Curriculum Vitae

by Xiaoqiang Wang

School of Computational Science &
Department of Mathematics
Florida State University
Dirac Science Library
Tallahassee, FL 32306-4120

Voice: (850)644-5792
Fax: (850)644-0098
Email: xwang@scs.fsu.edu
http://www.scs.fsu.edu/~xwang

RESEARCH INTERESTS

- Numerical analysis and applied partial differential equations
- Mathematical biology
- Image processing, scientific visualization and data mining
- High-performance scientific computing

EDUCATION

- **Ph.D** in Applied Mathematics, Pennsylvania State University, University Park, 2005
  Dissertation: Phase field models and simulations of vesicle bio-membranes
  Advisor: Qiang Du
- **M.S.** in Institute of Mathematics, Chinese Academy of Sciences, P.R.China, 1998
- **B.S.** in Mathematics, Wuhan University, Wuhan, Hubei, P.R.China, 1995

ACADEMIC EXPERIENCE

- **Assistant Professor** (2006 – present), Department of Mathematics and School of Computational Science, Florida State University, Tallahassee, FL
  - ➤ Instructor of *MAC2311 Calculus with Analytic Geometry I (4)*, Fall 2006
- **IMA Industrial Postdoctoral Associate** (2005 – 2), Institute for Mathematics and its Applications (IMA), University of Minnesota
  - ➤ Mathematical Biology: cell membrane related research
  - ➤ Human Brain Imaging Project carried out by the International Neuroimaging Consortium (INC)
- **Research Assistant** (2003 – 2005), Pennsylvania State University, University Park
  - ➤ Numerical simulation of vesicle membranes via Phase Field approaches
  - ➤ Vector fields visualization and segmentation
  - ➤ Tessellation and Clustering by Mixture Models and Their Parallel Implementations
  - ➤ Image compression and segmentation
- **Teaching Assistant** (2002 – 2003), Pennsylvania State University, University Park
  - ➤ Instructor of Math 22, *College Algebra II*, undergraduate course
  - ➤ Teaching Assistant, Math 580, *Applied Mathematics I*, graduate course
- **Teaching Assistant** (2001 – 2002), Iowa State University, Ames, IA
  - ➤ Teaching Assistant, Math 265 *Calculus III*, undergraduate course

- **Research Assistant** (1996 − 1998), Institute of Mathematics, Chinese Academy of Science, Beijing, China,
  - ➢ Geometrical Analysis: Existence of harmonic maps on Riemann surfaces

RECENT PUBLICATIONS

1) A Phase Field Approach in the Numerical Study of the Elastic Bending Energy for Vesicle Membranes, with Qiang Du and Chun Liu, *Journal of Computational Physics*, 198, pp. 450-468, 2004

2) Tessellation and Clustering by Mixture Models and Their Parallel Implementations , with Qiang Du, *Proceeding of the fourth SIAM international conference on Data Mining*, (regular paper), Orlando, FL, 2004, SIAM, pp. 257-268.

3) Centroidal Voronoi tessellation based algorithms for vector fields visualization and segmentation, with Qiang Du, *IEEE Proceedings of Visualization 2004* (VIS2004), (regular paper), Austin, Texas, pp. 43-50, 2004

4) A phase field formulation of the Willmore problem, with Qiang Du, Chun Liu and Rolf Ryham, *Nonlinearity*, 18, pp. 1249-1267, 2005

5) Modeling the Spontaneous Curvature Effects in Static Cell Membrane Deformations by a Phase Field Formulation, with Qiang Du, Chun Liu and Rolf Ryham, *Communications in Pure and Applied Analysis*, 4, pp. 537-548, 2005

6) Retrieving topological information for phase field models, with Qiang Du and Chun Liu, *SIAM Journal on Applied Mathematics* 65, pp. 1913-1932, 2005

7) Ideal point distributions, best mode selections and optimal spatial partitions via centroidal Voronoi tessellations, with Qiang Du, Maria Emelianenko and Hyung-Chun Lee, *Proceedings of 2nd Inter Symposium on Voronoi Diagrams in Sciences and Engineering* (refereed), Seoul, Korea, Oct 2005 (VD2005), pp. 325-333, 2005

8) Simulating the Deformation of Vesicle Membranes under Elastic Bending Energy in Three Dimensions, with Qiang Du and Chun Liu, **Journal of Computational Physics**, 212, pp. 757-777, 2006

9) Centroidal Voronoi tessellation algorithms for image compression and segmentation, with Qiang Du, Max Gunzburger and Lili Ju, accepted to publication in *Journal of Mathematical Imaging and Vision*, 2005

10) Modeling Vesicle Deformations in Flow Fields via Energetic Variational Approaches, with Qiang Du and Chun Liu, submitted to *Nonlinearity*, 2005.

11) Convergence of numerical approximations to a phase field bending elasticity model of membrane deformations, with Qiang Du, **International Journal of Numerical Analysis and Modelling**, accepted for publication, 2006

12) Modelling and Simulations of Multi-component Lipid Membranes and Open Membranes via Diffusive Interface Approaches, with Qiang Du, submitted to **Journal of Mathematical Biology**, 2006

13) Asymptotic Analysis of Phase Field Formulations of Bending Elasticity Models, submitted to **SIAM Mathematical Analysis**, 2006

14) A Modified Interfacial Energy for Capturing the Euler Number, with Qiang Du, Chun Liu and Rolf Ryham, preprint, 2006

15) A Phase Field Approach for Modeling Dropping Vesicle Membranes, with Qiang Du, in preparation, 2005.

16) A Phase Field Study of the Impacting and Rebounding of Vesicle Membranes, with Qiang Du, in preparation, 2005.

17) Numerical Simulation of Vesicle Membranes Probing by Laser Beams, with Qiang Du, in preparation, 2005.

18) A Phase Field Study of the Effect of Cell Viscosity, with Qiang Du, in preparation, 2005.

INVITED CONFERENCE PRESENTATIONS

1) *Tessellation and Clustering by Mixture Models and Their Parallel Implementations*, Regular conference paper presented at the fourth SIAM international conference on Data Mining, Orlando, FL, April 23, 2004

2) *Centroidal Voronoi tessellation based algorithms for vector field visualization and segmentation*, Regular conference paper presented at the IEEE Visualization 2004 (VIS2004), Austin, Texas, October 13, 2004.

3) *Deformation of Vesicle Membranes in Fluid Fields: A Phase Field Approach*, 2004, Special session on PDEs and applications, AMS Fall Eastern Section Meeting, Pittsburgh, PA, November 7, 2004

4) *Deformation of Vesicle Membranes in Fluid Fields: A Phase Field Approach*, invited colloquium, University of Pittsburgh, PA, Jan. 2005.

5) *Phase Field Study of Shape Transformation of Vesicle Membranes in Fluid Fields*, invited colloquium, University of California, Irvine, CA, Feb. 2005.

6) *Deformation of Vesicle Membranes in Fluid Fields: A Phase Field Approach*, invited colloquium, IPAM, University of California, Los Angeles, CA, Feb. 2005.

7) *Centroidal Voronoi tessellation based algorithms for vector field visualization and segmentation*, Invited talk in minisymposium at the SIAM annual meeting (July, 2005, New Orleans)

8) *Phase Field Models and Simulations of Vesicle Bio-Membranes,* invited colloquium, School of Mathematics, University of Minnesota, MN, Sep. 2005

9) *Phase Field Models and Simulations of Vesicle Bio-Membranes,* Computational Methods and Applied Partial Differential Equations Workshop, Department of Mathematics, Iowa State University, IA, Nov. 2005

10) *Phase Field Models and Simulations of Bio-membranes.*
   - Applied Mathematics Seminar, School of Mathematics, University of Minnesota, September 15, 2005;
   - Computational Methods and Applied Partial Differential Equations Workshop, Department of Mathematics, Iowa State University, November 4 - 5, 2005;
   - Department of Mathematics, Iowa State University, January 24, 2006;

- Math Biology Seminar, School of Mathematics, University of Minnesota, January 26, 2006;
- School of Computational Science, Florida State University, January 30, 2006; Department of Mathematics, University of Georgia, February 7, 2006;
- Department of Mathematics, University of Tennessee, February 14, 2006.

POSTERS

1) Centroidal Voronoi Tessellation Based Algorithms for Vector Fields Visualization and Segmentation, IMA Imaging Tutorial/Workshop: Radar and Optical, Sep. 2005
2) *Numerical Simulations of Vesicle Bio-Membranes by Phase Field Models*, IMA Tutorial/Workshop: New Paradigms in Computation, March, 2005
3) *Numerical Simulations of Vesicle Bio-Membranes by Phase Field Models*, Computation Day of Penn State University, Institute for Computational Science, Feb, 2005
4) *Centroidal Voronoi Tessellation Based Algorithms for Vector Fields Visualization and Segmentation*, Computation Day of Penn State University, Institute for Computational Science, Feb, 2005

EDITORIAL AND REFEREE ACTIVITIES

- Referee for Discrete and Continuous Dynamical System Series B
- Referee for IEEE Visualization Conference 2006
- Referee for IEEE Transactions on Visualization and Computer Graphics, 2006
- Chief Editor of student periodical *Luojia Mathematics* of Wuhan University, 1992-1994

HONORS AND FELLOWSHIPS

- SIAM Travel Award, 2005
- Haskell B. Curry Fellowship, Department of Mathematics, Penn State University.
- First Economics Fellowship of Wuhan University
- Outstanding Undergraduate Student Fellowship of Wuhan University

INDUSTRIAL EXPERIENCE

- Project Manager, NEC-CAS Software Laboratories Co., Ltd. 1998-2001
  - ➢ Supervised the development of system software projects
  - ➢ Quality assurance and schedule control
  - ➢ Hiring and technical training of group members
- Senior Software Engineer, TianBo Software Laboratories Co., Ltd. 1997-1998
  - ➢ Designed and developed three accounting software systems
- Software Engineer, Stone Word Processor Laboratories Co., Ltd. 1995

SOFTWARE ENGINEERING TECHNIQUES

- Software Engineering (BD, FD, DD, CD, UT, FT, ST)

- Numerical algorithms (Finite Difference method; Spectral methods including Fourier, Legendre and Chebychev methods; Finite Elements method)
- Image processing (3-D surface visualization; Vector field visualization; Image segmentation and compression), data mining
- Parallel implementation and high-performance computing (OPENMP, MPI)
- Client-Server Architecture Design & Programming
- Client GUI Design with Visual C++ 6.0, Java
- Platform Transplanting from Unix (in ANSI C, iTcl/tm) to NT
- Middleware Design and Analysis (CORBA, ORB API, IDL)
- Web Design (ASP, CGI) on Apache and IIS.
- Database (LDAP Protocol, DAO, Visual Foxpro 6.0 Programming)

REFERENCES

- Qiang Du, Department of Mathematics, Pennsylvania State University, qdu@math.psu.edu (Ph.D advisor),
- Chun Liu, Department of Mathematics, Pennsylvania State University, liu@math.psu.edu
- Max Gunzburger, School of Computational Science & Information Technology, Department of Mathematics, Florida State University, gunzburg@csit.fsu.edu
- Palanivel Manoharan, Department of Mathematics, Pennsylvania State University, manohar@math.psu.edu (Course Coordinator)