

# College of William and Mary

## Curriculum Vita Standard Format

Date: September 1st, 2009

### PERSONAL INFORMATION

1. Name: Junping Shi

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Phone: (757) 221-2030

Home address: 3456 Mallard Creek Run, Williamsburg, VA 23185, Phone: (757) 259-9873

2. Current Position: Associate Professor, Department of Mathematics

### EDUCATION

3. Academic degrees, institutions and dates

Ph.D. in Mathematics, Brigham Young University, Provo, Utah, USA, 1993-1998

Undergraduate in Mathematics, Nankai University, Tianjin, China, 1990-1993

### ACADEMIC POSITIONS

4. Teaching and research positions, including dates

1. September 2006 – :

Associate Professor, Department of Mathematics, College of William and Mary

2. August 2000 – August 2006:

Assistant Professor, Department of Mathematics, College of William and Mary

3. September 2001 – current:

Guest Professor, School of Mathematics, Harbin Normal University, China

4. March 2006 – 2009:

Longjiang Special Professor, School of Mathematics, Harbin Normal University, China

5. July 1998 – July 2000:

Visiting Assistant Professor, Department of Mathematics, Tulane University

6. Sept–Dec, 2007: Visiting Associate Professor, National Tsing Hua University, Hsinchu, Taiwan

7. Feb–Apr, 2005: Visiting Scholar, National Tsing Hua University, Hsinchu, Taiwan; University of Sydney, Sydney, NSW, Australia; University of New England, Armidale, NSW, Australia; and Tokyo Metropolitan University, Tokyo, Japan

8. May–June 2001: Visiting Scholar, Beijing (Peking) University, China

## HONORS, PRIZES AND AWARDS

### 5a. Professional prizes, awards, honors

1. Second class scientific research award, Heilongjiang province, China, 2008. (with Yuwen Wang, Ping Liu, Renhao Cui, Yuhua Zhao.)
2. Faculty Award for the Advancement of Scholarship by the Alpha Chapter of Phi Beta Kappa, College of William and Mary, 2008.
3. Second class research award from Department of Education of Heilongjiang province, China, 2003. (with Yuwen Wang, Wen Song, Mingyao Xu and Shaorong Pan.)
4. Ralph E. Powe Junior Faculty Enhancement Award, Oak Ridge Associated Universities, 2002.

### 5b. Editorial positions on scholarly journals

1. (2009-) Associate Editor, Journal of Mathematical Analysis and Applications
2. (2008-) Associate Editor, Applicable Analysis
3. (2008-) Editorial board, International Journal of Differential Equations
4. Guest editor for Special issue on “variational methods and applications”, edited by Chjan Lim, Mitsuharu Otani and Junping Shi, **Discrete and Continuous Dynamical Systems, Series A**, Volume 19, No. 2, October 2007, 235–467.
5. Guest editor for Special issue for Peter W. Bates’ sixty birthday, edited by Jibin Li, Kening Lu, Junping Shi and Chongchun Zeng, **Discrete and Continuous Dynamical Systems, Series A**, Volume 24, No. 3, July 2009, 653–1045.
6. Guest editors of special issue “analysis and application of PDEs in biomathematics” of the journal **Applicable Analysis**, edited by Junping Shi, Xingfu Zou, to appear in 2010.

## COURSES TAUGHT

### 6a. Courses taught

College of William and Mary (all are undergraduate courses)

1. Fall 2009: Math 302(Differential Equations), Math 441(Applied Mathematics, I)
2. Spring 2009: Math 311 (Elementary Analysis), Math 490(Math. biology and PDE)
3. Fall 2008: Math 111 (Calculus I), Math 311 (Elementary Analysis)

4. Spring 2008: Math 213(Multi-variable Calculus), Math 302(Differential Equations)
5. Spring and Fall 2007: sabbatical leave, no teaching
6. Fall 2006: Math 131 (Calculus for Life sciences I), Math 345 (Math. models in biology)
7. Spring 2006: Math 302(Differential Equations), Math 490(Math. biology and PDE)
8. Fall 2005: Math 302(Differential Equations), Math 490(Problem solving seminar)
9. Spring 2005: pre-tenure junior research leave, no teaching
10. Fall 2004: Math 112(Calculus II, 2 sections), Math 302(Differential Equations)
11. Spring 2004: Math 213(Multi-variable Calculus), Math 490(Math. biology and PDE)
12. Fall 2003: Math 112(Calculus II), Math 302(Differential Equations)
13. Spring 2003: Math 112(Calculus II, 2 sections)
14. Fall 2002: Math 111(Calculus I), Math 441(Applied Mathematics, I)
15. Spring 2002: Math 302(Differential Equations), Math 490(Math. biology and PDE)
16. Fall 2001: Math 302(Differential Equations), Math 410(510)(Math. models in biology)
17. Spring 2001: Math 111(Calculus I), Math 112(Calculus II)
18. Fall 2000: Math 111(Calculus I, 2 sections)

Tulane University (all are undergraduate courses)

1. Spring 2000: Math 111(Probability and statistics), Math 224(Differential Equations)
2. Fall 1999: Math 221(Multi-variable calculus), Math 224(Differential Equations)
3. Spring 1999: Math 122(Calculus II), Math 224(Differential Equations)
4. Fall 1998: Math 121(Calculus I), Math 224(Differential Equations)

Brigham Young University (all are undergraduate courses)

1. Fall 1997: Math 312(Advanced engineering mathematics)
2. Summer 1997: Math 112(Calculus I)
3. Spring 1997: Math 110(College Algebra)
4. Fall 1996: Math 110(College Algebra)

National Tsing Hua University (graduate course)

1. Fall 2007: Math 6101-01 (Bifurcation Theory in Banach Spaces and Application to Semi-linear Elliptic Equations and Systems)

Harbin Normal University (graduate courses, except one)

1. Spring 2008: Ordinary Differential Equations (undergraduate course, 4 guest lectures)
2. Summer 2007: Topics in reaction-diffusion systems
3. Summer 2006: Topics in differential equations
4. Summer 2002: Bifurcation Theory of semilinear elliptic equations

6b. Students supervised

1. REU students supervised in College of William and Mary:  
(supported by National Science Foundation grant, unless specified otherwise)

Young He Lee (Spring 2004)

Lena Shebakov (Spring 2004) Ph.D student in applied math, University of Washington

Jackie Taber (Spring and Fall 2004) M.S. student in COR, College of William and Mary

Kristina Little (Spring 2006) Ph.D student in bioengineering, University of Virginia

Derek LaMontagne (Spring 2006) Ph.D student in chemistry, University of Florida

Fumie Hirata (Spring 2006) M.S. student in mathematics, Keio University, Japan

Michael Essman (Spring, summer 2008)

Will Jordan-Cooley (Spring, summer 2009)

Daniel Hariprasad (Spring 2009) Ph.D student in mathematics, University of Arizona

Yuanyuan Liu (Spring 2009) supported by W&M Biomath fellowship

2. Honors students in College of William and Mary:

Daniel Hariprasad (BS, Mathematics, 2009) Ph.D student in mathematics, Univ. Arizona

Michael Essman (BS, Mathematics/Economics, 2010)

Will Jordan-Cooley (BS, Mathematics, 2010)

Yuanyuan Liu (BS, Mathematics/Economics, 2010)

3. Serve in committee of Marc McGuigan (BS, Physics, 2003), Heather Wiseman (BS, Biology, 2006), David Gould (BS, Mathematics, 2009), Niha Zubair (BS, Mathematics, 2009)

4. Master students supervised in Harbin Normal University: (all jointly with Yuwen Wang)

Jinfeng Wang, Yuhua Zhao (MS, 2005);

Renhao Cui, Guanqi Liu, Jia Duo (MS 2006);

Rui Diao, Hui Ding, Jili Fu, Linan Sun, Yanan Wang (MS 2008);

Xinying Hao, Ting Li, Yuhang Liu, Da Yu, Fujun Zhang, Xin Zhang (MS 2009);

Rui Wang, Min Cheng, Li Li, Xiuhong Feng, Ping Li (MS 2010);

5. Ph.D students supervised in Harbin Normal University: (all jointly with Yuwen Wang)

Ping Liu (PhD, 2008) Associate professor in Harbin Normal University;  
Yuhua Zhao (PhD expected 2011)

6. Ph.D students supervised in Harbin Institute of Technology: (all jointly with Junjie Wei)

Fengqi Yi (PhD, 2008) Lecturer in Harbin Engineering University;  
Ying Su (PhD expected 2010);  
Jinfeng Wang (PhD expected 2010)

#### FELLOWSHIPS AND GRANTS

7a. All fellowships, grants, contracts awarded by outside agencies.

1. *CSUMS: Theory, techniques, and research in computational mathematics*, National Science Foundation, 2007-2012, \$884,029. (PI: C. Li, co-PIs: V. Torczon, A. Stathopoulos, J. Shi, R. Lewis)
2. *Applications of singularity theory, generalized inverse in bifurcation problems and non-linear analysis*, National Natural Science Foundation of China, 2007-2009, 267,000 Chinese Yuan (about \$33,000 in 2006). (PI: Y. Wang, co-PI: J. Ma, J. Shi)
3. *UBM: Undergraduate Research in Metapopulation Ecology*, National Science Foundation, 2004-2009, \$647,000. (PI: D. Cristol, co-PIs: J. Swaddle, S. Schreiber, senior personnel: R. Chambers, T. Killingback, J. Shi.)
4. *Persistence and pattern formation in biological systems*, National Science Foundation, 2003-2007, \$108,545. (PI: J. Shi)
5. *Oversea Chinese Research Fund*, Heilongjiang province, China, 2003-2006. 50,000 Chinese Yuan (about \$6,200). (PI: Y. Wang, co-PI: J. Shi)
6. American Mathematical Society Ky Fan fund (with Chi-Kwong Li), 2003-2004. \$3,500 plus \$4,000 matching fund from College of William and Mary.
7. Ralph E. Powe Junior Faculty Enhancement Award, Oak Ridge Associated Universities, 2002. \$5,000.
8. *Theory and Applications of Semilinear Elliptic and Parabolic Equations*, Board of Regents of Louisiana, 1999-2001, \$15,501. (PI: J. Shi)

7b. All summer grants and Faculty Research Assignments received from William and Mary

1. *Bistability in Biological and Chemical Systems*, Summer Research Grant, College of William and Mary, 2008, \$5,000. (PI: J. Shi)
2. Faculty Semester Research Assignment, Spring 2007 and Fall 2007.
3. Junior Research Leave, Spring 2005.

4. *Reaction Diffusion Equations and Applications*,  
Summer Research Grant, College of William and Mary, 2003, \$4,000. (PI: J. Shi)
5. *Studies of Nonlinear Partial Differential Equations from Fishery Management*,  
Summer Research Grant, College of William and Mary, 2002, \$4,500. (PI: J. Shi)
6. *Qualitative Studies of Nonlinear Partial Differential Equations*,  
Summer Research Grant, College of William and Mary, 2001, \$6,000. (PI: J. Shi)
7. *Developing a revised calculus curriculum for business and economics students at W&M*,  
Charles Center Fellowships / May Seminar, College of William and Mary, 2001, \$2,700.  
(Project Coordinator: C.-K. Li, Participants: D. Lutzer, J. Shi, B. Robeson, C. Moody)
8. Startup grant, College of Arts and Sciences, College of William and Mary, 2000-2003,  
\$25,000. (PI: J. Shi)

## RESEARCH

### 8a. Refereed publications in periodicals, chapters in books, and conference proceedings

1. Ying Su, Junjie Wei and Junping Shi,  
*Bifurcation analysis in a delayed diffusive Nicholson's blowflies equation*. (24 pages)  
To appear in **Nonlinear Analysis: Real World Applications**.
2. Guanqi Liu, Junping Shi and Yuwen Wang,  
*Existence and nonexistence of positive solutions of semilinear elliptic equation with inhomogeneous strong Allee effect*. (10 pages)  
To appear in **Applied Mathematics and Mechanics**.
3. Jifa Jiang and Junping Shi,  
*Bistability dynamics in some structured ecological models*. (31 pages)  
To appear in **Spatial Ecology: a collection of essays**, a book to be published by CRC Press.
4. Junping Shi,  
*Bifurcation in infinite dimensional spaces and applications in spatiotemporal biological and chemical models*. **Frontier of Mathematics in China** 4, (2009), 3, 407–424.
5. Ying Su, Junjie Wei and Junping Shi,  
*Hopf Bifurcations in a Reaction-Diffusion Population Model with Delay Effect*.  
**Journal of Differential Equations** 247, (2009), 5, 1156–1184. (No. 3 in Top 25 Hottest Articles of *Journal of Differential Equations*, for Apr.-Jun., 2009)
6. Rui Peng, Junping Shi,  
*Non-existence of Non-constant Positive Steady States of Two Holling Type-II Predator-prey Systems: Strong Interaction Case*. **Journal of Differential Equations** 247, (2009), 3, 866–886. (No. 2 in Top 25 Hottest Articles of *Journal of Differential Equations*, for Apr.-Jun., 2009)

7. Hsu, Sze-Bi; Shi, Junping,  
*Relaxation oscillator profile of limit cycle in predator-prey system.*  
**Discrete and Continuous Dynamical Systems B**, 11, (2009), no. 4, 893–911.
8. Chjan Lim and Junping Shi,  
*The role of higher vorticity moments in a variational formulation of the Barotropic Vorticity Model on a rotating sphere.*  
**Discrete and Continuous Dynamical Systems B**, 11, (2009), no. 3, 717–740.
9. Junping Shi and Xuefeng Wang,  
*On global bifurcation for quasilinear elliptic systems on bounded domains.*  
**Journal of Differential Equations**, 246, (2009), no. 7, 2788–2812.  
(No. 12 in Top 25 Hottest Articles of *Journal of Differential Equations*, for the period of Jan.–March, 2009; No. 10 for the period of Oct.–Dec, 2008)
10. Fengqi Yi, Junjie Wei and Junping Shi,  
*Bifurcation and spatiotemporal patterns in a homogeneous diffusive predator-prey system.* **Journal of Differential Equations**, 246, (2009), no. 5, 1944–1977.  
(No. 2 in Top 25 Hottest Articles of *Journal of Differential Equations*, for Jan.–March, 2009; No. 12 for Oct.–Dec, 2008; No. 16 for Apr.–Jun., 2009)
11. Fengqi Yi, Junjie Wei and Junping Shi,  
*Global asymptotical behavior of the Lengyel-Epstein reaction-diffusion system.*  
**Applied Mathematics Letters**, 22, (2009), no. 1, 52–55.
12. Ping Liu, Junping Shi and Yuwen Wang,  
*Exact multiplicity of solutions to perturbed logistic type equations on a symmetric domain.* **Science in China Series A: Mathematics**, 51 (2008), no. 10, 1753–1762.  
(Chinese edition: 38 (2008) no. 8, 930–939.)
13. Jia Duo, Junping Shi and Yuwen Wang,  
*Structure of the solution set of semilinear elliptic equations with asymptotic linear nonlinearity.* **Nonlinear Analysis: Theory, Methods & Applications**, 69, (2008), no. 8, 2369–2378.
14. Kazuhiro Kurata and Junping Shi,  
*Optimal Spatial Harvesting Strategy and Symmetry-Breaking.*  
**Applied Mathematics and Optimization**, 58 (2008), no. 1, 89–110.
15. Rui Peng, Junping Shi and Mingxin Wang,  
*On Stationary Patterns of a Reaction-diffusion Model with Autocatalysis and Saturation Law.* **Nonlinearity**, 21 (2008), no. 7, 1471–1488.  
(One of 18 ‘high-profile articles’ of 2008 for **Nonlinearity**)
16. Jifa Jiang and Junping Shi,  
*Dynamics of a reaction-diffusion system of autocatalytic chemical reaction.*  
**Discrete and Continuous Dynamical Systems A**, 21 (2008), no. 1, 245–258.

17. Fengqi Yi, Junjie Wei and Junping Shi,  
*Diffusion-Driven Instability and Bifurcation in the Lengyel-Epstein System.*  
**Nonlinear Analysis: Real World Applications**, 9 (2008), no. 3, 1038–1051.
18. Junping Shi and Shin-Hwa Wang,  
*Exact multiplicity of boundary blow-up solutions for bistable equation.*  
**Computers and Mathematics with Applications**, 54 (2007), no. 9-10, 1285–1292.
19. Ping Liu, Junping Shi and Yuwen Wang,  
*Imperfect transcritical and pitchfork Bifurcations.*  
**Journal of Functional Analysis**, 251 (2007), no. 2, 573–600.
20. Rui Peng, Junping Shi and Mingxin Wang,  
*Stationary Pattern of a Ratio-dependent Food Chain Model with Diffusion.*  
**SIAM Journal of Applied Mathematics**, 67 (2007), no. 5, 1479–1503.
21. Yihong Du and Junping Shi,  
*Allee Effect and Bistability in a Spatial Heterogeneous Predator-Prey Model.*  
**Transactions of American Mathematical Society**, 359 (2007), no. 9, 4557–4593.
22. Renhao Cui, Yuwen Wang and Junping Shi,  
*Uniqueness of positive solution for a class of semilinear elliptic systems.*  
**Nonlinear Analysis: Theory, Methods & Applications**, 67 (2007), no. 6, 1710–1714.
23. Yuhua Zhao, Yuwen Wang and Junping Shi,  
*Exact multiplicity of solutions and S-shaped bifurcation curve for a class of semilinear elliptic equations.* **Journal of Mathematical Analysis and Applications**, 331 (2007), no. 1, 263–278.
24. Junping Shi and Xuefeng Wang,  
*Hair-Triggered Instability of Radial Steady States, Spread and Extinction in Semilinear Heat Equations,* **Journal of Differential Equations**, 231 (2006), no. 1, 235–251.
25. E. Norman Dancer and Junping Shi,  
*Uniqueness of positive solution to sublinear semipositone problem.*  
**Bulletins of London Mathematical Society**, 38 (2006), no. 6, 1033–1044.
26. Yihong Du and Junping Shi,  
*Spatially Heterogeneous Predator-Prey Model with Protect Zone for Prey.*  
**Journal of Differential Equations**, 229 (2006), no. 1, 63–91.  
(No. 11 in Top 25 Hottest Articles of *Journal of Differential Equations*, for the period of Jul.–Sep, 2006)
27. Yihong Du and Junping Shi,  
*Spatially Heterogeneous Predator-Prey Model (A survey paper).*  
**Nonlinear Dynamics and Evolution Equations**, Edited by Hermann Brunner, Xiaoqiang Zhao, and Xingfu Zou, Fields Institute Communications, 48, 95–135, American Mathematical Society, 2006.

28. Junping Shi and Ratnasingham Shivaji,  
*Diffusive population models with Allee effects.*  
**Journal of Mathematical Biology**, 52 (2006), no. 6, 807–829.
29. Young He Lee, Lena Sherbakov, Jacquelyn G. Taber and Junping Shi,  
*Bifurcation Diagrams of Population Models with Nonlinear Diffusion.*  
**Journal of Computational & Applied Mathematics**, 194 (2006), no. 2, 357–367.
30. Junping Shi,  
*A new proof of anti-maximum principle via a bifurcation approach.*  
**Resultate der Mathematik**, 48 (2005), no. 1-2, 162–167.
31. Philip Korman and Junping Shi,  
*On Lane-Emden type systems.*  
**Discrete and Continuous Dynamical Systems A**, Proceedings of 5th AIMS International Conference on Dynamic Systems and Differential Equations, 510–517, (2005).
32. Junping Shi and Ratnasingham Shivaji,  
*Semilinear elliptic equations with generalized cubic nonlinearities.*  
**Discrete and Continuous Dynamical Systems A**, Proceedings of 5th AIMS International Conference on Dynamic Systems and Differential Equations, 798–805, (2005).
33. Junping Shi and Miaoxin Yao,  
*Positive Solutions of Elliptic Equations with Singular Nonlinearity.*  
**Electronic Journal of Differential Equations**. 2005, No. 4, 1–11, (2005).
34. Junping Shi,  
*A radially symmetric anti-maximum principle and applications to fishery management models.* **Electronic Journal of Differential Equations**. 2004, No. 27, 1–13, (2004).
35. Shohba Oruganti, Junping Shi and Ratnasingham Shivaji,  
*Logistic equation with the  $p$ -Laplacian and constant yield harvesting.*  
**Abstract and Applied Analysis**, 2004, No. 9, 723–727, (2004).
36. Junping Shi and Ratnasingham Shivaji,  
*Global bifurcation of concave semipositon problems.*  
**Advances in Evolution Equations: Proceedings in honor of J.A. Goldstein's 60th birthday**, Edited by G.R. Goldstein, R. Nagel, and S. Romanelli, Marcel Dekker, Inc., New York, Basel, 385–398, 2003.
37. Junping Shi,  
*Exact multiplicity of positive solutions to superlinear problem.*  
**Electronic Journal of Differential Equations**. 2002, Conf 10, 257-265, (2002).
38. Peter W. Bates and Junping Shi,  
*Existence and instability of spike layer solutions to singular perturbation problems.*  
**Journal of Functional Analysis**, 196, No. 2, 429–482, (2002).

39. Junping Shi,  
*Global bifurcation of semilinear Neumann boundary problem.*  
**Transactions of American Mathematical Society**, 354, No. 8, 3117–3154, (2002).
40. Shohba Oruganti, Junping Shi and Ratnasingham Shivaji,  
*Diffusive Logistic equation with constant effort harvesting, I: steady states.*  
**Transactions of American Mathematical Society**, 354, No. 9, 3601–3619, (2002).
41. Junping Shi,  
*Saddle solutions of the balanced bistable diffusion equation.*  
**Communication of Pure and Applied Mathematics**, 55, No. 7, 815–830, (2002).
42. Junping Shi,  
*Exact multiplicity of solutions to superlinear and sublinear problems.*  
**Nonlinear Analysis: Theory, Methods & Applications**, 50, No. 5, 665–687, (2002).
43. Philip Korman and Junping Shi,  
*New exact multiplicity results with an application to a population model.*  
**Proceedings of Royal Society of Edinburgh A**, 131, No. 5, 1167–1182, (2001).
44. Junping Shi and Ratnasingham Shivaji,  
*Exact Multiplicity of solutions for classes of problems with concave-convex nonlinearity.*  
**Discrete and Continuous Dynamical Systems A**, 7, No. 3, 559–571, (2001).
45. Philip Korman and Junping Shi,  
*Instability and exact multiplicity of solutions of semilinear equations.*  
**Electronic Journal of Differential Equations**, Con-05, 311–322, (2000).
46. Junping Shi,  
*Blow-up points of solution curves for a semilinear problem.*  
**Topological Methods in Nonlinear Analysis**, 15, No. 2, 251–266, (2000).
47. Junping Shi,  
*Persistence and bifurcation of degenerate solutions.*  
**Journal of Functional Analysis**, 169, No. 2, 494–531, (1999).
48. Junping Shi and Junping Wang,  
*Morse indices and exact multiplicity of solutions to semilinear elliptic problems.*  
**Proceedings of American Mathematics Society**, 127, No. 12, 3685–3695, (1999).
49. Tiancheng Ouyang and Junping Shi,  
*Exact multiplicity of positive solutions for a class of semilinear problems:II.*  
**Journal of Differential Equations**, 158, No. 1, 94–151, (1999).
50. Peter W. Bates, Edward Norman Dancer and Junping Shi,  
*Multi-spike stationary solution of Cahn- Hilliard equation and instability.*  
**Advances in Differential Equations**, 4, No. 1, 1–69, (1999).

51. Junping Shi and Miaoxin Yao,  
*On a singular nonlinear semilinear elliptic problem.*  
**Proceedings of Royal Society of Edinburgh A**, 128, No. 6, 1389–1401, (1998).
52. Tiancheng Ouyang and Junping Shi,  
*Exact multiplicity of positive solutions for a class of semilinear problems.*  
**Journal of Differential Equations**, 146, No. 1, 121–156, (1998).
53. Tiancheng Ouyang and Junping Shi,  
*A bifurcation approach to the exact multiplicity of semilinear elliptic equations.*  
**Discrete and Continuous Dynamical Systems**, Proceedings of International Conference on Dynamic Systems and Differential Equations, 2, 162–173, (1998).

#### 8b. Books

1. Junping Shi,  
*Solution set of semilinear elliptic equations: Global Bifurcation and Exact Multiplicity.*  
Series on Partial Differential Equations and Applications, World Scientific Publication Company, Singapore, summer 2009. approximately 300 pages.  
ISBN 978-981-277-594-8, 981-277-594-3.  
<http://www.worldscibooks.com/mathematics/6640.html>
2. Jibin Li, Shigui Ruan and Junping Shi,  
*Stories of Mathematical Biology.* (in Chinese), Science Press, Beijing, China, summer 2009. popular science book, approximately 300 pages.
3. Junping Shi, *Reaction diffusion equations and mathematical biology.* Undergraduate Lecture Notes, (2004). 1–93.

#### 8c. Edited volumes

1. Special issue on “variational methods and applications”, edited by Chjan Lim, Mitsuharu Otani and Junping Shi, **Discrete and Continuous Dynamical Systems, Series A**, Volume 19, No. 2, October 2007, 235–467.
2. Special issue for Peter W. Bates’ sixty birthday, edited by Jibin Li, Kening Lu, Junping Shi and Chongchun Zeng, **Discrete and Continuous Dynamical Systems, Series A**, Volume: 24, No. 3, July 2009, 653–1045.
3. *Applicable Analysis*, Special issue on Analysis and Applications of PDE in Biomathematics, edited by Junping Shi, Xingfu Zou. To appear in 2010.

#### 8d. Articles published in non-refereed conference proceedings

1. Junping Shi,  
*Asymptotic Spatial Patterns and Entire Solutions of Semilinear Elliptic Equations.*  
**Proceedings of the Ryukoku Workshop 2003: New perspectives of nonlinear partial differential equations**, Edited by Y. Morita, H. Ninomiya, E. Yanagida and S. Yotsutani, Joint research center for sciences and technology of Ryukoku University, 27–35, 2004.
2. Junping Shi,  
*Multi-Parameter Bifurcation and Applications.*  
**ICM 2002 Satellite Conference on Nonlinear Functional Analysis: Topological Methods, Variational Methods and Their Applications**, Edited by H. Brezis, K.C. Chang, S.J. Li and P. Rabinowitz, World Scientific, Singapore, 211–222, 2003.
3. Tiancheng Ouyang and Junping Shi,  
*Exact multiplicity of solutions and global bifurcation of  $\Delta u + \lambda f(u) = 0$ .* **Proceedings of the US-Chinese Conference: Differential Equations and Applications**, Edited by P.W. Bates, S-N. Chow, K. Lu and X. Pan, World Scientific, Singapore, 356–363, 1998.

8e. Invited scholarly papers and talks

Conference Talks

1. *Global Bifurcation in reaction-diffusion systems*  
International Workshop on Reaction-Diffusion Models and Mathematical Biology, Harbin, China, June 24-27. (45 minute invited talk)
2. *Global Bifurcation in CIMA chemical reaction systems*  
International Conference on Nonlinear and Stochastic Dynamics, Sichuan university, Chengdu, China, June 1-5, 2009. (45 minute invited talk)
3. *Global Bifurcation in diffusive Rosenzweig-MacArthur predator-prey systems*  
Interdisciplinary Conference on Applied Analysis and Mathematics, NCTS, Tsing Hua University, Hsinchu, Taiwan, May 13, 2009. (30 minute invited talk)
4. *Bifurcation in diffusive predator-prey systems*  
AMS southeastern sectional meeting, Special Session on Dynamics and Applications of Differential Equations, Huntsville, AL, October 26, 2008. (30 minute invited talk)
5. *Lectures on bifurcation in reaction-diffusion models from biology.*  
Mathematical Applications in Ecology and Evolution Workshop, Center for Computational Sciences, Mississippi State University, August 4–6, 2008.  
(three 1-hour invited lectures)
6. *Uniqueness of solution of variational elliptic systems.*  
International Conference on Nonlinear Partial Differential Equations and Geometric Analysis, Harbin, China, June 30–July 4, 2008. (45 minute invited talk)

7. *Bifurcation in diffusive predator-prey systems*  
7th AIMS International Conference on Dynamical Systems and Differential Equations  
Special session on Differential Equations of Mixed Type Arising in Engineering, Biology  
and Ecology, Arlington, Texas, May 18-21, 2008 (30 minute invited talk)
8. *Extensions of bifurcation from simple eigenvalue theorem*  
7th AIMS International Conference on Dynamical Systems and Differential Equations  
Special session on Nonlinear Evolution Equations and Related Topics, Arlington, Texas,  
May 18-21, 2008 (30 minute invited talk)
9. *Standing Pulse solution of a reaction-diffusion equation of logistic growth*  
7th AIMS International Conference on Dynamical Systems and Differential Equations  
Special session on Pattern Formation in Biology and Ecology: from Interfaces to Meta-  
solutions, Arlington, Texas, May 18-21, 2008 (30 minute invited talk)
10. *Bifurcation and asymptotical behavior of classical predator-prey systems.*  
AMS southeastern sectional meeting, Special Session on Mathematical Modeling in  
Biology, Baton Rouge, LA, March 29, 2008. (30 minute invited talk)
11. *Uniqueness of solution of variational elliptic systems.*  
Workshop on Variational Methods, Capital Normal University, Beijing, China, Decem-  
ber 28-29, 2007. (45 minutes invited talk)
12. *Standing Pulse solution of a reaction-diffusion equation of logistic growth*  
PDE Day in Taida Institute of Mathematical Sciences, National Taiwan University,  
Taipei, Taiwan, November 28, 2007 (1 hour invited talk)
13. *Extensions of bifurcation from simple eigenvalue theorem*  
International Workshop on Banach Space, Operator Theory and Applications in Non-  
linear Analysis, Harbin Normal University, Harbin, Heilongjiang, China, July 25-27,  
2007 (50 minute invited talk)
14. *Extensions of bifurcation from simple eigenvalue theorem*  
The Second International Conference on Recent Advance in Applied Dynamical Sys-  
tems, Zhejiang Normal University, Jinhua, Zhejiang, China, June 4-8, 2007 (40 minute  
invited talk)
15. *Bistable dynamics in autocatalytic chemical reactions*  
The Fourth International Conference on Mathematical Biology, Wuyi Mountain, Fu-  
jian, China, May 29-June 1, 2007 (30 minute invited talk)
16. *Bistable dynamics in autocatalytic chemical reactions*  
AMS eastern sectional meeting, Special Session on Nonlinear Elliptic and Parabolic  
Equations, Storrs, CT, October 29, 2006. (20 minute invited talk)
17. *A variational problem in climate dynamics*  
AMS western sectional meeting, Special Session on Nonlinear Differential Equations:  
Methods & Applications, Salt Lake City, UT, October 7, 2006. (20 minute invited  
talk)

18. *Bistable dynamics in autocatalytic chemical reactions*  
Workshop on Analysis and PDE, Harbin Normal University, July 22, 2006. (1 hour invited talk)
19. *Standing Pulse solution of a reaction-diffusion equation of logistic growth*  
Workshop on Analysis and PDE, Harbin Normal University, July 21, 2006. (1 hour invited talk)
20. *Bistable dynamics in autocatalytic chemical reactions*  
Recent Developments In Differential Equations and Applications, Guangzhou University, Guangzhou, China, July 17-21, 2006. (45 minute invited talk)
21. *Allee Effect and Bistability in a Spatially Heterogeneous Predator-Prey Model*  
6th AIMS International Conference on Dynamical Systems and Differential Equations  
Special session on Modeling and Analysis of Predators-Preys Systems: Stability, Bifurcation, Chaos and Complexity, Poitiers, France, June 25-28, 2006 (30 minute invited talk)
22. *Standing Pulse solution of a reaction-diffusion equation of logistic growth*  
6th AIMS International Conference on Dynamical Systems and Differential Equations  
Special session on Nonlinear Parabolic and Elliptic PDEs and Applications  
Poitiers, France, June 25-28, 2006 (30 minute invited talk)
23. *Optimal Spatial Harvesting Strategy and Symmetry-Breaking*  
International Conference on Nonlinear and Stochastic Dynamics  
Sichuan University, Chengdu, China, June 5-9, 2006 (45 minute invited talk)
24. *Standing Pulse solution of a reaction-diffusion equation of logistic growth*  
International Conference on Dynamical Systems: Bifurcation, Application and Computation, Shanghai Normal University, Shanghai, China, June 2-5, 2006 (45 minute invited talk)
25. *Allee Effect and Bistability in Spatially Heterogeneous Predator-Prey Models*  
International Conference on Nonlinear Partial Differential Equations  
Qufu Normal University (Rizhao Campus), Rizhao, Shandong, China, July 11-16, 2005. (45 minute invited talk)
26. *Uniqueness of positive solution to sublinear semipositone problem*  
HuaZhong International Conference on Nonlinear Partial Differential Equations  
Zhangjiajie, Hunan, China, July 9-12, 2005. (45 minute invited talk)
27. *Allee Effect and Bistability in Spatially Heterogeneous Predator-Prey Models*  
First International Conference on Recent Advances in Bifurcation Theory and Applications of Dynamical System, Zhejiang Normal University, Jinhua, Zhejiang, China, June 8-12, 2005. (45 minute invited talk)
28. *A variational problem in climate dynamics*  
International Conference of Nonlinear Evolution Equations and Infinite Dimensional Dynamical Systems, Nanjing Normal University, Nanjing, Jiangsu, China, June 2-6, 2005. (45 minute invited talk)

29. *Bistability, Allee Effect and Threshold Manifold in Structured Population Models*  
Workshop on Mathematical and Numerical Analysis on Nonlinear Phenomena, Tokyo Metropolitan University, Tokyo, Japan, February 7, 2005. (one hour invited talk)
30. *Isothermal Balls in an autocatalytic chemical reaction.*  
Workshop on Mathematical and Numerical Analysis on Nonlinear Phenomena, Tokyo Metropolitan University, Tokyo, Japan, February 6, 2005. (one hour invited talk)
31. *Bistability, Allee Effect and Threshold Manifold in Structured Population Models*  
Workshop on Spatial Ecology: The Interplay between Theory and Data,  
Institute of Theoretical and Mathematical Ecology (ITME), University of Miami, Coral Gables, FL, January 7-10th, 2005. (one hour plenary talk)
32. *Isothermal Balls in an autocatalytic chemical reaction.*  
AMS-SIAM Special Session on Reaction Diffusion Equations and Applications,  
Joint Mathematics Meetings, Atlanta, GA, January 5-8th, 2005. (30 minute invited talk)
33. *Reaction-diffusion models with weak Allee effects,*  
International Conference On Nonlinear Dynamics And Evolution Equations,  
Memorial University of Newfoundland , St. John's, Newfoundland and Labrador, Canada, June 6-10th, 2004. (30 minute invited talk)
34. *Reaction-diffusion models with weak Allee effects,*  
Special session on Recent Developments on Nonlinear Elliptic Equations and Variational Problems, AIMS' Fifth International Conference on Dynamical Systems and Differential Equations California State Polytechnic University, Pomona, CA, June 16-19th, 2004. (30 minute invited talk)
35. *Anti-Maximum Principle and Applications,*  
Special session on PDE with Application in Biology,  
AIMS' Fifth International Conference on Dynamical Systems and Differential Equations California State Polytechnic University, Pomona, CA, June 16-19th, 2004. (30 minute invited talk)
36. *Asymptotic Spatial Patterns and Entire Solutions of Semilinear Elliptic Equations,*  
Workshop on Nonlinear Analysis - Hamiltonian Systems and Celestial Mechanics,  
Nankai Institute of Mathematics, Nankai University, Tianjin, China, June 9-13th, 2004. (1 hour invited talk)
37. *Reaction-diffusion models with weak Allee effects,*  
International Workshop of bifurcation theory and applications,  
Shanghai Jiaotong University, Shanghai, China, May 23-26th, 2004. (30 minute invited talk)
38. *Asymptotic Spatial Patterns and Entire Solutions of Semilinear Elliptic Equations,*  
Workshop on Defects and their Dynamics, Banff International Research Station,  
Banff, Canada, August 9-16th, 2003. (1 hour invited talk)

39. A. *Anti-Maximum Principle and Applications*,  
B. *Exact Multiplicity of Radially Symmetric Solutions*,  
Program on Nonlinear Functional Analysis and PDE, Morningside Center, Institute of Mathematics, Chinese Academy of Sciences, Beijing, China, July 4th, 2003. (Two 1 hour invited talks)
40. *Asymptotic Spatial Patterns and Entire Solutions of Semilinear Elliptic Equations*,  
Workshop: New Perspective of Nonlinear Partial Differential Equations,  
Ryukoku University, Otsu, Shiga, Japan, June 23-25th, 2003. (one hour plenary talk)
41. *Diffusive logistic equation with constant yield harvesting*,  
Special Session on Nonlinear Elliptic Partial Differential Equations, AMS Sectional Meeting, Salt Lake City, UT, October 26th, 2002. (30 minute invited talk)
42. *Multi-Parameter Bifurcation and Applications*,  
International conference of Nonlinear Functional Analysis, (satellite conference of ICM 2002) Shanxi University, Taiyuan, Shanxi, China, August 14-18th, 2002. (45 minute invited talk)
43. *Diffusive logistic equation with constant yield harvesting*,  
Dynamical Systems and Differential Equations Conference, University of North Carolina at Wilmington, NC, May 24-27th, 2002. (30 minute invited talk)
44. *The entire solutions of semilinear elliptic equations*,  
Special session of Nonlinear Elliptic Equations, AMS Annual joint meeting, San Diego, CA, January 5-10th, 2002. (30 minute invited talk)
45. *Saddle solutions of semilinear elliptic equations*,  
Workshops in Nonlinear PDE, PIMS, University of British Columbia, Vancouver, British Columbia, Canada, July 11-27th, 2001. (30 minute invited talk)
46. *Solution set of semilinear elliptic equations with Neumann boundary conditions*,  
International Conference in Differential Equations and Dynamical Systems, Lahsa, Tibet, China, July 2-7th, 2001. (45 minute invited talk)
47. *Singular concave semilinear elliptic problems*,  
Special Session of Singular and Degenerate Nonlinear Elliptic Boundary Value Problems, AMS Sectional Meeting, Hoboken, NJ, April 28th, 2001. (30 minute invited talk)
48. *Sharp layer solutions in semilinear elliptic equations*,  
Special Session of Analysis and Applications of Nonlinear PDEs, AMS Sectional Meeting, Las Vegas, NV, April 22nd, 2001. (30 minute invited talk)
49. *Diffusive Logistic Population Models with Predation terms*,  
Special session of PDE Models in Population Biology and Epidemiology, AMS Annual joint meeting, New Orleans, LA, January 11th, 2001. (30 minute invited talk)

50. *An abstract setting for the existence and stability of the spike layer solutions*,  
Minisymposium on Transitions and Reaction Diffusion Equations,  
SIAM Pacific Rim Dynamical Systems Conference, Maui, HI, August 11th, 2000. (30  
minute invited talk)
51. *Sharp layer solutions and secondary bifurcations*,  
Minisymposium on Spike Layer in Reaction-Diffusion Systems,  
SIAM Pacific Rim Dynamical Systems Conference, Maui, HI, August 11th, 2000. (30  
minute invited talk)
52. *Sharp layer solutions and secondary bifurcations*,  
Special session of Nonlinear Differential Equations and Their Applications,  
AMS sectional meeting, University of Louisiana at Lafayette, Lafayette, LA, April,  
2000. (30 minute invited talk)
53. *Sharp layer solutions and secondary bifurcations*,  
Special session of Nonlinear Eigenvalue Problems and Applications,  
AMS Annual joint meeting, Washington, DC, January, 2000. (30 minute invited talk)
54. *Exact Multiplicity of Solutions of Sublinear and Superlinear problems via Bifurcation  
Methods*,  
Special session of Nonlinear PDE, AMS sectional meeting, Las Vegas, NV, April, 1999.  
(30 minute invited talk)
55. *Exact Multiplicity of Solutions of Sublinear and Superlinear problems via Bifurcation  
Methods*,  
Conference honoring Professor Alan Lazer, University of Miami, Coral Gabels, FL,  
January, 1999. (30 minute invited talk)
56. *Exact multiplicity of a class of semilinear elliptic equations*,  
Special session of Nonlinear Elliptic and Parabolic Equations,  
International Conference of Differential Equations and Dynamical Systems, Southwest  
Missouri State University, Springfield, MO, July 1996. (30 minute invited talk)
57. *Exact multiplicity of a class of semilinear elliptic equations*,  
Utah Nonlinear Analysis Conference, Brigham Young University, Provo, UT, January  
1996. (45 minute invited talk)

#### Invited colloquium Talks

1. *Bistability in structured population models*  
Colloquium, National Central University, Chungli, Taiwan, May 14, 2009.
2. *Uniqueness of solution of variational elliptic systems*.  
Colloquium, University of Alabama at Birmingham, Birmingham, AL, October 24,  
2008.

3. *Extensions of bifurcation from simple eigenvalue theorem*, Colloquium, Institute of Mathematics, Chinese Academy of Sciences, Beijing, China, July 17, 2008.
4. *Counting: exact multiplicity of positive solutions of semilinear elliptic equation*, Colloquium, Harbin Institute of Technology, Harbin, Heilongjiang, China, June 21, 2008.
5. *Counting: exact multiplicity of positive solutions of semilinear elliptic equation*, Colloquium, Capital Normal University, Beijing, China, June 12, 2008.
6. *Bistable dynamics in autocatalytic chemical reactions*, Colloquium, George Washington University, February 28th, 2008.
7. *Predator-prey systems: history and new results*, Colloquium, Harbin Institute of Technology, Harbin, Heilongjiang, China, January 2, 2008.
8. *Counting: exact multiplicity of positive solutions of semilinear elliptic equation*, Colloquium, Beijing Normal University, Beijing, China, December 28, 2007.
9. *Counting: exact multiplicity of positive solutions of semilinear elliptic equation*, Colloquium, Institute of Mathematics, Chinese Academy of Sciences, Beijing, China, December 27, 2007.
10. *Extensions of bifurcation from simple eigenvalue theorem*, Colloquium, National Central University, Chungli, Taiwan, December 6, 2007.
11. *Extensions of bifurcation from simple eigenvalue theorem*, Colloquium, National Chiao Tung University, Hsinchu, Taiwan, November 27, 2007.
12. *Counting: exact multiplicity of positive solutions of semilinear elliptic equation*, Colloquium, National Taiwan University, Taipei, Taiwan, September 20th, 2007.
13. *Bistable dynamics in autocatalytic chemical reactions*, Colloquium, National Tsing Hua University, Hsinchu, Taiwan, September 17th, 2007.
14. *Bifurcation theory in Banach space and application to semilinear equations and systems* 45-hour lecture series, National Tsing Hua University, Hsinchu, Taiwan, September–December, 2007.
15. *Pattern formation in mathematical biology*, Undergraduate Colloquium, Zhejiang Normal University, Jinhua, Zhejiang, China, May 28, 2007.
16. *Bistable dynamics in autocatalytic chemical reactions*, Colloquium, Zhejiang Normal University, Jinhua, Zhejiang, China, May 28, 2007.
17. *The wonderful world of differential equations*, Undergraduate Colloquium, Harbin Normal University, Harbin, Heilongjiang, China, May 16, 2007.

18. *Degree Theory and Bifurcation theory for Fredholm operators, and Reaction-diffusion systems*, 12-hour Lecture series, Harbin Normal University, Harbin, Heilongjiang, China, May 7-19, 2007.
19. *Pattern formation in mathematical biology*, Undergraduate Colloquium, Harbin Institute of Technology, Harbin, Heilongjiang, China, April 27, 2007.
20. *Allee Effect and Bistability in a Spatially Heterogeneous Predator-Prey Model* Colloquium, Harbin Institute of Technology, Harbin, Heilongjiang, China, April 20, 2007.
21. *Bifurcation theory in Banach space and application to semilinear equations* 14-hour Lecture series, Harbin Institute of Technology, Harbin, Heilongjiang, China, April 17-29, 2007.
22. *Bistable dynamics in autocatalytic chemical reactions* Colloquium, Capital Normal University, Beijing, April 15th, 2007.
23. *Standing Pulse solution of a reaction-diffusion equation of logistic growth* Colloquium, Harbin Institute of Technology, Harbin, Heilongjiang, China, June 11th, 2006.
24. *Bistability in chemical reactions and predator-prey systems*, Dynamical Systems Seminar, Georgia Institute of Technology, Atlanta, GA, March 6th, 2006.
25. *Spread and Extinction of Isothermal Balls in an autocatalytic chemical reaction*, Colloquium, Beihang University, Beijing, China, July 1st, 2005.
26. *Spread and Extinction of Isothermal Balls in an autocatalytic chemical reaction*, Colloquium, Harbin Institute of Technology, Harbin, Heilongjiang, China, June 19th, 2005.
27. *Allee Effect and Bistability in a Spatially Heterogeneous Predator-Prey Model* Colloquium, Harbin Normal University, Harbin, Heilongjiang, China, June 16th, 2005.
28. *Spread and Extinction of Isothermal Balls in an autocatalytic chemical reaction*, Colloquium, Yangzhou University, Yangzhou, Jiangsu, China, June 8th, 2005.
29. *Allee Effect and Bistability in a Spatially Heterogeneous Predator-Prey Model* Colloquium, Yangzhou University, Yangzhou, Jiangsu, China, June 7th, 2005.
30. *A variational problem in climate dynamics* Colloquium, Capital Normal University, Beijing, May 30th, 2005.
31. *Allee Effect and Bistability in a Spatially Heterogeneous Predator-Prey Model* Colloquium, Academy of Sciences, Beijing, China, May 27th, 2005.
32. *Spread and Extinction of Isothermal Balls in an autocatalytic chemical reaction*, Colloquium, Tsing Hua University, Beijing, China, May 26th, 2005.

33. *Pattern formation in mathematical biology*,  
Undergraduate Colloquium, National Tsing Hua University,  
Hsinchu, Taiwan, April 25th, 2005.
34. *Spread and Extinction of Isothermal Balls in an autocatalytic chemical reaction*  
Colloquium, Taiwan Normal University, Taipei, Taiwan, April 20th, 2005.
35. *A variational problem in climate dynamics*  
Colloquium, National Chiao Tung University, Hsinchu, Taiwan, April 19th, 2005.
36. *Allee Effect and Bistability in a Spatially Heterogeneous Predator-Prey Model*  
Colloquium, National Tsing Hua University, Hsinchu, Taiwan, April 18th, 2005.
37. *Isothermal Balls in an autocatalytic chemical reaction*  
Colloquium, University of New England, Armidale, NSW, Australia, March 17th, 2005.
38. *Lectures on solution set of semilinear elliptic equations*  
12 hour lecture series for graduate students, Tokyo Metropolitan University, Tokyo,  
Japan, Feb. 7-18, 2005.
39. *Asymptotic spatial patterns and entire solutions of semilinear elliptic equations*  
Colloquium, Rensselaer Polytechnic Institute, Troy, NY, January 24th, 2005.
40. *Asymptotic Spatial Patterns and Entire Solutions of Semilinear Elliptic Equations*,  
Colloquium, East China Normal University, Shanghai, China, May 28th, 2004.
41. *Pattern formation in mathematical biology*,  
Undergraduate Colloquium, East China Normal University, Shanghai, China, May  
26th, 2004.
42. *Reaction-diffusion models with Allee effects*,  
Colloquium, Harbin Normal University, Harbin, Heilongjiang, China, May 20th, 2004.
43. *Pattern formation in mathematical biology*,  
Undergraduate Colloquium, Harbin Normal University, Harbin, Heilongjiang, China,  
May 18th, 2004.
44. *Reaction-diffusion models with Allee effects*,  
Colloquium, Academy of Sciences, Beijing, China, May 8th, 2004.
45. *Asymptotic Spatial Patterns and Entire Solutions of Semilinear Elliptic Equations*,  
Colloquium, Mississippi State University, Miss State, MS, March 9th, 2004.
46. *Solution set of semilinear elliptic equations with Neumann boundary conditions*, Collo-  
quium, Harbin Institute of Technology, Harbin, Heilongjiang, China, July 2nd, 2003.
47. *Asymptotic Spatial Patterns and Entire Solutions of Semilinear Elliptic Equations*,  
Colloquium, Harbin Normal University, Harbin, Heilongjiang, China, July 1st, 2003.
48. *Multi-Parameter Bifurcation and Applications*,  
Colloquium, Harbin Normal University, Harbin, Heilongjiang, China, June 30th, 2003.

49. *Bifurcation Theory of Nonlinear Elliptic equations*,  
Lecture series (12 hours), Harbin Normal University, Harbin, Heilongjiang, China, July 30th-August 5th, 2002.
50. *Solution set of semilinear elliptic equations with Neumann boundary conditions*,  
Colloquium, Academy of Sciences, Beijing, China, July 21st, 2002.
51. *Solution set of semilinear elliptic equations with Neumann boundary conditions*,  
Analysis Seminar, University of Virginia, Charlottesville, VA, September 21st, 2001.
52. *Spike layer solutions and Lyapunov-Schmidt reduction*,  
Colloquium, University of Virginia, Charlottesville, VA, September 20th, 2001.
53. *Spike layer solutions and Lyapunov-Schmidt reduction*, Colloquium, University of Texas  
at San Antonio, San Antonio, TX, September 7th, 2001.
54. *Solution set of semilinear elliptic equations with Neumann boundary conditions*,  
Colloquium, Peking (Beijing) University, Beijing, China, June 9th, 2001.
55. *Solution set of semilinear elliptic equations with Neumann boundary conditions*,  
Colloquium, Tsinghua (Qinghua) University, Beijing, China, May 31st, 2001.
56. *Story of the partial derivative*,  
Undergraduate Colloquium, Nankai University, Tianjin, China, May 28th, 2001.
57. *Exact multiplicity of a class of semilinear elliptic equations*,  
Colloquium, Georgia State University, Atlanta, GA, March, 2000;  
Colloquium, Portland State University, Portland, OR, March, 2000;  
Colloquium, University of Memphis, Memphis, TN, March, 2000;  
Colloquium, University of Texas at Arlington, Arlington, TX, February, 2000;  
Colloquium, Georgia Southern University, Statesboro, GA, February, 2000;  
Colloquium, College of William and Mary, Williamsburg, VA, February, 2000.
58. *Spike layer solutions and Lyapunov-Schmidt reduction*,  
Colloquium, Georgetown University, Washington, DC, February, 2000.
59. *Diffusive Logistic Population Models with Predation terms*,  
Colloquium, Georgia Southern University, Statesboro, GA, December 1999.
60. *Persistence and Bifurcation of Degenerate Solutions, and Applications to Global Bi-  
furcation of Semilinear Problems*, Colloquium, Brigham Young University, Provo, UT,  
May 1999.
61. *Persistence and Bifurcation of Degenerate Solutions, and Applications to Global Bi-  
furcation of Semilinear Problems*, Colloquium, Mississippi State University, Miss State,  
MS, April 1999.

8f. Contributed scholarly papers and talks

1. *Numerical studies of differential equations*, January 22, 2008. Math 410 (CSUMS seminar)
2. *Virginia Black Bear Population Model*, March 31, 2008. Biomath Luncheon.
3. *Uniqueness of positive solution to sublinear semipositone problem*  
25th Annual Southeastern-Atlantic Regional Conference on Differential Equations,  
Dayton University, Dayton, OH, October 8th, 2005.
4. *Bistability in chemical reactions and predator-prey systems*,  
Colloquium, College of William and Mary, Williamsburg, VA, September, 2005.
5. *Isothermal Balls in an autocatalytic chemical reaction*.  
Sixth Mississippi State-UAB Conference on Diff. Equations & Computational Simulations,  
Mississippi State University, Mississippi State, MS, May 13-14th, 2005.
6. *Pattern formation and bifurcation in reaction-diffusion equations*,  
Mathematical-Computational Biology (MCB) seminar,  
College of William and Mary, Williamsburg, VA, October 27th, 2004.
7. *Anti-Maximum Principle and Applications*,  
23rd Annual Southeastern-Atlantic Regional Conference on Differential Equations,  
Kennesaw State University, Kennesaw, GA, October 17-18th, 2003.
8. *The entire solutions of semilinear elliptic equations*,  
22nd Southeastern-Atlantic Regional Conf. on Differential Equations,  
University of Tennessee, Knoxville, TN, October 11th, 2002.
9. *Global Bifurcations of Semilinear Elliptic Problems with Neumann Boundary Conditions*,  
Nonlinear Differential Equations, Mechanics and Bifurcation Duke University, Durham,  
NC, May 20-22th, 2002.
10. *Diffusive logistic equation with constant yield harvesting*,  
21st Southeastern-Atlantic Regional Conference on Differential Equations, Wake Forest  
University, Winston-Salem, NC , November 3rd, 2001.
11. *Saddle solutions of semilinear elliptic equations*,  
Fifth Mississippi State Conference on Differential equations and computational simulations,  
Mississippi State University, Mississippi State, MS, May 18-19th, 2001.
12. *Spike layer solutions and Lyapunov-Schmidt reduction*,  
Colloquium, College of William and Mary, Williamsburg, VA, February 16th, 2001.
13. *Diffusive Logistic Population Models with Predation terms*,  
Colloquium, College of William and Mary, Williamsburg, VA, September, 2000.
14. *Sharp layer solutions and secondary bifurcations*,  
20th Southeastern-Atlantic Regional Conf. on Differential Equations, Virginia Tech,  
Blacksburg, VA, October 21st, 2000.

15. *Nucleation Dynamics of Cahn-Hilliard Equation*,  
SIAM Dynamical system conference, Snowbird, UT, May, 1999.
  16. *Multi-spike layer solutions of Cahn-Hilliard equation*,  
Applied Mathematics Seminar, Tulane University, New Orleans, LA, October 1998.
  17. *Counting the solutions of Nonlinear Elliptic Equations*,  
Colloquium, Tulane University, New Orleans, LA, September 1998.
  18. *Exact multiplicity of a class of semilinear elliptic equations*,  
Conference on Waves in Mathematical Biology, University of Pittsburgh, Pittsburgh, PA, September 1998.
- 8g. Reviews of books, software, etc. (None)
- 8h. Juried shows, exhibitions, and performances (None)
- 8i. Unjuried shows, exhibitions, and performances (None)
- 8j. Unrefereed publications not listed above
1. Junping Shi, *Mathematical problems in celestial mechanics—From Newton to Poincaré*, (in Chinese). **Kexue (Science) Magazine**, 53, No. 5, 38-40, (2001).
  2. Junping Shi, *Painlevé conjecture and N-body problem*, (in Chinese). **Kexue (Science) Magazine**, 53, No. 6, 20-23, (2001).
  3. Junping Shi, *Electronic publishing of mathematical research papers*, (in Chinese). **Kexue (Science) Magazine**, 54, No. 3, 55–58, (2002).
  4. Junping Shi, *Life's other secret—mathematical biology and pattern formation*, (in Chinese). **Kexue (Science) Magazine**, 57, No. 6, 28–32, (2005).
  5. Jinfeng Wang, Junping Shi and Yuwen Wang, *Bifurcation solutions of a class of semilinear elliptic equations*, (in Chinese). **Natural Science Journal of Harbin Normal University**, Vol.21, No.2, 1–4, (2005).
  6. Yuhua Zhao, Junping Shi and Yuwen Wang, *A model in autocatalytic chemical reaction and its positive solutions*, (in Chinese). **Natural Science Journal of Harbin Normal University**, Vol.21, No.3, 4–5, (2005).
  7. Guizhi Meng, Junping Shi and Yuwen Wang, *Existence of optimal control of population distribution system with harvesting and Allee effect*, (in Chinese). **Natural Science Journal of Harbin Normal University**, Vol.21, No.3, 6–9, (2005).
  8. Renhao Cui, Junping Shi and Yuwen Wang, *Uniqueness and existence of positive solutions for some semilinear elliptic systems*, (in Chinese). **Natural Science Journal of Harbin Normal University**, Vol.22, No.1, 1–4, (2006).
  9. Jia Duo, Junping Shi and Yuwen Wang, *Structure of the solution set of semilinear elliptic equations with asymptotic linear nonlinearity*, (in Chinese). **Natural Science Journal of Harbin Normal University**, Vol.22, No.2, 5–7, (2006).

10. Guanqi Liu, Junping Shi and Yuwen Wang, *The existence of positive solution on some steady state reaction and diffusion equations with strong Allee effect*, (in Chinese). **Natural Science Journal of Harbin Normal University**, Vol.22, No.3, 1–3, (2006).
11. Rui Diao, Junping Shi and Yuwen Wang, *The positive solutions of Gelfand equation*, (in Chinese). **Natural Science Journal of Harbin Normal University**, Vol.24, No.2, 4–6, (2008).
12. Yanan Wang, Junping Shi and Yuwen Wang, *Exact multiplicity of solutions to a diffusive logistic equation with harvesting*, (in Chinese). **Natural Science Journal of Harbin Normal University**, Vol.24, No.2, 22–24, (2008).
13. Linan Sun, Junping Shi and Yuwen Wang, *Numerical Analysis of the solution to non-local logistic equation*, (in Chinese). **Natural Science Journal of Harbin Normal University**, Vol.24, No.2, 27–30, (2008).
14. Jili Fu, Junping Shi and Yuwen Wang, *A class of solutions of sublinear elliptic systems*, (in Chinese). **Natural Science Journal of Harbin Normal University**, Vol.24, No.3, 4–6, (2008).
15. Hui Ding, Junping Shi and Yuwen Wang, *About positive solution and multiplicity to a semilinear elliptic equation*, (in Chinese). **Natural Science Journal of Harbin Normal University**, Vol.24, No.4, 4–6, (2008).
16. Yuhang Liu, Yuwen Wang, Junping Shi and Renhao Cui, *Nonexistence of nontrivial solution of a class of semilinear elliptic system*, (in Chinese). **Natural Science Journal of Harbin Normal University**, Vol.25, No.1, 1–3, (2009).
17. Ting Li, Ping Liu, Junping Shi and Yuwen Wang, *A class of water pollution model based on first order transport PDE*, (in Chinese). **Natural Science Journal of Harbin Normal University**, Vol.25, No.1, 4–6, (2009).
- 18.
- 8k. Research reports from grant or contract work (None)
- 8l. Performances by others of music, poetry, etc. you have written (None)
- 8m. Published software, audio, multimedia, etc. materials

Java applet drawing bifurcation diagram for elliptic equations:  
<http://www.math.wm.edu/~shij/java/bifurcation.html>

- 8n. Work in progress or submitted

Submitted Articles

1. Junping Shi, Zhifu Xie, and Kristina Little,  
*Cross-diffusion induced instability and stability in reaction-diffusion systems* (28 pages).
2. Junping Shi and Zhifu Xie,  
*Smoothness of crossing curves* (4 pages).

3. Yanan Wang, Yuwen Wang, and Junping Shi,  
*Exact multiplicity of solutions to a diffusive logistic equation with harvesting* (10 pages).
4. Junping Shi, Zhifu Xie,  
*Classification of four-body central configurations with three equal masses* (20 pages).
5. Jiayin Jin, Junping Shi, Junjie Wei, and Fengqi Yi,  
*Bifurcations of Patterned Solutions in Diffusive Lengyel-Epstein System of CIMA Chemical Reaction* (25 pages).
6. Renhao Cui, Junping Shi and Yuwen Wang,  
*Existence and Uniqueness of positive solutions for a class of semilinear elliptic systems.* (13 pages)
7. Jinfeng Wang, Junping Shi and Junjie Wei,  
*Predator-prey system with strong Allee effect.* (30 pages)
8. Ping Liu, Junping Shi and Yuwen Wang,  
*Periodic solutions of logistic type population model with harvesting.* (7 pages)
9. Jann-Long Chern, Yong-Li Tang, Chang-Shou Lin and Junping Shi,  
*Existence, Uniqueness and Stability of Positive Solution to Sublinear Elliptic Systems.* (22 pages)
10. Michael Essman, Junping Shi,  
*Bifurcation diagrams of coupled Schrödinger equations* (14 pages)
11. Zhi-You Chen, Jann-Long Chern, Junping Shi, and Yong-Li Tang,  
*On the Uniqueness and Structure of Solutions to a Coupled Elliptic System* (27 pages)

Work in progress

12. Junping Shi and Chongchun Zeng,  
*Stable standing pulse in reaction-diffusion chaotic flows.*
13. Sze-Bi Hsu; Junping Shi,  
*Spatial predator-prey model with immobile prey.*
14. Jann-Long Chern, Changshou Lin and Junping Shi,  
*Uniqueness of solution to coupled cooperative systems.*
15. Jann-Long Chern, Changshou Lin and Junping Shi,  
*Uniqueness of solution to a Hamiltonian elliptic system.*
16. Junping Shi and Ratnasingham Shivaji,  
*Exact multiplicity of positive solutions to cooperative Hamiltonian elliptic systems.*
17. Ping Liu, Junping Shi and Yuwen Wang,  
*A bifurcation theorem with two-dimensional kernel.*

18. Linan Sun, Junping Shi and Yuwen Wang,  
*Dynamical Behavior of Nonlocal Reaction-diffusion Logistic Equations*

## PROFESSIONAL SERVICE

### 9a. College committee service

Art and Sciences library Policy committee (Fall 2006)  
College admission policy advisory committee (Fall 2008)

Department of Mathematics committees:

Space committee: 2000-2005

Handbook committee: 2000-2001

Computer committee: 2001-current

Department webmaster: 2001-current

Merit Evaluation committee: 2009-2010

Library representative: 2005-2007

Student information: 2005-2007

Applied Math hiring committee: 2005-2006

Biomath hiring committee: 2006-2007

Online newsletter editor: 2002-2007

Institute representative of AMS, SIAM and MAA: 2002-2007

Undergraduate adviser: 2003-2004, 2005-2007, 2008-2010

Mathematics Contests adviser(VPI, Putnam): 2004-2007, 2008-2010(chair)

Colloquium Committee: 2008-2010(chair)

Math 112 (Calculus II) course coordinator: Spring 2003, Fall 2003, Fall 2004

### 9b. Other professional service not included in item 5 above

1. Main organizer of International Workshop on Reaction-Diffusion Models and Mathematical Biology, Harbin, China, June 24-June 27, 2009.
2. Co-organizer of International Conference on Nonlinear Partial Differential Equations and Geometric Analysis, Harbin, China, June 30-July 4, 2008.
3. Organizer of special session "Nonlinear Elliptic and Parabolic PDEs with Applications", The Seventh AIMS International Conference on Dynamical Systems and Differential Equations, University of Texas at Arlington, Arlington, TX, May 2008.
4. Co-Organizer of International Workshop on Banach Space, Operator Theory and Applications in Nonlinear Analysis, Y.Y. Tsengs Functional Analysis Research Center, Harbin Normal University, Harbin, China, July 25-27, 2007.
5. Co-organizer of Second International Conference on Recent Advances in Applied Dynamical Systems, Zhejiang Normal University, Jinhua, China, June 4-8, 2007.
6. Co-Organizer of Workshop on Analysis and PDE, Y.Y. Tsengs Functional Analysis Research Center, Harbin Normal University, Harbin, China, July 21-22, 2006.

7. Co-Organizer of AMS-SIAM Special Session on *Reaction Diffusion Equations and Applications*, Joint Mathematics Meetings, Atlanta, January 5-8, 2005.
8. Organizer of special session on *Recent Developments on Nonlinear Elliptic Equations and Variational Problems*, The Fifth AIMS International Conference on Dynamical Systems and Differential Equations, California State Polytechnic University, Pomona, CA, June 2004.
9. Co-organizer of mini-symposium on Steady States in *Reaction-Diffusion Systems*, SIAM Pacific Rim Dynamical Systems Conference, Maui, HI, August 2000.
10. Outreach lecture: *Pattern formation in mathematical biology*, Induction ceremony of Mu Alpha Theta, the National Math Honor Society, Lafayette High School Chapter, Williamsburg, VA, November 17th, 2004.
11. Supervisor of problem solving study group (Putnam competition), College of William and Mary, Fall 2004, Fall 2005, Fall 2006, Fall 2008.
12. Refereeing for
  - Transactions of American Mathematical Society, (2001(2), 2002, 2003, 2005(2), 2006)
  - Journal of London Mathematical Society (2005)
  - Journal of Differential Equations (2006, 2007(2),2008(2),2009(2))
  - Journal of Mathematical Analysis and Applications, (2004, 2005(2),2006, 2007, 2008(2),2009)
  - Discrete and Continuous Dynamical Systems A, (2001,2002(2),2003,2005,2006(3),2007(3))
  - Discrete and Continuous Dynamical Systems S, (2009(2))
  - Nonlinear Analysis, Theory, Methods & Applications (2005,2006(3),2007,2008(2))
  - Nonlinear Analysis, Real World Applications (2006,2007,2008,2009(2))
  - Proceedings of Royal Society of Edinburgh (2005,2008)
  - Mathematical Biosciences (2006)
  - Electronic Journal of Differential Equations (2000, 2002, 2005(3),2006,2007(2),2008(2),2009)
  - Communications on Pure and Applied Analysis, (2001)
  - International Journal of Mathematics and Mathematical Sciences, (2003, 2005(2))
  - Computers and Mathematics with Applications, (2005,2007,2008)
  - Applied Mathematics Letters, (2005,2008,2009)
  - Mathematical and Computer Modeling, (2005,2006(2),2007)
  - Ecological Modelling (2005,2009)
  - Boundary Value Problems (2005)
  - Physica A (2006)
  - Science in China (Mathematics) (2006)
  - Global Journal of pure and applied mathematics (2006)
  - IMA Journal Mathematical Medicine and Biology (2006)
  - Taiwannese Journal of Mathematics (2006,2007)
  - Theoretical Population Biology (2006,2007(4),2008,2009)
  - Journal of Mathematical Biology (2007)
  - Proceedings of American Mathematical Society (2007)
  - Numerical Algorithms (2007)
  - Journal of Franklin Institute (2007)

- International Journal of Dynamical Systems and Differential Equations (2007)  
Mathematical Methods in the Applied Sciences (2008)  
Journal of Biological Dynamics (2008)  
Communications of Partial Differential Equations (2008,2009)  
Rocky Mountain Journal of Mathematics (2008)  
Book: a collection of essays in spatial ecology (2008)  
ICNAAM 2008 (2008)  
Applicable Analysis (2008)  
Frontier of Mathematics in China (2008)  
International Journal of Biomathematics (2009)  
Acta Mathematica Applicatae Sinica (2009)
13. Reviewer for PSC-CUNY research Award (2008, 2009)
  14. Reviewer for textbooks: (a) Differential Equations Manuscript, Cengage Learning, Inc. (2007) (b) Applied Differential Equations text by Michael Greenberg, Addison Wiley (2008). (C) Calculus For the Life Sciences: A Modeling Approach, by James L. Cornette and Ralph A. Ackerman, John Wiley & Sons (2008).
  15. Reviewer for *Mathematical Reviews* (MathSciNet). (36 reviews since 2000)
  16. Seminar and colloquium speakers hosted in William and Mary
    - Ratnasingham Shivaji (Mississippi State University, Fall 2000, Spring 2003, Spring 2008)
    - Chongchun Zeng (University of Virginia, Spring 2002)
    - Peter W. Bates (Michigan State University, Fall 2002)
    - Tiancheng Ouyang (Brigham Young University, Spring 2003)
    - Xuefeng Wang (Tulane University, Spring 2001, Spring 2004)
    - Zhitao Zhang (Chinese Academy of Sciences, Spring 2004)
    - Chjan Lim (Rensselaer Polytechnic Institute, Fall 2004)
    - Jiabao Su (Capital Normal University, Spring 2006)
    - Xiaofeng Ren (George Washington University, Spring 2008)
  17. Professional membership:  
American Mathematical Society (since 1993),  
Society of Industrial and Applied Mathematics (1993-2002).