

# 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

- Associate Professor: School of Mathematics Sciences, University of Science and Technology of China, July, 2010 - present.
- 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, 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 TZZT2019-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)

- 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. 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.
  2. 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.
  3. 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.
  4. 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.
  5. 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.
  6. 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.

7. Y. Xia, S.C. Wong and C.-W. Shu, *Dynamic continuum pedestrian flow model with memory effect*, Physical Review E, **79** (2009), 066113.
8. 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.
9. 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.
10. 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.
11. 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.
12. 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).
13. Y. Xia, Y. Xu, *A Conservative Local Discontinuous Galerkin Method for the Schrödinger-KdV System*, Commun. Comput. Phys., **15**(2014), pp. 1091-1107.
14. 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.
15. Y. Xia, *Fourier spectral methods for Degasperis-Procesi equation with discontinuous solutions*, Journal of Scientific Computing, **61** (2014), pp. 584-603.
16. 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.
17. 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.
18. 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.
19. 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.
20. 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.
21. 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.
22. 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.
23. 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.
24. 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..
25. 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.
26. C. Zhang, Y. Xu and Y. Xia, *Local discontinuous Galerkin methods for the  $\mu$ -Camassa-Holm and  $\mu$ -Degasperis-Procesi equations*, Journal of Scientific Computing, **79** (2019), pp. 1294-1334.

27. P. Fu, G. Schnücke, and Y. Xia, *Arbitrary Lagrangian-Eulerian discontinuous Galerkin method for conservation laws on moving simplex meshes*, Mathematics of Computation, **88** (2019), pp. 2221-2255.
28. 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.
29. 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.
30. 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.
31. Q. Zhang, and Y. Xia, *Discontinuous Galerkin methods for short pulse type equations via hodograph transformations*, Journal of Computational Physics, **399** (2019), 108928.
32. X. Hong, and Y. Xia, *Arbitrary Lagrangian-Eulerian discontinuous Galerkin method for hyperbolic equations involving  $\delta$ -singularities*, SIAM Journal on Numerical Analysis, **58** (2020), pp. 125-152.
33. Q. Zhang, and Y. Xia, *Discontinuous Galerkin methods for the Ostrovsky-Vakhnenko equation*, Journal of Scientific Computing, **82**:24, (2020).
34. 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.
35. 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.
36. 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).
37. 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.
38. 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.
39. 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).
40. L. Zhou and Y. Xia, *Arbitrary Lagrangian-Eulerian local discontinuous Galerkin method for linear convection-diffusion equations*, Journal of Scientific Computing, **90**:21 (2022).
41. 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.
42. 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.
43. 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.
44. Y. Wan, and Y. Xia, *A hybrid WENO scheme for steady-state simulations of Euler equations*, Journal of Computational Physics, **463** (2022), 111292.
45. 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).
46. S. Hou, Y. Chen, and Y. Xia, *Fast  $L^2$  optimal mass transport via reduced basis methods for the Monge-Ampère equation*, SIAM Journal of Scientific Computing, **44**(6) (2022), A3536-A3559.

47. 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.
  48. 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.
  49. 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.
  50. 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).
  51. 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.
  52. 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.
  53. 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.
  54. 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.
  55. L. Yao, Y. Xia and Y. Xu, *L-stable spectral deferred correction methods and applications to phase field models*, Applied Numerical Mathematics, **197** (2024), 288-306.
  56. 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.
  57. 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).
- 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. Schnücke, 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.