

Curriculum Vitae

Wei Guo

Department of Mathematics
Michigan State University
East Lansing, MI, 48824

Office: 517-580-9991
Email: wguo@math.msu.edu
<http://users.math.msu.edu/users/wguo/>

Education

- Ph.D. in Applied Mathematics, University of Houston (2011-2014).
Advisor: Professor Jing-Mei Qiu
- M.S. in Computational Mathematics, Nanjing University (2007-2010).
Advisor: Professor Jian-Xian Qiu
- B.S. in Information and Computational Science, Nanjing University (2003-2007).

Professional Appointment

- Visiting research associate, Michigan State University (Aug. 2014 - present).
Advisor: Professor Andrew Christlieb

Research Interests

- High order numerical methods for hyperbolic conservation laws and Hamilton-Jacobi equations:
 - High order spatial discretization: discontinuous Galerkin finite element methods, and finite difference/volume WENO methods.
 - High order temporal discretization: Runge-Kutta methods, Lax-Wendroff type methods, and integral defer correction methods.
- High order semi-Lagrangian methods and their applications in kinetic simulations and atmospheric modelings.
- Sparse grid methods for high-dimensional PDEs.
- Asymptotic preserving methods for plasma simulations.
- Method of lines transpose approaches for efficient transport simulations.

Grant

- Sole PI: NSF-DMS-1620047, *Development and Application of Efficient High-order Semi-Lagrangian Schemes*, National Science Foundation, Division of Mathematical Science, \$79,713 (2016-2019).

Publications/Preprints

1. A. Christlieb, W. Guo, Y. Jiang, H. Yang, “A moving mesh WENO method based on exponential polynomials for one-dimensional conservation laws”, *submitted*.
2. W. Guo and Y. Cheng, “An adaptive multiresolution discontinuous Galerkin method for time-dependent transport equations in multi-dimensions”, *submitted*.
3. Y. Cheng, A. Christlieb, W. Guo, B. Ong, “An asymptotic preserving Maxwell solver resulting in the Darwin limit of electrodynamics”, **Journal of Scientific Computing**, *accepted*.
4. A. Christlieb, W. Guo and Y. Jiang, “A WENO-based method of lines transpose approach for Vlasov simulations”, **Journal of Computational Physics**, *accepted*.
5. W. Guo and Y. Cheng, “A sparse grid discontinuous Galerkin method for high-dimensional transport equations and its application to kinetic simulations”, **SIAM Journal on Scientific Computing**, *accepted*.
6. W. Guo, G. Lin, A. Christlieb and J.-M. Qiu, “An adaptive WENO collocation method for differential equations with random coefficients”, **MDPI**, Special Issue “New Trends in Applications of Orthogonal Polynomials and Special Functions”, 2016.
7. Z. Wang, Q. Tang, W. Guo and Y. Cheng, “Sparse grid discontinuous Galerkin methods for high-dimensional elliptic equations”, **Journal of Computational Physics**, v314 (2016), pp.244-263.
8. W. Guo, R. D. Nair and X.-H. Zhong, “An efficient WENO limiter for discontinuous Galerkin transport scheme on the cubed sphere”, **International Journal for Numerical Methods in Fluids**, v81 (2015), pp.3-21.
9. W. Guo, J.-M. Qiu and J.-X. Qiu, “A new Lax-Wendroff discontinuous Galerkin method with superconvergence”, **Journal of Scientific Computing**, v65 (2015), pp.299-326.
10. A. Christlieb, W. Guo, M. Morton and J.-M. Qiu, “A high order time splitting method based on integral deferred correction for semi-Lagrangian Vlasov simulations”, **Journal of Computational Physics**, v267 (2014), pp.7-27.
11. W. Guo, R. D. Nair and J.-M. Qiu, “A conservative semi-Lagrangian discontinuous Galerkin method for transport equation on the cubed-sphere”, **Monthly Weather Review**, v142 (2014), pp.457-475.
12. W. Guo, X.-H. Zhong and J.-M. Qiu, “Superconvergence of discontinuous Galerkin and local discontinuous Galerkin methods: eigen-structure analysis based on Fourier approach”, **Journal of Computational Physics**, v235 (2013), pp.458-485.

13. W. Guo, and J.-M. Qiu, “Hybrid semi-Lagrangian finite element-finite difference methods for the Vlasov equation”, **Journal of Computational Physics**, v234 (2013), pp.108-132.
14. W. Guo, F. Li and J.-X. Qiu, “Local-structure-preserving discontinuous Galerkin methods with Lax-Wendroff type time discretizations for Hamilton-Jacobi equations”, **Journal of Scientific Computing**, v47 (2011), pp.239-257.

Conferences/Workshops

- Organizer/Co-organizer:
 - Recent Development and Application on High Order Methods for Time-Dependent PDEs (I, II), SIAM annual meeting, Boston, MA (July 2016).
- Invited and Contributed Talks:
 - Mini-Symposium on Recent Advance on High Order Numerical Methods for Partial Differential Equations, The 2nd Annual Meeting of SIAM Central States Section, Little Rock, AR (Sept. 2016).
 - Mini-Symposium on Recent Development and Application on High Order Methods for Time-Dependent PDEs, SIAM annual meeting, Boston, MA (July 2016).
 - Scientific Computing Seminar, Department of Mathematics, University of Houston, Houston, TX (Mar. 2016).
 - Mini-Symposium on Structure Preserving Numerical Methods for Kinetic and Wave Equations, SIAM Conference on Analysis of Partial Differential Equations, Scottsdale, AZ (Dec. 2015).
 - Mid Atlantic Numerical Analysis Day 2015. Temple University, Pennsylvania, PA (Nov. 2015).
 - Department of Mathematics, Michigan State University, East Lansing, MI (Apr. 2014).
 - Oak Ridge National Laboratory, Oak Ridge, TN (Jan, 2014).
 - Mini-Symposium on High Order Numerical Methods for Hyperbolic and Kinetic Equations, SIAM Conference on Analysis of Partial Differential Equations, Orlando, FL (Dec. 2013).
 - SIAM Conference on Computational Science and Engineering, Boston, MA (Feb. - Mar. 2013).
 - Midwest Numerical Analysis Day 2012, Notre Dame, IN (May 2012).
 - Contributed Talk, 7th International Congress on Industrial and Applied Mathematics (ICIAM 2011), Vancouver, Canada (July 2011).
 - Mini-Symposium on Advances in the Numerical Simulation of Plasma, SIAM Conference on Computational Science and Engineering, Reno, NV (Mar. 2011).

- Posters:
 - SIAM Conference on Computational Science and Engineering, Salt Lake City, Utah (Mar. 2015).

Teaching Experience

- Instructor: *Calculus I*, Michigan State University, Fall 2016.
- Instructor: *Calculus I*, Michigan State University, Spring 2016.
- Instructor: *Calculus II*, Michigan State University, Fall 2015.
- Instructor: *Calculus I*, Michigan State University, Spring 2015.
- Instructor: *Calculus I*, Michigan State University, Fall 2014.

Professional Experience

- **Visiting Researcher**, Research and Supercomputing Visitor Program (RSVP) at Computational & Information Systems Lab (CISL), National Center for Atmospheric Research (NCAR), Boulder, CO (July-Aug. 2014).
- **Summer Intern**, Pacific Northwest National Laboratory (PNNL), Richland, WA (May-Aug. 2013).
Mentor: Dr. Guang Lin.
- **Summer Intern**, Summer Internship in Parallel Computational Science (SIParCS) at CISL, NCAR, Boulder, CO (May-Aug. 2012).
Mentor: Dr. Ram Nair.
- **Visiting Researcher**, Institute for Computational and Experimental Research in Mathematics (ICERM), Brown University, Providence, RI (Sept.-Dec. 2011).

Awards and Honors

- Friends of NSM Graduate Fellowship (\$5000), University of Houston (2013).
- Scholarship for Excellent Master Graduates, Nanjing University (2008).

Professional Service

- Referee for Journal of Computational Physics (JCP), Journal of Scientific Computing (JSC), Journal of Computational Mathematics (JCM), Communication in Computational Physics (CiCP), ESAIM: Mathematical Modelling and Numerical Analysis (M^2AN), Boundary Value Problems (BVP), Geoscientific Model Development (GMD).