CURRICULUM VITAE

1 General

- Name: **Yihong DU**
- Place of Birth: **Shandong, China**
- Citizenship: **Australia**

2 Work Address

Department of Mathematics,
School of Science and Technology,
University of New England,
Armidale, NSW 2351, Australia

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3 Education

- 1978-1982: **Bachelor Degree Study**
  Department of Mathematics, Shandong University, China.
  Bachelor of Science awarded in 1982.
- 1982-1985: **Master Degree Study**
  Department of Mathematics, Shandong University.
  Master of Science awarded in 1985.
- 1985-1988: **Ph.D. Study**
  Department of Mathematics, Shandong University, China.
  Doctor of Science awarded in 1988.

4 Employment

- Aug., 1988– Sep., 1990: **Lecturer**
  Department of Mathematics, Shandong University, China.
- Sep., 1990-Aug., 1991: **Research Fellow**
  Dept of Maths, Heriot-Watt Univ., UK.
- Aug., 1991–Dec., 1992: **Research Fellow**
  Dept of Maths, University of New England, Australia.
- Jan., 1993–Dec., 1998: **Lecturer**
  Dept of Maths, University of New England.
- Jan., 1999–Dec. 2003: **Senior Lecturer**
  Dept of Maths, University of New England.

- Jan. 2004–Dec. 2007 : **Associate Professor**
  Dept of Maths, University of New England.
- Jan. 2008– : **Professor**
  Dept of Maths, University of New England.
- Visiting Positions:

  Jan.–Mar., 1996: Visiting Research Fellow
  School of Maths and Stats., Univ of Sydney.

  May-June, 1996: The Royal Society Exchange Fellow
  Dept of Maths, Heriot-Watt Univ., UK.

  Feb.-April, 2000: Visiting Fellow
  Dept of Applied Math., Complutense Univ. of Madrid, Spain.

  Nov. 2002-Jan. 2003: Visiting Professor
  National Center for Theoretical Sciences, Taiwan.

  April 2004– : Adjunct Professor
  Dept of Math., Qufu Normal Univ., China

  March-April, 2007: Visiting Professor
  National Center for Theoretical Sciences, Taiwan.

5 Honors and Awards

- Exemption of entrance exam to Shandong Univ., 1978.
- First Prize for Best Undergraduate Research Article, Shandong Univ., 1981.
- Sino-British Friendship Scholarship, 1990-91.
- Australian Academy of Science and the Royal Society Exchange Fellow, 1996.
- Australian Academy of Science and Academia Sinica Exchange Fellow, 1999, 2002.
- Australian Research Council discovery grant, 2003-2005.
- Australian Academy of Science and JSPS (Japan) Exchange Fellow, 2006.
- Australian Research Council discovery grant, 2007-2009.
- Vice-Chancellor's Award for Excellence in Research, Univ. of New England, 2007.

6 Professional Activities

Member of Editorial Committee:

Discrete and Continuous Dynamical Systems-Series S

Referee for more than 20 different research journals including

Archive for Rational Mechanics and Analysis
Journal of Differential Equations
Proceedings of the London Mathematical Society
SIAM Journal on Mathematical Analysis
Transactions of the American Mathematical Society

Conference Organization:

- (With M.C. Hong and C. Radford) Nonlinear Partial Differential Equations and Their Applications, 8-12 December, 2003, Univ. of New England, Armidale, Australia.
- Workshop on Nonlinear Analysis and Partial Differential Equations, 25-30 Dec. 2004, Qufu Normal Univ. (Qufu Campus), China.
- (With L. Liu and Z. Liu) International Conference on Nonlinear Partial Differential Equations, 11-16 July, 2005, Qufu Normal Univ. (Rizhao Campus), China.
- (With D. Daners, C. Radford and S. Yan) Recent Advances in Nonlinear Partial Differential Equations: A celebration of Norman Dancer's 60th birthday, 16-21 July, 2006, University of New England (Armidale), Australia.
- (With E.N. Dancer, C. Mischaikow, P. Polacik and X.Q. Zhao) Recent Progress on Nonlinear Elliptic and Parabolic Problems and Related Abstract Methods 7-12 October, 2007, Banff International Research Station, Canada.

Some Recent Invited Talks:

- International Conference on Elliptic and Parabolic Partial Differential Equations and Applications, Hangzhou, China, Aug. 20-24, 2007.
  "Convergence and sharp thresholds for propagation in nonlinear diffusion problems".
- Joint Australia-China Meeting on Nonlinear Partial Differential Equations, Gold Coast, Australia, July 2-6, 2007.
  "Convergence and sharp thresholds of propagation in the bistable reaction-diffusion problem".
- Zhongyuan International Conference on Partial Differential Equations, Xinxiang, China, May 29-June 2,
  "Convergence and sharp thresholds of propagation in the bistable reaction-diffusion problem".
- International Conference on Reaction-Diffusion Systems and Viscosity Solutions, Providence Univ., Taiwan, Jan. 3-6, 2007
  "A diffusive competition model with a protection zone".
- Korea Univ., Seoul, Jan. 7-12, 2007
  "A diffusive competition model with a protection zone".
- Univ. of Paris-Sud., France, Jan. 14-20, 2007
  "A diffusive competition model with a protection zone".
- International conference "Some Topics in Nonlinear Analysis and Applications to Partial Differential Equations"-A celebration of Norman Dancer's 60th birthday, Univ. of Rome I, Jan. 29-Feb. 1, 2007
  "The heterogeneous Allen-Cahn equation in a ball: Solutions with layers and spikes".
- Ecole Polytechnique Federale de Lausanne, Switzerland., Feb. 5, 2007
  "A diffusive competition model with a protection zone".
- The 3rd East China PDE Conference, East China Normal Univ., Shanghai, China, July 3-8, 2006
  "The heterogeneous Allen-Cahn equation in a ball: Solutions with layers and spikes".
- Australian National Univ., Sept. 18-22, 2006
  "The heterogeneous Allen-Cahn equation in a ball: Solutions with layers and spikes".

- The 50th Annual Meeting of the Australian Math. Soc., Macquarie Univ., Sydney., Sept. 25-27, 2006
  "Classification of isolated singularities of some semilinear elliptic equations".

- Xiamen Univ., China, Dec. 21-26, 2006
  "A diffusive competition model with a protection zone".

- Tokyo University, Jan. 8-20, 2006.
  "A competition model in heterogeneous environment".

- Waseda Univ., Jan 21-28, 2006.
  "Boundary blow-up solutions with interior layers and spikes".

- Institute of Math., Chinese Academy of Science, Beijing, Jan. 7, 2005.
  "Nonlinear Liouville theorems and apriori bounds".

- Univ. of Queensland, March 30, 2005.
  "Boundary blow-up solutions with interior layers and spikes".

- Australian National Univ., June 13-17, 2005.
  "Nonlinear Liouville theorems and apriori bounds".

- June 26-July 2, Topological and Variational Methods for Differential Equations, Oberwolfach, Germany, June 26-July 2, 2005.
  "Boundary blow-up solutions with interior layers and spikes".

- Symposium on Nonlinear Elliptic Equations and Variational Methods, Beijing Normal Univ. and Chinese Academy of Sciences, Beijing, China, July 3-6, 2005. "Boundary blow-up solutions with interior layers and spikes".

- International conference on nonlinear partial differential equations, Qufu Normal Univ. (Rizhao Campus), Shandong, China, July 11-16.
  "Population models in heterogeneous environment".

- The 49th Annual Meeting of the Australian Math. Soc., Univ. Western Australia, Perth, Sept. 27-30, 2005.
  "Boundary blow-up solutions with interior layers and spikes".

- Workshop on Singularities Arising in Nonlinear Problems, Kansai Seminar House, Kyoto, Japan, Nov. 28-30.
  "Boundary blow-up solutions with interior layers and spikes".

- International Conference on Topological and Variational Methods in Partial Differential Equations, CIMAT, Guanajuato, Mexico, Dec. 5-9, 2005.
  "Multiple States and Hysteresis for Type I Superconductors".

- Capital Normal Univ., Beijing, China, Dec. 12-14.
  "Multiple States and Hysteresis for Type I Superconductors".

- Qufu Normal Univ., Shandong, China, Dec. 15 2005-Jan. 7, 2006. Series of talks on nonlinear partial differential equations.

- WCNA-2004(International Federation of Nonlinear Analysts), Orlando, USA. July, 2004.
  "Nonlinear Liville theorems and a priori bounds"

- International Conference on Dynamics and Evolution Equations, St John's, Canada. July, 2004.
  "Boundary blow-up solutions with a spike layer"

- ICIAM 2003, Sydney. July, 2003.
  "Realization of prescribed patterns in the competition model"
- Canadian Math Society summer meeting, Edmonton, Canada. June, 2003.
  "Realization of prescribed patterns in certain population models"
- International Conference on Topological and Variational Methods in Nonlinear Analysis, Bedlewo, Poland. July, 2003.
  "Mountain pass solutions and an indefinite superlinear problem on the entire space"
- Australia-Italy-Taiwan Trilateral Workshop on Analysis and Applications, Murramarang Resort, Australia, 3-7 Feb., 2003.
  "Boundary blow-up solutions and their applications"
- National Center for Theoretical Sciences, Taiwan, Nov. 2002-Jan. 2003.
  "Brief introduction of boundary blow-up solutions"
  "The degenerate logistic model"
  "The degenerate competition model"
  "Realization of prescribed patterns in the competition model"

7 Publications

Book:

1. Order Structure and Topological Methods in Nonlinear Partial Differential Equations, Vol. 1, Maximum Principles and Applications, *World Scientific*, 2006.

Book Chapters:

2. Boundary blow-up solutions and their applications, in *Topological Methods, Variational Methods, and Their Applications*, Eds., H. Brezis, K.C. Chang, S. Li and P. Rabinowitz, World Scientific, 2003, pp. 89-97.
3. Bifurcation and related topics in elliptic problems, in *Handbook for Partial Diff. Eqns. Vol. 2*, Eds. M. Chipot and P. Quittner, Elsevier, 2005, pp.127-209.
4. (With Junping Shi) Some recent results on diffusive predator-prey models in spatially heterogeneous environment, in *Nonlinear Dynamics and Evolution Equations*, Eds. Hermann Brunner, Xiao-Qiang Zhao and Xingfu Zou, Fields Institute Communications (FIC) series Vol. 48 , American Math. Soc., 2006, pp 95-135.

Journal Articles:

5. A note on a theorem of H. Amann, Chinese Science Bull., 31(1986), 636.
6. On the fixed point index of positive operators, J. Math.(Wuhan), 6(1986), 91-98.
7. Multiple solutions of increasing condensing operator equations, Northeast Math. J., 3(1987), 199-309.
8. Positive solutions of nonlinear eigenvalue problems and its applications, J. Shandong Univ., 22(1987), 25-33.

9. Multiple solutions of nonlinear eigenvalue problems and its applications, J. Shandong Univ., 22(1987), 34-40.

10. Total order minihedral cones, J. Sys. Sci. and Math., 8(1988), 19-24.

11. Multiple solutions of eigenvalue problems with increasing operators, Acta Math. Sinica, 31(1988), 21-28.

12. Nonzero solutions and eigenvectors of nonlinear equations, Acta Math. Sinica, 32(1989), 76-85.

13. Fixed points of a class of non-compact operators and applications, Acta Math. Sinica, 32(1989), 618-627.

14. Multiple fixed points of increasing maps, J. Math.(Wuhan), 9(1989), 81-86.

15. A deformation lemma and its applications, Chinese Science Bull., 35(1990), 96-97.

16. On the global structure of the positive solution set of a nonlinear operator, Acta Math. Sinica, 33(1990), 445-455.

17. Fixed points of increasing operators in ordered Banach spaces and applications, Appl. Anal., 38(1990), 1-20.

18. A deformation lemma and some critical point theorems, Bull. Aust. Math. Soc., 43(1991), 161-168.

19. The structure of the solution set of a class of nonlinear eigenvalue problems, J. Math. Anal. Appl., 170(1992), 567-580.

20. Nontrivial solutions of super-linear Sturm-Liouville problems, Acta Math. Sinica, 35(1992), 721-728.

21. Critical point theorems with relaxed boundary condition and applications, Bull. Austr. math. Soc., 47(1993), 108-118.

22. (With K.J. Brown) Bifurcation and monotonicity in competition reaction-diffusion systems, Nonlinear Anal., TMA. 23(1994), 1-13.

23. (With E.N. Dancer) Competing species equations with diffusion, large interactions and jumping nonlinearities, J. Diff. Eqns., 114(1994), 434-475.

24. (With E.N. Dancer) Existence of changing sign solutions for some semilinear problems with jumping nonlinearities at zero, Proc. Roy. Soc. Edinburgh, 124A(1994), 1165-1176.

25. (With E.N. Dancer) Positive solutions for a three species competition system with diffusion, Part I, General existence results, Nonlinear Anal., TMA., 24(1995), 337-357.

26. (With E.N. Dancer) Positive solutions for a three species competition system with diffusion, Part II, The case of equal birth rates, Nonlinear Anal., TMA., 24(1995), 359-373.

27. Uniqueness results for the gap equation in the theory of supperconductivity, Diff. and Integral Eqns., 8(1995), 309-324.

28. (With E.N. Dancer) Multiple solutions of some semilinear elliptic equations via the generalized Conley index, J. Math. Anal. Appl., 189(1995), 848-871.

29. (With E.N. Dancer) On sign-changing solutions of certain semilinear elliptic problems, Appl. Anal., 56(1995), 193-206.

30. Uniqueness, multiplicity and stability for positive solutions of a pair of reaction-diffusion equations, Proc. Roy. Soc. Edinburgh, 126A(1996), 777-809.

31. Positive periodic solutions of a competitor-competitor-mutualist model, Diff. Int. Eqns., 9(1996), 1043-1066.

32. Bifurcation from semitrivial solution bundles and applications to certain equation systems, Nonlinear Analysis, 27(1996), 1407-1435.

33. (With E.N. Dancer) The generalized Conley index and multiple solutions of semilinear elliptic problems, Abstract and Applied Analysis, 1(1996), 103-135.

34. (With Y. Lou) Some uniqueness and exact multiplicity results for a predator-prey model, Trans. Amer. Math. Soc., 349(1997), 2443-2475.

35. (With E.N. Dancer) A note on multiple solutions of some semilinear elliptic problems, J. Math. Anal. Appl., 211(1997), 626-640.

36. (With Y. Lou) S-shaped global bifurcation curve and Hopf bifurcation of positive solutions to a predator-prey model, J. Diff. Eqns., 144(1998), 390-440.

37. A degree theoretic approach to N-species periodic competition systems on the whole R^n, Proc. Roy. Soc. Edinburgh, 129A(1999), 295-318.

38. (With Q. Huang) Blow-up solutions for a class of semilinear elliptic and parabolic equations, SIAM J. Math Anal., 31(1999), 1-18.

39. Exact multiplicity and S-shaped bifurcation curve for some semilinear elliptic problems from combustion theory, SIAM J. Math. Anal., 32(2000), 707-733.

40. On Dancer's fixed point index formulas, Diff. Integral Eqns, 13(2000), 145-158.

41. (With Y. Lou) Qualitative behaviour of positive solutions of a predator-prey model: effects of saturation, Proc. Roy. Soc. Edinburgh, 131A(2001), 321-349.

42. (With Y. Lou) Proof of a conjecture for the perturbed Gelfand equation from combustion theory, J. Diff. Eqns., 173(2001), 213-230.

43. (With L. Ma) Logistic type equation on R^N by a squeezing method involving boundary blow-up solutions, J. London Math. Soc., 64(2001), 107-124.

44. Effects of a degeneracy in the competition model, part I: classical and generalized steady-state solutions, J. Diff. Eqns.,181(2002), 92-132.

45. Effects of a degeneracy in the competition model, part II: perturbation and dynamical behaviour, J. Diff. Eqns.,181(2002), 133-164.

46. Bifurcation from infinity in a class of nonlocal elliptic problems, Diff. Integral Eqns., 15(2002), 687-606.

47. (With L. Ma) Positive solutions of an elliptic partial differential equation on R^N, J. Math. Anal. Appl., 271(2002), 409-425.

48. (With Shujie Li) Positive solutions with prescribed patterns in some simple semilinear equations, Diff. Integral Eqns.,15(2002), 805-822.

49. (with Z.M. Guo) Liouville type results and eventual flatness of positive solutions for p-Laplacian equations, Adv. Diff. Eqns., 7(2002), 1479-1512.

50. (with T. Ouyang) Bifurcation from infinity induced by a degeneracy in semilinear equations, Advanced Nonlinear Studies, 2(2002), 117-132.

51. (With E.N. Dancer) Effects of certain degeneracies in the predator-prey model, SIAM J. Math. Anal., 34(2002), 292-314.

52. (with E.N. Dancer) On a free boundary problem arising from population biology, Indiana Univ. Math. J., 52 (2003), 51-68.

53. (with E.N. Dancer and L. Ma) Asymptotic behaviour of positive solutions of some elliptic problems, Pacific J. Math., 210(2003), 215-228.

54. (with L. Ma) Some remarks related to De Giorgi's conjecture, Proc. Amer. Math. Soc., 131(2003), 2415-2422.

55. (with Z.M. Guo) Boundary blow-up solutions and their applications in quasilinear elliptic problems, J. d'Analyse Math., 89(2003), 277-302.

56. (with E.N. Dancer) Some remarks on Liouville type results for quasilinear elliptic equations, Proc. Amer. Math. Soc., 131 (2003), 1891-1899.

57. (with Y. Guo) Mountain pass solutions and an indefinite superlinear elliptic problem on R^N, Topological Methods in Nonl. Anal., 22(2003), 69-92.

58. Realization of prescribed patterns in the competition model, J. Diff. Eqns., 193(2003), 147-179.

59. (with W. Dong) Unbounded principal eigenfunctions and the logistic equation on R^N, Bull. Australian Math. Soc., 67(2003), 413-427.

60. Multiplicity of positive solutions for an indefinite superlinear elliptic problem in R^N, Ann. Inst. Henri Poincare Anal. Non Lineaire, 21(2004), 657-672.

61. (with S.B. Hsu) A diffusive predator-prey model in heterogeneous environment, J. Diff. Eqns., 203(2004), 331-364.

62. (with Z.M. Guo) Symmetry for elliptic equations in a half space without strong maximum principle, Proc. Roy. Soc. Edinburgh, 134A(2004), 259-269.

63. Spatial patterns for population models in a heterogeneous environment, (survey article), Taiwanese J. Math., 8(2004), 155-182.

64. (With Z.M. Guo) Uniqueness and layer analysis for boundary blow-up solutions, J. Math. Pure Appl., 83(2004), 739-763.

65. (With S. Yan) Boundary blow-up solutions with a spike layer, J. Diff. Eqns., 205(2004), 156-184.

66. Asymptotic behavior and uniqueness results for boundary blow-up solutions, Diff. Integral Eqns., 17(2004), 819-834.

67. (With S.J. Li) Nonlinear Liouville theorems and a priori estimates for indefinite superlinear elliptic equations, Adv. Diff. Eqns., 10(2005), 841-860.

68. (With X.B. Pan) Multiple states and hysteresis for type I superconductors, J. Math. Physics, 46(2005), 073301(34pp).

69. (With F. Cirstea) General uniqueness results and variation speed for blow-up solutions of elliptic equations, Proc. London Math. Soc., 91(2005), 459-482.

70. (With M.X. Wang) Asymptotic behavior of positive steady-states to a predator-prey model, Proc. Roy. Soc. Edinburgh, 136A(2006), 759-778.

71. (With Z.M. Guo) The degenerate logistic model and a singularly mixed boundary blow-up problem, Discrete and Continuous Dynamical Systems, 14(2006), 1-29.

72. (With Z.M. Guo) Boundary layer and spike layer solutions for a bistable elliptic problem with generalized boundary conditions, J. Diff. Eqns., 221(2006), 102-133.

73. (With Lishan Liu) Remarks on the uniqueness problem of the logistic equation on the entire space, Bull. Australian Math. Soc., 73(2006), 129-137.

74. (With J. Shi) A diffusive predator-prey model with a protection zone, J. Diff. Eqns., 229(2006), 63-91.

75. (With E.N. Dancer) A uniqueness theorem for a free boundary problem, Proc. Amer. Math. Soc., 134(2006), 3223-3230.

76. (With J. Shi) Allee effect and bistability in a spatially heterogeneous predator-prey model, Trans. Amer. Math. Soc., 359(2007), 4557-4593.

77. (With Z.M. Guo and F. Zhou) Boundary blow-up solutions with interior layers and spikes in a bistable problem, Discrete and Continuous Dynamical Systems, 19(2007), 271-298.

78. (With K. Nakashima) Morse index of layered solutions to the heterogeneous Allen-Cahn equation, J. Diff. Eqns., 238(2007), 87-117.

79. (With F. Cirstea) Large solutions of elliptic equations with a weakly superlinear nonlinearity, J. d'Analyse Math., 103(2007), 261-277.

80. (With F. Cirstea) Asymptotic behavior of solutions of semilinear elliptic equations near an isolated singularity, J. Functional Anal., 250(2007),317-346.

81. The heterogeneous Allen-Cahn equation in a ball: solutions with layers and spikes, J. Diff. Eqns., 244(2008), 117-169.

82. (With Xing Liang) A diffusive competition model with a protection zone, J. Diff. Eqns., 244(2008), 61-86.