CURRICULUM VITAE

DR Renjun Duan

PERSONAL INFORMATION

Date of Birth:	October 17, 1979
Nationality:	China
Position:	Research Scientist in Partial Differential Equations
Address:	Johann Radon Institute for Computational and Applied Mathematics (RICAM) Austrian Academy of Sciences Altenbergerstrasse 69, A-4040 Linz, Austria
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EDUCATIONS

– Aug. 2008: Doctor of Philosophy
City University of Hong Kong, Hong Kong
Thesis title: *Some Mathematical Theories on the Gas Motion Under the Influence of External Forcing*

– Jun. 2005: Master of Science
Huazhong Normal University, China
Thesis title: *Global Existence to Boltzmann Equation with External Force in Infinite Vacuum*

– Jun. 2002: Bachelor of Science
Huazhong Normal University, China

PROFESSIONAL POSITIONS

– Research Scientist
Johann Radon Institute for Computational and Applied Mathematics (RICAM)
Austrian Academy of Sciences, Linz, Austria
Oct. 1 2008 to Jul. 31 2010

TEACHING EXPERIENCES

– Tutor, City University of Hong Kong:
Basic Calculus and Linear Algebra (MA2176), Semester A 2007-2008
Advanced Mathematical Analysis (MA3150), Semester B 2006-2007
Calculus I (MA2501), Semester A 2006-2007

– Tutor, Huazhong Normal University:
Partial Differential Equations (MA4506), Semester A 2004-2005

HONORS AND AWARDS

– Outstanding Thesis Award
City University of Hong Kong, 2008

– Zhong Jiaqing Mathematics Award
Chinese Mathematical Society (CMS), Nov. 2007

– Award for Outstanding Master's Thesis in Hubei Province
Hubei Provincial Department of Education, Dec. 2006

ACADEMIC VISITS

– Department of Mathematics
Universitat Autònoma de Barcelona, Spain
Oct. 19-24 2009, Apr. 26-30 2010

– Department of Mathematics
University of Pavia, Italy
May 24-30 2009

– Department of Applied Mathematics and Theoretical Physics
Centre for Mathematical Sciences
University of Cambridge, UK
Nov. 3-10 2008, Oct. 26 – Nov. 22 2009, Feb. 10-15 2010

– Department of Mathematics
City University of Hong Kong, HK
Sep. 1-31 2008, Nov. 12-17 2008, Dec. 1-31 2009

– Laboraoire de Mathématiques Raphaël Salem
UMR 6085 CNRS-Université de Rouen, France
Feb. 4-8 2008

– Institut de Recherche de l'Ecole navale
French Naval Academy, France
Jan. 7 – Feb. 3 2008

– Department of Mathematics
National Taiwan University, Taiwan
Jun. 15 – Jul. 15 2007

RESEARCH INTERESTS

Well-posedness, stability and large-time behavior of solutions to the Cauchy problem or initial boundary value problem on

– Boltzmann equation and related kinetic equations
– fluid dynamic equations arising in mathematical physics
– chemotaxis equations from biology
– general evolution equations with relaxation

PRESENTATIONS

Invited talks in conferences and workshops

1. *Stability for a nonlinear Fokker-Planck equation with density-dependent diffusion*, Concentration en vitesse et en espace dans les modèles cinétiques et diffusifs (chemotaxis, gravitation, swarming), Oct. 6-7, 2009, Institut Henri Poincaré and Ecole Normale Superieure, Paris, France.

2. *Global solutions to the coupled chemotaxis-fluid equations*, Modern Topics in Nonlinear Kinetic Equations, Apr. 20-22, 2009, University of Cambridge, Cambridge, UK.

3. *Stability of a chemotaxis-fluid-coupled model*, Kinetic modelling for socio-economic and related problems, Nov. 27-29, 2008, Vigevano, Italy.

4. *Optimal decay estimates on the linearized Boltzmann equation with time-dependent force and their applications*, Second Workshop on Nonlinear Partial Differential Equations: Analysis, Computation and Application, May 31 – Jun. 2, 2007, Seoul National University, Seoul, Korea.

5. *Optimal convergence rates for the Boltzmann equation with potential forces*, International Conference on Conservation Laws & Kinetic equations, Dec. 7-12, 2006, Shanghai Jiao Tong University, Shanghai, China.

Contributed talks in conferences and workshops

6. *Rates of Convergence on the Vlasov-Poisson-Boltzmann System in* $\mathbb{R}^3$, Thirteenth International Conference on "Hyperbolic Problems: Theory, Numerics and Applications", HYP2010, Jun. 15-19, 2010, Beijing, China.

7. *Rates of Convergence on the Vlasov-Poisson-Boltzmann System in* $\mathbb{R}^3$, Joint SIAM/RSME-SCM-SEMA Meeting "Emerging Topics in Dynamical Systems and Partial Differential Equations", DSPDEs'10, May 31 – Jun. 4, 2010, Barcelona, Spain.

8. *Hypocoercivity of linear degenerately dissipative kinetic equations*, Workshop "Theory and Numerics for Kinetic Equations", Nov. 16-18, 2009, Saarland University, Saarbrücken, Germany.

9. *Time decay of some linear kinetic equations*, Workshop on "Kinetics and statistical methods for complex particle systems", July 20-24, 2009, Complexo Interdisciplinar da Universidade de Lisboa, Lisbon, Portugal.

10. *The Boltzmann equation with forcing: Global existence, uniform stability and optimal decay rates*, Twelfth International Conference on "Hyperbolic Problems: Theory, Numerics, Applications", Jun. 9-13, 2008, University of Maryland, College Park, USA.

11. *Propagation of singularities in the solutions to the Boltzmann equation near equilibrium*, Fourth Pacific Rim Conference on Mathematics, Dec. 7-11, 2007, City University of Hong Kong, HK.

12. *Optimal L^p-L^q convergence rates for the compressible Navier-Stokes equations with potential force*, 1st PhD Student Workshop 2007 (Suzhou) City University of Hong Kong, Apr. 10-11, 2007, Suzhou, China.

Talks in seminars

13. *Stability of dissipative fluids*, Special talk in Department of Mathematical and Statistical Sciences, Jan. 11, 2010, University of Alberta, Canada.

14. *Hypocoercivity of linear degenerately dissipative kinetic equations*, IMS PDE Seminar, Dec. 10, 2009, The Chinese University of Hong Kong, HK.

15. *A kinetic flocking model with diffusion*, Applied and Computational Analysis Graduate Seminar, Oct. 28, 2009, Centre for Mathematical Sciences, University of Cambridge, UK.

16. *Introduction to models and mathematical studies in animal aggregation*, Group Seminar – Analysis of Partial Differential Equations, Aug. 7, 2009, RICAM, Linz, Austria.

17. *Some mathematical theories on the gas motion under the influence of external forcing*, Group Seminar – Analysis of Partial Differential Equations, Oct. 13, 2008, RICAM, Linz, Austria.

18. *On the Cauchy problem of the Boltzmann equation near Maxwellians*, Analysis Seminar at Institute of Mathematics, Jul. 14, 2007, Academic Sinica, Taipei, Taiwan.

19. *Optimal decay estimates on the linearized Boltzmann equation with time-dependent force and their applications*, Taida Institute of Mathematical Sciences, Jun. 28, 2007, National Taiwan University, Taipei, Taiwan.

Conferences, workshops and schools as participants

20. CoLab Mathematics Summer School on "Kinetics and statistical methods for complex particle systems", Jul. 13-17, 2009, Complexo Interdisciplinar da Universidade de Lisboa, Lisbon, Portugal.

21. PIMS/Accelerate Canada Summer School in PDE: Topics in Kinetic Theory, Jun. 29 – Jul. 3, 2009, University of Victoria, Victoria, Canada.

22. International Conference on Kinetic and Related Models, Apr. 1-4, 2009, Wuhan University, Wuhan, China.

PUBLICATIONS

Work in progress

1. Global smooth flows for the compressible Euler-Maxwell system: II. Non relaxation case.

2. With Lizhi Ruan and Changjiang Zhu: On the Cauchy problem of some conservation laws with diffusion-type terms.

3. Dispersion of degenerately dissipative evolution equations.

Preprints submitted

4. Global smooth flows for the compressible Euler-Maxwell system: I. Relaxation case, arXiv:1006.3606v1, submitted (Jun. 10, 2010).

5. With Robert M. Strain: Optimal large-time behavior of the Vlasov-Maxwell-Boltzmann system in the whole space, arXiv:1006.3605v1, submitted (Jun. 7, 2010).

6. With José A. Carrillo and Ayman Moussa: Global classical solutions close to equilibrium to the Vlasov-Euler-Fokker-Planck system, submitted (May. 7, 2010).

7. Hypocoercivity of the linearized dissipative kinetic equations, arXiv:0912.1733v1, submitted (Dec. 3, 2009).

Research papers accepted and published

8. With Alexander Lorz and Peter Markowich: Global solutions to the coupled chemotaxis-fluid equations, to appear in **Communications in Partial Differential Equations** (2010).

9. With Massimo Fornasier and Giuseppe Toscani: A kinetic flocking model with diffusions, to appear in **Communications in Mathematical Physics** (2010).

10. With Robert M. Strain: Optimal time decay of the Vlasov-Poisson-Boltzmann system in $\mathbb{R}^3$, to appear in **Archive for Rational Mechanics and Analysis** (2010).

11. With Klemens Fellner and Changjiang Zhu: Energy method for multi-dimensional balance laws with non-local dissipation, **Journal Mathematiques Pures Appliquees**, 93 (2010), no. 6, 572–598.

12. With Tong Yang: Stability of the one-species Vlasov-Poisson-Boltzmann system, **SIAM Journal on Mathematical Analysis**, 41 (2010), no. 6, 2353–2387.

13. Stability of the Boltzmann equation with potential forces on torus, **Physica D: Nonlinear Phenomena**, 238 (2009), 1808–1820.

14. With Hongfang Ma: Global existence and convergence rates for the 3-D compressible Navier-Stokes equations without heat conductivity, **Indiana University Mathematics Journal**, 57 (2008), no. 5, 2299–2320.

15. With Meng-Rong Li and Tong Yang: Propagation of singularities in the solutions to the Boltzmann equation near equilibrium, **Mathematical Models and Methods in Applied Sciences**, 18 (2008), no. 7, 1093–1114.

16. On the Cauchy problem for the Boltzmann equation in the whole space: Global existence and uniform stability in $L^2_x(H^N_x)$, **Journal of Differential Equations**, 244 (2008), no. 12, 3204–3234.

17. With Seiji Ukai, Tong Yang and Huijiang Zhao: Optimal decay estimates on the linearized Boltzmann equation with time-dependent forces and their applications, **Communications in Mathematical Physics**, 277 (2008), no. 1, 189–236.

18. With Hongxia Liu, Seiji Ukai and Tong Yang: Optimal L^p-L^q Convergence rates for the Navier-Stokes equations with potential force, **Journal of Differential Equations**, 238 (2007), no. 1, 220–233.

19. With Seiji Ukai, Tong Yang and Huijiang Zhao: Optimal convergence rates for the compressible Navier-Stokes equations with potential forces, **Mathematical Models and Methods in Applied Sciences**, 17 (2007), No. 5, 737–758.

20. With Saipan Lin and Changjiang Zhu: Optimal $L^p(1 \leq p \leq \infty)$ rates of decay to linear diffusion waves for nonlinear evolution equations with ellipticity and dissipation, **Nonlinear Analysis: Theory, Methods** & **Applications**, 66 (2007), no. 11, 2335–2344.

21. With Tong Yang and Changjiang Zhu: Navier-Stokes equations with degenerate viscosity, vacuum and gravitational force, **Mathematical Methods in the Applied Sciences**, 30 (2007), no. 3, 347–374.

22. With Tong Yang and Changjiang Zhu: Existence of stationary solutions to the Vlasov-Poisson-Boltzmann system, **Journal of Mathematical Analysis and Applications**, 327 (2007), no. 1, 425–434.

23. With Shaoqiang Tang and Changjiang Zhu: Asymptotics in nonlinear evolution system with dissipation and ellipticity on quadrant, **Journal of Mathematical Analysis and Applications**, 323 (2006), no. 2, 1152–1170.

24. With Mei Zhang and Changjiang Zhu: L^1 stability for the Vlasov-Poisson-Boltzmann system around vacuum, **Mathematical Models and Methods in Applied Sciences**, 16 (2006), No. 9, 1505–1526.

25. With Tong Yang and Changjiang Zhu: L^1 and BV-type stability of the Botlzmann equation with external forces, **Journal of Differential Equations**, 227 (2006), no. 1, 1–28.

26. With Tong Yang and Changjiang Zhu: Boltzmann equation with external force and Vlasov-Poisson-Boltzmann system in infinite vacuum, **Discrete and Continuous Dynamical Systems**, 16 (2006), no. 1, 253–277.

27. With Tong Yang and Changjiang Zhu: Global existence to Boltzmann equation with external force in infinite vacuum, **Journal of Mathematical Physics**, 46 (2005), 053307, 13pp.

28. With Changjiang Zhu: Asymptotics of dissipative nonlinear evolution equations with ellipticity: different end states, **Journal of Mathematical Analysis and Applications**, 303 (2005), no. 1, 15–35.

29. With Changjiang Zhu: A note on semiconcave function, **Applicable Analysis**, 82 (2003), no. 9, 889–894.

30. With Changjiang Zhu: Existence and uniqueness of entropy solution to initial boundary value problem for the inviscid Burgers equation, **Journal of Physics. A.**, 36 (2003), no. 8, 2099–2107.

Conference papers and short surveys

31. With Seiji Ukai and Tong Yang: A combination of energy method and spectral analysis for studies on systems for gas motions, **Frontiers of Mathematics in China**, 4 (2009), No. 2, 253–282.

32. The Boltzmann equation near equilibrium states in $\mathbb{R}^n$, **Methods and Applications of Analysis**, 14 (2007), No. 3, 227–250.

JOURNALS REVIEWED

Acta Mathematica Scientia
AIMS Proceedings
Applied Mathematics and Computation
Frontiers of Mathematics in China
Journal of Mathematical Analysis and Applications
Mathematical Methods in the Applied Sciences

INTERNATIONAL REFERENCES

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