

Zheng Sun

Department of Mathematics
The University of Alabama
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Education

- **Brown University, RI, USA**

Ph.D. in Applied Mathematics, Division of Applied Mathematics. 08/2014 – 05/2018
Advisor: Prof. Chi-Wang Shu.

M.Sc. in Applied Mathematics, Division of Applied Mathematics. 08/2014 – 05/2015

- **University of Science and Technology of China, Anhui, China**

B.Sc. in Mathematics and Applied Mathematics, 09/2010 – 07/2014
School of the Gifted Young.
Advisor: Prof. Falai Chen.

Professional Experience

- **The University of Alabama, AL, USA**

Assistant Professor, Department of Mathematics. 08/2021 – Present

- **The Ohio State University, OH, USA**

Visiting Assistant Professor, Department of Mathematics. 08/2018 – 08/2021
Mentor: Prof. Yulong Xing.

- **Oak Ridge National Laboratory, TN, USA**

Intern, Computer Science and Mathematics Division. Summers, 2017 & 2018
Mentor: Dr. Cory Hauck.

Honors and Awards

- SIAM Early Career Travel Award. 2019 & 2021
- New World Mathematics Award, Honorable Mention of Doctoral Thesis. 2018
- David Gottlieb Memorial Award, Brown University. 2018
- Selectee of NSF Mathematical Sciences Graduate Internship Program. 2017
- China National Scholarship. 2011, 2012 & 2013

Publications in and Submissions to Refereed Journals

Preprint

11. Z. Sun and C.-W. Shu, Error analysis of Runge–Kutta discontinuous Galerkin methods for linear time-dependent partial differential equations. <https://arxiv.org/abs/2001.00971>

Appeared or Accepted

10. Z. Sun and C.-W. Shu, Enforcing strong stability of explicit Runge–Kutta methods with superviscosity, *Communications on Applied Mathematics and Computation*, to appear.
9. Z. Sun, S. Wang, L.-B. Chang, Y. Xing and D. Xiu, Convolution neural network shock detector for numerical solution of conservation laws, *Communications in Computational Physics*, v28 (2020), pp.2075–2108.
8. Z. Sun and Y. Xing, Optimal error estimates of discontinuous Galerkin methods with generalized fluxes for wave equations on unstructured meshes, *Mathematics of Computation*, v90 (2021), pp.1741–1772.
7. Z. Sun and Y. Xing, On structure-preserving discontinuous Galerkin methods for Hamiltonian partial differential equations: Energy conservation and multi-symplecticity, *Journal of Computational Physics*, v419 (2020), 109662.
6. Z. Sun and C.D. Hauck, Low-memory, discrete ordinates, discontinuous Galerkin methods for radiative transport, *SIAM Journal on Scientific Computing*, v42 (2020), pp.B869–B893.
5. Z. Sun and C.-W. Shu, Strong stability of explicit Runge–Kutta time discretizations, *SIAM Journal on Numerical Analysis*, v57 (2019), pp.1158–1182.
4. Z. Sun, J.A. Carrillo and C.-W. Shu, An entropy stable high-order discontinuous Galerkin method for cross-diffusion gradient flow systems, *Kinetic and Related Models*, v12 (2019), pp.885–908.
3. Z. Sun, J.A. Carrillo and C.-W. Shu, A discontinuous Galerkin method for nonlinear parabolic equations and gradient flow problems with interaction potentials, *Journal of Computational Physics*, v352 (2018), pp.76–104.
2. Z. Sun and C.-W. Shu, Stability of the fourth order Runge–Kutta method for time-dependent partial differential equations, *Annals of Mathematical Sciences and Applications*, v2 (2017), pp.255–284.
1. Z. Sun and C.-W. Shu, Stability analysis and error estimates of Lax–Wendroff discontinuous Galerkin methods for linear conservation laws, *ESAIM: Mathematical Modelling and Numerical Analysis*, v51 (2017), pp.1063–1087.

Talks and Presentations

Invited talks at department seminars/colloquia

9. Online colloquium, Department of Mathematical Sciences, Florida Institute of Technology, 03/18/2021.
8. Online CAM seminar, Computer Science and Mathematics Division, Oak Ridge National Laboratory, 03/11/2021.
7. Online seminar, School of Mathematical Sciences and Statistics, University of Texas Rio Grande Valley, 03/10/2021.
6. Online colloquium, Department of Mathematics, The University of Alabama, 01/26/2021.
5. Online seminar, Department of Mathematical Sciences, Michigan Technological University, 12/07/2020.
4. Online seminar, Department of Mathematics, National University of Singapore, 12/01/2020.
3. Online seminar, Mathematics Department, Western Connecticut State University, 11/15/2020.
2. Online seminar, Department of Mathematical Sciences, Korea Advanced Institute of Science and Technology, 10/14/2020.
1. CAM seminar, Computer Science and Mathematics Division, Oak Ridge National Laboratory, 06/27/2019.

Invited talks at conference minisymposia

8. Minisymposium on *Advances in Memory Efficient Numerical Algorithms for Kinetic Problems*, organized by Stefan Schnake, SIAM Southeastern Atlantic Section Meeting, Auburn, AL, 09/2021.
7. Minisymposium on *Modeling and numerical methods for coupled PDE systems*, organized by Xiaoming He and Xiaofeng Yang, SIAM Southeastern Atlantic Section Meeting, Auburn, AL, 09/2021.
6. Minisymposium on *Recent advances on discontinuous Galerkin finite element methods: analysis and computation*, organized by Zheng Sun and Yulong Xing, online, 03/04/2021.
5. Minisymposium on *Stable and Efficient Time Integration Schemes for Conservation Laws and Related Models*, organized by Philip Öffner and Hendrik Ranocha, online, 07/09/2020.
4. Minisymposium on *Structure Preserving Numerical Methods for Gradient Flow Equations*, organized by Jingwei Hu and Erlend S. Riis, 2019 SIAM Conference on Analysis of Partial Differential Equations, La Quinta, CA, 12/11/2019.
3. Minisymposium on *Recent Developments of Discontinuous Galerkin Finite Element Methods*, organized by Jue Yan and Yang Yang, 2019 SIAM Central States Section Meeting, Ames, IA, 10/19/2019.
2. Minisymposium on *Recent Advances in Discontinuous Galerkin Methods for Partial Differential Equations*, organized by Ziyao Xu, 2019 SIAM Conference on Computational Science and Engineering, Spokane, WA, 02/28/2019.
1. Minisymposium on *Recent Advances in Finite Element Methods for Partial Differential Equations*, organized by Yukun Li and Yulong Xing, 2018 AMS Spring Central Sectional Meeting, Columbus, OH, 03/17/2018.

Contributed talks at conference minisymposia

3. 2021 Spring Finite Element Circus, online, 04/09/2021.
2. 2019 SIAM Great Lakes Section Meeting, Ann Arbor, MI, 04/27/2019.
1. 2019 Spring Finite Element Circus, West Lafayette, IN, 03/22/2019.

Other presentations

2. Poster presentation, ORNL Summer Poster Sessions, Oak Ridge National Laboratory, Oak Ridge, TN, 08/08/2017.
1. Seminar talk, Brown Applied Math Graduate Student Seminar, Brown University, Providence, RI, 05/01/2017.

Mentoring Experiences

Co-advised with Prof. Yulong Xing at The Ohio State University

Undergraduate students

- Mr. Pedro F. Gonzalez-Medina (University of Puerto Rico) SU 2021
Ms. Yushan Qu (The Ohio State University)
Ms. Siwei Xu (Emory University)
Project: Machine learning of flocking phenomenon.
Graduate assistants: Mr. Joseph Hunter and Mr. Wei-Hung Su.
- Mr. Qifan Chen (The Chinese University of Hong Kong) SU 2020
Project: Fourier analysis for discontinuous Galerkin methods.
Project presented at 2020 Young Mathematicians Conference.

Master student

- Mr. Joseph Hunter (The Ohio State University) 2020 – 2021

Teaching Experiences

The University of Alabama (Instructor)

1. MATH 301, Discrete Mathematics AU 2021

The Ohio State University (Instructor)

7. MATH 2415, Ordinary and Partial Differential Equations (online) SP 2021
(58 students, 4.67/5)
6. MATH 2177, Mathematical Topics for Engineers. (online) SP 2021
(68 students, 4.36/5)
5. MATH 2415, Ordinary and Partial Differential Equations (online) AU 2020
(54 students, 4.46/5)

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| 4. MATH 2568, Linear Algebra
(Session I: 60 students, 4.18/5; Session II: 60 students, 4.30/5) | SP 2020 |
| 3. MATH 2415, Ordinary and Partial Differential Equations
(56 students, 4.54/5) | AU 2019 |
| 2. MATH 2177, Mathematical Topics for Engineers
(94 students, 3.98/5) | SP 2019 |
| 1. MATH 2415, Ordinary and Partial Differential Equations
(42 students, 4.03/5) | AU 2018 |

Brown University (Teaching Assistant)

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| 2. APMA 0160, Introduction to Scientific Computing | SP 2016 |
| 1. APMA 1690, Computational Probability and Statistics | AU 2015 |

Professional Services

Journal referee

- *Acta Applicandae Mathematicae*
- *Calcolo*
- *Communications on Applied Mathematics and Computation*
- *Computational and Applied Mathematics*
- *IMA Journal of Numerical Analysis*
- *Journal of Computational Physics*
- *Journal of Scientific Computing*
- *Mathematics of Computation*
- *Numerische Mathematik*
- *Science China Mathematics*
- *SIAM Journal on Numerical Analysis*

Co-organizer of conference minisymposia

- With Prof. Xiangxiong Zhang, *Recent developments in high order numerical methods for partial differential equations*, AMS Spring Central Sectional Meeting, West Lafayette, IN, 03/2022.
- With Prof. Yulong Xing, *Recent advances on discontinuous Galerkin finite element methods: analysis and computation*, SIAM CSE conference, Fort Worth, TX, 03/04/2021.

Computer Skills

- Programming Languages: Fortran, MATLAB, Mathematica, C/C++ and Python.

- Software and Packages: \LaTeX , ParaView, FEniCS, NGSolve, PETSc, etc.

Memberships of Professional Societies

- Society for Industrial and Applied Mathematics (SIAM) 2017 – Present
- American Mathematical Society (AMS) 2015 – Present