

# 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 2005.  
*Thesis Title:* Local Discontinuous Galerkin Methods for Nonlinear Wave Equations  
*Advisor:* Professor Chi-Wang Shu
- *M.Sc.* in School of Mathematical Sciences, Tianjin Normal University, Tianjin, P.R. China, June 2003.  
*Thesis Title:* Application of Discrete Functional Analysis for Burgers-KdV Equations (in Chinese)  
*Advisor:* Professor Shao-Hong Zhu
- *B.Sc.* in Department of Mathematics, Tianjin Normal University, Tianjin, P.R. China, June 2000.

## Academic Experience

- Associate Professor: Department of Mathematics, University of Science and Technology of China, December 2007 – present.
- Alexander von Humboldt-Foundation, Humboldt Research Fellowship: Department of Applied Mathematics, Freiburg University, Freiburg, Germany, September 2009 – present.
- Research visitor: Division of Applied Mathematics, Brown University, Providence, USA, January 21, 2010 – February 20, 2010.
- Research visitor: Delft Institute of Applied Mathematics, Delft University of Technology, the Netherlands, November 9–November 12, 2009.
- Research visitor: Division of Applied Mathematics, Brown University, Providence, USA, January 2, 2009 – February 15, 2009.

- Lecturer: Department of Mathematics, University of Science and Technology of China, July 2005 – December 2007.
- Post-doctoral Research Associate: Department of Applied Mathematics, University of Twente, the Netherlands, August 2005 – July 2007.
- Research visitor: Division of Applied Mathematics, Brown University, Providence, USA, July 22, 2006 – August 11, 2006.
- Research visitor: Department of Applied Mathematics, University of Twente, the Netherlands, February 1, 2005 – March 31, 2005.

## Research Interests

- Numerical solutions of conservation laws and in general convection dominated problems using high order methods such as
  - Finite difference/finite volume weighted ENO (WENO) methods.
  - Finite element discontinuous Galerkin (DG) methods.
- Numerical solutions of nonlinear wave equations using local discontinuous Galerkin (LDG) methods.
- Numerical solutions of water wave equations with free-surface using space-time discontinuous Galerkin (STDG) methods.
- Numerical solutions of incompressible Navier-Stokes equations using DG methods.
- Discontinuous Hamiltonian Finite Element Method for Bilinear Poisson Brackets.

## Publications in Refereed Journals (Appeared or Accepted)

1. Y. Xu, *The convergence and stability of difference solutions for Burgers-KdV equation* (in Chinese), Journal of Tianjin Normal University (Natural Science Edition), **22** (2002), pp.33–37.
2. Y. Xu and C.-W. Shu, *Local discontinuous Galerkin methods for three classes of nonlinear wave equations*, Journal of Computational Mathematics, **22** (2004), pp.250–274.
3. Y. Xu, *The convergence and stability of difference solutions for a class of coupled KdV equation* (in Chinese), Journal of Engineering Mathematics, **22** (2005), pp.47–52.
4. Y. Xu and C.-W. Shu, *Local discontinuous Galerkin methods for nonlinear Schrödinger equations*, Journal of Computational Physics, **205** (2005), pp.72–97.

5. Y. Xu and C.-W. Shu, *Local discontinuous Galerkin methods for two classes of two dimensional nonlinear wave equations*, Physica D, **208** (2005), pp.21-58.
6. Y. Xu and C.-W. Shu, *Local discontinuous Galerkin methods for the Kuramoto-Sivashinsky equations and the Ito-type coupled KdV equations*, Computer Methods in Applied Mechanics and Engineering, **195** (2006), pp.3430-3447.
7. J.J.W. van der Vegt and Y. Xu, *Space-Time Discontinuous Galerkin Method for Nonlinear Water Waves*, Journal of Computational Physics, **224** (2007), pp.17-39.
8. Y. Xu and C.-W. Shu, *Error estimates of the semi-discrete local discontinuous Galerkin method for nonlinear convection-diffusion and KdV equations*, Computer Methods in Applied Mechanics and Engineering, **196** (2007), pp.3805-3822.
9. 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.
10. Y. Xia, Y. Xu and C.-W. Shu, *Local Discontinuous Galerkin Methods for the Cahn-Hilliard type equations*, Journal of Computational Physics, **227** (2007), pp.472-491.
11. Y. Xu and C.-W. Shu, *A local discontinuous Galerkin method for the Camassa-Holm equation*, SIAM Journal on Numerical Analysis, **46** (2008), pp.1998-2021.
12. Y. Xu, J.J.W. van der Vegt and O. Bokhove, *Discontinuous Hamiltonian finite element method for bilinear Poisson brackets*, Journal of Scientific Computing, **35** (2005), pp.241-265.
13. Y. Xu and C.-W. Shu, *Local discontinuous Galerkin method for the Hunter-Saxton equation and its zero-viscosity and zero-dispersion limit*, SIAM Journal on Scientific Computing, **31** (2008), pp. 1249-1268.
14. 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.
15. Y. Xu and C.-W. Shu, *Local discontinuous Galerkin method for surface diffusion and Willmore flow of graphs*, Journal of Scientific Computing, **40** (2009), pp.375-390.
16. Y. Xu and C.-W. Shu, *Local discontinuous Galerkin methods for high-order time-dependent partial differential equations*, Communications in Computational Physics, **7** (2010), pp. 1-46.
17. 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.
18. Y. Xu and C.-W. Shu, *Dissipative numerical methods for the Hunter-Saxton equation*, Journal of Computational Mathematics, to appear.

## Publications in Refereed Proceedings

19. Y. Xu and C.-W. Shu, *Preliminary results in local discontinuous Galerkin methods for two classes of 2D nonlinear wave equations (Abstract)*, in Abstracts of the Papers Presented at the Minisymposia Sessions of the Sixth World Congress on Computational Mechanics in conjunction with the Second Asian-Pacific Congress on Computational Mechanics, Z.H. Yao, M.W. Yuan and W.X. Zhong, editors, Tsinghua University Press & Springer, 2004, p.212.
20. Y. Xu and J.J.W. van der Vegt, *Space-Time Discontinuous Galerkin Method for Large Amplitude Nonlinear Water Waves*, Computational Fluid Dynamics 2006: Proceedings of the Fourth International Conference on Computational Fluid Dynamics, ICCFD, Ghent, Belgium, July 10-14, 2006, H. Deconinck and E. Dick, (Eds.), Springer, 2009, pp. 53-58.

## Preprint

21. L. Ji and Y. Xu, *Optimal error estimates of the local discontinuous Galerkin method for surface diffusion of graphs on Cartesian meshes*, submitted to SIAM Journal on Numerical Analysis.
22. L. Ji and Y. Xu, *Optimal error estimates of the local discontinuous Galerkin method for Willmore flow of graphs on Cartesian meshes*, submitted to International Journal of Numerical Analysis & Modeling.

## Teaching

Courses Taught at Department of Mathematics, University of Science and Technology of China.

- Spring 2008, MA05135, Finite Difference Methods for Initial Boundary Value Problems of Partial Differential Equation.
- Spring 2008, 00151107, Computational methods (B).
- Fall 2008, MA06425, Numerical Methods for Nonlinear Hyperbolic Equations.
- Spring 2009, 00151101, Computational methods (B).
- Spring 2009, 00151107, Computational methods (B).

## Referee for Journals

- SIAM Journal on Numerical Analysis
- Journal of Computational Physics

- Computer Methods in Applied Mechanics and Engineering
- Journal of Scientific Computing
- Communication in Computational Physics
- Discrete and Continuous Dynamical Systems - Series B
- Mathematics and Computers in Simulation
- Journal of Computational Mathematics
- Science in China Series A-Mathematics
- Nonlinear Analysis: Modelling and Control

## Memberships

- American Mathematical Society

## Awards

- National Excellent Doctoral Dissertation of PR China, 2008.
- Excellent Doctor Dissertation of the Chinese Academy of Sciences, 2007.
- Qiu Shi Graduate Student Scholarship, 2004, University of Science and Technology of China.
- Excellent Graduate Scholarship, 2001–2002, Tianjin Normal University.
- Award for Tianjin Excellent Undergraduate Students, 1999; Wang Ke-Chang Scholarship for Excellent Undergraduate Students, 1998; Excellent Undergraduate Scholarship, 1996–2000, Tianjin Normal University.

## Computer Experience

- Operating systems: Unix, Linux, Windows.
- Programming languages: FORTRAN, Matlab, C.
- Experience in high performance scientific computing and in parallel computing using MPI on various parallel computers (SGI Origin 3800, HP Superdome, Linux Cluster).
- Software: working knowledge of standard business and mathematical software, including Matlab, Mathematica, Maple, Tecplot, LAPACK, BLAS, L<sup>A</sup>T<sub>E</sub>X, MSWord etc.

## Conferences/Workshops

- Invited Talk:

- Mini-Symposium on “Discontinuous Galerkin Methods Theory and Applications”, at Sixth World Congress on Computational Mechanics in conjunction with the Second Asian-Pacific Congress on Computational Mechanics, Beijing, China, Sept. 5–10, 2004.

Presentation: *Local discontinuous Galerkin methods for two classes of two dimensional nonlinear wave equations.*

- Mini-Symposium on “High order numerical methods for convection dominated problems and applications”, Second International Conference on Scientific Computing and Partial Differential Equations and First East Asia SIAM Conference, Hong Kong Baptist University, December 12-16, 2005.

Presentation: *Space-time discontinuous Galerkin method for nonlinear water waves.*

- Mini-Symposium on “Discontinuous Galerkin Methods”, at Seven World Congress on Computational Mechanics, Los Angeles, California, July 16 - 22, 2006.

Presentation: *Discontinuous Hamiltonian Finite Element Method for a Bilinear Poisson Bracket.*

- Workshop on discontinuous Galerkin method and its applications, Beijing International Center for Computational Physics, June 13-17, 2007, Beijing, P.R. China.

Presentation: *Discontinuous Hamiltonian Finite Element Method for Bilinear Poisson Brackets*

- Mini-Symposium on “High order discontinuous Galerkin methods and application”, International Conference On Spectral and High Order Methods (ICOSAHOM07), Institute of Computational Mathematics Chinese Academy of Sciences, Beijing, P.R. China June 18- 22, 2007

Presentation: *Space-time discontinuous Galerkin method for nonlinear water waves.*

- The 8th Congress on Computational Mathematics of China, Sichuan University, Sichuan Chengdu, P.R. China, Oct. 25-29, 2007.

Presentation: *A local discontinuous Galerkin method for the Camassa-Holm equation.*

- Seminar of scientific computing group, University of Science and Technology of China, Anhui, Hefei, P.R. China, Nov 23, 2007.

Presentation: *Space-time discontinuous Galerkin method for nonlinear water waves.*

- Workshop: Discontinuous Galerkin Methods for Partial Differential Equations, Banff International Research Station, Banff, AB, Canada , Nov 25-30, 2007.

Presentation: *A local discontinuous Galerkin method for the Camassa-Holm equation.*

- International Conference on Applied Mathematics: Modeling, Analysis and Computation, June 1-5, 2008, City University of Hong Kong, Hong Kong.  
Presentation: *A local discontinuous Galerkin method for the Camassa-Holm and Hunter-Saxton equations.*
- 2008 Frontiers of computational and applied mathematics , July 19-22, 2008, University of Science and Technology of China, Hefei, China.  
Presentation: *A local discontinuous Galerkin method for the Camassa-Holm and Hunter-Saxton equations.*
- International Conference on Approximation in Scientific Computing (ICASC08) , Oct. 26-30, 2008, Beijing, China.  
Presentation: *Discontinuous Hamiltonian Finite Element Method for Bilinear Poisson Brackets.*
- A Workshop on Modern Numerical Methods in Fluid Mechanics, Dec. 26–28, 2008, Capital Normal University, Beijing, China.  
Presentation: *Discontinuous Hamiltonian Finite Element Method for Bilinear Poisson Brackets.*
- Seminar of scientific computing group, Brown University, Providence, RI, USA, Feb. 6, 2009.  
Presentation: *Local discontinuous Galerkin methods for the integrable nonlinear hyperbolic equations.*
- Seminar of Institute of Applied Mathematics, Freiburg University, Freiburg, Germany, Dec. 8, 2009.  
Presentation: *Local discontinuous Galerkin methods for the nonlinear wave equations.*
- Seminar of scientific computing group, Brown University, Providence, RI, USA, Feb. 19, 2010.  
Presentation: *Error estimates of the local discontinuous Galerkin method for fourth order geometric evolution equation.*
- Poster:
  - 31th Conference of the Dutch-Flemish Numerical Analysis Communities, Woudschoten, Zeist, the Netherlands, October 11-13, 2006.  
Poster: *Space-Time Discontinuous Galerkin Method for Nonlinear Water Waves*
- Participant:
  - International Workshop on Scientific Computing, on the occasion of Zhong-Ci Shi's 70th birthday, Institute of Computational Mathematics, Chinese Academy of Sciences, Beijing, P.R. China, December 5–6, 2003.
  - International Conference on Frontiers of Applied Mathematics, Morningside Center of Mathematics, Chinese Academy of Sciences, Beijing, P.R. China, June 14–17, 2004.

- Summer School on Multiscale Modelings and Simulations, Morningside Center of Mathematics, Chinese Academy of Sciences, Beijing, P.R. China, June 10 – August 9, 2004.
- Workshop on Adaptive Method for Compressible Flows, University of Science and Technology of China, Anhui, Hefei, P.R. China, June 28 – July 2, 2004.
- International Conference on Control, Partial Differential Equations and Scientific Computing, dedicated to late Professor J.-L. Lions, Beijing, P.R. China, September 13–16, 2004.
- Summer school in numerical analysis, University of Science and Technology of China, Hefei, P.R. China, May 23-Jun. 26, 2005
- 30th Conference of the Dutch-Flemish Numerical Analysis Communities, Woudschoten, Zeist, the Netherlands, October 12-14, 2005.
- 34th VKI CFD Lecture Series Very-High Order Discretization, Von Karman Institute For Fluid Dynamics, Brussels, Belgium, November 14-18, 2005
- International Workshop on Scientific Computing, On The Occasion Of Cui Jun-Zhi'S 70 The Birthday , June 7-8, 2008, Institute of Computational Mathematics, Chinese Academy of Sciences, Beijing, China.
- Advances in Mathematics and Its Applications , July 17-18, 2008, University of Science and Technology of China, Hefei, China.
- Workshop Adaptive Finite Elements: Analysis and Application, Kirchzarten, Germany, September 7-11, 2009.
- Workshop: Numerical Methods for Partial Differential Equations on Surfaces, Department of Applied Mathematics, University of Freiburg, Freiburg, Germany, September 14-17, 2009.
- Chinese-German Workshop on Computational and Applied Mathematics 2009 (3rd Workshop), University of Heidelberg, Heidelberg, Germany, September 28 - October 2, 2009.
- The fourth Russian-German advanced research workshop on computational science and high performance computing, Department of Applied Mathematics, University of Freiburg, Freiburg, Germany, October 12-16, 2009.
- Network Meeting of the Alexander von Humboldt Foundation, Heidelberg, Germany, November 24-26, 2009.

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