QING NIE

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EDUCATION

The Ohio State University, Columbus, OH	
Ph.D. in Mathematics	1995
Wuhan University, P.R. China	
M.S. in Computational Mathematics	1990
Wuhan University, P.R. China	
B.S. in Computational Mathematics	1988

POSITIONS HELD

University of California, Irvine	
Director – Center for Mathematical and Computational Biology (CMCB)	2005-
Professor & Chancellor's Fellow –	2005-
Department of Mathematics	
Department of Biomedical Engineering	
Center for Complex Biological Systems	
Associate Professor –	2002-2005
Department of Mathematics	
Department of Biomedical Engineering	
Center for Complex Biological Systems	
Assistant Professor – Department of Mathematics	1999-2002
The University of Chicago	
L.E. Dickson Instructor – Department of Mathematics	1997-1999
University of Minnesota	
Postdoctoral Fellow – Institute for Mathematics and Its Application	1996-1997
Annual Program on Mathematics in High-Performance Computing	
The Ohio State University	
Postdoctoral Researcher & Lecturer – Department of Mathematics	1995-1996

AWARDS

Chancellor's Fellow, University of California, Irvine	2005-2008
(*http://www.ap.uci.edu/distinctions/titles.html#chancprof*)	
Faculty Career Development Award, University of California, Irvine	2001-2002

RESEARCH GRANTS

Biology and Mechanics: Applications of Mathematics and Computations **PI**; DMS/NSF (DMS0608574)	2006-2007
Principles of Robust Developmental Patterning **Co-PI**; NIGMS/NIH (2R01GM67247); $1.6M	2006-2010
Specificity and Spatial Dynamics of Cell Signaling: Theory and Experiment **PI**; NIGMS/NIH (R01GM75309); $1.2M	2005-2009
Developing a New Interdisciplinary Ph.D. Program on Mathematical, Computational and Systems Biology **Co-PI**; Howard Hughes Medical Institute (HHMI-56005680); $1.0M	2006-2009
Morphological Evolution in Materials **PI**; DMS/NSF Program on Computational Mathematics (DMS0511169)	2005-2008

Morphogen Systems: A Joint Mathematical and Experimental Investigation
Co-PI; NIGMS/NIH Mathematical Biology Initiative (R01GM67247); $1.6M   2002-2006

Transport and Complexity in Biological Systems
Co-PI; NIH Center for Bioinformatics & Computational Biology (P20GM66051); $0.7M   2002-2006

Computational of Interface Dynamics in Fluids and Materials
PI; DMS/NSF Program on Computational Mathematics (DMS0074414)   2000-2003

Scientific Computing Research Environments
Co-PI; NSF (DMS0112416)   2001-2003

VISITING POSITIONS

Institute for Pure and Applied Mathematics, UCLA
Core Participant   3/06-06/06
"Cell and Materials: At the Interface Between Mathematics, Biology and Engineering"

Mathematical Biosciences Institute, The Ohio State University
Long-Term Visitor   11/03
"Mathematical Modeling of Cell Process"

Institute for Pure and Applied Mathematics, UCLA
Short-Term Visitor   02/03
"Workshop on Cell & Materials: at the Tissue Engineering Interface"

Institute for Pure and Applied Mathematics, UCLA
Visitor   10/02-12/02
"Program on Mathematics in Nanoscale Science and Engineering"

Institute for Advanced Study, Princton, New Jersey
Short-Term Member   10/02

National Center for Theoretical Sciences, Taiwan
Short-Term Visitor   06/02

Institute of Mathematical Sciences, The Chinese University of Hong Kong
Short-Term Visitor   12/00

STUDENTS AND POSTDOCS

Supervised Ph.D. Thesis
Myung Yun; Ph.D   09/03
"Numerical Simulations of Microstructure Evolution in Three-Dimensional Inhomogeneous Elastic Media"

Rui Zhao; Ph.D
"Computational Analysis of Morphogen Gradients"   06/06
Current Position: Postdoc at Mathematical Bioscience Institute, The Ohio State University.

Supervised M.S. Thesis
Ryan Moore, M.S.   06/04
"   *"Spatial Effects of Scaffolds in Intra-Cellular Signaling"*
Current Position: Asst. V.P.; Union Bank of California, Los Angeles

Angie Teng; M.S.   06/04
"Effects of Sog on BMP Signaling"
Current Position: Aerospace Corporation, California

Supervised Postdoctoral Fellows

Lan Pham, Ph.D., The Ohio State University — 2001-2003

David Iron, Ph.D., Univ. of British Columbia — 2003-2004
Current Position: Tenure-Track Assistant Professor, Dalhousie University, Canada

Jinzhi Lei, Ph.D., Beijing Aeronautic & Aerospace University — 2004-2005
Current Position: Tenure-Track Assistant Professor, Tsinghua University, China

Yongtao Zhang, Ph.D., Brown University — 2003-2006
Current Position: Tenure-Track Assistant Professor, Notre Dame University

Shanqin Chen, Ph.D., Brown University — 2005-2006
Current Position: Lecturer, Indiana University at South Bend

Current Postdoctoral Fellows
Baocho Nguyen; Ph.D., MIT — 2003-2007
Xingeng Liu; Ph.D., SUNY, Stony Brook — 2006-2009
Ching-Shan Chou; Ph.D., Brown University — 2006-2009

Current Ph.D. Students
Su Zhao — Expected 06/09
Seth Haney — Expected 06/09

EDITORIAL BOARD

Associate Editor; *Mathematical Biosciences and Engineering* — 2006 --

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UNIVERSITY & DEPARTMENTAL SERVICES

- Undergraduate Advisor for Specialization in Applied and Computational Mathematics; University of California, Irvine, 2000-2004
- Member of The University Council for Research, Computing and Library Resources; University of California, Irvine, 2002-2005
- Chair of Visiting Assistant Professor Recruiting Committee; Dept. of Mathematics, University of California, Irvine, 2002-2003 & 2005-2006
- Departmental Colloquium Committee; Dept. of Mathematics, University of California, Irvine, 1999-2000 (Chair) & 2004-2006
- Departmental Chairman Selection Committee; Dept. of Mathematics, University of California, Irvine, 2004
- Distinguished Lecture Selection Committee; Dept. of Mathematics, University of California, Irvine, 2004-2006
- Founding Member and Executive Committee Member: A Ph.D. Gateway Program for Mathematical and Computational Biology; University of California, Irvine, 2006 - -
- Co-Director and Executive Committee Member: Developing a Ph.D. Program for Mathematics, Computational and Systems Biology; University of California, Irvine, 2006 --

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PUBLICATIONS

Journal Articles
- 26. A. Lander, Q. Nie and F. Wan. Membrane Associated Non-receptors and Morphogen Gradients. *Bulletin of Mathematical Biology*, Accepted, 2005.
- 25. X. Li and Q. Nie. Surface Diffusion on Stressed Solid Surface *Communications in Computational Physics*, Accepted, 2006.
- 24. Q. Nie, Y. Zhang and R. Zhao. Efficient Semi-implicit Schemes for Stiff Systems. *Journal of Computational Physics*, 214, pp 521-537, 2006.
- 23. A. Lander, Q. Nie and F. Wan. Internalization and End Flux in Morphogen Gradient Formation. *Journal of Computational and Applied Mathematics*, 190(1-2), pp 232-251,

2006.

- 22. N. Komarova, X. Zou, Q. Nie and L. Bardwell. A Theoretical Framework for Specificity in Cell Signaling. *Nature Molecular Systems Biology*, 1:2005.0023, 2005.
- 21. C. Mizutant, Q. Nie, F. Wan, Y. Zhang, P. Vilmos, E. Bier, L. Marsh and A. Lander. Formation of the BMP Activity Gradient in the Drosophila Embryo. *Developmental Cell*, 8(6), pp 915-924, 2005
- 20. Y. Lou, Q. Nie and F. Wan. Effects of Sog on Dpp-Receptor Binding. *SIAM J. on Applied Math.*, 66(5), pp 1748-1771, 2005.
- 19. A. Lander, Q. Nie and F. Wan. Spatially Distributed Morphogen Production and Morphogen Gradient Formation. *Mathematical Biosciences and Engineering*, 2(2), pp 239-262, 2005.
- 18. A. Lander, Q. Nie, B. Vargas and F. Wan. Aggregation of a Distributed Source in Morphogen Gradient Formation. *Studies in Applied Mathematics*, 114(4), pp 343-374, 2005.
- 17. X. Li, K. Thornton, Q. Nie, P. Voorhees and J. Lowengrub. Two- and Three-dimensional Equilibrium Morphology of a Misfitting Particle and the Gibbs-Thomson Effect. *Acta Materialia*, Vol 52/20, pp 5829-5843, 2004.
- 16. Y. Lou, Q. Nie, and F. Wan. Nonlinear Eigenvalue Problems in the Stability Analysis of Morphogen Gradients. *Studies in Applied Mathematics*, Vol 113, pp 183-215, 2004.
- 15. X. Li, J. Lowengrub, Q. Nie, V. Cristini and P. Leo. Microstructural Evolution in Three-Dimensional Inhomogeneous Elastic Media. *Metall. Mater. Tran. A*, 34A(7), pp 1421-1431, 2003.
- 14. V. Cristini, J. Lowengrub and Q. Nie. Nonlinear Simulation of Tumor Growth *J. of Mathematical Biology*, 46(3), pp 191-224, 2003.
- 13. A. Lander, Q. Nie and F. Wan. Do Morphogen Gradients Arise by Diffusion? *Developmental Cell*, Vol. 2, no. 6, pp 785-796, 2002.
- 12. Q. Nie. The Nonlinear Evolution of Vortex Sheets with Surface Tension in Axi-symmetric Flows. *J. of Computational Physics*, 174, pp 438-459, 2001.
- 11. Q. Nie and F. Tian. Singularities in Hele-Shaw Flows Driven by a Multipole. *SIAM J. on Applied Mathematics*, 62(2), pp 385-406, 2001.
- 10. P. Leo, J. Lowengrub and Q. Nie. On an Elastically Induced Splitting Instability. *Acta Mater.* 49, pp. 2761-2772, 2001.
- 9. P. Leo, J. Lowengrub and Q. Nie. Microstructural Evolution in Inhomogeneous and Anisotropic Elastic Media. *J. of Computational Physics*, 157, pp 44-88, 2000.
- 8. P. Constantin, Q. Nie and N. Schorghofer. Front Formation in an Active Scalar. *Physical Review* E, 60(3), pp. 2858-2863, 1999.
- 7. P. Constantin, Q. Nie and S. Tanveer. Bounds for Second Order Structure Functions and Energy Spectrum in Turbulence. *Physics of Fluids*, 11(8), pp. 2251-2256, 1999.
- 6. Q. Nie and S. Tanveer. A Note on Third Order Structure Functions in Turbulence. *Proc. Royal Soc. London A*, 455, pp 1615-1636, 1999.
- 5. P. Constantin, Q. Nie and N. Schorghofer. Nonsingular Surface Quasi-Geostrophic flows. *Physics Letters* A 241, pp 168-172, 1998.
- 4. Q. Nie and G. Baker. Application of Adaptive Quadrature to Axi-symmetric Vortex Sheet Motion. *J. of Computational Physics* 143, pp. 49-69, 1998.
- 3. G. Baker and Q. Nie. The Asymptotic Motion of an Accelerating, Thick Layer of Inviscid Liquid. *Physics of Fluids* 10(1), pp. 101-112, 1998.
- 2. Q. Nie and F. Tian. Singularities in Hele-Shaw Flows. *SIAM J. on Applied Mathematics* 58(1), pp. 34-54, 1998.
- 1. Q. Nie and S. Tanveer. The Stability of a Two-dimensional Rising Bubble. *Physics of Fluids* 7 (6), pp. 1292-1306, 1995.

Papers Submitted for Publication

- 1. N. Komarova, X. Zou, Q. Nie and L. Bardwell. Mathematical Models of Specificity in Cell Signaling. Submitted, 2006.

- 2. Y. Liu, Q. Nie and G. Kassab. A Generalized Minimization of Vascular Design Cost Function. Submitted, 2006.
- 3. A. Syed, H. Theisen, B. Nguyen, T. Lukasovich, J. Purcell, G. Srivastava, D. Irons, K. Gaudenz, Q. Nie, F. Wan, M. Waterman, and J. Marsh. Pattern of DPP Morphogen Expression Maintained by Armadillo/TCF Mediated Repression in Response to WG Signaling. Submitted, 2006.
- 4. R. White, Q. Nie, A. Lander, F. Thomas, Shaping the Retinoic Acid Morphogen Gradient in Zebrafish Embryo by Regulation of Degradation. Submitted, 2006.
- 5. Y. Zhang, A. Lander and Q. Nie. Computational Analysis BMP Gradients in Dorsal-ventral Patterning of Zebrafish Embryos. Submitted, 2006.
- 6. X. Li, V. Cristini, Q. Nie and J. Lowengrub. Nonlinear Three-dimensional Simulation of Solid Tumor Growth. Submitted, 2006.
- 7. C. Chou, Y. Zhang, R. Zhao and Q. Nie. Numerical Methods for Stiff Reaction-Diffusion Systems. Submitted, 2006.

Refereed Proceeding Papers
- 1. Q. Nie, S. Tanveer, T. Dupont and X. Li. Singularity Formation in Free-Surface Stokes Flows. *Contemporary Mathematics*, Vol 306, pp 147-165, 2002.
- 2. J. Kao, Q. Nie, A. Teng, F. Wan, A. Lander, and J. Marsh. Can Morphogen Activity be Enhanced by its Inhibitors? Proceedings of the 2nd MIT Conference on Computational Fluid and Solid Mechanics, pp1729-1733, 2003.

CONFERENCE ORGANIZED

Mini-Symposium on Modeling, Analysis and Computational in Materials Science
Organizer; 3rd SIAM meeting on Mathematical Aspects of Material Science; Philadelphia   05/00

Mini-Symposium on Computational and Analysis of Interfaces in Materials
Organizer; 50th SIAM Annual Meeting   07/02

Mini-Symposium on Quantitative Studies of Complex Systems in Cell and Developmental Biology
Organizer; 2nd SIAM Conference on the Life Sciences; Portland, OR   07/04

International Conference on High Performance Computing and Applications
Program Committee Member; Shanghai, P.R. China   08/04

Conference on Biology and Mechanics: Applications of Mathematics and Computations
Chair of the Organization Committee; Beckman Center for National Academics; Irvine, CA   05/06

Mini-Symposium on Bio-Mechanics of Tissues
Organizer; 15th U.S. National Congress on Theoretical and Applied Mechanics; Boulder, CO   06/06

Mini-Symposium on Modeling and Simulation for Tissue-Level and Multicelullar Phenomena
Organizer; SIAM Conference on Life Science; Raleigh, NC   07/06

Conference on Advances in Scientific Computing
Organizer & Scientific Committee Member; The University of Chicago, Chicago, IL   09/07

RECENT INVITED LECTURES

Conference
- Mini-symposiums, 2nd SIAM meeting on mathematical aspects of material science, Philadelphia, 5/97
- Mini-symposiums in SIAM Annual Meeting at Toronto, 7/98
- Section on Nonlinear PDE, AMS Meeting at Chicago, 9/98
- Mini-symposium on Modeling, Analysis and in Materials Science 3rd SIAM meeting on

mathematical aspects of material science, Philadelphia, 5/00
- Section on Nonlinear Waves, AMS-HK joint meeting, Hong Kong, 12/00
- Barrett Memorial Lectures on "New Directions and Developments in Computational Mathematics", U. of Tennessee, 5/01
- Workshop on Multiscale Analysis and Computation National Center for Theoretical Sciences, Taiwan, 6/02
- Mini-symposium on Computations and Analysis of Interfaces in Materials, 50th SIAM annual meeting, 7/02
- Mini-symposium, Satellite Conference on Scientific Computing of 2002, ICM, Xi'an, China, 8/02
- Workshop on Cell & Materials: at the Tissue Engineering Interface, Institute for Pure and Applied Mathematics, UCLA,02/03
- Mini-symposium on Modeling of Biological Tissues, 2nd M.I.T. Conference on Computational Fluid and Solid Mechanics, MIT,06/03
- Mini-symposium on The Role of Signaling Systems in Developmental Biology, 5th International Congress on Industrial and Applied Mathematics, 07/03
- Mini-symposium on Advances of Numerical Methods and Analysis for Interface Problems with applications, 5th International Congress on Industrial and Applied Mathematics, 07/03
- Workshop on Mathematical Challenges Arising in Cancer Models Mathematical Biosciences Institute, OSU, 11/03
- Workshop on Multiscale Challenges in Soft Matter Materials, SAMSI, Research Triangle, North Carolina, 02/04
- Mini-symposium on Computational Modeling of Microstructure Evolution, 4th SIAM Conference on Mathematical Aspects of Materials Sci., Los Angels, 05/04
- Mini-symposium on Mathematical Biology, AIMS' fifth International Conference on Dynamical Systems and Differential Equations, Pomona, 06/04
- Mini-symposium on Mathematics Inspired by Biology, AIMS' fifth International Conference on Dynamical Systems and Differential Equations, Pomona, 06/04
- Mini-symposium on Quantitative Studies of Complex Systems in Cell and Developmental Biology, 2nd SIAM Conference on the Life Sciences, Portland, 07/04
- Mini-symposium on Chemotherapy and Tumor Biology, International Conference for Mathematics in Biology and Medicine, Ann Arbor, 7/04
- Southwest Consortium on Mathematics in Life Science, Phoenix, ASU, 01/05
- Cells and Materials: At the Interface between Mathematics, Biology and Engineering, Arrowhead, IPAM, UCLA, 06/06

Colloquium & Seminars
- IMA Postdoc Seminar; IMA, University of Minnesota, 03/97
- Applied Math. Seminar; Dept. of Mathematics, University of Chicago, 10/97
- Colloquium; Dept. of Mathematics, University of North Carolina at Chapel Hill, 02/98
- Colloquium; Dept. of Mathematics, University of California, Irvine, 12/98
- Colloquium; Dept. of Mathematics, NJIT, 01/99
- Colloquium; Dept. of Mathematics, Florida State University, 01/99
- Colloquium; Dept. of Mathematics, Iowa State University, 02/99
- Colloquium; Dept. of Mathematics, University of North Carolina at Chapel Hill, 02/99
- Applied Math. Seminar; Dept. of Mathematics, The Ohio State University, 05/99
- Applied Math. Seminar; Dept. of Mathematics, University of North Carolina at Chapel Hill, 02/00
- Analysis Seminar; Dept. of Mathematics, University of Southern California, 03/00
- Colloquium; Dept. of Control and Dynamical Systems, Caltech, 04/00
- Colloquium; Dept. of Mathematics, Purdue University, 05/00

- Numerical Analysis Seminar; Dept. of Mathematics, University of Maryland, 08/00
- Numerical Analysis Seminar; Dept. of Mathematics, North Carolina State University, 08/00
- Colloquium; Dept. of Applied Mathematics, Illinois Institute of Technology, 09/00
- Colloquium; Dept. of Bioengineering, University of Illinois at Chicago, 09/00
- Colloquium; Dept. of Mathematics, Purdue University, 11/00
- Colloquium; Dept. of Computational Mathematics, Wuhan University, China, 12/00
- Numerical Analysis Seminar, Dept. of Mathematics, University of California- San Diego, 06/01
- Applied Math. Seminar; Dept. of Mathematics, The Ohio State University, 06/01
- Colloquium; Dept. of Mathematics, Shenzheng University, China, 12/01
- Colloquium; Dept. of Applied and Computational Mathematics, Caltech, 05/02
- Colloquium; Dept. of Mathematics, Science & Technology University of Hong Kong, 08/02
- PDE and Numerical Analysis Seminar; Dept. of Mathematics, Florida State University, 11/02
- Applied Math./Statistical Mech. Seminar; Institute for Advanced Study, 10/02
- Scientific Computation & Applied Math. Seminar; Dept. of Mathematics, Florida State Univ., 11/02
- Colloquium; Dept. of Applied Math., Illinois Institute of Technology, 03/03
- Seminar; Institute for Comp. Engineering and Science (TICOM), Univ. of Texas, Austin, 04/03
- Mathematical Physics Seminar; Dept. of Mathematics, Univ. of Texas, Austin, 04/03
- Colloquium; Dept. of Mathematics, Penn State University, 04/03
- Applied Math. Seminar; Dept. of Mathematics, The Ohio State University, 05/03
- Seminar; Inst. for Comp. Math. and Sci. Computations., Chinese Academy of Sci., Beijing, 01/04.
- Seminar; Dept. of Computational Mathematics, Beijing University, China, 01/04
- Seminar; Dept. of Mechanics and Engineering Sciences, Fudan University, China 01/04
- Seminar; Center for Sci. Computation and Math. Modeling, Univ. of Maryland, College Park, 02/04
- Colloquium; Applied and Computational Math., Penn State University, 01/05
- Numerical Analysis Seminar; Dept. of Mathematics, UC-San Diego, 02/05
- Colloquium; Dept. of Mathematics, The Ohio State University, 05/05
- Seminar; Institute of Mechanics, Chinese Academy of Science, Beijing, China 06/05
- Colloquium; Dept. of Computational Math., Wuhan University, China, 06/05
- Computational and Applied Math. Seminar; Dept. of Math., Iowa State Univ., Ames, IA, 09/05
- Applied and Computational Math. Seminar; School of Math., Georgia Tech. Univ., 11/05
- Colloquium on Applied Math.; Dept. of Mathematics, Notre Dame University, 03/06
- Computational Math. Seminar; Dept. of Applied Math., SUNY, Stony Brook, NY, 04/06
- Colloquium; Dept. of Math. Science, NJIT, 09/06
- Colloquium; Dept. of Mathematics, Michigan State University, East Lansing, 10/06