

Curriculum Vitae

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Education

- *Ph.D.* in Department of Mathematics, University of Science and Technology of China, Hefei, Anhui, P.R. China, June 2008.
Thesis Title: Development of Discontinuous Galerkin Methods for Nonlinear Problems and Time Discretization Methods
Advisor: Professor Chi-Wang Shu
- *B.Sc.* School of Mathematical Sciences, Nankai University, Tianjin, P.R. China, June 2001.

Academic Experience

- Professor: School of Mathematics Sciences, University of Science and Technology of China, January, 2025 - present
- Associate Professor: School of Mathematics Sciences, University of Science and Technology of China, July, 2010 - January, 2025
- Post-doctoral Research Associate: Division of Applied Mathematics & Department of Geological Sciences, Brown University, Providence, RI, USA, July 2008 - June 2010.
- Research Assistant: Department of Civil Engineering, University of Hong Kong, April 2007 - March 2008.

Short Term Visiting Positions

- Visiting Scholar: Institute of Mathematical Sciences, National University of Singapore, Singapore, December 23, 2019 - January 5, 2020.
- Visiting Professor: Department of Mathematics, University of Cologne, Germany, August 13-30, 2019.
- Visiting Scholar: Department of Mathematics, University Würzburg, August, 2013 - August, 2014
- Visiting Scholar: Department of Civil Engineering, University of Hong Kong, Hong Kong, January 17, 2011 - February 16, 2011, January 13, 2012- January 20, 2012.

Grants (PI: Principal Investigator)

- PI, APNSF grant 2408085J004, Structure preserving high-order numerical methods for hyperbolic balance laws, September 1, 2024 - August 31, 2027.
- PI, NSFC grant 12271498, Structure preserving filter for discontinuous Galerkin method for hyperbolic conservation laws, January 1, 2023 - December 31, 2026.
- PI, NSFC grant 11871449, Arbitrary Lagrangian-Eulerian discontinuous Galerkin method for hyperbolic balance laws and well-balanced schemes, January 1, 2019 - December 31, 2022.

- Co-PI, Adaptive discontinuous Galerkin methods, National Numerical Windtunnel grant NNW2019ZT4-B08, November 1, 2019 - December 31, 2021.
- Co-PI, Fast algorithm for the neutron transport problem, Science Challenge Project TZTZ2019-A2.3, November 1, 2019 - December 31, 2020.
- PI, NSFC grant 11471306, Numerical simulation and analysis for the conservation laws in moving domain, January 1, 2015 - December 31, 2018.
- Co-PI, NSFC grant 11371342, Numerical simulation and analysis for non-classical hyperbolic equations, January 1, 2014 - December 31, 2017.
- PI, NSFC grant 11101400, High order numerical methods for the gradient flows, January 1, 2012 - December 31, 2014.

Recent Invited Talks (Conference/workshop)

- ICM Special Program: Numerical Methods for Nonlinear Hyperbolic PDEs, SUSTech, December 9-15, 2023
- The Ninth International Congress of Chinese Mathematicians, Nanjing, August 6-11, 2022.
- The Fourth International Consortium of Chinese Mathematicians (ICCM) Annual Meeting, University of Science and Technology of China, Hefei, December 27-29, 2020.
- Workshop on “Nonlinear Problems: Numerics and Applications” -Tsinghua Sanya International Mathematics Forum, Sanya, January 12-16, 2020.
- “Quantum and Kinetic Problems: Modeling, Analysis, Numerics and Applications, Forum 1: Non-linear PDEs and Related Topics”, National University of Singapore, Singapore, December 26-30, 2019.
- Workshop on “High Order Structure-Preserving Numerical Methods Algorithms, Analysis and Applications” -Tsinghua Sanya International Mathematics Forum, Sanya, January 14-18, 2019.
- The Fourth International Workshop on Development and Application of High-Order Numerical Methods, Nanjing University, Nanjing, May 31 - June 4, 2018.
- Chinese Mathematical Society 2017 Annual Meeting, Xiangtan, October 21-23, 2017.
- Workshop on “Recent Advances in Finite Element Methods”, City University of Hong Kong, Hong Kong, March 13-15, 2017.
- The Seventh International Congress of Chinese Mathematicians, Beijing, August 6-11, 2016.
- Workshop: Higher Order Numerical Methods for Evolutionary PDEs: Applied Mathematics Meets Astrophysical Applications, Banff International Research Station for Mathematical Innovation and Discovery (BIRS) in Banff, Alberta, Canada, May 10-15, 2015.

Publications

- Journal papers (appeared or accepted)
 1. C. Qiu, J. Hou, Y. Xia and L. Shan, *A high order ensemble algorithm for dual-porosity-Navier-Stokes flows*, Journal of Computational Physics, 529 (2025), 113833.
 2. C. Jin, Y. Xia and Yan Xu. *Kernel compensation method for Maxwell eigenproblem in photonic crystals with mimetic finite difference discretizations*, Numerical Methods for Partial Differential Equations, 41:e23171 (2025).
 3. F. Yan and Y. Xia. *Analysis of average bound preserving time-implicit discretizations for convection-diffusion-reaction equation*, Applied Numerical Mathematics, 211 (2025), pp.103-122.

4. L. Wei, L. Zhou and Y. Xia. *The jump filter in the discontinuous Galerkin method for hyperbolic conservation laws*, Journal of Computational Physics, 520 (2025), 113498.
5. J. Zhang, Y. Xia and Y. Xu. *Well-balanced path-conservative discontinuous Galerkin methods with equilibrium preserving space for two-layer shallow water equations*, Journal of Computational Physics, 520 (2025), 113473.
6. S. Hou, Y. Chen and Y. Xia. *A reduced basis warm-start iterative solver for the parameterized linear systems*, Beijing Journal of Pure and Applied Mathematics, to appear.
7. L. Yao, Y. Xia and Y. Xu. *Stability of implicit deferred correction methods based on BDF methods*, Applied Mathematics Letters, 158 (2024), 109225.
8. L. Wei and Y. Xia. *Steady-state simulation of Euler equations by the discontinuous Galerkin method with the hybrid limiter*, Journal of Computational Physics, 515 (2024), 113288.
9. J. Zhang, Y. Xia and Y. Xu. *Equilibrium preserving space in discontinuous Galerkin methods for hyperbolic balance laws*, Communications in Computational Physics, to appear.
10. S. Hou and Y. Xia. *Discontinuous Galerkin method based on the reduced space for the nonlinear convection-diffusion-reaction equation*, Journal of Scientific Computing, 99:19 (2024).
11. L. Wei and Y. Xia, *An indicator-based hybrid limiter in discontinuous Galerkin methods for hyperbolic conservation laws*, Journal of Computational Physics, **498** (2024), 112676.
12. L. Yao, Y. Xia and Y. Xu, *L-stable spectral deferred correction methods and applications to phase field models*, Applied Numerical Mathematics, **197** (2024), pp. 288-306.
13. F. Yan, J.J.W. van der Vegt, Y. Xia and Y. Xu, *Entropy dissipative higher order accurate positivity preserving time-implicit discretizations for nonlinear degenerate parabolic equations*, Journal of Computational and Applied Mathematics, **441** (2024), 115674.
14. F. Yan, J.J.W. van der Vegt, Y. Xia and Y. Xu, *Higher order accurate bounds preserving time-implicit discretizations for the chemically reactive Euler equations*, Communications in Computational Physics, to appear.
15. W. Zhang, Y. Xing, Y. Xia and Y. Xu. *High order structure-preserving arbitrary Lagrangian-Eulerian discontinuous Galerkin methods for the Euler equations under gravitational fields*, Computers and Mathematics with Applications, **146** (2023), pp. 339-359.
16. R. Guo, and Y. Xia. *Arbitrary high-order fully-decoupled numerical schemes for phase-field models of two-phase incompressible flows*, Communications on Applied Mathematics and Computation, **6** (2024), pp. 625-657.
17. J. Zhang, Y. Xia, and Y. Xu. *Moving water equilibria preserving discontinuous Galerkin method for the shallow water equations*, Journal of Scientific Computing, **95**:48 (2023).
18. Y. Wan, and Y. Xia. *A hybrid WENO scheme for steady Euler equations in curved geometries on Cartesian grids*, Communications in Computational Physics, **33** (2023), pp. 1270-1331.
19. J. Zhang, Y. Xia, and Y. Xu. *Structure-preserving finite volume arbitrary Lagrangian-Eulerian WENO schemes for the shallow water equations*, Journal of Computational Physics, **473** (2023), 111758.
20. P. Fu, and Y. Xia, *The positivity preserving property on the high order arbitrary Lagrangian-Eulerian discontinuous Galerkin method for Euler equations*, Journal of Computational Physics, **470** (2022), 111600.
21. S. Hou, Y. Chen, and Y. Xia, *Fast L2 optimal mass transport via reduced basis methods for the Monge-Ampère equation*, SIAM Journal of Scientific Computing, **44**(6) (2022), A3536-A3559.
22. Y. Liu, J. Lu, Q. Tao and Y. Xia, *An oscillation-free discontinuous Galerkin method for shallow water equations*, Journal of Scientific Computing, **92**:109 (2022).
23. Y. Wan, and Y. Xia, *A hybrid WENO scheme for steady-state simulations of Euler equations*, Journal of Computational Physics, **463** (2022), 111292.
24. Z. Xue, Y. Xia, C. Li and X. Yuan, *A simplified multilayer perceptron detector for the hybrid WENO scheme*, Computers and Fluids, **244** (2022), 105584.

25. B. Li, Y. Xia and Z. Yang, *Optimal convergence of arbitrary Lagrangian-Eulerian iso-parametric finite element methods for parabolic equations in an evolving domain*, IMA Journal of Numerical Analysis, **43** (2023), pp. 501-534.
26. W. Zhang, Y. Xing, Y. Xia and Y. Xu, *High-order positivity-preserving well-balanced discontinuous Galerkin methods for Euler equations with gravitation on unstructured meshes*, Communications in Computational Physics, **32** (2022), pp. 771-815.
27. L. Zhou and Y. Xia, *Arbitrary Lagrangian-Eulerian local discontinuous Galerkin method for linear convection-diffusion equations*, Journal of Scientific Computing, **90**:21 (2022).
28. W. Zhang, Y. Xia and Y. Xu, *Positivity-preserving well-balanced arbitrary Lagrangian-Eulerian discontinuous Galerkin methods for the shallow water equations*, Journal of Scientific Computing, **88**:57 (2021).
29. Y. Wan and Y. Xia, *A new hybrid WENO scheme with the high-frequency region for hyperbolic conservation laws*, Communications on Applied Mathematics and Computation, **5** (2023), pp. 199-234.
30. X. Hong and Y. Xia, *Arbitrary Lagrangian-Eulerian discontinuous Galerkin methods for KdV type equations*, Communications on Applied Mathematics and Computation, **4** (2022), pp. 530-562.
31. C. Zhang, Y. Xu and Y. Xia, *Local discontinuous Galerkin methods to a dispersive system of KdV-type equations*, Journal of Scientific Computing, **86**:4 (2021).
32. J. Zhao, Q. Zhang, Y. Yang and Y. Xia, *Conservative discontinuous Galerkin methods for the nonlinear Serre equations*, Journal of Computational Physics, **421** (2020), 109729.
33. Y. Li, J. Cheng, Y. Xia and C.-W. Shu, *On moving mesh WENO schemes with characteristic boundary conditions for Hamilton-Jacobi equations*, Computers and Fluids, **205** (2020), 104582.
34. Q. Zhang, and Y. Xia, *Discontinuous Galerkin methods for the Ostrovsky-Vakhnenko equation*, Journal of Scientific Computing, **82**:24, (2020).
35. X. Hong, and Y. Xia, *Arbitrary Lagrangian-Eulerian discontinuous Galerkin method for hyperbolic equations involving δ -singularities*, SIAM Journal on Numerical Analysis, **58** (2020), pp. 125-152.
36. Q. Zhang, and Y. Xia, *Discontinuous Galerkin methods for short pulse type equations via hodograph transformations*, Journal of Computational Physics, **399** (2019), 108928.
37. Y. Li, J. Cheng, Y. Xia and C.-W. Shu, *High order arbitrary Lagrangian-Eulerian finite difference WENO scheme for Hamilton-Jacobi equations*, Communications in Computational Physics, **26** (2019), pp. 1530-1574.
38. J.J.W. van der Vegt, Y. Xia and Y. Xu, *Positivity preserving limiters for time-implicit higher order accurate discontinuous Galerkin discretizations*, SIAM Journal on Scientific Computing, **41** (2019), pp. A2037-A2063.
39. Q. Tao, and Y. Xia, *Error estimates and post-processing of local discontinuous Galerkin method for Schrödinger equations*, Journal of Computational and Applied Mathematics, **356** (2019), pp. 198-218.
40. P. Fu, G. Schnücker, and Y. Xia, *Arbitrary Lagrangian-Eulerian discontinuous Galerkin method for conservation laws on moving simplex meshes*, Mathematics of Computation, **88** (2019), pp. 2221-2255.
41. C. Zhang, Y. Xu and Y. Xia, *Local discontinuous Galerkin methods for the μ -Camassa-Holm and μ -Degasperis-Procesi equations*, Journal of Scientific Computing, **79** (2019), pp. 1294-1334.
42. C. Sun, and Y. Xia, *Asymptotic preserving spectral deferred correction methods for hyperbolic systems with relaxation*, Communications in Computational Physics, **26** (2019), pp. 531-557.
43. L. Zhou, Y. Xia, and C.-W. Shu, *Stability analysis and error estimates of arbitrary Lagrangian-Eulerian discontinuous Galerkin method coupled with Runge-Kutta time-marching for linear conservation laws*, ESAIM: Mathematical Modelling and Numerical Analysis, **53** (2019), pp. 105-144.

44. Q. Zhang, and Y. Xia, *Conservative and dissipative local discontinuous Galerkin methods for Korteweg-de Vries type equations*, Communications in Computational Physics, **25** (2019), pp. 532-563.
45. Z. Cao, P. Fu, L.-W. Ji, and Y. Xia, *Application of local discontinuous Galerkin method to Einstein equations*, International Journal of Modern Physics D, **28** (2019), 1950014.
46. C. Klingenberg, G. Schnücke, and Y. Xia, *An arbitrary Lagrangian-Eulerian local discontinuous Galerkin method for Hamilton-Jacobi equations*, Journal of Scientific Computing, **73** (2017), pp. 906-942.
47. R. Guo, Y. Xia and Y. Xu, *Semi-implicit spectral deferred correction methods for highly nonlinear partial differential equations*, Journal of Computational Physics, **338** (2017), pp.269-284.
48. Y. Xia, Y. Xu, *Weighted essentially non-oscillatory schemes for Degasperis-Procesi equation with discontinuous solutions*, Annals of Mathematical Sciences and Applications, **2** (2017), pp.319-340.
49. C. Klingenberg, F. Pörner, and Y. Xia, *An efficient implementation of the divergence free constraint in a discontinuous Galerkin method for magnetohydrodynamics on unstructured meshes*, Communications in Computational Physics, **21** (2017), pp. 423-442.
50. C. Klingenberg, G. Schnücke, and Y. Xia, *Arbitrary Lagrangian-Eulerian discontinuous Galerkin method for conservation laws: analysis and application in one dimension*, Mathematics of Computation, **86** (2017), pp. 423-442.
51. Y. Xia, *A fully discrete stable discontinuous Galerkin method for the thin film epitaxy problem without slope selection*, Journal of Computational Physics, **280** (2015), pp. 248-260.
52. Y. Xia, *Fourier spectral methods for Degasperis-Procesi equation with discontinuous solutions*, Journal of Scientific Computing, **61** (2014), pp. 584-603.
53. R. Guo, Y. Xia, and Y. Xu *An efficient fully-discrete local discontinuous Galerkin method for the Cahn-Hilliard-Hele-Shaw system*, Journal of Computational Physics, **264** (2014), pp.23-40.
54. Y. Xia, Y. Xu, *A Conservative Local Discontinuous Galerkin Method for the Schrödinger-KdV System*, Commun. Comput. Phys., **15**(2014), pp. 1091-1107.
55. W. Zhu, L.-L Feng, Y. Xia, C.-W. Shu, Q. Gu, and L.-Z. Fang, *Turbulence in the intergalactic medium: solenoidal and dilatational motions and the impact of numerical viscosity*, The Astrophysical Journal, 777:48 (2013).
56. Y.Z.Tao, Y.Q. Jiang, J.Du, S.C.Wong, P.Zhang, Y.H.Xia, K.Choi, *Dynamic system-optimal traffic assignment for a city using the continuum modeling approach*, Journal of Advanced Transportation, **48** (2014), pp. 782-797.
57. R.-Y. Guo, S. C. Wong; Y. Xia, H.-J. Huang, W. H. K. Lam, and K. Choi, *Empirical Evidence for the Look-Ahead Behavior of Pedestrians in Bi-directional Flows*, Chinese Physics Letter, **29** (2012), 068901.
58. 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, **50** (2012), pp.29-62.
59. Y. Xia, Y. Xu and C.-W. Shu, *Local discontinuous Galerkin methods for the generalized Zakharov system*, Journal of Computational Physics, **229** (2010), pp.1238-1259.
60. Y. Xia, S.C. Wong and C.-W. Shu, *Dynamic continuum pedestrian flow model with memory effect*, Physical Review E, **79** (2009), 066113.
61. L. Huang, Y. Xia, S.C. Wong, C.-W. Shu, M. Zhang and W.H.K. Lam, *A dynamic continuum model for bi-directional pedestrian flows*, Proceedings of the Institution of Civil Engineers, Engineering and Computational Mechanics, **162** (2009), pp.67-75.
62. Y. Xia, Y. Xu and C.-W. Shu, *Application of the local discontinuous Galerkin method for the Allen-Cahn/Cahn-Hilliard system*, Communications in Computational Physics, **5** (2009), pp. 821-835.
63. Y. Xia, S.C. Wong, M.P. Zhang, C.-W. Shu and W.H.K. Lam, *An efficient discontinuous Galerkin method on triangular meshes for a pedestrian flow model*, International Journal for Numerical Methods in Engineering, **76** (2008), pp. 337-350.

64. Y. Xia, Y. Xu and C.-W. Shu, *Local discontinuous Galerkin method for Cahn-Hilliard type equations*, Journal of Computational Physics, **227** (2007), pp. 472-491.
 65. Y. Xia, Y. Xu and C.-W. Shu, *Efficient time discretization for local discontinuous Galerkin methods*, Discrete and Continuous Dynamical Systems - Series B, **8** (2007), pp. 677-693.
 66. D. Xiao, J.X. Ma, Y. Li, Y. Xia and M.Y. Yu, *Evolution of nonlinear dust-ion-acoustic waves in an inhomogeneous plasma*, Physics of Plasmas **13** (2006), 052308.
- Publications in Proceedings
 1. Y. Xia, L. Huang, S.C. Wong, M. Zhang, C.-W. Shu and W.H.K. Lam, The follow-the-crowd effect in a pedestrian flow model, the Proceedings of the 12th International Conference of Hong Kong Society for Transportation Studies, December 2007, Hong Kong, pp.309-317.
 2. Y. Liang, A. Schiemenz, Y. Xia and M. Parmentier, High porosity harzburgite and dunite channels for the transport of compositionally heterogeneous melts in the mantle: II. Geochemical consequences, AGU Fall meeting, 2009.
 3. Y. Liang, Y. Xia and P. Bons, Grain growth and dissolution during crystal-melt interaction, Conference on Goldschmidt 2010 - Earth, Energy, and the Environment.
 4. J. Gallego, J. Loebbert, P. Bastian, C. Klingenberg, Y. Xia, Implementing a discontinuous Galerkin method for the compressible, inviscid Euler equations in the DUNE framework, Proceedings in Applied Mathematics and Mechanics, Vol. 14,1 (2014).
 5. C. Klingenberg, G. Schnücker, and Y. Xia, An arbitrary Lagrangian-Eulerian discontinuous Galerkin method for conservation laws: Entropy stability, In: Klingenberg C., Westdickenberg M. (eds) Theory, Numerics and Applications of Hyperbolic Problems II. HYP 2016, pp. 209-219. Springer Proceedings in Mathematics & Statistics, vol 237. Springer, Cham.