

Xiangxiong Zhang

CONTACT INFORMATION

Department of Mathematics
Purdue University
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West Lafayette, IN 47907-2067

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URL: www.math.purdue.edu/~zhan1966/

EMPLOYMENT

2020-
Associate Professor, Department of Mathematics,
2014-2020
Assistant Professor, Department of Mathematics,
Purdue University.

PROFESSIONAL PREPARATION



Aug 2011-July 2014
Postdoctoral Associate in Imaging and Computing Group, Mathematics Department,
Mentor: Laurent Demanet
Massachusetts Institute of Technology.



Ph.D. in Mathematics, May 2011
Advisor: Chi-Wang Shu
Brown University



B. Sc. in Mathematics and Applied Mathematics, 2006
University of Science and Technology of China

RESEARCH INTERESTS

Applied mathematics, numerical analysis and scientific computing including:

1. Numerical PDEs, especially high order accurate schemes
2. Optimization algorithms, especially nonsmooth convex optimization and Riemannian optimization

RESEARCH IMPACT

- 4,400+ citations on [Google Scholar](#).
- 3,000+ citations on [Elsevier Scopus database](#).
- 2,900+ citations on [Web of Science](#).
- 2,000+ citations on [American Mathematical Society MathSciNet database](#).
- Most Cited *Journal of Computational Physics* Articles in the year 2015 since 2010: [2] and [3] in JOURNAL PUBLICATIONS.
- [Most cited mathematicians by citations in MathSciNet in 2021](#): ranked 3rd among mathematicians who received their Ph.D. in 2011.
- [Stanford/Elsevier Top 2% Scientists List 2024](#): ranked 98th among 16,442 scientists in the subfield *Numerical & Computational Mathematics* by counting citations (self citations excluded) in the year 2023.
- [Stanford/Elsevier Top 2% Scientists List 2023](#): ranked 104th among 15,925 scientists in the subfield *Numerical & Computational Mathematics* by counting citations (self citations excluded) in the year 2022.

HONORS

- Plenary speaker, International Conference on Spectral and High Order Methods (ICOSAHOM) 2023.
- [ACM Computing Reviews' Best of 2012](#), notable paper in computing: [6] in JOURNAL PUBLICATIONS.
- Silver prize of doctoral thesis, [2011 New World Mathematics Awards](#), awarded in the 6th International Congress of Chinese Mathematicians, Taipei, 2013.
- [2011 SIAM Student Paper Prize](#).

GRANTS

- 2024: Purdue Seed Funding for high-profile journal review papers, books and monographs.
- 2023-2024: National Science Foundation, AGEP-GRS supplement to DMS-2208518, \$62,868.
- 2022-2025: National Science Foundation DMS-2208518, *Efficient Neural Network Based Numerical Schemes for Hyperbolic Conservation Laws*. \$271,606.
- 2019-2022: National Science Foundation DMS-1913120, *Novel High Order Accurate Finite Difference Schemes Constructed via Superconvergence of Finite Element Methods*. \$175,000 (with no cost extension to 2023).
- 2020: PRF Summer Faculty Grant.
- 2019-2020: year-long PRF grant (Cagiantas Fellowship for Mr. Hao Li).
- 2018-2019: Simons Foundation Collaboration Grants for Mathematicians. \$8,400.
- 2015-2018: National Science Foundation DMS-1522593, *Robust and Efficient High Order Methods for Time Dependent Problems*. \$196,912 (with no cost extension to 2019).
- 2013-2015: AMS Simons Travel Grant. \$4,000.

EDITORIAL & SERVICE

- *Computers and Mathematics with Applications*, editorial board, 2024-

STUDENTS & POSTDOCS

Postdoc:

- Dr. Chen Liu, Golomb Visiting Assistant Professor, 2021-2024
Placement: 2024-, tenure-track assistant professor of mathematics, University of Arkansas, Fayetteville.

Ph.D. students:

- Mr. Emmanuel Torres, Ph.D. student in mathematics, 2021-
- Mr. Shixin Zheng, Ph.D. student in mathematics, 2019-
- Dr. Hao Li, Ph.D. in mathematics, 2021. Thesis title: *Accuracy and monotonicity of spectral element method on structured meshes*. Placement after graduation: 2022-2023, Postdoctoral Fellow, Oden Institute, University of Texas at Austin. 2024-, Postdoctoral Fellow The Hong Kong Polytechnic University.

Advised graduate students for research:

- Ms. Anshika, visiting Ph.D. student from Indian Institute of Technology (BHU) Varanasi, SERB Overseas Visiting Doctoral Fellowship, 2023-2024.
- (co-adviser) Mr. Xinyu Liu, Ph.D. student in mathematics, 2019-
- (co-adviser) Mr. Sashank Srinivasan, Master's student in Aeronautics and Astronautics Engineering, 2016-2017.

Advised undergraduate students for research:

- Mr. Turjo Debnath, spring 2025.
- Mr. William Francis, fall 2024.
- Ms. YINUO Zhao, fall 2024.
- Mr. Dionysis Milesis, fall 2022, with one ongoing project.
- Mr. Yue Wu, summer 2022, with one working paper.
- Ms. Xinyang Chen, spring 2022.
- Ms. Bhakti Vyas, summer 2021, with one publication [36].
- Mr. Cody Ball, spring 2021.
- Ms. Chiara Travesset, summer and fall 2020.
- Mr. Naveen Vivek, summer 2020.
- Mr. Logan Cross (summer 2019, supported by SURF program; fall 2019; spring and summer 2020), with two journal publications [39] and [43].
- Ms. HyeJin Kim (summer 2018, supported by Joel Spira Undergraduate Summer Research Award).
- Mr. Jarrod Burgh (summer 2018).
- Mr. Keith Yuan Patarroyo Tovar, undergrad from Universidad Nacional de Colombia, UREP-C program in the Colombia Purdue Initiative, June-Dec, 2017.
- Mr. Varun Vasudevan Nair, fall semester, 2017.

Undergraduate student mentoring:

- Ms. Goodness Alabi, Applied Mathematics Undergraduate Science Scholars (Emerging Leaders Science Scholars), 2024-
- Mr. Brijesh Patel, Applied Mathematics Undergraduate Science Scholars (Emerging Leaders Science Scholars), 2022-
- Mr. Xiaoyu Liu, Mathematics and Physics, 2021-
Joel Spira Undergraduate Summer Research Award, 2023.
Jerison Memorial Award in Analysis, 2024.

Graduate student mentoring:

- Mr. Leo Shen, 2024-
- Mr. Nicholas Dominic Gismondi, Mathematics, 2021-2023
- Mr. Emmanuel Torres, Mathematics, 2021-2023

JOURNAL PUBLICATIONS

52. S. Zheng, W. Huang, B. Vandereycken and X. Zhang, Riemannian optimization using three different metrics for Hermitian PSD fixed-rank constraints, to appear on *Computational Optimization and Applications*. An extended version with more details is on arXiv (arXiv:2204.07830).
51. W. Hao, S. Lee and X. Zhang, An Efficient Quasi-Newton Method with Tensor Product Implementation for Solving Quasi-Linear Elliptic Equations and Systems. arXiv:2502.03611.
50. Y. Chen, D. Xiu and X. Zhang, On enforcing non-negativity in polynomial approximations in high dimensions, *SIAM Journal on Scientific Computing* Vol. 40, No. 5, pp. A3211–A3239.

49. B. Ren, B.S. Wang, X. Zhang and Z. Gao, Fourth Order Positivity and Bound Preserving Well-Balanced Compact Finite Difference Scheme for Ripa and Pollutant Transport Systems, to appear in *Computers and Mathematics with Applications*.
48. Z. Chen, J. Lu, Y. Lu and X. Zhang, Fully discretized Sobolev gradient flow for the Gross-Pitaevskii eigenvalue problem, to appear in *Mathematics of Computation*. <https://arxiv.org/abs/2403.06028>
47. C. Liu, G. Buzzard and X. Zhang, An optimization based limiter for enforcing positivity in a semi-implicit discontinuous Galerkin scheme for compressible Navier–Stokes equations, *Journal of Computational Physics*, 519 (2024), pp. 113440. <https://arxiv.org/abs/2402.15645>
46. H. Li and X. Zhang, A monotone Q^1 finite element method for anisotropic elliptic equations, to appear in the special issue in honor of Prof. Chi-Wang Shu’s 65th birthday for the *Beijing Journal of Pure and Applied Mathematics*.
45. X. Liu, J. Shen and X. Zhang, A simple GPU implementation of spectral-element methods for solving 3D Poisson type equations on cartesian meshes, *Communications in Computational Physics*, 36 (2024), pp. 1157–1185.
44. S. Zheng, H. Yang, and X. Zhang, On the convergence of orthogonalization-free conjugate gradient method for extreme eigenvalues of Hermitian matrices: a Riemannian optimization interpretation, on the special issue *Computational Methods and Models in Deep Learning for Inverse Problems*, in *Journal of Computational and Applied Mathematics* 451 (2024), pp. 116053. [arxiv:2302.04974](https://arxiv.org/abs/2302.04974)
43. L. Cross and X. Zhang, On the monotonicity of Q3 spectral element method for Laplacian, *Annals of Applied Mathematics* 40(2), 161–190, 2024. [arXiv:2010.07282](https://arxiv.org/abs/2010.07282)
42. C. Liu, B. Riviere, J. Shen and X. Zhang, A simple and efficient convex optimization based bound-preserving high order accurate limiter for Cahn–Hilliard–Navier–Stokes system, *SIAM Journal on Scientific Computing*, Volume: 46, Issue: 3, pp. A1373–C271. [arxiv:2307.09726](https://arxiv.org/abs/2307.09726)
41. M. Dai, M. Hoeller, Q. Peng, and X. Zhang, Kolmogorov’s dissipation number and determining wavenumber for dyadic models. *Nonlinearity* 37, No. 2 (2024): 025015.
40. Z. Chen, J. Lu, Y. Lu and X. Zhang, On the convergence of Sobolev gradient flow for the Gross-Pitaevskii eigenvalue problem, *SIAM Journal on Numerical Analysis* 62 (2024), pp. 667–691.
39. L. Cross and X. Zhang, On the monotonicity of Q2 spectral element method for Laplacian on quasi-uniform rectangular meshes, *Communications in Computational Physics* Vol. 35, No. 1, pp. 160–180, 2024.
38. C. Liu, Y. Gao and X. Zhang, Structure preserving schemes for Fokker-Planck equations of irreversible processes, *Journal of Scientific Computing* 98(1):4, 2024.
37. C. Liu and X. Zhang, A positivity-preserving implicit-explicit scheme with high order polynomial basis for compressible Navier–Stokes equations, *Journal of Computational Physics* 493:112496, 2023.
36. M. Dai, B. Vyas and X. Zhang, 1D Model for the 3D Magnetohydrodynamics, *Journal of Nonlinear Science* (2023) 33:87. [DOI](https://doi.org/10.1007/s00033-023-02000-0).
35. X. Liu, J. Shen and X. Zhang, An efficient and robust SAV based algorithm for discrete gradient systems arising from optimizations. *SIAM Journal on Scientific Computing*, Vol. 45, No. 5, pp. A2304–A2324, 2023.

34. B. Ren, Z. Gao, Y. Gu, S. Xie and X. Zhang, A positivity-preserving and well-balanced high order compact finite difference scheme for shallow water equations, *Communications in Computational Physics*, 35 (2024), pp. 524-552.
33. H. Li and X. Zhang, A high order accurate bound-preserving compact finite difference scheme for two-dimensional incompressible flow, *Communications on Applied Mathematics and Computation*, Volume 6, pages 113–141, (2024). Focused Issue in Memory of Prof. Ching-Shan Chou.
32. C. Fan, X. Zhang and J. Qiu, Positivity-preserving high order finite difference WENO schemes for the compressible Navier-Stokes equations, *Journal of Computational Physics* 467 (2022): 111446.
31. J. Hu and X. Zhang, Positivity-preserving and energy-dissipative finite difference schemes for the Fokker-Planck and Keller-Segel equations, *IMA Journal of Numerical Analysis*, 43 (2022), pp. 1450–1484.
30. J. Shen and X. Zhang, Discrete Maximum principle of a high order finite difference scheme for a generalized Allen-Cahn equation, *Communications in Mathematical Sciences* 20(5), pp.1409-1436.
29. H. Li, D. Appelö and X. Zhang, Accuracy of spectral element method for wave, parabolic and Schrödinger equations, *SIAM Journal on Numerical Analysis* 60(1): 339–363, 2022.
28. C. Fan, X. Zhang and J. Qiu, A positivity-preserving hybrid Hermite WENO scheme for the compressible Navier-Stokes equations, *Journal of Computational Physics* Volume 445, 2021, 110596.
27. M. Li, Y. Cheng, J. Shen and X. Zhang, A Bound-Preserving High Order Scheme for Variable Density Incompressible Navier-Stokes Equations, *Journal of Computational Physics* 425 (2021): 109906.
26. H. Li and X. Zhang, On the monotonicity and discrete maximum principle of the finite difference implementation of C^0 - Q^2 finite element method, *Numerische Mathematik*, 145, 437-472 (2020).
25. H. Li and X. Zhang, Superconvergence of high order finite difference schemes based on variational formulation for elliptic equations, *Journal of Scientific Computing* 82, 36 (2020).
24. H. Li and X. Zhang, Superconvergence of C^0 - Q^k finite element method for elliptic equations with approximated coefficients, *Journal of Scientific Computing* 2, 1 (2020).
23. H. Li, S. Xie and X. Zhang, A high order accurate bound-preserving compact finite difference scheme for scalar convection diffusion equations, *SIAM Journal on Numerical Analysis*, 2018, 56(6), 3308-3345.
22. S. Srinivasan, J. Poggie and X. Zhang, A positivity-preserving high order discontinuous Galerkin scheme for convection-diffusion equations, *Journal of Computational Physics*, Volume 366 (2018), Pages 120-143.
21. J. Hu, R. Shu and X. Zhang, Asymptotic-preserving and positivity-preserving implicit-explicit schemes for the stiff BGK equation, *SIAM Journal on Numerical Analysis*, 2018, Vol.56(2), 942-973.
20. J. Hu and X. Zhang, On a class of implicit-explicit Runge Kutta schemes for stiff kinetic equations preserving the Navier-Stokes limit, *Journal of Scientific Computing*, (2017) 73: 797-818.
19. W. Huang, K. Gallivan and X. Zhang, Solving PhaseLift by low-rank Riemannian optimization methods for complex semidefinite constraints, *SIAM Journal on Scientific Computing*, 39-5 (2017), pp. B840-B859.

18. X. Zhang, On positivity preserving high order discontinuous Galerkin schemes for compressible Navier-Stokes equations, *Journal of Computational Physics*, 328 (2017): 301-343.
17. X. Zhang, A curved boundary treatment for discontinuous Galerkin schemes solving time dependent problems, *Journal of Computational Physics*, 308 (2016): 153-170.
16. X. Cai, X. Zhang and J. Qiu, Positivity-preserving high order finite volume HWENO schemes for compressible Euler equations, *Journal of Scientific Computing*, (2016) 68: 464.
15. X. Zhang and S. Tan, A simple and accurate discontinuous Galerkin scheme for modeling scalar-wave propagation in media with curved interfaces, *Geophysics*, Vol. 80, No. 2, pp. T83-T89.
14. L. Demanet and X. Zhang, Eventual linear convergence of the Douglas-Rachford iteration for basis pursuit, *Mathematics of Computation* 85 (2016), 209-238.
13. Y. Xing and X. Zhang, Positivity-preserving well-balanced discontinuous Galerkin methods for the shallow water equations on unstructured triangular meshes, *Journal of Scientific Computing*, v57 (2013), pp. 19-41.
12. Y. Zhang, X. Zhang and C.-W. Shu, Maximum-principle-satisfying second order discontinuous Galerkin schemes for convection-diffusion equations on triangular meshes, *Journal of Computational Physics*, v234 (2013), pp. 295-316.
11. X. Zhang and C.-W. Shu, A minimum entropy principle of high order schemes for gas dynamics equations, *Numerische Mathematik*, (2012) 121:545-563.
10. X. Zhang and C.-W. Shu, Positivity-preserving high order finite difference WENO schemes for compressible Euler equations, *Journal of Computational Physics*, v231 (2012), pp.2245-2258.
9. X. Zhang, Y.-Y. Liu and C.-W. Shu, Maximum-principle-satisfying high order finite volume WENO schemes for convection-diffusion equations, *SIAM Journal on Scientific Computing*, v34 (2012), pp. A627-A658.
8. C. Wang, X. Zhang, C.-W. Shu and J. Ning, Robust high order discontinuous Galerkin schemes for two-dimensional gaseous detonations, *Journal of Computational Physics*, v231 (2012), pp.653-665.
7. X. Zhang and C.-W. Shu, Maximum-principle-satisfying and positivity-preserving high order schemes for conservation laws: survey and new developments, *Proceedings of the Royal Society A: Mathematical, Physical and Engineering Sciences*, v467 (2011), pp.2752-2776.
6. X. Zhang, Y. Xia and C.-W. Shu, Maximum-principle-satisfying and positivity-preserving high order discontinuous Galerkin schemes for conservation laws on triangular meshes, *Journal of Scientific Computing*, v50 (2012), pp.29-62.
5. X. Zhang and C.-W. Shu, Positivity-preserving high order discontinuous Galerkin schemes for compressible Euler equations with source terms, *Journal of Computational Physics*, v230 (2011), pp.1238-1248.
4. Y. Xing, X. Zhang and C.-W. Shu, Positivity-preserving high order well-balanced discontinuous Galerkin methods for the shallow water equations, *Advances in Water Resources*, v33 (2010), pp.1476-1493.
3. X. Zhang and C.-W. Shu, On positivity preserving high order discontinuous Galerkin schemes for compressible Euler equations on rectangular meshes, *Journal of Computational Physics*, v229 (2010), pp.8918-8934.

2. X. Zhang and C.-W. Shu, On maximum-principle-satisfying high order schemes for scalar conservation laws, *Journal of Computational Physics*, v229 (2010), pp. 3091-3120.
1. X. Zhang and C.-W. Shu, A genuinely high order total variation diminishing scheme for one-dimensional scalar conservation laws, *SIAM Journal on Numerical Analysis*, Volume 48, Issue 2 (2010), pp. 772-795.

PUBLICATIONS IN REFEREED BOOK CHAPTERS & CONFERENCE PROCEEDINGS

5. X. Zhang, Recent Progress on Qk Spectral Element Method: Accuracy, Monotonicity and Applications, to appear in *Sehun Chun, Jae-Hun Jung, Eun-Jae Park, and Jie Shen, editors*, Spectral and High-Order Methods for Partial Differential Equations ICOSAHOM 2023, volume 142 of *Lecture Notes in Computational Science and Engineering*. Springer, Cham, 2025.
4. Zhengfu Xu and Xiangxiong Zhang, *Bound-preserving high order schemes for conservation laws*, Volume 18, *Handbook of Numerical Methods for Hyperbolic Problems: Applied and Modern Issues*, R. Abgrall and C.-W. Shu, Editors, North-Holland, Elsevier, Amsterdam, 2017, pp. 81-102.
3. Wen Huang, Kyle A. Gallivan and Xiangxiong Zhang, Solving PhaseLift by Low-rank Riemannian Optimization Methods, The International Conference on Computational Science (ICCS), San Diego, California, 2016.
2. X. Zhang and S. Tan, A simple and accurate discontinuous Galerkin scheme for modeling scalar-wave propagation in media with curved interfaces, in Proc. SEG annual meeting, Denver, Oct 2014.
1. M. Leinonen, R. J. Hewett, X. Zhang, L. Ying, L. Demanet, Higher-dimensional wave atoms and compression of seismic datasets, in Proc. SEG annual meeting, Houston, Sept 2013.

PREPRINTS

1. T. Yu, S. Zheng, J. Lu, G. Menon and X. Zhang, Riemannian Langevin Monte Carlo schemes for sampling PSD matrices with fixed rank.
<https://arxiv.org/abs/2309.04072>
2. C. Liu, J. Hu, W. Taitano and X. Zhang, An optimization-based positivity-preserving limiter in semi-implicit discontinuous Galerkin schemes solving Fokker–Planck equations.
3. A. Anshika, D. Ghosh and X. Zhang, A Three-Operator Splitting Scheme Derived from Three-Block ADMM, submitted to MOPTA 24 special issue of Optimization and Engineering.
4. C. Liu. Z. Sun and X. Zhang, A bound-preserving Runge–Kutta discontinuous Galerkin method with compact stencils for hyperbolic conservation laws. arXiv: 2412.16002.

TALKS & PRESENTATIONS

- Invited talk, minisymposium *New Perspectives on Numerical Methods for Multiscale and Multiphysics Problems (CAMWA50)*, The European Conference on Numerical Mathematics and Advanced Applications (ENUMATH), Heidelberg, Germany, Sep 1-5, 2025.
- Invited talk, workshop *Modeling and Simulation of Transport Phenomena (MoST 2025)*, Moselle Valley, Germany, July 28-31, 2025.
- CCAM Lunch Seminar, Department of Mathematics, Purdue University, April 25, 2025.
- Bridge to Research Seminar, Department of Mathematics, Purdue University, April 7, 2025.

- Scientific Computing Seminar, Division of Applied Mathematics Brown University, Mar 2025.
- Computational and Applied Mathematics Colloquium, Penn State University, Oct 2024.
- Invited talk, workshop on *Spectral Analysis of Schrödinger Operators*, ICERM, Providence, Rhode Island, Aug 2024.
- Invited minisymposium talk, Conference on *Modeling and Optimization: Theory and Applications (MOPTA)*, Lehigh University, Bethlehem, Pennsylvania, Aug 2024.
- Minisymposium talk, minisymposium *Geometric Methods for Matrix Spaces*, SIAM Conference on Applied Linear Algebra, Paris, France, May 2024.
- Minisymposium talk, Midwest Numerical Analysis Day, Department of Mathematics, The University of Iowa, Iowa City, Iowa, Apr 13-14, 2024.
- Probability Seminar, Purdue University, Apr 10, 2024
- Minisymposium talk, 7th Chilean Workshop on Numerical Analysis of Partial Differential Equations (WONAPDE 2024), University of Concepcion, Concepcion, Chile, Jan 2024.
- Invited talk, *Opening Workshop on Recent Advances in Numerical Methods for Hyperbolic Conservation Laws*, Shenzhen International Center of Mathematics at Southern University of Science and Technology, Shenzhen, China, Dec 2023.
- Seminar talk, Department of Applied Mathematics, The Hong Kong Polytechnic University, Dec 2023.
- Seminar talk, Department of Mathematics, Hong Kong University of Science and Technology, Dec 2023.
- Talk at Conference on Fast Direct Solvers, CCAM, Purdue University, West Lafayette, Indiana, Nov 2023.
- Invited talk at workshop *New Trends in Kinetic and Optimal Transport*, School of Mathematics, University of Minnesota, Minneapolis, Minnesota, Oct 2023.
- Seminar of Mathematical Sciences, Michigan Tech University, Oct 2023.
- Numerical Analysis Seminar, University of Maryland, College Park, Oct 2023.
- CCAM seminar talk, Purdue University, Sept 2023.
- Minisymposium talk, International Congress on Industrial and Applied Mathematics (ICIAM 2023), Tokyo, Japan, Aug 2023.
- **Plenary talk**, International Conference on Spectral and High Order Methods (ICOSAHOM), Seoul, Korea, Aug 2023.
- **Invited 45 minutes lecture** (postponed/cancelled due to pandemic restrictions), the 9th International Congress of Chinese Mathematicians (ICCM2022), Beijing, China, June 27 to July 2, 2022.
- Minisymposium talk, USNCCM 17 (US National Congress on Computational Mechanics), Albuquerque, New Mexico, July 2023.
- *Lefschetz Center for Dynamical Systems* Seminar, Division of Applied Mathematics Brown University, Feb and May 2023.
- Scientific Computing Seminar, Division of Applied Mathematics Brown University, Feb 2023.
- Numerical Analysis and Scientific Computing Seminar, the University of Waterloo, virtual talk, Nov 2022.

- Numerical Analysis & PDE Seminar, University of Delaware, Oct 2022.
- Applied Mathematics Seminar, Duke University, Oct 2022.
- Applied Mathematics Seminar, Texas Tech University, virtual talk, Sept 2022.
- Chinese Academy of Science, virtual talk, Aug 2022.
- CAM lectures, Southern University of Science and Technology, virtual talk, July 2022.
- Seminar on Applied Mathematics, Hong Kong University of Science and Technology, virtual talk, Apr 26, 2022.
- Poster Presentation, New trends in scientific computing, IPAM, UCLA, Los Angeles, California, Apr 20-22 2022.
- Departmental Colloquium talk, Old Dominion University, virtual talk, Apr 21, 2022.
- Applied and Computational Mathematics and Statistics, seminar talk, Notre Dame University, Mar 17, 2022.
- Applied and Computational Mathematics Seminar, University of Wisconsin Madison, Mar 4, 2022.
- Invited talk, International Workshop on Physical Property-Preserving Numerical Methods for PDEs, Ocean University of China, Qingdao, China, virtual talk, Nov 13 - 14, 2021.
- Minisymposium talk, International Conference on Spectral and High Order Methods (ICOSAHOM), virtual talk, July 2021.
- Seminar talk, Ocean University of China, virtual talk, Apr 2021.
- CCAM seminar, Purdue University, virtual talk, Apr 2021.
- Minisymposium talk, SIAM CSE conference, virtual talk, Mar 2, 2021.
- Data science seminar, Purdue University, virtual talk, Nov 2020.
- Invited talk, workshop on high order WENO methods, Xiamen University, Xiamen, China, virtual talk, Nov 2020.
- One hour lecture on high order numerical methods, University of Science and Technology of China, Hefei, China, virtual talk, Aug 2020.
- Numerical analysis seminar, University of Colorado Boulder, Oct 2019.
- Invited talk, Second Conference on Scientific and Engineering Computing for Young Chinese Scientists, Beijing, China, Aug 2019.
- Invited talk, 11th International Conference on Scientific Computing and Applications, Xiamen, China, May 2019.
- TDS (SciDAC) Webinar, Los Alamos National Laboratory, virtual talk, May 2019.
- Minisymposium talk, SIAM CSE conference, Spokane, Washington, Feb 25 - Mar 1, 2019.
- *High Order Structure-Preserving Numerical Methods: Algorithms, Analysis, and Applications*, Workshop at Tsinghua Sanya International Mathematics Forum, Sanya, China, Jan 2019.
- Numerical Analysis Seminar, Texas A & M, Sept 26, 2018.
- SIAM Great Lakes Section Annual Meeting, Wayne State University, Detroit, Michigan, Apr 2018.
- Numerical Analysis Seminar, University of Maryland, College Park, Apr 2018.

- Workshop *Recent advances and applications in discontinuous Galerkin methods*, Harbin, China, July 2017.
- SIAM CSE Conference, Atlanta, Georgia, Feb 2017.
- Institute of Mathematical Sciences Colloquium, Renmin University of China, Dec 2016.
- The Third International Workshop on Development and Application of High-Order Numerical Methods, Hefei, China, Dec 2016.
- School of Mathematical Sciences Seminar, Ocean University of China, Dec 2016.
- International Conference on Spectral and High Order Methods (ICOSAHOM), Rio de Janeiro, Brazil, June 2016.
- 10th International Conference on Scientific Computing and Applications, Toronto, Canada, June 2016.
- Applied Mathematics Seminar, UC Berkeley, Apr 2016.
- Applied Mathematics Seminar, Michigan State University, Apr 2016.
- Mathematical Sciences Colloquium, Rensselaer Polytechnic Institute, Oct 2015.
- ACMS Colloquium, University of Notre Dame, Sept 2015.
- International Council for Industrial and Applied Mathematics, Beijing, China, Aug 2015.
- The International Workshop on Moving Mesh and High Order Numerical Methods, Xiamen, China, Aug 2015.
- National Center for Mathematics and Interdisciplinary Sciences Seminar, University of Science and Technology of China, Aug 2015.
- SIAM Conference on Mathematical and Computational Issues in the Geosciences, Stanford, California, June 2015.
- BIRS Workshop *Higher Order Numerical Methods for Evolutionary PDEs: Applied Mathematics Meets Astrophysical Applications*, Banff, Canada, May 2015.
- CAM Seminar, Iowa State University, May 2015.
- SIAM Central States Section Conference, Rolla, Missouri, Apr 2015.
- SIAM CSE Conference, Salt Lake City, Utah, Mar 2015.
- 2014 SEG Annual Meeting, Denver, Colorado, Oct 2014.
- DG mini-symposium, The 6th European Conference on Computational Fluid Dynamics (ECFD VI), together with the 11th World Congress on Computational Mechanics (WCCM XI), Barcelona, Spain, July 2014.
- Mathematics Colloquium, Florida State University, Jan 2014.
- Mathematics Colloquium, Syracuse University, Jan 2014.
- Mathematics Colloquium, University of Southern California, Jan 2014.
- Mathematics Colloquium, Purdue University, Jan 2014.
- AMS-SIAM Special Session on Mathematics of Computation, Joint Mathematics Meetings, Baltimore, Maryland, Jan 2014.
- Mathematics Colloquium, UT Dallas, Dec 2013.
- Scientific Computing and Numerics Seminar, Cornell University, Dec 2013.
- Scientific Computing Seminar, UMass Dartmouth, Dec 2013.
- Minisymposium *Recent Developments in Numerical Methods for PDEs*, SIAM annual meeting, San Diego, California, July 2013.

- SIAM annual meeting, Minneapolis, Minnesota, July 2012.
- Mathematics Colloquium, The University of Iowa, Jan 2011.
- Minisymposium *Discontinuous Galerkin Methods*, 11th U.S. National Congress on Computational Mechanics, Minneapolis, Minnesota, July 2011.
- Minisymposium *Advances in High Order Numerical Methods for PDEs in Computational Mathematics*, 7th International Congress on Industrial and Applied Mathematics (ICIAM 2011), Vancouver, Canada, July 2011.
- Seminar talk, Mathematics Department, MIT, Jan 2011.
- AMS-SIAM Special Session on Mathematics of Computation, Joint Mathematics Meetings, New Orleans, Louisiana, Jan 2011.

TEACHING EXPERIENCE

Purdue University

Primary Instructor

- MA 528, Advanced Mathematics for Engineers and Physicists II, Spring 2025.
- MA 574 Numerical Optimization, Fall 2024.
- MA/CS 615 Numerical PDE, Spring 2017/2019/2020/2022/2024.
- MA 598 Topics on optimization, Spring 2023
- MA 341 Foundations of Analysis, Fall 2018, Fall 2022
- MA 351 Elementary Linear Algebra, Fall 2021, Fall 2023.
- MA 353 Linear Algebra II, Spring 2021
- MA 362 Topics in Vector Calculus, Fall 2017, Spring 2019, Spring 2020,
- MA 304 Differential Equations And Analysis Of Nonlinear Systems For Engineering And The Sciences, Spring 2018
- MA 303 ODE and PDE for Engineering and the Sciences, Fall 2016
- MA 511 Linear Algebra With Applications, Spring 2016
- MA 265 Linear Algebra, Fall 2014

MIT

Primary Instructor

- MA 18.086 Computational Science and Engineering II, Spring 2014.

Brown University

Primary Instructor

- Math 0520 *Linear Algebra*, Spring 2010
- Math 0200 *Multivariable Calculus (Physics/Engineering)*, Fall 2009, Fall 2010
- Math 0100 *Single Variable Calculus II*, Spring 2009
- Math 0180 *Multivariable Calculus*, Fall 2008

Teaching Assistant

- *Intermediate Calculus (Physics/Engineering)*, Spring 2008
- *Introductory Calculus I*, Fall 2007

Math Resource Center Tutor, Spring 2007

Teaching Certificate I, Sheridan Center for Teaching and Learning, Brown University, Aug 2007-May 2008

SERVICE AT
PURDUE

Department of Mathematics Committee Service:

- Applied Mathematics Committee, 2021-2025
- Computer Committee: 2016-2020
- Chair of Computer Committee: 2021-2025
- Personnel Committee: 2021-2023

Organizer of Center for Computational & Applied Mathematics Seminar: 2021-2022

Thesis/defense committees of Ph.D. students:

- Mr. Jielin Yang, Mathematics, 2025.
- Mr. Junpyo Choi, Mathematics, 2025.
- Dr./Mr. Xinyu Liu, Mathematics, 2024
- Dr./Ms. Brooke E Hejnal, Mathematics, 2024
- Dr./Mr. Qiyuan Pang, Mathematics, 2023
- Dr./Mr. Shiheng Zhang, Mathematics, 2023
- Dr./Mr. Jiahao Zhang, Mathematics, 2022
- Dr./Mr. Senwei Liang, Mathematics, 2022
- Dr./Ms. Jingshuang Chen, Mathematics, 2021
- Dr./Mr. Yiqi Gu, Mathematics, 2019
- Dr./Ms. Tian Jing, School of Nuclear Engineering, 2018

Thesis/defense committees of Master's students:

- Ms. Lei Qin, Earth, Atmospheric and Planetary Sciences, 2015
- Mr. Sashank Srinivasan, Aeronautics and Astronautics Engineering, 2017

Preliminary Exam or Advisory committees of Ph.D. students:

- Mr. Ashwin R Kidambi, Mechanical Engineering, 2024-
- Mr. Gareth Hardwick, Mathematics, 2024
- Mr. Cesar Andres Herrera Garro, Mathematics, 2024
- Ms. Anastassia Doktorova, Mathematics, 2023
- Ms. Tong Ding, Mathematics, 2022
- Ms. Brooke Hejnal, Mathematics, 2021
- Mr. Shiheng Zhang, Mathematics, 2021
- Mr. Senwei Liang, Mathematics, 2021
- Ms. Jingshuang Chen, Mathematics, 2018
- Mr. Jiahao Zhang, Mathematics, 2018

PROFESSIONAL
SERVICE

Referee for high school competitions:

Hang Lung Mathematics Awards for mathematical research of Hong Kong high school students: 2022, 2023.

Co-organizer of workshops and conference mini-symposiums:

With David Del Rey Fernandez, Sigal Gottlieb, Jie Shen, and Xiaofeng Yang, BIRS-IASM Workshop, *Structure Preserving Schemes for Complex Nonlinear Systems* on June 1 - 6, 2025.

With Chi-Wang Shu, *Recent advances of novel high order accurate methods for conservation laws*, International Conference on Spectral and High Order Methods, Seoul, Korea, Aug 14-18, 2023.

With Zhiqiang Cai and Jie Shen, *CCAM workshop: New trends in numerical methods for hyperbolic conservation laws*, Purdue University, May 9-10, 2022.

With Zheng Sun, *Special Session on Recent Developments in High Order Numerical Methods for Partial Differential Equations*, AMS spring central sectional meeting at Purdue University, Apr, 2022.

With Chen Liu, *Special Session on Recent Progress of Efficient and Robust Schemes for Compressible Navier-Stokes Equations*, AMS spring central sectional meeting at Purdue University, Apr, 2022.

with Jean-Luc Guermond, *Structure preserving techniques for hyperbolic systems*, SIAM CSE conference, Spokane, Washington, Feb 25 - Mar 1, 2019.

With Y. Xing, *Recent advances in structure preserving numerical methods for partial differential equations*, International Conference on Spectral and High Order Methods, London, UK, July 2018.

With B. Popov and J.-L. Guermond, *Positivity preserving and invariant domain preserving methods*, SIAM Conference on Computational Science and Engineering, Atlanta, Georgia, 2017

With Y. Cheng, *New advances in Discontinuous Galerkin methods*, International Conference on Spectral and High Order Methods, Rio de Janeiro, Brazil, June 2016

With Y. Xing, *Discontinuous Galerkin finite element methods for partial differential equations and their applications*, 10th International Conference on Scientific Computing and Applications, Toronto, Canada, June 2016.

Referee for research proposals:

Simons Foundation Collaboration Grants, 2019.

Swiss National Science Foundation, 2014, 2017, 2021, 2023

Computational Mathematics, DMS, *National Science Foundation*, 2016

Research Grants Council of Hong Kong, 2014

Referee for journals/proceedings:

Acta Applicandae Mathematicae

Advances in Applied Mathematics and Mechanics

Advances in Water Resources

Applied Mathematics and Computation

Applied Mathematics Letters

Applied Numerical Mathematics

Beijing Journal of Pure and Applied Mathematics

Communications in Computational Physics
Communications in Mathematical Sciences
Communications in Mathematics and Statistics
Communications on Applied Mathematics and Computation
Computers and Fluids
Computers and Mathematics with Applications
Computer Methods in Applied Mechanics and Engineering
Computer Physics Communications
Discrete and Continuous Dynamical System - B
Engineering Computations
ESAIM: Mathematical Modelling and Numerical Analysis (M2AN)
IEEE Transactions on Signal Processing
IMA Journal of Numerical Analysis
International Journal for Numerical Methods in Engineering
International Journal for Numerical Methods in Fluids
International Journal of Numerical Analysis and Modeling
Journal of Applied Mathematics
Journal of Computational and Applied Mathematics
Journal of Computational Mathematics
Journal of Computational Physics
Journal of Fluid Mechanics
Journal of Scientific Computing
Kinetic and Related Models
Mathematics and Computers in Simulation
Methods and Applications of Analysis
Mathematical Programming
Mathematics of Computation
Numerical Methods for Partial Differential Equations
Numerische Mathematik
Research in the Mathematical Sciences
Results in Applied Mathematics
SCIENCE CHINA Mathematics
SIAM Review
SIAM Journal on Matrix Analysis and Applications
SIAM Journal on Numerical Analysis
SIAM Journal on Optimization
SIAM Journal on Scientific Computing
Studies in Applied Mathematics