# Curriculum Vitae of Jun Zhang


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**Research Interests**

- Data perturbation and privacy-preserving data mining.
- Computational medical image analysis & visualization.
- Biological and medical modeling and simulations, bioinformatics.
- Parallel and distributed scientific computing.

**Education**

- Doctor of Philosophy in Mathematics, The George Washington University, 1997.
- Master of Philosophy in Mathematics, The George Washington University, 1996.
- Bachelor of Science in Applied Mathematics, Chongqing University, China, 1985.

**Professional Experience**

- Associate Chair, Department of Computer Science, University of Kentucky, 2007 – present.
- Professor of Computer Science, Department of Computer Science, University of Kentucky, 2006 – present.
- Director, Laboratory for Computational Medical Imaging & Data Analysis, University of Kentucky, 2005 – present.
- Associate Professor of Computer Science, University of Kentucky, 2002 – 2006.
- Director, Laboratory for High Performance Scientific Computing and Computer Simulation, University of Kentucky, 2000 – present.
- Acting Director of Graduate Studies, Department of Computer Science, University of Kentucky, Spring, 2002.
- Assistant Professor of Computer Science, University of Kentucky, 1998 – 2002.
- Postdoctoral Researcher, Department of Computer Science and Engineering, University of Minnesota, 1997 – 1998.

- Postdoctoral Associate, Department of Mechanical and Aerospace Engineering, The George Washington University, January 1, 1997 – March 15, 1997.
- Teaching Assistant, The George Washington University, 1993 – 1996.
- Teaching and Research Assistant, University of Queensland, Australia, 1992 – 1993.
- Research Scientist, Research Computing Center, China, 1985 – 1992.

**Awards**

- Wethington Award for Outstanding Competitive or Prestigious Extramural Funding, University of Kentucky, 2004, 2008.
- U.S. National Science Foundation Faculty Early Career Award, 2001.
- University of Minnesota Supercomputing Institute Research Scholarship, 1998.
- University of Minnesota Supercomputing Institute Travel Award, 1998.
- James H. Taylor Prize for outstanding performance in mathematics, The George Washington University, 1997.
- Honorable Mention in Student Paper Competition, SIAM, 1997.
- SIAM Student Travel Award (2), 1996.
- Marvin Green Prize for outstanding performance in mathematics and/or computer science, The George Washington University, 1996.
- Australian Development Co-Operation Scholarship, 1992 – 1993.

**Principal Investigator of External Research Grants**

1. *A Unified Framework for Large Scale Scientific Computing*, National Science Foundation, 10/01/2007–09/20/2010 **PI: Jun Zhang**, **$190,000**.
2. *Undergraduate Research Experience in Computational Medical Imaging*, a supplement, National Science Foundation, 06/01/2007–09/30/2008 **PI: Jun Zhang**, **$6,000**.
3. *Generalized Diffusion Simulation-Based Tractography for Mapping Human Brain*, Kentucky Science and Engineering Foundation, 01/01/2007–12/30/2008 **PI: Jun Zhang**, Co-PI: Brian T. Gold (Anatomy and Neurobiology), University of Kentucky, **$88,468**.
4. *Diffusion Tensor MRI Analysis for Early Detection of AD*, Alzheimer's Association, 07/01/2006–06/30/2008 **PI: Jun Zhang**, **$100,000**.
5. *MSPA-MCS: Mathematical and Computational Algorithms for Visualization of Human Brain Neural Pathways*, National Science Foundation, 10/01/2005–09/30/2008 **PI: Jun Zhang**, Co-PIs: Yunmei Chen (Mathematics) and Yijun Liu (Psychiatry and Neuroscience), University of Florida, **$193,615**.

6. *Research Experience for Undergraduate Students*, a supplement to the NSF CAREER Award, National Science Foundation, 07/15/2005–07/14/2006 **PI: Jun Zhang**, **$12,000**.

7. *Support Vector Machine Approach to Matrix Condition Number Prediction*, Kentucky Science and Engineering Foundation, 04/01/2005–03/31/2007 **PI: Jun Zhang**, **$64,612**.

8. *Building A Preliminary Prototype Terrorist Analysis System with Privacy Protection*, Kentucky New Economy Safety and Security Initiative Consortium, 08/15/2004–08/14/2005 **PI: Jun Zhang, $29,294**.

9. *A Software Environment for High Performance Scientific Computing Applications*, National Science Foundation, 03/15/2003–03/14/2004 **PI: Jun Zhang, $60,270**.

10. *Scalable Parallel Iterative Solvers with Mixed MPI and OpenMP*, Research Organization for Information Science & Technology, Japan, 10/01/2002–04/01/2003 **PI: Jun Zhang, $16,000**.

11. *Preliminary Study on Modeling and Simulation of Thermomechanical Interaction of Biological Bodies at High Temperature*, Kentucky Science & Technology Foundation, 01/01/2003–12/30/2003 **PI: Jun Zhang**, Co-PI: Fuqian Yang, **$14,705**.

12. *New Concept and Parallel Algorithms for Robust Preconditioning in Large Scale Parallel Matrix Computation*, National Science Foundation, 06/01/2002–05/31/2006 **PI: Jun Zhang, $172,361**.

13. *Development of a High-Performance Anisotropic Diffusion Equation Solver Using the ACTS Toolkit*, Department of Energy Office of Science, 01/01/2002–12/30/2005 **UK PI: Jun Zhang, $217,577**. (This is a subcontract from the University of Alabama, Project PI: Eric Carlson, total project budget: $445,700).

14. *Scalable Parallel Iterative Solvers for Realistic Ill-Conditioned Problems*, Research Organization for Information Science & Technology, Japan, 10/01/2001–09/30/2002 **PI: Jun Zhang, $56,394**.

15. *CAREER: Develop Robust Scalable Linear System Solvers with Scientific, Engineering and Industrial Applications*, National Science Foundation, 02/15/2001–02/14/2006 **PI: Jun Zhang, $325,000**.

16. *Nonstandard High Order Multigrid Techniques with Applications to Laminar Diffusion Flame Simulations*, National Science Foundation, 07/01/2000–06/30/2003 **PI: Jun Zhang**, Co-PI: Craig C. Douglas, **$281,627** ($253,970 plus $27,627 in supplemental funding).

17. *A Fully Algebraic Multigrid Software Package for Automated Solution of Unstructured Sparse Linear Systems on High Performance Computers*, National Science Foundation, 08/01/1999–07/31/2002 **PI: Jun Zhang**, Co-PI: Craig C. Douglas, **$199,013** ($188,313 plus $10,700 in supplemental funding).

18. *Travel Grant to Attend the 2002 International Congress of Mathematicians, Beijing, China*, American Mathematical Society, 08/01/2002–08/30/2002 **PI: Jun Zhang, $2,250**.

19. *Parallel Iterative High Accuracy Solution of the Convection-Diffusion Equation with High Reynolds Number*, Pittsburgh Supercomputing Center and National Science Foundation, 1997–1998. **PI: Jun Zhang**, 20 hours of supercomputer time.

**Non-Principal Investigator of External Research Grants**

1. *Computer Modeling of Perlecan as a Vascular Regulator*, National Institutes of Health, 01/01/2007–12/31/2010 PI: Michael Fannon, UK Medical School, $1,318,500 (direct and indirect total approximately). Amount to **Jun Zhang**, $286,280 (direct and indirect total approximately).

2. *Supercomputing Using Commodity Graphics Processing Units with Applications to Information Retrieval*, Kentucky Science and Engineering Foundation, 06/01/2004–05/31/2005 PI: Ruigang Yang, Co-PIs: Hank Dietz, and **Jun Zhang**, $14,977.

3. *Wind Driven Oceanographic Circulation*, National Center for Supercomputing Applications, 2000–2000, PIs: Craig C. Douglas and Dale B. Haidvogel, Co-PIs: Mohamed Iskandarani and **Jun Zhang**, 40,000 service units on SGI Origin 2000.

**Principal Investigator of Internal Research Grants**

1. *Computational Techniques for Nerve Fiber Tracking with Applications to Aging Disease Studies*, University of Kentucky Faculty Research Support Program, 01/01/2004–12/30/2004 **PI: Jun Zhang**, Co-PI: Peter A. Hardy, (Biomedical Engineering), **$20,000**.

2. *Memory Efficient Algorithms for Large Scale Document Retrieval*, University of Kentucky Research Committee, 01/01/2002–12/30/2002 **PI: Jun Zhang, $6,000**.

3. *High Performance and High Accuracy Computation of Navier-Stokes Equations*, University of Kentucky Center for Computational Sciences, 07/01/2000–12/31/2000 **PI: Jun Zhang, $15,000**.

**Archival Journal Publications**

1. Eun-Joo Lee, and Jun Zhang, A two-phase preconditioning strategy of sparse approximate inverse for indefinite matrices, *Computers and Mathematics with Applications*, **58** (6), 1152–1159 (2009). (SCI & EI)

2. Wensheng Shen, Changjiang Zhang, Michael Fannon, Kimberly Forsten-Williams, and Jun Zhang, A computational model of FGF-2 binding and HSPG regulation under flow, *IEEE Transactions on Biomedical Engineering*, **56** (9), 2147–2155 (2009). (SCI)

3. Yin Wang, and Jun Zhang, Sixth order compact scheme combined with multigrid method and extrapolation technique for 2D Poisson equation, *Journal of Computational Physics*, **228** (1), 137–146 (2009). (SCI)

4. Ning Kang, Eric S. Carlson, and Jun Zhang, Reconstructing brain white matter pathways with diffusion tensor MRI using kernel-based diffusion simulations, *Journal of Algorithms and Computational Technology*, **2** (2), 501–526 (2008).

5. Jie Wang, Jun Zhang, Shuting Xu, and Weijun Zhong, A novel data distortion approach via selective SSVD for privacy protection, *International Journal of Information and Computer Security*, **2** (1), 48–69 (2008). (EI)

6. Yin Wang, Jeonghwa Lee, and Jun Zhang, A short survey on preconditioning techniques for large scale dense complex linear systems in electromagnetics, *International Journal of Computer Mathematics*, **84** (8), 1211–1223 (2007). (SCI & EI)

7. Shuting Xu, Jun Zhang, Dianwei Han, and Jie Wang, Singular value decomposition based data distortion strategy for privacy protection, *Knowledge and Information Systems*, **10** (3), 383–397 (2006). (SCI)

8. Jie Wang, Weijun Zhong, and Jun Zhang, A general meshsize fourth-order compact difference discretization scheme for 3D Poisson equation, *Applied Mathematics and Computation*, **183**, 804–812 (2006). (EI)

9. Chi Shen, and Jun Zhang, Performance study and analysis of parallel multilevel preconditioners, *Journal of Mathematical Modelling and Algorithms*, **5**, 331–352 (2006).

10. Jie Wang, Weijun Zhong, and Jun Zhang, High order compact computation and nonuniform grids for streamfunction vorticity equations, *Applied Mathematics and Computation*, **179**, 108–120 (2006). (EI)

11. Eun-Joo Lee, and Jun Zhang, Hybrid reordering strategies for ILU preconditioning of indefinite sparse matrices, *Journal of Applied Mathematics & Computing*, **22** (1-2), 307–316 (2006). (EI)

12. Yong-Gang Lv, Jing Liu, and Jun Zhang, Theoretical evaluation on burn injury of human respiratory tract due to inhalation of hot gas at the early stage of fires, *Burns*, **32**, 436–446 (2006).

13. Kai Wang, Jun Zhang, and Chi Shen, A class of parallel multilevel sparse approximate inverse preconditioners for sparse linear systems, *Scalable Computing: Practice and Experience*, **7** (2), 93–106 (2006).

14. Ning Kang, Jun Zhang, Eric S. Carlson, and Daniel Gembris, White matter fiber tractography via anisotropic diffusion simulation in the human brain, *IEEE Transactions on Medical Imaging*, **24** (9), 1127–1137 (2005). (EI)

15. Jennifer J. Zhao, Jun Zhang, Ning Kang, and Fuqian Yang, A two level finite difference scheme for the one dimensional Pennes' bioheat equation, *Applied Mathematics and Computation*, **171** (1), 320–331 (2005). (EI)

16. Wensheng Shen, Jun Zhang, and Fuqian Yang, Three-dimensional model on thermal response of skin subject to laser heating, *Computer Methods in Biomechanics and Biomedical Engineering*, **8** (2), 115–125 (2005).

17. Wei Song, Fuqian Yang, and Jun Zhang, Stress-driven evolution of waviness in an elastic layer, *Materials Science and Engineering A*, **409**, 195–205 (2005). (EI)

18. Wensheng Shen, Jun Zhang, and Fuqian Yang, Modeling and numerical simulation of bioheat transfer and biomechanics in soft tissue, *Mathematical and Computer Modelling*, **41**, 1251–1265 (2005). (EI)

19. Wensheng Shen, Jun Zhang, and Fuqian Yang, Skin thermal injury prediction with strain energy, *International Journal of Nonlinear Sciences and Numerical Simulation*, **6** (3), 317–328 (2005).

20. Samir Karaa, Jun Zhang, and Fuqian Yang, A numerical study of a 3D bioheat transfer problem with different spatial heating, *Mathematics and Computers in Simulation*, **68** (4), 375–388 (2005). (EI)

21. Jing Gao, and Jun Zhang, Clustered SVD strategies in latent semantic indexing, *Information Processing and Management*, **41** (5), 1051–1063 (2005). (EI)

22. Chi Shen, Jun Zhang, and Kai Wang, Distributed block independent set algorithms and parallel multilevel ILU preconditioners, *Journal of Parallel and Distributed Computing*, **65**, 331–346 (2005). (EI)

23. Fuqian Yang, Wei Song, and Jun Zhang, Surface evolution of crystalline tubes, *International Journal of Solid Thin Films*, **474**, 285–293 (2005). (EI)

24. Jun Zhang, and Jennifer J. Zhao, Truncation error and oscillation property of the combined compact difference scheme, *Applied Mathematics and Computation*, **161** (1), 241–251 (2005). (EI)

25. Shuting Xu, and Jun Zhang, A new data mining approach to predicting matrix condition numbers, *Communications in Information and Systems*, **4** (4), 325–340 (2004).

26. Ning Kang, Jun Zhang, and Eric S. Carlson, Tracking white matter fiber in human brain, *Journal of Shanghai University*, **10** (suppl.), 13–17 (2004).

27. Shuting Xu, and Jun Zhang, A parallel hybrid web document clustering algorithm and its performance study, *Journal of Supercomputing*, **30** (2), 117–131 (2004). (EI)

28. Ning Kang, Jun Zhang, and Eric S. Carlson, Parallel simulation of anisotropic diffusion with human brain DT-MRI data, *Computers and Structures*, **82** (28), 2389–2399 (2004). (EI)

29. Jeonghwa Lee, Jun Zhang, and Cai-Cheng Lu, Sparse inverse preconditioning of multilevel fast multipole algorithm for hybrid integral equations in electromagnetics, *IEEE Transactions on Antennas and Propagation*, **52** (9), 2277–2287 (2004). (EI)

30. Samir Karaa, and Jun Zhang, High order ADI method for solving unsteady convection-diffusion problems, *Journal of Computational Physics*, **198**, 1–9 (2004).

31. Ning Kang, Jun Zhang, and Eric S. Carlson, Performance of ILU preconditioning techniques in simulating anisotropic diffusion in the human brain, *Future Generation Computer Systems*, **20** (4), 687–698 (2004). (EI)

32. Haiwei Sun, and Jun Zhang, A high order finite difference discretization strategy based on extrapolation for convection diffusion equations, *Numerical Methods for Partial Differential Equations*, **20** (1), 18–32 (2004). (EI)

33. Kai Wang, Sangbae Kim, and Jun Zhang, A comparative study on dynamic and static sparsity patterns in parallel sparse approximate inverse preconditioning, *Journal of Mathematical Modeling and Applications*, **2** (3), 203–215 (2003).

34. Jeonghwa Lee, Jun Zhang, and Cai-Cheng Lu, Performance of preconditioned Krylov iterative methods for solving hybrid integral equations in electromagnetics, *Journal of Computational Electromagnetic Society*, **18** (4), 54–61 (2003). (EI)

35. Chi Shen, and Jun Zhang, A fully parallel block independent set algorithm for distributed sparse matrices, *Parallel Computing*, **29** (11-12), 1685–1699 (2003). (EI)

36. Haiwei Sun, Ning Kang, Jun Zhang, and Eric S. Carlson, A fourth order compact difference scheme on face centered cubic grids with multigrid method for solving 2D convection diffusion equation, *Mathematics and Computers in Simulations*, **63** (6), 651–661 (2003). (EI)

37. Samir Karaa, Jun Zhang, and Craig C. Douglas, Preconditioned multigrid simulation of an axisymmetric laminar diffusion flame, *Mathematical and Computer Modeling*, **38**, 269–279 (2003).

38. Haiwei Sun, and Jun Zhang, A high order compact boundary value method for solving one-dimensional heat equations, *Numerical Methods for Partial Differential Equations*, **19** (6), 846–857 (2003). (EI)

39. Li Wang, and Jun Zhang, A new stabilization strategy for incomplete LU preconditioning of indefinite matrices, *Applied Mathematics and Computation*, **144** (1), 75–87 (2003). (EI)

40. Samir Karaa, and Jun Zhang, Analysis of stationary iterative methods for the discrete convection-diffusion equation with a nine-point compact scheme, *Journal of Computational and Applied Mathematics*, **154** (2), 447–476 (2003). (EI)

41. Kai Wang, Sang-Bae Kim, Jun Zhang, Kengo Nakajima, and Hiroshi Okuda, Global and localized parallel preconditioning techniques for large scale solid Earth simulations, *Future Generation Computer Systems*, **19** (4), 443–456 (2003). (EI)

42. Jun Zhang, Numerical simulation of 2D square driven cavity using fourth order compact finite difference schemes, *Computers and Mathematics with Applications*, **45**, 43–52 (2003). (EI)

43. Jeonghwa Lee, Jun Zhang, and Cai-Cheng Lu, Incomplete LU preconditioning for large scale dense complex linear systems from electromagnetic wave scattering problems, *Journal of Computational Physics*, **185**, 158–175 (2003).

44. Kai Wang, and Jun Zhang, MSP: a class of parallel multistep successive sparse approximate inverse preconditioning strategies, *SIAM Journal on Scientific Computing*, **24** (4), 1141–1156 (2003). (EI)

45. Jun Zhang, and Tong Xiao, A multilevel block Cholesky incomplete preconditioner for solving normal equations in linear least squares problems, *Journal of Applied Mathematics & Computing*, **11** (1-2), 59–80 (2003). (EI)

46. Jun Zhang, Haiwei Sun, and Jennifer J. Zhao, High order compact scheme with multigrid local mesh refinement procedure for convection diffusion problems, *Computer Methods in Applied Mechanics and Engineering*, **191** (41-42), 4661–4674 (2002). (EI)

47. Chi Shen, and Jun Zhang, Parallel two level block ILU preconditioning techniques for solving large sparse linear systems, *Parallel Computing*, **28** (10), 1451–1475 (2002). (EI)

48. Kai Wang, and Jun Zhang, Multigrid treatment and robustness enhancement factored sparse approximate inverse preconditioning, *Applied Numerical Mathematics*, **43** (4), 483–500 (2002). (EI)

49. Jun Zhang, Jules Kouatchou, and Lixin Ge, A family of fourth order difference schemes on rotated grid for two dimensional convection-diffusion equation, *Mathematics and Computers in Simulation*, **59**, 413–429 (2002). (EI)

50. Samir Karaa, and Jun Zhang, Convergence and performance of iterative methods for solving variable coefficient convection-diffusion equation with a fourth-order compact difference scheme, *Computers and Mathematics with Applications*, **44**, 457–479 (2002). (EI)

51. Jun Zhang, Multigrid method and fourth order compact scheme for 2D Poisson equation with unequal meshsize discretization, *Journal of Computational Physics*, **179**, 170–179 (2002).

52. Jun Zhang, Jules Kouatchou, and Mohamed Othman, On cyclic reduction and finite difference schemes, *Journal of Computational and Applied Mathematics*, **145** (1), 213–222 (2002). (EI)

53. Lixin Ge, and Jun Zhang, Symbolic computation of high order compact difference schemes for three dimensional linear elliptic partial differential equations with variable coefficients, *Journal of Computational and Applied Mathematics*, **143** (1), 9–27 (2002). (EI)

54. Jun Zhang, A sparse approximate inverse preconditioner for parallel preconditioning of general sparse matrices, *Applied Mathematics and Computation*, **130** (1), 63–85 (2002). (EI)

55. Jun Zhang, Anand L. Pardhanani, and Graham F. Carey, Performance of adaptive dual-dropping ILUT preconditioners in semiconductor dopant diffusion simulation, *International Journal of Numerical Modeling: Electronic Networks, Devices and Fields*, **15** (2), 147–167 (2002). (EI)

56. Samir Karaa, and Jun Zhang, A note on convergence of line iterative methods for a nine-point matrix, *Applied Mathematics Letters*, **15**, 495–503 (2002). (EI)

57. Jun Zhang, Comments on "Solution of the system of linear algebraic equations by decreasing dimension", *Applied Mathematics and Computation*, **128** (1), 95–98 (2002). (EI)

58. Jun Zhang, and Jennifer J. Zhao, High accuracy stable numerical solution of 1D microscale heat transport equation, *Communications in Numerical Methods in Engineering*, **17** (11), 821–832 (2001). (EI)

59. Lixin Ge, and Jun Zhang, High accuracy iterative solution of convection diffusion equation with boundary layers on nonuniform grids, *Journal of Computational Physics*, **171** (2), 560–578 (2001).

60. Jun Zhang, and Jennifer J. Zhao, Iterative solution and finite difference approximations to 3D microscale heat transport equation, *Mathematics and Computers in Simulation*, **57** (6), 387–404 (2001). (EI)

61. Jun Zhang, A grid based multilevel incomplete LU preconditioning technique for general sparse matrices, *Applied Mathematics and Computation*, **124** (1), 95–115 (2001). (EI)

62. Jun Zhang, and Jennifer J. Zhao, Unconditionally stable finite difference scheme and iterative solution of 2D microscale heat transport equation, *Journal of Computational Physics*, **170**, 261–275 (2001).

63. Yousef Saad, and Jun Zhang, Enhanced multilevel block ILU preconditioning strategies for general sparse linear systems, *Journal of Computational and Applied Mathematics*, **130** (1-2), 99–118 (2001). (EI)

64. Jun Zhang, A class of multilevel recursive incomplete LU preconditioning techniques, *Korean Journal of Computational and Applied Mathematics*, **8** (2), 213–234 (2001). (EI)

65. Jun Zhang, A multilevel dual reordering strategy for robust incomplete LU factorization of indefinite matrices, *SIAM Journal on Matrix Analysis and Applications*, **22** (3), 925–947 (2000).

66. Jun Zhang, Lixin Ge, and Murli M. Gupta, Fourth order compact difference scheme for 3D convection diffusion equation with boundary layers on nonuniform grids, *Neural, Parallel & Scientific Computations*, **8** (3-4), 373–392 (2000).

67. Jun Zhang, Lixin Ge, and Jules Kouatchou, A two colorable fourth order compact difference scheme and parallel iterative solution of the 3D convection diffusion equation, *Mathematics and Computers in Simulation*, **54** (1-3), 67–83 (2000). (EI)

68. Jun Zhang, Preconditioned Krylov subspace methods for solving nonsymmetric matrices from CFD applications, *Computer Methods in Applied Mechanics and Engineering*, **189** (3), 825–840 (2000). (EI)

69. Jules Kouatchou, and Jun Zhang, Optimal injection operator and high order schemes for multigrid solution of 3D Poisson equation, *International Journal of Computer Mathematics*, **76**, 173–190 (2000). (EI)

70. Murli M. Gupta, and Jun Zhang, High accuracy multigrid solution of the 3D convection-diffusion equation, *Applied Mathematics and Computation*, **113** (2-3), 249–274 (2000). (EI)

71. Lixin Ge, and Jun Zhang, Accuracy, robustness, and efficiency comparison in iterative computation of convection diffusion equation with boundary layers, *Numerical Methods for Partial Differential Equations*, **16** (4), 379–394 (2000).

72. Jun Zhang, Sparse approximate inverse and multilevel block ILU preconditioning techniques for general sparse matrices, *Applied Numerical Mathematics*, **35** (1), 89–108 (2000). (EI)

73. Jun Zhang, On preconditioning Schur complement and Schur complement preconditioning, *Electronic Transactions on Numerical Analysis*, **10**, 115–130 (2000).

74. Jun Zhang, Preconditioned iterative methods and finite difference schemes for convection-diffusion, *Applied Mathematics and Computation*, **109** (1), 11–30 (2000). (EI)

75. Jun Zhang, A note on accelerated multigrid high accuracy solution of the convection-diffusion equation with high Reynolds number, *Numerical Methods for Partial Differential Equations*, **16** (1), 1–10 (2000). (EI)

76. Yousef Saad, and Jun Zhang, BILUTM: a domain-based multilevel block ILU preconditioner for general sparse linear systems, *SIAM Journal on Matrix Analysis and Applications*, **21** (1), 279–299 (1999).

77. Yousef Saad, and Jun Zhang, Diagonal threshold techniques in robust multi-level ILU preconditioners for general sparse linear systems, *Numerical Linear Algebra with Applications*, **6** (4), 257–280 (1999).

78. Yousef Saad, and Jun Zhang, BILUM: block versions of multielimination and multilevel preconditioners for general sparse linear systems, *SIAM Journal on Scientific Computing*, **20** (6), 2103–2121 (1999). (EI)

79. Jun Zhang, Acceleration and stabilization properties of minimal residual smoothing technique in multigrid, *Applied Mathematics and Computation*, **100** (2-3), 151–168 (1999).

80. Jun Zhang, Multi-level minimal residual smoothing: a family of general purpose multigrid acceleration techniques, *Journal of Computational and Applied Mathematics*, **100** (1), 41–51 (1998). (EI)

81. Jun Zhang, Fast and high accuracy multigrid solution of the three dimensional Poisson equation, *Journal of Computational Physics*, **143**, 449–461 (1998).

82. Jun Zhang, Two-grid analysis of minimal residual smoothing as a multigrid acceleration technique, *Applied Mathematics and Computation*, **96** (1), 27–45 (1998).

83. Jun Zhang, VML: a class of virtual multi-level iterative methods for solving partial differential equations, *Applied Mathematics and Computation*, **92** (1), 29–48 (1998).

84. Jun Zhang, An explicit fourth-order compact finite difference scheme for three dimensional convection-diffusion equation, *Communications in Numerical Methods in Engineering*, **14**, 209–218 (1998).

85. Jun Zhang, On convergence and performance of iterative methods with fourth-order compact schemes, *Numerical Methods for Partial Differential Equations*, **14**, 263–280 (1998).

86. Jun Zhang, Residual scaling techniques in multigrid, II: practical applications, *Applied Mathematics and Computation*, **90** (2-3), 229–252 (1998).

87. Jun Zhang, Residual scaling techniques in multigrid, I: equivalence proof, *Applied Mathematics and Computation*, **86** (2-3), 283–303 (1997).

88. Jun Zhang, Multigrid with inexact minimal residual smoothing acceleration, *Applied Numerical Mathematics*, **24** (4), 501–512 (1997). (EI)

89. Jun Zhang, Accelerated multigrid high accuracy solution of the convection-diffusion equation with high Reynolds number, *Numerical Methods for Partial Differential Equations*, **13**, 77–92 (1997).

90. Jun Zhang, Convergence of iterative methods for a fourth-order discretization scheme, *Applied Mathematics Letters*, **10** (2), 49–55 (1997). (EI)

91. Jun Zhang, Minimal residual smoothing in multi-level iterative method, *Applied Mathematics and Computation*, **84** (1), 1–25 (1997).

92. Murli M. Gupta, Jules Kouatchou, and Jun Zhang, Comparison of second and fourth order discretizations for multigrid Poisson solver, *Journal of Computational Physics*, **132** (2), 226–232 (1997).

93. Murli M. Gupta, Jules Kouatchou, and Jun Zhang, A compact multigrid solver for convection-diffusion equations, *Journal of Computational Physics*, **132** (1), 123–129 (1997).

94. Jun Zhang, and John A. Belward, Chebyshev series approximations for the Bessel function $Y_n(z)$ with complex argument, *Applied Mathematics and Computation*, **88** (2-3), 275–286 (1997).

95. Jun Zhang, Acceleration of five-point red-black Gauss-Seidel in multigrid for two dimensional Poisson equation, *Applied Mathematics and Computation*, **80** (1), 73–93 (1996). (EI)

96. Jun Zhang, A cost-effective multigrid projection operator, *Journal of Computational and Applied Mathematics*, **76**, 325–333 (1996). (EI)

97. Jun Zhang, A note on the Tau-method approximations for the Bessel functions $Y_0(z)$ and $Y_1(z)$, *Computers and Mathematics with Applications*, **31** (9), 63–70 (1996). (EI)

98. Jun Zhang, Symbolic computation on complex polynomial solution of differential equations, *Journal of Symbolic Computation*, **22** (3), 345–354 (1996). (EI)

99. Jun Zhang, Symbolic and numerical computation on Bessel functions of complex argument and large magnitude, *Journal of Computational and Applied Mathematics*, **75** (1), 99–118 (1996). (EI)

100. Jun Zhang, and John A. Belward, Tau-method approximations for the Bessel function $Y_0(z)$, *Computers and Mathematics with Applications*, **30** (7), 5–14 (1995). (EI)

101. Jun Zhang, Tau-method approximations for the Bessel function $Y_1(z)$, *Computers and Mathematics with Applications*, **30** (7), 15–20 (1995). (EI)

**Papers Accepted for Journal Publication**

1. Xuwei Liang, and Jun Zhang, A framework for quantitative and visual analysis of white matter integrity using diffusion tensor imaging, *International Journal of Functional Informatics and Personalized Medicine*.

**Book Edited**

1. Jun Zhang, Ji-Huan He, and Yuxi Fu, *Computational and Information Science*, Spring-Verlag, Heidelberg, Proceedings, CIS 2004, Shanghai, China, December, 2004.

**Conference Proceedings, Book Chapters, and Abstracts**

1. Wensheng Shen, Kimberly Forsten-Williams, Michael Fannon, Changjiang Zhang, and Jun Zhang, Multigrid accelerated computation of ligand-receptor interactions under flow condition, in *Proceedings of the World Congress on Engineering and Computer Science*, pp. 949–954, San Francisco, USA, October 20-22, 2009.

2. Changjiang Zhang, Wensheng Shen, Bei Zhao, Michael Fannon, Kimberly Forsten-Williams, and Jun Zhang, A numerical study of pulsatile flow through a hollow fiber cartridge: growth factor-receptor binding and dissociation analysis, in *Proceedings of the International Joint Conference on Bioinformatics, Systems Biology and Intelligent*, pp. 435–441, Shanghai, China, August 3-6, 2009.

3. Xuwei Liang, Qi Zhuang, Ning Cao, and Jun Zhang, Shape modeling and clustering of white matter fiber tracts using Fourier descriptors, in *Proceedings of IEEE Symposium on Computational Intelligence in Bioinformatics and Computational Biology*, pp. 292–297, Nashville, TN, March 30-April 2, 2009. (EI)

4. Zhenmin Lin, Jun Zhang, Dianwei Han, and Jie Wang, Generalized random rotation perturbation for vertically partitioned data sets, in *Proceedings of IEEE Symposium on Computational Intelligence and Data Mining*, pp. 159–162, Nashville, TN, March 30-April 2, 2009. (EI)

5. Lian Liu, Jie Wang, and Jun Zhang, Privacy vulnerability with background information in data perturbation, in *Proceedings of the Ninth SIAM International Conference on Data Mining, Workshop on Link Analysis, Counterterrorism and Security*, 10 pages, Sparks, NV, May 2, 2009,

6. Lian Liu, Jie Wang, Jinze Liu, and Jun Zhang, Privacy preservation in social networks with sensitive edge weights, in *Proceedings of the 2009 SIAM International Conference on Data Mining*, pp. 954–965, Sparks, NV, April 30-May 2, 2009.

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8. Ning Cao, Xuwei Liang, Qi Zhuang, and Jun Zhang, Approximating high angular resolution apparent diffusion coefficient profiles using spherical harmonics under biGaussian assumption, in *Proceedings of the 2009 SPIE Medical Imaging*, Vol. 7262, 726204, 8 pages, Lake Buena Vista, FL, USA, February 6-8, 2009. (EI)

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19. Dianwei Han, Shuting Xu, and Jun Zhang, Relationship between the features of sparse matrix and the matrix solving status, in *Proceedings of the 2008 ACM Southeast Conference*, pp. 501–506, Auburn, AL, March 28-29, 2008.

20. Dianwei Han, and Jun Zhang, A comparison of two algorithms for predicting the condition number, in *Proceedings of the Sixth International Conference on Machine Learning and Applications*, pp. 223–228, Cincinnati, OH, December 14-16, 2007. (EI)

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53. Jeonghwa Lee, Jun Zhang, and Cai-Cheng Lu, Two-level preconditioning for electromagnetic scattering from composite and dielectric objects, in *Abstracts of the 8th Copper Mountain Conference on Iterative Methods*, Copper Mountain, CO, pp. 49, March 2004.

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92. Jun Zhang, A multilevel preconditioning technique with implicit coarse level system construction, in *Abstracts of the 942th American Mathematical Society Meeting*, Las Vegas, Nevada, pp. 53, April 1999.

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97. Jun Zhang, Multigrid solution of convection-diffusion equations with high-Reynolds number, in *Preliminary Proceedings of 1996 Copper Mountain Conference on Iterative Methods,* Vol. 2, pp. 1–9, 1996

98. Jun Zhang, Accelerated multigrid high accuracy solution of the convection-diffusion equations with high Reynolds number, in *Society for Industrial and Applied Mathematics 1996 Annual Meeting*, pp. 134, 1996.

**Supervision**

- Ph.D. students graduated (**8**):
  - Jie Wang (2008): Title of Dissertation: Matrix Decomposition for Data Disclosure Control and Data Mining Applications. First Job: Assistant Professor of Computer Science, Minnesota State University, Mankato, Minnesota.
  - Eun-Joo Lee (2008): Title of Dissertation: Accurate and Robust Preconditioning Techniques for Solving General Sparse Linear Systems. First Job: Associate Professor of Computer Science, East Stroudsburg University, Stroudsburg, Pennsylvania.
  - Wensheng Shen (2007): Title of Dissertation: Computer Simulation and Modeling of Physical and Biological Processes Using Partial Differential Equations. First Job: Assistant Professor of Computational Science, State University of New York at Brockport, Brockport, New York.
  - Ning Kang (2006): Title of Dissertation: Approximating Anatomical Brain Connectivity with Diffusion Tensor MRI via Anisotropic Diffusion Simulations. First Job: Research Scientist, University of California at San Diego, La Jolla, California.
  - Shuting Xu (2005): Title of Dissertation: Study and Design of An Intelligent Preconditioner Recommendation System. First Job: Assistant Professor of Information Science, Virginia State University, Petersburg, Virginia.
  - Chi Shen (2004): Title of Dissertation: Parallel Multilevel Block ILU Preconditioning Techniques for Solving General Sparse Linear Systems. First Job: Assistant Professor of Computer Science, Kentucky State University, Frankfort, Kentucky.
  - Jeonghwa Lee (2004): Title of Dissertation: Preconditioned Iterative Methods for Solving Dense Linear Systems from Electromagnetic Scattering Applications. First Job: Mathematician/Software Engineer, RAPT Industries, Pennsylvania. Current Position: Assistant Professor of Computer Science, Shippensburg University, Shippensburg, Pennsylvania.
  - Kai Wang (2003): Title of Dissertation: High Performance Preconditioning Techniques for Solving General Sparse Linear Systems. First Job: Postdoctoral Researcher, University of Illinois at Urbana-Champaign, Illinois. Current Position: Assistant Professor of Computer Science, University of South Dakota, Vermillion, South Dakota.

- M.S. students graduated (**4**): Jing Gao (2004), Jiantao Tang (2003), Tong Xiao (2000), Jiqing Zhang (1999).
- Postdoctoral fellows and visiting scholars supervised (**7**): Lixin Ge, Samir Karaa, Sangbae C. Kim, Jeonghwa Lee, Chi Shen, Haiwei Sun, Zhangyang Xiong.
- Undergraduate research student supervised (**4**): Jing Gao (2002), William Berry (2005-06), Levon Ter-Isahakyan (2006), Jeffrey Wheeler (2005-06).
- Ph.D. students in progress (**8**): Ning Cao, Dianwei Han, Xuwei Liang, Zhenmin Lin, Lian Liu, Yin Wang, Changjiang Zhang, Qi Zhuang.

**Online Software Packages**

- BILUM: A Software Package of Multi-Level Block ILU Preconditioning Techniques for Solving General Sparse Linear Systems, (co-author: Yousef Saad), 1997.
- CVTM: A Software Package for Generating Test Matrices for the Convection Diffusion Equations, 1997.
- MG3DCV: A Software Package for High Accuracy Multigrid Computation of Three Dimensional Convection Diffusion Equations, 1998.

**Graduate and Undergraduate Teaching**

- Graduate Level Courses Developed:
  - Parallel and Distributed Computing, University of Kentucky, 1998.
  - Parallel Iterative Computing, University of Kentucky, 1999.
  - Computational Medical Imaging Analysis, University of Kentucky, 2005.

**Professional Service**

- Associate Editor for
  - *Journal of Applied Mathematics and Computing* (an international journal), 2001 – 2009.
  - *Journal of Computational Science and Engineering*, 2004 – present.
- Member of the Editorial Board for
  - *Health*, 2009 – present.
  - *International Journal of Nonlinear Sciences and Numerical Simulation*, 1999 – present.
  - *International Journal of Nonlinear Modeling in Science and Engineering*, 2000 – 2004.
  - *Journal of Biomedical Science and Engineering*, 2007 –.
  - *The Open Applied Mathematics Journal*, 2007 –.
  - *International Journal of Data Mining, Modelling and Management*, 2008 –.

- *The Open Information Systems Journal*, 2008 –.
- *The Open Mechanics Journal*, 2007 –.
- *Advances and Applications in Mathematical Sciences*, 2009 –.

- Member of the Program Committee, ISIBM International Joint Conference on Bioinformatics, Systems Biology and Intelligent Computing, Shanghai, China, August 3-6, 2009.
- Co-Chair, Second IEEE International Conference on Bioinformatics and Biomedical Engineering, Shanghai, China, May 2008.
- Session Chair, First IEEE International Conference on Bioinformatics and Biomedical Engineering, Wuhan, China, July 6-8, 2007.
- Local Chair and Member of the International Committee, International Conference on Life System Modeling and Simulations, Shanghai, China, September 2007.
- Program Committee Member, KOSEN Workshop on Mathematics, Technology and Education, Ibaraki, Japan, 2006, 2008.
- Keynote Speaker, the 2005 International Symposium on Medical Imaging and Computing, Beijing, China, June 2005.
- Keynote Speaker, International Conference on Life Science and Simulations, Shanghai, China, October 2004.
- Associate Editor, Proceedings of the 1999 International Conference on Parallel and Distributed Processing Techniques and Applications, CSREA Press, 1999.
- Associate Editor, Proceedings of the 2001 International Symposium on Distributed Computing and Applications to Business, Engineering and Science, Wuhan, China, 2001.
- General Co-Chair, International Conference on Computational and Information Sciences, Shanghai, China, 2004.
- Program Committee member on the 2005 International Symposium on Medical Imaging and Computing, Beijing, China, June, 2005.
- General Co-Chair, International Conference on Nonlinear Science and Numerical Simulation, Shanghai, China, 2004.
- General Co-Chair, the 6th Workshop on High Performance Scientific and Engineering Computing (HPSEC-04) Montreal, Canada, 2004
- Program Committee Member on the annual International Conference on Parallel and Distributed Processing Techniques and Applications, Las Vegas, Nevada, 1998, 2001, 2002.
- Program Committee Member, Second International Symposium on Parallel and Distributed Processing and Applications, Hong Kong, China, December 13-15, 2004.
- Program Committee Member, Third International Symposium on Parallel and Distributed Processing and Applications, Nanjing, China, November 2-5, 2005.

- Technical Committee Member on the Fourth Workshop on High Performance Scientific and Engineering Computing with Applications, Vancouver, British Columbia, Canada, August 18 - 21, 2002.
- Technical Committee Member and Session Chair on the Third Workshop on Parallel and Distributed Scientific and Engineering Computing with Applications, Fort Lauderdale, Florida, April 15 - 19, 2002.
- Scientific Committee Member on the 2005 International Symposium on Distributed Computing and Applications to Business, Engineering and Science, Greenwich, United Kingdom, 2005.
- Steering Committee Member on the 2004 International Symposium on Distributed Computing and Applications to Business, Engineering and Science, Wuhan, China, September 2004.
- Scientific Committee Member on the 2002 International Symposium on Distributed Computing and Applications to Business, Engineering and Science, Wuxi, China, 2002.
- Program Committee Member on the Third Workshop on High Performance Scientific and Engineering Computing with Applications, Velencia, Spain, September 3 - 7, 2001.
- Co-Organizer of Minisymposium on New Developments in Fiber Tracking Algorithms for Human Brain Imaging, in SIAM 2004 Conference on Life Sciences, Portland, Oregon, July 11-14, 2004.
- Co-Organizer of Workshop on Computational Linear Algebra, Tsinghua University, Beijing, China, June 12, 2004. (With Zhongxiao Jia).
- Co-Organizer of a minisymposium on Advanced Computational and Modeling Techniques in Computer Simulations of Physical and Engineering Problems, SIAM Annual Meeting, San Diego, CA, July 9 - 13, 2001. (With Jennifer J. Zhao).
- Organizer of a Special Session on High Order Compact Schemes with Applications, First SIAM Conference on Computational Science and Engineering, Washington, DC, September 21 – 24, 2000.
- Co-Organizer of a Special Session on Numerical Analysis and Computational Mathematics, AMS Sectional Meeting, Las Vegas, Nevada, April 10 – 11, 1999. (With Jennifer J. Zhao).
- Participated in panel reviews for the U.S. National Science Foundation Information Technology Research Program, Faculty Early Career Program, and other programs, 2001, 2002, 2004, 2005.
- Mail-in and electronic reviews of research proposals for the National Science Foundation, including proposals in the Climate Dynamics Program, Faculty Early Career Program, Computational Mathematics Program, International Program, since 2001.
- Reviewed research proposals for the State of Louisiana Board of Regents, 2000.

- Reviewed research proposals for the research funding agencies of Austria and Ukraine governments, 2001.
- Reviewed research proposals for the research funding agency of Hong Kong government, 2003.
- Reviewed research proposals for Swiss National Science Foundation, 2004.
- Reviewed research proposal for the American Association for the Advancement of Science, 2003.
- Invited by the President of Academic Board to review the Department of Mathematics of the University of Queensland, Australia, 1999.
- Referee for the following professional journals:
  - *AIAA Journal.*
  - *Applied Mathematics Letters.*
  - *Applied Mathematical Modelling.*
  - *Applied Numerical Analysis and Computational Mathematics.*
  - *Applied Numerical Mathematics.*
  - *BIT.*
  - *Building and Environment.*
  - *Bulletin of Belgian Mathematical Society.*
  - *Communications in Numerical Methods in Engineering.*
  - *Computer Methods in Applied Mechanics and Engineering.*
  - *Future Generation Computer Systems.*
  - *IEEE Transactions on Biomedical Engineering.*
  - *IEEE Transactions on Medical Imaging.*
  - *Information Sciences.*
  - *International Journal of General Systems.*
  - *International Journal of Numerical Methods for Heat & Fluid Flow.*
  - *International Journal of Numerical Methods in Fluids.*
  - *International Journal of Structural Engineering and Mechanics.*
  - *IMA Journal on Numerical Analysis.*
  - *Iranian Journal of Science and Technology.*
  - *Journal of Applied Mathematics and Computing.*
  - *Journal of Computational and Applied Mathematics.*
  - *Journal of Computational Methods in Science and Engineering.*
  - *Journal of Computational Physics.*
  - *Journal of Image Communications.*

- *Journal of Information Processing and Management.*
- *Journal of Knowledge and Information Systems.*
- *Journal of Parallel Algorithms and Applications.*
- *Journal of Performance Evaluation.*
- *Journal of Scientific Computing.*
- *Journal of Scientific Programming.*
- *Journal of The Franklin Institute.*
- *Mathematics and Computers in Simulation.*
- *Methods and Applications of Analysis.*
- *Mobile Networks and Applications.*
- *Numerical Linear Algebra with Applications.*
- *Numerical Methods for Partial Differential Equations.*
- *Parallel Processing Letters.*
- *Perception and Psychophysics.*
- *PLoS Computational Biology.*
- *SIAM Journal on Matrix Analysis with Applications.*
- *SIAM Journal on Scientific Computing.*

- Technical and screening reviews on text books in *parallel computing* for the McGraw-Hill Publishing Company and the Benjamin/Cummings Publishing Company, 2001.
- **Service at the University of Kentucky**:
  - Member of the Executive Committee, Department of Computer Science, University of Kentucky, 2007 – present.
  - Member of the Faculty Search Committee, Department of Computer Science, University of Kentucky, 2006 – 2007.
  - Acting Director of Graduate Studies, Department of Computer Science, University of Kentucky, Spring, 2002.
  - Member of the Higher Degree Committee, Department of Computer Science, University of Kentucky, 1998 – present.

**Professional Memberships**

- American Mathematical Society, 1995 – 1998.
- Institute of Electrical and Electronic Engineers, 1999 – present.
- International Society for Magnetic Resonance in Medicine, 2004 – 2007.
- Society for Industrial and Applied Mathematics, 1995 – 2004.
- Medical Image Computing and Computer Assisted Intervention Society, 2005 - 2007.