

Curriculum Vitae for  
**HAILIANG LIU**

10/10/2008

**CONTACT INFORMATION**

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Professor of Mathematics  
Iowa State University  
Ames, IA 50011-2064, USA  
Phone: (515)294-0392, Fax:(515)294-5454  
Email: hliu@iastate.edu  
URL: <http://www.math.iastate.edu/hliu>

**DEGREES**

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1995, Ph.D. Applied Math, Chinese Academy of Sciences  
Dissertation: Nonlinear stability of viscous shock waves and discrete shock waves  
Advisors: Professors Xiaqi Ding and Jinghua Wang  
1988, M.Sc. Applied Math, Tsinghua University  
Large time behavior of solutions of the porous medium equation with convection  
Advisor: Professor Shutie Xiao  
1984, B.Sc. Mathematics, Henan Normal University

**Research interests**

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Critical thresholds in nonlinear balance laws  
Level set methods for computational high frequency wave propagations  
Numerical methods for convection-diffusion equations, Hamilton-Jacobi equations  
Kinetic methods for polymers, multi-dispersive fluids.

**EMPLOYMENT**

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2002– Dio Lewis Holl Chair in Applied mathematics, Iowa State University  
2007–date, Full Professor, Iowa State University  
2002–2006, Associate Professor, Iowa State University  
1999-2002, Assistant Professor, UCLA, Department of Mathematics  
1997-1998, Alexander von Humboldt Fellow, Otto-von-Guericke University  
1989-1996, Lecturer and Professor, Henan Normal University  
1984-1986, Instructor, Henan Normal University.

**VISITING APPOINTMENTS**

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Visiting Professor, University of Maryland, USA, Sept-Oct. 2008  
Visiting Professor, Beijing Institute of Technology, Beijing July-August 2007.  
Visiting Professor, University of Toulouse, France, June 2007.  
Visiting Professor, Pauli Institute of Science, Vienna, May 2006.  
Long term visitor, Institute of Mathematics and Applications, Minneapolis, Spring 2005.  
Visiting Professor, The Modern Laboratory of Mathematics, Fudan University, May-June 2004.

Visiting Professor, Institute of Computational Mathematics, CAS, Beijing, July 2004.  
Visiting Member, Isaac Newton Institute for Mathematical Sciences, UK, 2003.  
Research Fellow, Institute of Pure and Applied Mathematics, Los Angeles, 2001.  
Invited, Hebrew University of Jerusalem, February 1999  
Invited, Heidelberg University, Germany, July 1998  
Invited, Lulea University of Technology, Sweden, May-June 1998  
Invited, Consiglio Nazionale delle Ricerche, Roma, Italy, March 1998  
Invited, Georgia Institute of Technology, November 1996  
Invited, University of Wisconsin-Madison, October 1996  
Research Assistant, City University of Hong Kong, 1995-1996.

## HONORS AND AWARDS

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2008, NSF FRG award  
2006, IMA conference fund award  
2005, National Science Foundation research award  
2005 Ames Lab(DOE) new collaborative research award  
2004, Iowa State University summer travel award  
2003, Plant Science Institute research award  
2003, SIAM travel award for ICIAM 2003 in Sydney  
2002, Dio Lewis Holl Chair in Applied mathematics, Iowa State University  
2002, AMS travel award for International Conference of Mathematicians in Beijing  
2002, The Robert Sorgenfrey Distinguished Teaching Award, UCLA  
2001, National Science Foundation research award  
1999, German Research Foundation (DFG) research award  
1996, Alexander von Humboldt Research Fellowship award  
1996, Chinese National Science Foundation research award  
1997–1998, Alexander von Humboldt Research Fellowship

## EDITORSHIPS

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Editorial boards of *Journal of Mathematical Analysis and Applications*, 2008–.

## SELECTED RESEARCH GRANTS

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PI, NSF DMS07-57227, FRG (Focused Research Group) Collaborative Research: Kinetic Description of Multi-scale Phenomena: Modeling, Theory And Computation. 2008–2011.  
Principal Investigator, NSF Grant DMS05-05975  
for “Multi-scale Wave Dynamics in Nonlinear Balance Laws”, 2005-2008  
Principal Investigator, New Collaborative Research Grant, DOE Lab at Ames  
for “High Frequency Wave Propagation and Geometric Motion”, 2005-2006.  
Co-Principal Investigator, PSI (Plant Sciences Institute at ISU) Grant  
for “System Biology: Genome, Genetic Network, and Evolution”, 2003-2005.  
Co-Principal Investigator, NSF Grant DMS01-07917  
for “Critical Threshold Phenomena in Nonlinear Balance Laws”, 2001-2004.  
Co-Principal Investigator, German Research Society (DFG) Grant Wa633/11-1

for “Stability of Hyperbolic Relaxation Problems ”, 1999-2002.  
Principal Investigator, CNSF Grant  
for “Stability and Structure of Nonlinear Waves ”, 1996-1998.

## **GRADUATE STUDENTS ADVISEES:**

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a) Ph.D Programm of Study Committees

i)Major Professor:

Ahmed, Haseena, Iowa State University, Ph.D. 2008. First position after Ph.D.: Research company EQECAT in California.

Wang, Zhongming, Iowa State University, Ph.D. 2008. First position after Ph.D.: Postdoc at Department of mathematics, UCSD.

Xie, Xiaoliang, Iowa State University, Ph.D. Fall 2008 (expected).

Mater Studetns: Jin-Young Guo, Hung Phan, Eric Blabac

ii) Math and Applied Math Member:

Chepkwony, Isaac, PhD, Applied Math

Lee, Jangwoon, PhD, Applied Math

Meng, Qiang, PhD, Applied Math,

Miranda-Mendoza, Fernando, PhD, Applied Math

Shin, Jaemin, PhD, Applied Math

b)Ph.D. Program of Study Committees for students out of math department

i) Minor Representative:

Wang, Xiaohang, PhD, Mechanical Engineering

ii) Out of Department Representative:

Kannan, Ravishekar, PhD, Aerospace Engineering

Zhan, Sanyi, PhD, Electrical Engineering

## **SELECTED MEETINGS AND SYMPOSIA**

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FRG's PI meeting, October 4-5, 2008, University of Maryland.

(Invited speaker) Workshop on applied PDEs, July 25-27, 2008, Iowa City.

(Invited speaker) Midwest Numerical analysis day, May 3, 2008, Minneapolis

(Invited speaker) AMS sectional meeting in Bloomington, April 4-5, 2008, Indiana University.

(Invited speaker) SIAM Conference on Analysis of Partial Differential Equations (PD07)

December 10-12, 2007, Mesa, Arizona.

(Invited speaker) Workshop on Quantized Vortices in Superfluidity and Superconductivity and Kinetic Theory

National University of Singapore, Nov. 12-16, 2007.

”Semiclassical Dynamics in Schroedinger equations: Convergence and Computation”.

(Invited Speaker)International conference on Nonlinear PDEs, Beijing July 27–30, 2007.

(Invited)International conference of Industrial and Applied Mathematics (ICIAM07)

Zuerich, Switzerland, July 17–20, 2007.

(Invited Speaker) International Conference on Higher-Order Methods for PDEs, Beijing, June 18–20, 2007.

(Invited Speaker) Workshop on 'Multiscale Modeling and Simulation in Complex Fluids'

University of Maryland, April 15-20, 2007.

(Invited Speaker) Clifford Lecture Series workshop, Tulane University, March 20-25, 2006

(Invited Speaker) Midwest PDE conference, Iowa City, September 22-25, 2006.

(Invited speaker) 43rd Annual Technical Meeting Society of Engineering Science University Park, August 13–16, 2006.

(Invited speaker) SIAM Conference on Analysis of Partial Differential Equations Boston, July 10–12, 2006.

(Invited speaker) International conference on “ Nonlinear PDEs: Homogenization and Kinetic Equations”  
Vienna, Austria, June 26–30, 2006.

(Invited speaker) International conference on “Recent Advances of Scientific Computing”  
Beijing, China, June 18–19, 2006.

(Invited speaker) AMS sectional meeting at Johnson City, TN. October 15-16, 2005.

(Invited speaker) International workshop on “High Frequency Wave propagation” at CSCAMM, University of Maryland., September 19–22, 2005.

(Invited speaker) International Conference on Scientific Computing  
Nanjing, China, June 4–8, 2005.

(Invited speaker) Workshop on “Computational Transport in Meso and Nano Scales”  
Austin, Texas. March 4–5, 2005.

(Organizer and invited speaker) SIAM Conference on Analysis of Partial Differential Equations  
Houston, Texas, December 6-8, 2004.

(Invited speaker) AMS Meeting on ‘Partial Differential Equations and Applications’ (Code: SS4)  
Pittsburgh, PA, November 06-07, 2004.

(Invited speaker) AMS Meeting on ‘Nonlinear Partial Differential Equations and Applications’ .  
(Code: SS 6A) Evanston, IL, October 23-24, 2004.

(Organizer) Iowa PDE/Applied Math Seminar Iowa State University, October 09, 2004.

(Invited speaker) International Conference on Nonlinear Evolution equations  
Zhengzhou, Henan, China, June 20–23, 2004.

(Invited speaker) International Conference on Nonlinear Evolutional PDEs  
Zhenjiang, Jiangsu, China, May 16-20, 2004.

(Invited speaker) Workshop on Hyperbolic Conservation Laws, Oberwolfach, Germany, April 4-10,  
2004.

(Invited speaker) AMS Meeting at University of Southern California  
(2004 Spring Western Section Meeting), Los Angeles, CA, April 3-4, 2004.

(Invited speaker) Second Reunion Conference of IPAM’s Geometrically Based Motion Program  
Lake Arrowhead, California, Dec. 7-12, 2003.

(Invited session speaker) The 5th International Congress on Industrial and Applied Mathematics  
ICIAM 2003, Sydney, Australia, 7-11 July 2003.

(Organizer & invited speaker) Second M.I.T. Conference on Computational Fluid and Solid Me-  
chanics

(Organizer & invited speaker) International workshop on “Analysis and Numerics  
for Modelling Semiconductor Devices and Biological Channels”, CSCAMM, May 19-23, 2003.

(Organizer) Iowa PDE/Applied Math Seminar Iowa State University, April 26, 2003.

(Invited speaker) Emerging Applications of the Nonlinear Schrödinger Equations  
IPAM, UCLA, Feb. 3-7 2003.

(Invited Speaker) The AMS Sectional Meeting, Madison, October 12-13, 2002.

(Invited speaker) International Workshop on Hyperbolic Problems  
Potsdam, Germany, September 30–October 3, 2002

(Invited speaker) The IPAM GBM Reunion at Lake Arrowhead, September 16-20, 2002

(Organizer & Chair) International Conference on Evolution Equation: Analysis and Applications,  
Kaifeng, China, August 29–September 1, 2002

International Conference of Mathematicians, Beijing, August 20-28, 2002

(Invited Lecture) Ninth International Conference on Hyperbolic Problems,  
Theory, Numerics, Applications, Pasadena, California, March 25-29, 2002

(Invited Speaker) The 2002 UAB International Conference on Differential Equations  
and Mathematical Physics, Birmingham, Alabama, March 26-30, 2002

(Invited Speaker) The AMS Joint Mathematics Meetings, San Diego, January 6-9, 2002 (Invited  
Speaker) The AMS Sectional Meeting, Madison, October 12-13, 2002.

(Invited Speaker) International Workshop on Hyperbolic Problems, Potsdam, Germany, September  
30–October 3, 2002

(Invited Talk) The IPAM GBM Reunion at Lake Arrowhead, September 16-20, 2002

International Conference of Mathematicians, Beijing, August 20-28, 2002

(Invited Lecture) Ninth International Conference on Hyperbolic Problems, Theory, Numerics, Ap-  
plications, Pasadena, California, March 25-29, 2002

(Invited Speaker) The 2002 UAB International Conference on Differential Equations and Mathe-  
matical Physics, Birmingham, Alabama, March 26-30, 2002

(Invited Speaker) The AMS Joint Mathematics Meetings, San Diego, January 6-9, 2002

(Invited Speaker) The AMS Western Section Meeting, UC Irvine, November 11-16, 2001

(Invited Talk) The IPAM workshop at Lake Arrowhead, June 11-15, 2001

(Invited Speaker) The AMS-HKMS Meeting 2000, Hong Kong, December 13-16, 2000

(Invited Lecture) International Conference Equadiff'99 Berlin, Germany, August 1-7, 1999

(Invited talk) International Conference on fluid Computation, Oxford, England, October 16-22,  
1999

(Invited talk) DFG-workshop on Analytic and Numerics of hyperbolic conservation laws, Austria,  
September, 1998

### **SELECTED SEMINARS AND COLLOQUIA (2000–)**\_\_\_\_\_

CSCAMM, University of Maryland, October 15, 2008.

Georgetown University, Washington D.C. October 08, 2008

Institute of Mathematics, Chinese Academy, July 10, 2008.

Beijing Normal University, Beijing, July 08, 2008.

Tianjin Normal University, Tianjin, July 04, 2008.

Huabei University of Water and Electricity, June 30, 2008.

Hunan Normal University, Changsha, June 13, 2008.

Chinese University of Hong Kong, May 28, 2008.

Iowa State University's CFD center, April 08, 2008.

Penn State University, March 28, 2008.

University of Wisconsin, Madison, Feb. 25, 2008.

Graduate colloquium, Department of Math, ISU, December 05, 2007.

Zhengzhou University, August 15, 2007. Beijing University of Chemical Technology, August 02,

2007.

Beijing Institute of Technology (BIT), lecture series (4 lectures) July 25-July 31, 2007.  
Institute of Computation and LSEC, Academia sinica, Beijing, July 26, 2007.  
University of Magdeburg, Institute of analysis and numerics, Germany, July 12, 2007.  
University of Stuggart, Center of Applied Math, Germany, July 16, 2007.  
University of Toulouse, Mathematics for Industry and Applications, France, June 11, 2007.  
University of Vienna, Department of Math, Austria, May 26-June 3, 2007.  
Department of Math, UCSD, March 11-14, 2007.  
Department of Math, University of Missouri at Columbia, November 16, 2006.  
PWI, Vienna University, Vienna, June 25, 2006.  
Tsinghua University, Beijing, May 31, 2006.  
Institute of Computational Math, Beijing, May 25, 2006.  
Department of Math, ISU, April 11, 2006.  
The Ames Laboratory (a USDOE facility), December 13, 2005.  
Department of Math, University of Wisconsin at Madison, September 16, 2005  
Department of Mathematics, Ohio State University, April 21, 2005.  
Institute of Applied Physics and Computational Mathematics, Beijing, June 16, 2005.  
Department of Mathematics, Capital Normal University, June 15, 2005.  
Department of Mathematics, Zheng Zhou University, June 09, 2005.  
Department of mathematics, Penn State University, April 04, 2005.  
Institute of Mathematics and Applications, IMA, March 09, 2005.  
Department of Mathematics, Georgia Institute of Technology, March 01, 2005.  
Institute of Mathematics and Applications (IMA), February 1, 2005.  
Applied Math. Colloquium, Department of Math, University of Iowa, November 18, 2004.  
Institute of Mathematics, CAS, Beijing, July 19, 2004.  
Beijing University of Chemical Engineering, Beijing, July 16, 2004.  
Institute of Computational Mathematics, CAS, Beijing, July 13, 2004.  
Beijing Normal University, Beijing, July 09, 2004.  
Zhengzhou University, Zhengzhou, June 26, 2004.  
Zhejiang University, Hangzhou, June 6, 2004.  
Fudan University, Shanghai, May 28, 2004.  
Southeastern University, May 21, 2004.  
Shanghai Normal University Colloquium, Shanghai, May 14, 2004.  
Shanghai Jiaotong University, Shanghai, May 12, 2004.  
Northwestern Unieversity PDE seminar, Evanstan, Feb. 25, 2004.  
CSCAMM Summer Program at University of Maryland, June 24, 2003.  
Isaac Newton Institute for Mathematical Sciences, UK; 25 May-07 June, 2003.  
CSCAMM Colloquium at University of Maryland, May 14, 2003.  
Applied Mathematics Seminar at Penn State University, April 7, 2003.  
Zhengzhou University, China, September 2, 2002.  
Henan University, China, July 30, 2002  
Georgetown University, March 15, 2002  
National Singapore University, March 11, 2002  
University of California, Riverside, March 7, 2002  
George Mason University, March 4, 2002  
Iowa State University, February 28, 2002

UC Santa Cruz, January 30, 2002  
Hong Kong Baptist University, Hong Kong, December 17, 2001  
Hong Kong University of Science and Technology (HKUST), Hong Kong, December 14, 2001  
University of Akron, Akron, December 5, 2001  
University of California Davis, Davis, November 28, 2001  
UCSD, Mathematics Colloquium, San Diego, November 15, 2001  
Northwestern University, Evanston, October 19, 2001  
Wisconsin University–Madison, October 17, 2001  
Purdue University, Lafayette, October 16, 2001  
Indiana University, Bloomington, October 15, 2001  
UCLA, Mathematics Colloquium, Los Angeles, October 12, 2001  
Institute of Pure and Applied Mathematics, June, 2001  
University of California, Irvine, November 6, 2000  
UCLA, Applied Math Colloquium, Los Angeles, October 24, 2000

### **Conference Organized (2002–)**\_\_\_\_\_

(Organizer and Co-Chair) The IMA participating workshop on “Computational and Mathematical Aspects of Materials and Fluids” (with J. Evans) held at Iowa State University, April 13–14, 2007.  
(Organizer and Co-Chair) The ISU workshop “Computational Methods and Applied Partial Differential Equations” (with S. Hou), November 4-5, 2005.  
(Organizer of a mini-symposium) SIAM Conference on Analysis of Partial Differential Equations (with H.-T. Fan), Houston, Texas, December 6-8, 2004.  
(Organizer & invited speaker) Second M.I.T. Conference on Computational Fluid and Solid Mechanics, Special Session on “Recent Advances in Analysis and Numerics for Fluid Dynamics Problems” (with Wade), Cambridge USA, June 17 - 20, 2003.  
(Organizer and invited speaker) International workshop on “Analysis and Numerics for Modelling Semiconductor Devices and Biological Channels” (with E. Tadmor et al), CSCAMM, May 19-23, 2003.  
(Organizer) Iowa PDE/Applied Math Seminar Iowa State University (with P. Sacks), April 26, 2003.  
(Chair and Organizer) International Conference on Evolution Equation: Analysis and Applications (with T.Z. Wang and Z-J.Zheng), Kaifeng, China, August 29–September 1, 2002.

### **OTHER PROFESSIONAL SERVICES**\_\_\_\_\_

Member of American Mathematical Society (AMS)  
Member of Society for Industry and Applied Mathematics (SIAM)  
Member of the CFD (Computational Fluid Dynamics) Center, Iowa State University (2005–).  
NSF conference series proposal review panelist, 2007.  
Member of Mathematical Department Advisory committee, Iowa State University(2003–2004, 2007–2008).  
Associate Editor for Journal of Mathematical Analysis and Applications (JMAA)  
Referee for over 15 scientific journals, Mathematical Review, etc.

## PUBLICATIONS

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### Manuscripts Submitted

1. H. Liu, E. Tadmor and D. Wei. Global regularity of the 4D Restricted Euler equations preprint.
2. H. Liu and Z. Wang. A Bloch band based level set method for computing the semiclassical limit of Schrödinger equations, JCP, 2008.
3. H. Liu, On discreteness of the Hopf equation, Acta Mathematicae Applicatae Sinica (2008).
4. H. Ahmed and H. Liu. Formulation and analysis of alternating evolution (AE) schemes for hyperbolic conservation laws, preprint.
5. Liu, Hailiang; Yan, Jue, *The direct discontinuous Galerkin (DDG) methods for diffusion problems*, to appear in SINUM.
6. Li, Tong; Liu, Hailiang, *Critical thresholds in relaxation systems with resonance of characteristic speeds*, to appear in DCDS, Series A.

### Refereed Journal Articles

7. Liu, Chun; Liu, Hailiang. *Boundary conditions for the microscopic FENE models*, SIAM J. Appl. Math. 68 (5) (2008), 1304–1315.
8. Liu, Hailiang. *An Alternating Evolution Approximation to systems of Hyperbolic Conservation Laws*, Journal of Hyperbolic Differential Equations, 5(2) (2008), 1–27.
9. Liu, Hailiang and Sparber, C. *Rigorous derivation of the hydrodynamical equations for rotating superfluids*, Mathematical Models and Methods in Applied Sciences, 18(5) (2008), 689–706.
10. Liu, Hailiang; Wang, Zhongming. *Superposition of Multi-valued Solutions in High Frequency Wave Dynamics*, to appear in Journal of Sci. Comp. (2007).
11. Marco Di Francesco, Klemens Fellner, Hailiang Liu. *A non-local conservation law with nonlinear ‘radiation’ inhomogeneity*, J. Hyperbolic Differ. Equ. 5(1)(2008), 1–23.
12. Li, Tong; Liu, Hailiang, *Critical thresholds in a relaxation model for traffic flows*, Indiana Univ. Math. Journal, 57(3) (2008), 1409–1430.
13. Liu, Hailiang. *Global orientation dynamics for liquid crystalline polymers*, Physics D. Non-linear Phenomena. **228**(2) (2007), 122–129.
14. Liu, Hailiang; Wang, Zhongming. *A field space based level set method for computing multi-valued solutions to Euler-Poisson equations*, Journal of Computational Physics, **225** (2007), 591–614.

15. Liu, Hailiang; Wang, Zhongming. *Computing Multi-valued velocity and electric fields for 1D Euler-Poisson equations*, Applied Numerical Mathematic **57** (2007), 821–836.
16. H. Liu, S. Osher and R. Tsai, *Multi-valued solution and level set methods in computational high frequency wave propagation*, Commun. Comput. Phys. **1**(5) (2006), 765 – 804.
17. Liu, Hailiang; Yan, Jue. *A local discontinuous Galerkin method for the Korteweg-de Vries equation with boundary effect*, Journal of Computational Physics, **215** (2006), 197–218.
18. Liu, Hailiang, *Critical Thresholds in the Semiclassical Limit of 2-D Rotational Schrödinger Equations*, Z. Angew. Math. Phys. **57** (1) (2006), 42–58.
19. Liu, Hailiang. *Wave breaking in a class of nonlocal dispersive wave equations*, Journal of Nonlinear Mathematical Physics, **13**(3) (2006), 441–466.
20. Liu, Hailiang; Cheng, Li-Tien; Osher, Stanley. *A level set framework for capturing multi-valued solutions of nonlinear first-order equations*, Journal of Sci. Computing (in press), Publication online December 07, 2005.
21. S. Jin, H. Liu, S. Osher and R. Tsai, *Computing multi-valued physical observables for the high frequency limit of symmetric hyperbolic systems*. J. Comput. Phys. **210** (2005), no. 2, 497–518.
22. S. Jin, H. Liu, S. Osher and R. Tsai, *Computing multi-valued physical observables for the semiclassical limit of the Schrödinger equations*, J. Comput. Phys. **205**(1) (2005), 222–241.
23. H. Liu, H. Zhang and P.W. Zhang, *Axial Symmetry and Classification of Stationary Solutions of Doi-Onsager Equation on the Sphere with Maier-Saupe Potential*, Comm. Math. Sci. **3** (2), (2005), 201218.
24. T. Li and H. Liu, *Stability of a traffic flow model with nonconvex relaxation*, Comm. Math. Sci., **3**(2), (2005), 101–118.
25. Fan, Haitao; Liu, Hailiang, *Pattern formation, wave propagation and stability in conservation laws with slow diffusion and fast reaction*, J. Hyperbolic Differ. Equ. **1**(4) (2004), 605–626.
26. G.-Q. Chen and H. Liu, *Concentration and cavitation in solutions of the Euler equations for non-isentropic fluids as the pressure vanishes*, Physics. D. **189** (2004), 141–165.
27. H. Liu and E. Tadmor, *Rotation prevents finite time breakdown*, Physica D, **188** (2004) 262–276.
28. H. Liu and M. Slemrod, *KdV dynamics in the Plasma-sheath transition*, Appl. Math. Lett. **17** ( 2004) 401–419.
29. H. Liu and E. Tadmor, *Critical thresholds in 2-D restricted Euler-Poisson equations*, SIAM Appl. Math. **63** (2003), 1889–1910.
30. L.T. Cheng, H. Liu and S. Osher, *Computational high frequency wave propagation using the level set method, with applications to the semi-classical limit of Schrödinger equations*, Comm. Math. Sci. **1**(3) (2003), 593–621.

31. J. Pan and H. Liu, *Convergence rates to travelling waves of viscous conservation laws with dispersion*, J. Diff. Equ. 187 (2003), 337–358.
32. H. Liu, *Asymptotic stability of relaxation shock profiles for hyperbolic conservation laws*, J. Diff. Equ. 192 (2003), 285–307.
33. G.-Q. Chen and H. Liu, *Formation of delta-shocks and vacuum states in the vanishing pressure limit of solutions to the isentropic Euler equations*, SIAM J. Math. Anal. 34 (2003), 925–938.
34. H. Liu, *The  $L^1$  global decay to discrete shocks for scalar monotone schemes*, Math. Comp. 72 (2003), 227–245.
35. H. Liu and E. Tadmor, *Spectral dynamics of the velocity gradient field in restricted flows*, Commun. Math. Phys. 228 (2002), 435–466.
36. H. Liu and E. Tadmor, *Semi-classical limit of the nonlinear Schrodinger-Poisson equation with subcritical initial data*, Methods and Applications of Analysis, 9(4) (2002), 517–532.
37. S. Engelberg, H. Liu and E. Tadmor, *Critical threshold phenomena in Euler-Poisson equations*, Indiana University Mathematics Journal, 50(1) (2001), 109–157.
38. H. Liu, J. Wang and G. Warnecke, *Convergence of a splitting scheme applied to the R-W model of the Boltzmann equation*, Journal of Computational and Applied Mathematics, 134(1-2) (2001), 343–367.
39. H. Liu and E. Tadmor, *Critical thresholds in a convolution model for nonlinear conservation laws*, SIAM J. Math. Anal. 33 (2001), 930–945.
40. H. Liu, J. Wang and G. Warnecke, *The  $Lip^+$  stability and error estimates for a relaxation scheme*, SIAM J. Numer. Anal. 38(4) (2001), 1154–1170.
41. H. Liu and W.-A. Yong, *Time-asymptotic stability of boundary layers for a hyperbolic relaxation system* Commun. Partial Diff. Equ. 26 (2001), 1323–1343.
42. H. Liu, *The  $L^p$  stability of relaxation rarefaction profiles*, J. Differ Equations, 171 (2001), 397–411.
43. H. Liu and R. Natalini, *Long-time diffusive behavior of solutions to a hyperbolic relaxation system*, Asymptotic Analysis, 25 (2001) 21–38.
44. H. Liu, *Asymptotic decay to the relaxation shock fronts in two dimensions*, Proceedings of the Royal Society of Edinburgh: Section A. 131 A, (2001), 1385–1410.
45. H. Liu, J. Wang and G. Warnecke, *Convergence rate to discrete shocks for non-convex conservation laws*, Numerische Mathematik, 88 (2001), 513–541.
46. H. Liu and G. Warnecke, *Convergence rates for relaxation schemes approximating conservation laws*, SIAM J. Numer. Anal. 37(4) (2000), 1316–1337.
47. H. Liu, *Convergence rates to the discrete travelling wave for relaxation schemes*, Math. Comp. 69(230) (2000), 583–608.

48. S. Jin and H. Liu, *A diffusive sub-characteristic condition for hyperbolic systems with diffusion relaxation*, *Transport Theory and Statistical Physics*, **29**(3-5) (2000), 583-593.
49. H. Liu, J. Wang and T. Yang, *Nonlinear stability and existence of stationary discrete travelling waves for the relaxing schemes*, *Japan J. Indust. Appl. Math.* **16** (1999), 195-224.
50. H. Liu and J. Pan, *On stability of travelling waves of Burgers-Fisher equation*, *Ann. Differential Equations*, **14** (1998), 37-47.
51. S. Jin and H. Liu, *Diffusion limit of a hyperbolic system with relaxation*, *Methods and Applications of Analysis* **5** (1998) 317-334.
52. H. Liu, J. Wang and T. Yang, *Stability for a relaxation model with a non-convex flux*, *SIAM J. Math. Anal.* **29** (1998), 18-29.
53. H. Liu, *Nonlinear stability of shock profiles for non-convex model equations with degenerate shock*, *J. Partial. Diff. Eqs.* **11** (1998), 209-230.
54. H. Liu and J. Wang, *Asymptotic stability of stationary discrete shocks of Lax-Friedrichs scheme for non-convex conservation laws*, *Japan J. Indust. Appl. Math.* **15** (1998), 1-16.
55. H. Liu, C. W. Woo and T. Yang, *Decay rate for travelling waves of a relaxation model*, *J. Diff. Equ.* **134** (1997), 343-367.
56. H. Liu, J. Wang and T. Yang, *Existence of the discrete travelling waves for a relaxing scheme*, *Appl. Math. Lett.*, **10** (1997), 117-122.
57. H. Liu, *Asymptotic stability of shock profiles for non-convex convection diffusion equation*, *Appl. Math. Lett.* **10** (1997), 129-134.
58. H. Liu and J. Wang, *Decay rate for perturbations of stationary discrete shocks for convex scalar conservation laws*, *Math. Comp.* **66** (1997), 69-84.
59. H. Liu and J. Wang, *Asymptotic stability of travelling wave solutions for a hyperbolic system with relaxation terms*, *Beijing Math.* **2** (1996), 119-130.
60. H. Liu, *Asymptotic properties of solutions to non-convex scalar conservation laws*, *Gaoxiao Yingyong Shuxue Xuebao*, Ser. **A**. **11** (1996), 277-282 (in Chinese).
61. H. Liu and J. Wang, *Nonlinear stability of stationary discrete profiles of non-convex scalar conservation laws*, *Math. Comp.* **65** (1996), 1137-1153.
62. H. Liu and J. Pan, *Decay rate for perturbations of viscous shock profiles for non-convex convection-diffusion equation*, *Appl. Functional Anal.* **2** (1995), 171-176.
63. H. Liu and J. Pan, *Propagation and cancellation of initial oscillations*, *J. Henan Normal Univ.* **22**(4) (1994), 12-15 (in Chinese).
64. H. Liu, *An existence theorem for radial positive solutions of nonlinear elliptic equations*, *Sys. Sci. Math. Sci.* **7** (1994), 1-4.

65. H. Liu, *Asymptotic stability of travelling waves for one-dimensional viscous conservation laws*, J. Henan Normal Univ. **20** (1992), 1-4 (in Chinese).
66. H. Liu, *The interactions of shock waves of non-strictly hyperbolic systems*, Acta Math. Scientia, **12** (1992), 312-336.
67. H. Liu, *Large time behavior of solutions of the porous medium equation with convection*, Acta Mathematicae Appl. Sinica **15** (1992), 239-256.

#### **Invited Book Chapters and Conference Papers**

68. Liu, Hailiang. *Relaxation dynamics, scaling limits and convergence of relaxation schemes*. Analysis and numerics for conservation laws, 453–478, Springer, Berlin, 2005.
69. H. Liu and E. Tadmor, *Spectral Dynamics and Eulerian Flows*, invited article in a book on 'Analytical tools in Multi-D balance laws', preprint, 2004.
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