

July 1999 to May 2000 NSF Graduate Research Fellow, Teaching Assistant
Department of Mathematics and Statistics
University of Nebraska, Lincoln

July 1998 to May 1999 Undergraduate Teaching Assistant
Department of Mathematics and Statistics
University of Nebraska, Lincoln

HONORS AND GRANTS:

- 2007 GAANN (Graduate Assistance in Areas of National Need) Fellowship
- 2007 University of California, Irvine Department of Mathematics Dissertation Fellowship
- 2006 University of California, Irvine Department of Mathematics Fellowship
- 2003 University of California, Irvine Department of Mathematics Research Fellowship
- 1999 NSF Graduate Research Fellowship
- 1999 Inducted Phi Beta Kappa
- 1998 Barry M. Goldwater Scholarship
- 1995 Regents Scholarship, University of Nebraska, Lincoln

PUBLICATIONS:

1. P. Macklin, *Nonlinear Simulation of Tumor Growth and Chemotherapy*, M.S. Thesis, University of Minnesota School of Mathematics (2003).
2. P. Macklin and J.S. Lowengrub, *Evolving interfaces via gradients of geometry-dependent interior Poisson problems: application to tumor growth*, *J. Comput. Phys.*, 203 (1) (2005), pp. 191-220.
3. P. Macklin and J.S. Lowengrub, *An improved geometry-aware curvature discretization for level set methods: application to tumor growth*, *J. Comput. Phys.*, 215 (2) (2006), pp. 392-401.
4. P. Macklin and J.S. Lowengrub, *Nonlinear simulation of the effect of microenvironment on tumor growth*, *J. Theor. Biol.*, 245 (4) (2007), pp. 677-704.
5. H.B. Frieboes, J.S. Lowengrub, S. Wise, X. Zheng, P. Macklin, and V. Cristini, *Computer Simulation of Glioma Growth and Morphology*, *NeuroImage*, in press (2007).
6. P. Macklin, *Toward Computational Oncology: Nonlinear Simulation of Centimeter-Scale Tumor Growth in Complex, Heterogeneous Tissues*, Ph.D. Dissertation, University of California-Irvine Department of Mathematics (2007).

WORK IN PROGRESS AND IN REVIEW:

1. P. Macklin and J.S. Lowengrub, *A New Ghost Cell/Level Set Method for Moving Boundary Problems: Application to Tumor Growth*, *J. Sci. Comput.*, in review.
2. A.R.A. Anderson, M.A.J. Chaplain, J.S. Lowengrub, P. Macklin, and S.R. McDougall, *Nonlinear simulation of the effect of tumor growth on neovascular remodeling*, *Bull. Math. Biol.*, in preparation.

3. J.S. Lowengrub and P. Macklin, *A Centimeter-Scale Nonlinear Model of Tumor Growth in Complex, Heterogeneous Tissues*, J. Math. Biol., in preparation.
4. P. Macklin, N.L. Komarova, and J.S. Lowengrub, *A Cellular Automata Study of the Effect of Neighbor Dynamics on Carcinogenesis*, in preparation.

RESEARCH INTERESTS:

continuum, cellular automata, agent, and hybrid modeling of tumor growth; healthy and pathological tissue modeling; tissue engineering; integrative biomathematical modeling; scientific visualization; mathematical biology; tumor-microenvironment interaction; multicomponent fluid flows; nonlinear simulation of free boundary problems; high performance computing

REFERENCES:

John Lowengrub (UC Irvine); Natalia Komarova (UC Irvine); Mark Chaplain (U. Dundee, Scotland)

SERVICE:

1. Developed and Maintained EasyBMP, an open source, cross-platform C++ bitmap (BMP) image library for industrial, educational, and academic use - <http://easybmp.sourceforge.net> (2005-present)
2. Developed and Maintained Easy BMP to AVI Movie Creator, an open source, cross-platform tool for converting images to movies, primarily for scientific visualization - <http://easybmptoavi.sourceforge.net> (2006-present)
3. Founded and Organized the UCI Mathematics Graduate Student Colloquium (MGSC) - <http://math.uci.edu/mgsc/> (2006-present)

INVITED TALKS:

- 1999 Workshop on Mathematical Methods in the Geosciences and Related Areas, University of Nebraska, Lincoln
- 2006 Mathematics Graduate Student Colloquium, University of California, Irvine

CONTRIBUTED AND OTHER TALKS:

- 1999 Second Annual Regional Workshop in Mathematics and Statistics, University of Nebraska, Lincoln
- 2005 The Modeling of Cancer Progression and Immunotherapy Workshop, American Institute of Mathematics (AIM), Palo Alto, CA
- 2007 Mathematical Modelling and Analysis of Cancer Invasion of Tissues Workshop, Dundee, Scotland

TECHNICAL AND OTHER SKILLS:

Programming and Software skills:

- C++ and OpenGL/GLUT, with emphasis on scientific and high-performance computing
- Cross-platform/cross-architecture software development
- Open source/collaborative software development
- 2D and 3D scientific visualization
- MATLAB, Maple, Mathematica, and other mathematics software
- GIMP, Inkscape, and other open source graphic editing software
- W3C standards-compliant HTML and CSS web authoring
- PHP webpage authoring

Other skills:

- Building and maintaining computers
- Wired and wireless networking and security
- Fluent spoken and written German
- Public speaking skills