantic Section Conference, University of Georgia, March 12 - 13, 2016.
 - 28th Annual University of Alabama System Applied Mathematics Joint Meeting, University of Alabama, Huntsville, Nov. 7, 2015.
 - Geometric and Topological Modeling of Biomolecules, Mathematical Biosciences Institute, Ohio State University, Sept. 28 - Oct. 2, 2015.
 - Mathematics of Biological Charge Transport: Molecules and Beyond, Institute for Mathematics and its Applications, University of Minnesota, July 20-24, 2015.
 - International Conference on Computational Mathematics and Sciences, Xi'an Jiaotong University, China, June 6-8, 2015.
 - 1st Annual Meeting of SIAM Central States Section, Missouri University of Science and Technology, April 11-12, 2015.
 - 39th Annual SIAM Southeastern Atlantic Section Conference, University of Alabama at Birmingham, March 20-22, 2015.
 - 27th Annual University of Alabama System Applied Mathematics Joint Meeting, University of Alabama, Birmingham, Nov. 8, 2014.
 - Ninth Mississippi State Conference on Differential Equations & Computational Simulations, Mississippi State University, Oct. 23 - 25, 2014.
 - SIAM Conference on the Life Sciences, Charlotte, NC, August 4 - 7, 2014.
 - Fourth Workshop on Recent Advances on Spectral Methods and Related Applications, Xiamen University, China, Nov. 2 - 4, 2013.
 - New Mathematical Developments Arising from Ecology, Epidemiology and Environmental Science, Beijing International Center for Mathematical Research, Beijing, China, Oct. 17 - 20, 2013.

- South Central Conference on Advanced Numerical Methods and Applications, University of Arkansas at Little Rock, April 5 - 7, 2013.
- Mathematical Challenges in Biomolecular/Biomedical Imaging and Visualization, Mathematical Biosciences Institute, Ohio State University, Feb. 17 - 22, 2013.
- 25th Annual University of Alabama System Applied Mathematics Joint Meeting, University of Alabama, Huntsville, Nov. 3, 2012.
- Ninth Mississippi State - UAB Conference on Differential Equations & Computational Simulations, Mississippi State University, Oct. 4 - 6, 2012.
- The Society for Mathematical Biology Annual Meeting and Conference, NIMBioS, University of Tennessee, Knoxville, July 25 - 28, 2012.
- Workshop on Applied Mathematics and Scientific Computing, Lanzhou University, China, June 1 - 2, 2012.
- The second international conference on scientific computing (ICSC12), Nanjing, China, May 22-25, 2012.
- Eighth International Conference on Scientific Computing and Applications, University of Nevada, Las Vegas, April 1 - 4, 2012.
- 36th Annual SIAM Southeastern Atlantic Section Conference, University of Alabama in Huntsville, March 24 - 25, 2012.
- 24th Annual University of Alabama System Applied Mathematics Joint Meeting, University of Alabama, Birmingham, Nov. 5, 2011.
- 2011 Differential equations weekend conference, Mississippi State University, May 7, 2011.
- Modeling and computation of biomolecular structure and dynamics, Mathematical Biosciences Institute, Ohio State University, April 25 - 29, 2011.
- SIAM Conference on Computational Science and Engineering (CSE11), Reno, Nevada, USA, Feb. 28 - March 4, 2011.
- IMA workshop: Numerical solutions of partial differential equations: novel discretization techniques, University of Minnesota, Nov. 1-5, 2010.
- 23th Annual University of Alabama System Applied Mathematics Joint Meeting, University of Alabama, Oct. 30, 2010.
- 2010 Annual Meeting of The Society of Mathematical Biology, Federal University of Rio de Janeiro State, Rio de Janeiro, Brazil, July 26 - July 29, 2010.
- Fluid dynamics, Analysis, and Numerics (FAN) 2010, Duke University, North Carolina, June 28-30, 2010.
- Southwest Conference on Integrated Mathematical Methods in Medical Imaging, Arizona State University, Tempe, AZ, February 6-7, 2010.
- Metamaterials: Applications, Analysis and Modeling, Institute for Pure & Applied Mathematics, UCLA, January 25-29, 2010.
- International Conference on Advances in Scientific Computing, Brown University, Providence, RI, December 6-8, 2009.
- 22th Annual University of Alabama System Applied Mathematics Joint Meeting, University of Alabama in Huntsville, Nov. 7, 2009.
- The Second International Conference on Mathematical Modeling and Analysis of Populations in Biological Systems, University of Alabama in Huntsville, October 9-11, 2009.
- Workshop on Nano-Bio Mathematics, Michigan State University, East Lansing, MI, August 4, 2009.
- International Conference on Applied Analysis and Scientific Computation, Shanghai Nor-

- mal University, Shanghai, China, June 25-28, 2009.
- Eighth Mississippi State - UAB Conference on Differential Equations & Computational Simulations, Mississippi State University, May 7-9, 2009.
 - Midwest Conference on Mathematical Methods for Images and Surfaces, Michigan State University, East Lansing, MI, April 18-19, 2009.
 - 21th Annual University of Alabama System Applied Mathematics Joint Meeting, University of Alabama, Birmingham, Nov. 1, 2008.
 - International Conference on Applied Mathematics and Approximation Theory, University of Memphis, Oct 11-13, 2008.
 - 2008 Annual Alabama EPSCoR Conference and Stakeholder Symposium, Montgomery, AL, July 23-24, 2008.
 - IMA Workshop: Quantitative Approaches to Cell Mobility and Chemotaxis, Institute for Mathematics and Its Applications, University of Minnesota, Minneapolis, MN, May 27-30, 2008.
 - AMS special session on Mathematical Modeling in Biology, AMS Spring Southeastern Meeting, Baton Rouge, LA, March 28-30, 2008.
 - Seventh Mississippi State - UAB Conference on Differential Equations & Computational Simulations, Birmingham, Alabama, Nov. 1-3, 2007.
 - 20th Annual University of Alabama System Applied Mathematics Joint Meeting, University of Alabama, Tuscaloosa, Oct. 27, 2007.
 - Fall 2007 Workshop for Young Researchers in Mathematical Biology (WYRMB), Mathematical Biosciences Institute, Ohio State University, Sept. 11-14, 2007.
 - The 7th International Conference On Spectral and High Order Methods, Institute of Computational Mathematics, Chinese Academic of Sciences, Beijing, China, June 18-22, 2007.
 - Workshop on the occasion of the Establishment of the Wuhan Center of Physical Biology, Huazhong University of Science & Technology, Wuhan, China, May 27-28, 2007.
 - The 2007 Symposium on the Advancement of Magnetic Resonance Spectroscopy and Imaging, Wuhan Institute of Physics and Mathematics, Chinese Academic of Sciences, Wuhan, China, May 26-27, 2007.
 - Nineteenth Annual University of Alabama System Applied Mathematics Joint Meeting, University of Alabama, Huntsville, Oct. 21, 2006.
 - Midwest Quantitative Biology Conference, Mackinac Island, Michigan, Sept. 29 - Oct. 1, 2006.
 - Workshop on Applications of Methods of Stochastic Systems and Statistical Physics in Biology, University of Notre Dame, Indiana, October 28 - 30, 2005.
 - Midwest Numerical Analysis Conference, University of Iowa, Iowa City, IA 52242, USA, May 20-22, 2005.
 - QBMI Midwest Computational Structural Biology Workshop, Brook Lodge, Augusta, Michigan, USA, April 30 - May 1, 2005.
 - SIAM Great Lakes Section 2005 Spring Meeting, Numerical PDEs, Applications and Modeling, Michigan State University, East Lansing, Michigan, USA, April 16, 2005.
 - The 6th International Conference on Spectral and High Order Methods, Brown University, Providence, RI 02912, USA, June 21-25, 2004
 - Third International Workshop on Scientific Computing and Applications, January 6-9, City University of Hong Kong, Hong Kong, 2003.

- Inter-Faculty Workshop on Financial Mathematics, National University of Singapore, Singapore, January 12, 2002.
- International Symposium on Computational and Applied PDEs, Zhangjiajie, China, July 1-7, 2001.
- Second International ICSC Symposium on Advanced Computing in Financial Markets, Bangor, Wales, U.K., June 19-22, 2001.
- The Third Asian Symposium on Computer Mathematics, Lanzhou University, Lanzhou, China, August 6-8, 1998.

Selected Talks

- AMS Southeastern Sectional Meeting, Florida State University, March 23, 2024.
- The 8th Annual Meeting of SIAM Central States Section, University of Nebraska - Lincoln, October 7, 2023.
- AMS Southeastern Sectional Meeting, Georgia Institute of Technology, March 19, 2023.
- Bioinformatics seminar, University of Texas at El Paso, Feb. 17, 2023.
- Applied math seminar, Nanyang Technological University, Singapore, Dec. 22, 2022.
- AMS Southeastern Sectional Meeting, University of Tennessee at Chattanooga, Oct. 15, 2022.
- Applied Math Seminar, School of Mathematics, Nanjing University of Science and Technology, Sept. 12, 2022.
- SIAM Conference on the Life Sciences, Pittsburgh, July 14, 2022.
- The Second International Conference on Computational Methods and Applications in Engineering, Mississippi State University, May 7, 2022.
- American Chemical Society (ACS) Spring Meeting, San Diego, March 23, 2022.
- Conference on Fast Direct Solvers (Online), Purdue University, October 24, 2021.
- The 44th SIAM Southeastern Atlantic Section (SEAS) conference, Auburn University, Sept. 18, 2021.
- Applied Math Seminar, Department of Mathematics, University of Alabama, Sept. 3, 2021.
- Seminar, School of Mathematics and Statistics, Lanzhou University, Lanzhou, China, June 21, 2021.
- Online Seminar on Mathematical Molecular Bioscience and Biophysics, May 17, 2021.
- Seminar, Beijing Computational Science Research Center, China, March 22, 2021.
- Computational math seminar, Penn State University, Nov. 5, 2020.
- Online Workshop on Numerical Algorithms and Their Applications in Big Data Science, Lanzhou University, China, August 2, 2020.
- Conference on Computational Mathematics and Applications (CCMA), University of Nevada, Las Vegas, USA, October 26, 2019.
- The 43rd annual meeting of the SIAM Southeastern Atlantic Section, University of Tennessee - Knoxville, USA, Sept. 21, 2019.
- Applied math seminar, School of Mathematics and Sciences, Guizhou Normal University, Guiyang, China, June 28, 2019.
- Colloquium, Department of Mathematics, Guizhou Minzu University, Guiyang, China, June 27, 2019.
- Applied math seminar, School of Mathematics and Statistics, Lanzhou University, Lanzhou, China, June 21, 2019.

- International Conference on Mathematical Modeling and Numerical Methods, Qingdao, China, May 30, 2019.
- NSF-CBMS Conference on Mathematical Molecular Bioscience and Biophysics, The University of Alabama, May 13, 2019.
- Colloquium, Department of Mathematics, University of Alabama at Birmingham, Feb. 1, 2019.
- Applied Math seminar, Department of Mathematics, University of Alabama, October 5, 2018.
- SIAM Conference on the Life Sciences, Minneapolis, August 9, 2018.
- Mathematics in Action (MiA2018): Modeling and analysis in molecular biology and electrophysiology, Suzhou, China, June 17, 2018.
- Colloquium, College of Mathematical Science, Guizhou University, Guiyang, China, June 12, 2018.
- Colloquium, Department of Mathematics, Guizhou Minzu University, Guiyang, China, June 12, 2018.
- Modeling, Analysis, Simulations and Applications of Inter-Facial Dynamics and FSI Problems, Tsinghua Sanya International Mathematics Forum, Sanya, China, June 6, 2018.
- Applied Math Seminar, School of Mathematical Sciences, Beijing Normal University, China, May 29, 2018.
- Colloquium, Department of Applied Mathematics, Illinois Institute of Technology, April 2, 2018.
- The 3rd Annual Meeting of SIAM Central States Section, Colorado State University, Sept. 29, 2017.
- Colloquium, School of Mathematics and Statistics, Lanzhou University, Lanzhou, China, July 31, 2017.
- Computational Science Seminar, School of Information Science and Engineering, Lanzhou University, Lanzhou, China, July 27, 2017.
- Biology Seminar, Guangzhou Institute of Biomedicine and Health, Chinese Academy of Sciences, Guangzhou, China, July 25, 2017.
- Colloquium, School of Mathematics, Guangxi Teachers Education University, Nanning, China, July 10, 2017.
- Applied Math seminar, Department of Mathematics and Statistics, Mississippi State University, April 27, 2017.
- Applied Math seminar, Department of Mathematics, University of Alabama, Jan. 27, 2017.
- Colloquium, College of Mathematical Science, Guizhou University, Guiyang, China, Dec. 30, 2016.
- Colloquium, School of Mathematical and Computer Science, Guizhou Normal University, Guiyang, China, Dec. 27, 2016.
- Workshop of Mathematics Biophysics and Molecular Biosciences, Tsinghua Sanya International Mathematics Forum, Sanya, China, Dec. 20, 2016.
- 20th IMACS World Congress, Xiamen, China, Dec. 11, 2016.
- Colloquium, Department of Mathematical Sciences, University of Alabama in Huntsville, Oct. 14, 2016.
- The second Annual Meeting of SIAM Central States Section, University of Arkansas at Little Rock, Oct. 1, 2016.

- SIAM Conference on the Life Sciences, Boston, July 14, 2016.
- SIAM Annual Meeting, Boston, July 13, 2016.
- The Tenth International Conference on Scientific Computing and Applications, Fields Institute, Toronto, Canada, June 7, 2016.
- Computational and Applied Mathematics Seminar, Department of Mathematics, Iowa State University, April 25, 2016.
- 40th Annual SIAM Southeastern Atlantic Section Conference, University of Georgia, March 12, 2016.
- Geometric and Topological Modeling of Biomolecules, Mathematical Biosciences Institute, Ohio State University, Sept. 30, 2015.
- Mathematics of Biological Charge Transport: Molecules and Beyond, Institute for Mathematics and its Applications, University of Minnesota, July 21, 2015.
- Colloquium, Cuiying Honors College, Lanzhou University, Lanzhou, China, June 12, 2015.
- Computational Math Seminar, School of Mathematics and Statistics, Lanzhou University, Lanzhou, China, June 9, 2015.
- International Conference on Computational Mathematics and Sciences, Xi'an Jiaotong University, Xi'an, China, June 6, 2015.
- Colloquium, Department of Applied Mathematics, Xi'an University of Technology, Xi'an, China, June 3, 2015.
- Colloquium, School of Mathematical and Computer Science, Guizhou Normal University, Guiyang, China, May 28, 2015.
- Colloquium, College of Natural Sciences, Guizhou University, Guiyang, China, May 26, 2015.
- Applied Math Seminar, Institute of Software, Chinese Academy of Sciences, Beijing, May 19, 2015.
- 1st Annual Meeting of SIAM Central States Section, Missouri University of Science and Technology, April 11, 2015.
- 39th Annual SIAM Southeastern Atlantic Section Conference, University of Alabama at Birmingham, March 22, 2015.
- Ninth Mississippi State Conference on Differential Equations & Computational Simulations, Mississippi State University, Oct. 24, 2014.
- Applied Math Seminar, Department of Mathematics and Statistics, Auburn University, Sept. 12, 2014.
- Applied Math Seminar, Department of Mathematics, University of Alabama, Sept. 5, 2014.
- SIAM Conference on the Life Sciences, Charlotte, NC, August 5, 2014.
- Colloquium, Beijing Computational Science Research Center, Beijing, March 12, 2014.
- Applied Math Seminar, Beijing Computational Science Research Center, Beijing, Jan. 14, 2014.
- Fourth Workshop on Recent Advances on Spectral Methods and Related Applications, Xiamen University, China, Nov. 3, 2013.
- Applied Math Seminar, Department of Mathematics, Xiamen University, Xiamen, China, Nov. 1, 2013.
- Computational Math Seminar, Department of Mathematics, Communication University of China, Beijing, Oct. 16, 2013.
- Computational Biology Seminar, Beijing Computational Science Research Center, Beijing,

September 23, 2013.

- Computational Math Seminar, Institute of Computational Mathematics and Scientific Engineering Computing, Chinese Academy of Sciences, Beijing, September 18, 2013.
- Applied Math Seminar, Beijing Computational Science Research Center, Beijing, September 10, 2013.
- Math department research talk, University of Alabama, April 23, 2013.
- South Central Conference on Advanced Numerical Methods and Applications, University of Arkansas at Little Rock, April 6, 2013.
- Mathematical Challenges in Biomolecular/Biomedical Imaging and Visualization, Mathematical Biosciences Institute, Ohio State University, Feb. 20, 2013.
- 25th Annual University of Alabama System Applied Mathematics Joint Meeting, University of Alabama, Huntsville, Nov. 3, 2012.
- Ninth Mississippi State - UAB Conference on Differential Equations & Computational Simulations, Mississippi State University, Oct. 4, 2012.
- The Society for Mathematical Biology Annual Meeting and Conference, NIMBioS, University of Tennessee, Knoxville, July 26, 2012.
- Colloquium, College of Natural Sciences, Guizhou University, Guiyang, China, June 13, 2012.
- Computational Mathematics seminar, Department of Mathematics, Lanzhou University, Lanzhou, China, June 5, 2012.
- Workshop on Applied Mathematics and Scientific Computing, Lanzhou University, Lanzhou, China, June 1, 2012.
- The second international conference on scientific computing (ICSC12), Nanjing, China, May 23, 2012.
- Eighth International Conference on Scientific Computing and Applications, University of Nevada, Las Vegas, April 2, 2012.
- 36th Annual SIAM Southeastern Atlantic Section Conference, University of Alabama in Huntsville, March 24, 2012.
- Math department research talk, University of Alabama, Nov. 2, 2011.
- 2011 Differential equations weekend conference, Mississippi State University, May 7, 2011.
- Modeling and computation of biomolecular structure and dynamics, Mathematical Bioscience Institute, Ohio State University, April 26, 2011.
- SIAM Conference on Computational Science and Engineering (CSE11), Reno, Nevada, USA, March 2, 2011.
- 2010 Annual Meeting of The Society of Mathematical Biology, Federal University of Rio de Janeiro State, Rio de Janeiro, Brazil, July 26, 2010.
- Math Biology seminar, Department of Mathematics, Michigan State University, March 15, 2010.
- Applied Mathematics seminar, Department of Mathematics, University of Georgia, October 23, 2009.
- The Second International Conference on Mathematical Modeling and Analysis of Populations in Biological Systems, University of Alabama in Huntsville, October 11, 2009.
- Workshop on Nano-Bio Mathematics, Michigan State University, East Lansing, MI, August 4, 2009.
- International Conference on Applied Analysis and Scientific Computation, Shanghai Normal University, Shanghai, China, June 26, 2009.

- Colloquium, School of Mathematical and Computer Science, Guizhou Normal University, Guiyang, China, June 22, 2009.
- Colloquium, College of Natural Sciences, Guizhou University, Guiyang, China, June 16, 2009.
- Eighth Mississippi State - UAB Conference on Differential Equations & Computational Simulations, Mississippi State University, May 9, 2009.
- Midwest Conference on Mathematical Methods for Images and Surfaces, Michigan State University, East Lansing, MI, April 19, 2009.
- International Conference on Applied Mathematics and Approximation Theory, University of Memphis, Oct 12, 2008.
- AMS special session on Mathematical Modeling in Biology, AMS Spring Southeastern Meeting, Baton Rouge, LA, March 29, 2008.
- Seventh Mississippi State - UAB Conference on Differential Equations & Computational Simulations, Birmingham, Alabama, Nov. 2, 2007.
- Computational and Applied Mathematics seminar, School of Mathematics, Georgia Institute of Technology, Sept. 21, 2007.
- The 7th International Conference On Spectral and High Order Methods, Institute of Computational Mathematics, Chinese Academic of Sciences, Beijing, China, June 22, 2007.
- Applied Mathematics seminar, Department of Mathematics, Lanzhou University, Lanzhou, China, June 15, 2007.
- Workshop on the occasion of the Establishment of the Wuhan Center of Physical Biology, Huazhong University of Science & Technology, Wuhan, China, May 27, 2007.
- New Faculty Applied Mathematics Talk Series: Department of Mathematics, University of Alabama, Sept. 27 2006, Oct. 25 2006, Nov. 8 2006, and Jan. 24 2007.
- Applied Mathematics seminar, Department of Mathematics, Tulane University, Nov. 17, 2006.
- Nineteenth Annual University of Alabama System Applied Mathematics Joint Meeting, University of Alabama, Huntsville, Oct. 21, 2006.
- Applied Mathematics seminar, Department of Mathematics, University of Alabama, March 6, 2006.
- Applied Mathematics seminar, Department of Applied Mathematics and Statistics, Johns Hopkins University, March 2, 2006.
- Applied Mathematics seminar, Department of Mathematics and Statistics, South Dakota State University, Feb. 14, 2006.
- Colloquium, Department of Mathematics and Statistics, University of New Mexico, Feb. 6, 2006.
- Applied Mathematics Seminar, Department of Mathematics, The College of William and Mary, Jan. 27, 2006.
- Midwest Numerical Analysis Conference, University of Iowa, May 20, 2005.
- The 6th International Conference on Spectral and High Order Methods, Brown University, June 24, 2004.
- Applied Mathematics Seminar, Department of Mathematics, Michigan State University, Nov. 7, 2003.
- Third International Workshop on Scientific Computing and Applications, City University of Hong Kong, Jan. 8, 2003.

- Inter-Faculty Workshop on Financial Mathematics, National University of Singapore, Jan. 12, 2002.