

Curriculum Vitae

Yingda Cheng

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Education

- **Ph.D. in Applied Mathematics.** Division of Applied Mathematics, Brown University. May 2007.
Advisor: Prof. Chi-Wang Shu.
Thesis Title: Discontinuous Galerkin Finite Element Methods for Hamilton-Jacobi Equations and Equations with Higher Order Spatial Derivatives.
- **M.Sc. in Applied Mathematics.** Division of Applied Mathematics, Brown University. May 2004.
- **B.Sc. in Information and Computational Science.** Special Class for the Gifted Young, University of Science and Technology of China. July 2003.

Academic Appointments

- **Postdoctoral Fellow.** Institute for Computational Engineering and Sciences (ICES), University of Texas at Austin. August 2007 - Present.
Research Mentor: Prof. Irene M. Gamba.
- **Instructor.** Department of Mathematics, University of Texas at Austin. August 2007 - Present.

Research Interests

- Design and analysis of discontinuous Galerkin finite element methods.
- Deterministic numerical simulations of kinetic transport, in particular Boltzmann-Poisson systems in semiconductor device modeling.
- High order numerical methods for Hamilton-Jacobi equations with applications in front propagation.
- High order computational methods, including finite difference and finite volume weighted ENO methods, spectral methods.

Publications

Publications in Refereed Journals

1. Y. Cheng and C.-W. Shu, A discontinuous Galerkin finite element method for directly solving the Hamilton-Jacobi equations, *Journal of Computational Physics*, v223 (2007), pp.398-415.
2. Y. Cheng and C.-W. Shu, A discontinuous Galerkin finite element method for time dependent partial differential equations with higher order derivatives, *Mathematics of Computation*, v77 (2008), pp.699-730.
3. Y. Cheng, I. M. Gamba, A. Majorana and C.-W. Shu, Discontinuous Galerkin solver for Boltzmann-Poisson transients, *Journal of Computational Electronics*, v7 (2008), pp.119-123.
4. Y. Cheng and C.-W. Shu, Superconvergence and time evolution of discontinuous Galerkin finite element solutions, *Journal of Computational Physics*, v227 (2008), pp.9612-9627.
5. Y. Cheng and C.-W. Shu, Superconvergence of local discontinuous Galerkin methods for one-dimensional convection-diffusion equations, *Computers and Structures*, v87 (2009), pp.630-641.
6. Y. Cheng, I. M. Gamba, A. Majorana and C.-W. Shu, A discontinuous Galerkin solver for Boltzmann Poisson systems in nano devices, *Computer Methods in Applied Mechanics and Engineering*, in press.
7. Y. Cheng and C.-W. Shu, Superconvergence of discontinuous Galerkin and local discontinuous Galerkin schemes for linear hyperbolic and convection diffusion equations in one space dimension, *SIAM Journal on Numerical Analysis*, to appear.

Publications in Conference Proceedings

8. Y. Cheng, I. M. Gamba, A. Majorana and C.-W. Shu, Discontinuous Galerkin solver for the semiconductor Boltzmann equation, *SISPAD 07*, T. Grasser and S. Selberherr, editors, Springer (2007) pp. 257-260.
9. Y. Cheng, I. M. Gamba, A. Majorana and C.-W. Shu, A discontinuous Galerkin solver for full-band Boltzmann-Poisson models, *Proceeding of IWCE13* (2009), pp. 211-214.

Preprints (Submitted or in Preparation)

10. O. Bokanowski, Y. Cheng and C.-W. Shu, A discontinuous Galerkin solver for front propagation, submitted to *SIAM Journal on Scientific Computing*, 2009.
11. Y. Cheng, I. M. Gamba and J. Proft, Positivity-Preserving Discontinuous Galerkin Schemes for Linear Vlasov-Boltzmann Transport Equations, *to be submitted*.
12. Y. Cheng, F. Li, G. Lin and J.-M. Qiu, High-order numerical methods for Vlasov-Maxwell systems, *in preparation*.

Awards and Honors

- Travel Awards.
 - AWM-NSF Travel Grant, 2008.
 - NSF Postdoc/Early Career Travel Award to attend the SIAM PD09, 2009.
 - IPAM long program: Quantum and Kinetic Transport: Analysis, Computations, and New Applications, March 9 - June 12, 2009, IPAM, UCLA.
 - Mathematics Research Communities (MRC), June 21-27, 2008, Snow Bird, Utah.
- ICES Postdoctoral Fellowship, 2007-2009. University of Texas at Austin.
- Joukowsky Dissertation Fellowship, 2006. Brown University.
- Joukowsky Presidential Fellowship, 2003. Brown University.
- Outstanding Student Scholarship, 2002. University of Science and Technology of China.
- China Friendship Foundation for Peace and Development, Panasonic Electronics Talent Cultivation Foundation Scholarship, 2001. University of Science and Technology of China.
- Shanghai Bell Scholarship, 2000. University of Science and Technology of China.
- Outstanding Freshman Scholarship, 1999. University of Science and Technology of China.

Teaching Experience

- Instructor. Department of Mathematics, the University of Texas at Austin.
 - M408L Integral Calculus, Fall 2009, Fall 2008, two sessions each semester.*
 - M348 Scientific Computation in Numerical Analysis, Spring 2008.*
 - M408L Integral Calculus, Fall 2007.*
- Co-advised graduate students Michael Harmon and Kent Van Vels under the supervision of Prof. Irene M. Gamba on the research project titled “Discontinuous Galerkin solvers for kinetic transport”, Fall, 2009.
- Co-advised graduate student Elizabeth Thoren under the supervision of Prof. Irene M. Gamba on the research project titled “Computing and analyzing numerical solutions to the vorticity equation for 2D incompressible fluid flows”, Spring, 2008, 2009.
- Teaching Assistant for a short course in discontinuous Galerkin methods. Beijing, China. August, 2009.
- Sheridan Center Teaching Certificate I, 2006. Brown University.
- Teaching Assistant. Division of Applied Mathematics, Brown University.
 - AM 34 Methods of Applied Mathematics, II, Fall 2004, Spring 2005.*

Conferences/Workshops

- Minisymposium Organization
 - Co-organized a minisymposium titled “Advanced Numerical methods for Kinetic Equations” in SIAM Annual Meeting, 2009, Denver, Colorado.
- Invited Talks
 - SIAM Conference on Analysis of Partial Differential Equations, December 7-9, 2009, Miami.
 - Workshop in analytical and numerical issues on quantum, kinetic and statistical flows, October 9, 2009, University of Texas at Austin.
 - SIAM Annual Meeting, July 6-10, 2009, Denver, Colorado.
 - Joint Mathematics Meetings, January 5-8, 2009, Washington, D.C.
 - SIAM Annual Meeting, July 7-11, 2008, San Diego, California.
 - Workshop on Discontinuous Galerkin Methods for Partial Differential Equations, November 25-30, 2007, BIRS, Banff, AB, Canada.
 - Numerical Analysis Seminar, November 7, 2007, University of Texas at Austin.
 - Scientific Computing Seminar, November 3, 2006, Brown University.
- Contributed Talks
 - Fifth M.I.T. Conference on Computational Fluid and Solid Mechanics, June 17-19, 2009, Massachusetts Institute of Technology.
 - 14th International Conference on Finite Elements in Flow Problems, March 26-28, 2007, Santa Fe, New Mexico.
- Poster Sessions
 - 13th International Workshop on Computational Electronics, May 27-29, 2009, Beijing, China.
 - 12th International Workshop on Computational Electronics, October 8-10, 2007, Amherst, Massachusetts.
- Participant
 - Core participant of IPAM long program: Quantum and Kinetic Transport: Analysis, Computations, and New Applications, March 9 - June 12, 2009, IPAM, University of California, Los Angeles.
 - Kinetic FRG Young Researchers Workshop, March 2-5, 2009, University of Maryland, College Park.
 - Workshop on Recent Developments in Numerical Methods for Nonlinear Hyperbolic Partial Differential Equations and their Applications, August 31-September 5, 2008, BIRS, Banff, AB, Canada.
 - Mathematics Research Communities (MRC), June 21-27, 2008, Snow Bird, Utah.

- Summer School in Geophysical Porous Media: Multidisciplinary Science from Nano- to Global-Scale, July 17-28, 2006, Purdue University.
- Third M.I.T. Conference on Computational Fluid and Solid Mechanics, June 14-17, 2005, Massachusetts Institute of Technology.
- An International Conference on the Research Trend in PDE, Modeling and Computation (In honor of Prof. David Gottlieb's 60th birthday), November 7-8, 2004, Brown University.

Professional Services and Memberships

- Referee for Journal of Numerical Mathematics: Theory, Methods, and Applications (NMTMA), Journal of Scientific Computing, ACM Transactions on Mathematical Software, Communication in Computational Physics (CiCP), Mathematics of Computation, Applied Numerical Mathematics.
- Member of the American Mathematical Society (**AMS**) and the Association for Women in Mathematics (**AWM**).