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Fields: Mathematical and Computational Biology, Biophysics

Education:

1990 -	Ph.D. in Mathematics, *University of Pennsylvania, Philadelphia, PA* advisor: J.E. Marsden, Caltech
1983 -	Honors M.S. in Mathematics, *Department of Applied Mathematics*, *Moscow Institute of Technology*

Positions Held:

2009 - present	Vincent J. Duncan Family Professor of Applied Mathematics
2010 - present	Adjunct Professor of Medicine, Indiana University School of Medicine
2011 - present	Director of Graduate Studies, ACMS Department, University of Notre Dame
2003 - present	Director, Interdisciplinary Center for the Study of Biocomplexity
2003 - present	Concurrent Professor of Physics
2011 - present	Concurrent Professor of Computer Science and Engineering
2006 - 2009	Notre Dame University Professor of Applied Mathematics
2001 - 2006	Full Professor of Mathematics, University of Notre Dame
1996 - 2001	Tenured Associate Professor, University of Notre Dame
2000 - 2001	On Sabbatical leave at Stanford University, CA
March-June 2001	Senior Fellow, Institute for Pure and Applied Mathematics, UCLA, CA
October 2000	Institute for Mathematics and its Applications (IMA), Minneapolis
1990 - 1996	Tenure Track Assistant Professor, University of Notre Dame
Summer 1995, 1996	Basic Research Institute in the Mathematical Sciences (BRIMS) Hewlett-Packard Research Lab., Bristol, UK
Summer 1994	CNLS, Los Alamos Natl. Lab., NM
1993 - 1994	On Sabbatical leave at UC Berkeley, CA; Institute for Advanced Study, Princeton, NJ; Mathematical Sciences Research Institute, Berkeley, CA
June 1993	The Fields Institute for Research in Mathematical Sciences, Canada
Summer 1990	Instructor, University of Pennsylvania

Honors and Service:

2011	Elected Fellow, American Association for the Advancement of Science (AAAS)
2009 - present	Vincent J. Duncan Family Professor of Applied Mathematics
2006 - 2009	Notre Dame University Professor of Applied Mathematics
2011 - present	Member of the Editorial Board, PLoS Computational Biology

2010 - present	Member of the Editorial Board, Bulletin of Mathematical Biology
2008 - present	Member of the Editorial Board, Journal of Statistical Physics
2010-12	Member of 6 NIH and 3 NSF Panels
2009 - present	Field Editor for Applications in Biosciences and Medicine of the Encyclopedia of Applied and Computational Mathematics (Springer)
2010-present	Review Editor of Frontiers in Computational Physiology and Medicine
2010-present	Member of the Committee of the American Mathematical Society on Human Rights of Mathematicians
June 23, 2009	Member of the External Scientific Review Board of the NIH Center for Complex Biological Systems, University of California, Irvine
2001, 2004, 2008	Member of the NSF and NIH Panels

Research Support:

NIH grant 1R01GM100470-01. Combined multiscale modeling and experimental study of bacterial swarming, 04/01/2012 - 12/31/2015, $1,149,272, PI: Alber; Most infections are the result of surface-attached biofilm communities of bacteria that colonize host surfaces. Pseudomonas aeruginosa is an opportunistic pathogen responsible for both acute and persistent infections in susceptible individuals, as exampled by those for burn victims and people with cystic fibrosis. A key aspect of these infections is the formation of bacterial swarms, which are surface-associated, socially organized communities of cells. Because identification of single cell behavior within groups is extremely difficult experimentally, we will use multiscale models to perform predictive simulations describing complex bacterial interactions that potentially control swarming. This combined multiscale modeling and laboratory study of bacterial behavior on surfaces will provide new critical information needed for the eradication, prevention and treatment of the P. aeruginosa infections.

NIH grant 1R01GM100470-01. Study of the interplay of motility mechanisms during swarming of Myxococcus xanthus, 06/01/11 - 06/01/14, $779,565, PI: Alber; The main goal of this interdisciplinary project is to combine simulations using new three-dimensional multiscale modeling environment and specifically designed experiments to study basic coordination events of M. xanthus swarming, which is essential to understanding how millions of bacteria function in real environments. A collaboration has been established between Drs. Alber (PI), Xu, Chen, Shrout (Notre Dame), Dr. Aronson from the Argonne National Laboratory (ANL) and Dr Kaiser from Stanford University to achieve these goals.

Gerber Foundation. Development of technology to assess bruises. 09/15/10-/09/15/12, $90,000, PI: Alber. The main goal of this project is to use novel spectrophotometry and predictive 3D multiscale modeling to generate specific hypothesis on the age of bruises.

NSF grant MCB 0951264, Cellular Organization, Computational and Experimental Studies of Microtubule Dynamics and Regulation by Binding proteins, 03/15/10 - 03/15/13, $640,058, Co-PI; The long-term goal of this project is to develop a predictive and quantitative understanding of the MT cytoskeleton and its regulation by MTBPs, which will impact fields ranging from systems biology to nanotechnology. The flexible model and tutorials developed through this project will allow researchers to develop and test specific hypotheses about the mechanisms of dynamic instability and MTBP action, which will in turn help

design and direct future experiments. More broadly, it will help students and researchers at all levels gain an intuitive understanding of dynamic MT systems.

NSF Grant DMS-0800612, NSF Mathematical Biology and NIH NIGMS, Integrating Multiscale Modeling and in vivo Experiments for Studying Blood Clot Development, 09/01/08 - 09/01/11, $864,000, PI: Alber; The overall goal of this project is to develop 3-dimensional multiscale mathematical models and a computational toolkit for simulating thrombus formation. These models will be validated with specifically designed experiments to test predictions of thrombus development, structure and stability. Moreover, the development of reasonable models will serve as a generator of new hypotheses that can be tested in experiments in vivo. To achieve this goal a collaboration has been formed between Dr Alber and Dr. Xu (Notre Dame), Dr. Rosen (Indiana University Medical School) and Dr. Jiang (Los Alamos National Lab (LANL)).

NSF grant BCS 0826958, DHB. Longitudinal Analysis and Modeling of Large-Scale Social Networks, 10/01/08 - 10/01/11, $699,770, Co-PI; The data generated by digital communication technologies will be used to (1) test/validate existing social network theories about the mechanisms underlying network dynamics by developing quantitative high fidelity temporal stochastic models of human behavior within social networks; (2) produce a data-driven, dynamic network modeling suite with prediction capabilities.

NSF Grant DMS-0719895, AMS-SS: Multiscale stochastic model of myxobacteria dynamics, 08/15/07-07/31/2010, $222,000, PI: Alber; A large amount of available, reliable experimental data on single wild type and mutant cell behavior and interactions between cells will be used as building blocks for developing comprehensive mathematical and computational multi-dimensional hybrid model of bacterial swarming based on short and long range interactions. To bring different scale levels of description together new mathematical techniques and tools will be used including elements of stochastic analysis, nonlinear analysis and kinetic theory.

NSF Grant CCF 0622940, CompBio: Simulation of self-emerging properties of coupled biochemical and cellular networks in social behavior of Myxobacteria, Biology and Information Technology, 09/01/06-08/31/09, $300,000, Co-PI; The project bridges the molecular, subcellular, cellular, and macroscopic level models by introducing consistent mathematical and computational interfaces among them. This general approach is demonstrated by developing a multiscale computational model of formation of Myxobacteria fruiting bodies based on short range (C-signaling) interactions, differentiation and motility regulation, and by analyzing the effect of genetic mutations on macroscopic development.

DOE: Northwest Indiana Computational Grid (NWICG), Modeling Microtubule Dynamics, 09/01/08 - 09/01/09, $50,000, PI; 1) Development of the detailed microscale model of several microtubules formation and parallelized computational implementation. 2) Development of multiscale model of venous thrombosis.

NIH 1 RO1 GM065420: Supplement for the Study of Complex Biological Systems, 08/01/05-07/31/08, $320,000, Co-PI; This grant supported collaboration between cell biologist Holly Goodson and applied mathematician Mark Alber to use a coupled program of iterative

computational modeling and experiment to investigate key aspects of dynamic microtubule systems.

NIH 1 RO1 GM76692-01: Interagency Opportunities in Multiscale Modeling in Biomedical, Biological and Behavioral NSF 04.6071, (collaboration with IU Bloomington and Medical School at Kansas University) 09/01/05-08/31/08, $800,000, Co-PI; The investigators developed an open-source comprehensive Tissue-Simulation-Toolkit (TST) using multiscale mathematical modelling and computer simulation techniques to investigate the mechanism of segmentation during somite and limb formation.

NSF Grant 0344647, Division of Integrative Biology and Neuroscience, BIO Directorate and DMS Applied Mathematics, Testing a Developmental Mechanism by an Integrated Empirical-Computational Approach, (collaboration with Medical College of New York) 04/15/04-04/15/07, $360,000, Co-PI; The objective of this project was to define and test an activator-inhibitor based mechanism for skeletal pattern formation in vertebrate limb mesenchymal cells.

NSF MRI Grant 0420980, Acquisition of the Notre Dame Biocomplexity Computer Cluster, 08/01/04-07/31/07, PI; This grant supported the purchase of a Beowulf type Biocomplexity Cluster (62 dual processors nodes with 64-bit architecture) to provide computer infrastructure for The Notre Dame Interdisciplinary Center for the Study of Biocomplexity (ICSB) to meet its broad research and educational goals.

NSF Grant 0083653, BIOCOMPLEXITY Multiscale Simulation of Avian Limb Development (collaboration with IU Bloomington, PI on a Notre Dame subcontract) 9/1/00-8/31/05, $3,000,000. The goal was to develop mathematical and computational models of avian limb structural development based on physical processes including cell adhesion, chemotaxis and haptotaxis, mitosis, and cell differentiation. We introduced unified, object-oriented, three-dimensional computational framework which includes composite discrete and continuous modeling and computation and used it for simulating chondrogenesis in an avian limb. The package is available for uploading at: https://simtk.org/home/compucell3d

REU Supplement, NSF Biocomplexity Grant 0083653, 06/01/03-09/01/07, $25,000, PI.

NSF DMS05-17864, 09/01/05-08/31/06, $25,000, PI; DOE grant $15,000, PI; Indiana 21st Century Research and Technology Fund, $5,000; Workshop on Applications of Methods of Stochastic Systems and Statistical Physics

Burroughs Wellcome Fund, Biocomplexity V Workshop, August 2003, $5,000, PI

NSF Grant DMS 9626672, 1996-2000, Geometric Analysis, PI

Grants from BRIMS, Research Laboratories of Hewlett-Packard, and from the Institute for Mathematics and its Applications, University of Minnesota, Conference on Nonlinear Problems in Applied Mathematics, University of Notre Dame, April 7-9, 2000, PI

NATO Collaborative Research Grant CRG 950897, 1995-99, Applied Mathematics, Notre Dame, CNLS Los Alamos Natl. Lab and Hewlett-Packard Lab., Co-PI

NSF Grant DMS 9508711, 1995-97, Special Projects (Mathematical Sciences), PI

Grant from Research Laboratories of Hewlett-Packard, 1995-97, PI

NSF Grant DMS 9403861, 1994-96, Geometric Analysis, PI

Publications

***Edited Special Issues of Journals and Books*:**

1. Special Issue of the Bulletin of Mathematical Biology, M.Alber, P.Maini, G. Niebur, Editors (in preparation).
2. Mark Alber, Field Editor for Mathematical and Computational Methods in Biosciences and Medicine of the Encyclopedia of Applied and Computational Mathematics (Springer) (to appear).
3. Special Issue on Applications to Biology of the Journal of Statistical Physics, Mark Alber, Ray Goldstein, Erwin Frey, Editors, *Springer*, Volume 128, Issue 1-2, July 2007.
4. Special Issue on Multiscale Modeling in Biology, SIAM Journal: Multiscale Modeling and Simulation, Mark Alber, Thomas Hou, James A. Glazier, Yi Jiang, Editors, *SIAM*, Volume 3, Number 2, 2005.
5. Special Issue of the Journal: Biofilms, Clay Fuqua, James A. Glazier, Yves Brun and Mark S. Alber, Editors, *Cambridge University Press*, Volume 1, Number 4, 2004.
6. Alber, M.S. , B. Hu and J. Rosenthal, Editors, Current and future directions in applied mathematics [1997]. Papers from the symposium held at the University of Notre Dame, Notre Dame, IN, April 1996. *Birkhuser Boston, Inc., Boston, MA* x+261.

Papers in Peer-reviewed Journals:

7. Richard Gejji, Pavel Lushnikov and Mark Alber [2012], Macroscopic model of self-propelled bacteria swarming with regular reversals, *Physical Review E* 85, 021903.
8. Richard Gejji, Bogdan Kazmierczak and Mark Alber [2012], Classification and Stability of Global Inhomogeneous Solutions of a Macroscopic Model of Cell Motion, *Mathematical Biosciences*, Epub ahead of print: April 13, 2012, doi: 10.1016/j.mbs.2012.03.009.
9. Constance L. Slaboch, Mark S. Alber, Elliot D. Rosen, Timothy C. Ovaert [2012], Mechano-rheological properties of the murine thrombus determined via nanoindentation and finite element modeling, *Journal of the Mechanical Behavior of Biomedical Materials* 10, 75–86.
10. Gennady Margolin, Ivan V. Gregoretti, Trevor M. Ciskovski, Chunlei Li, Wei Shi, Mark S. Alber and Holly V. Goodson [2012], The Mechanisms of Microtubule Catastrophe and Rescue: Implications from analysis of a dimer-scale computational model, *Molecular Biology of the Cell*, 23:4 642–656 (paper was highlighted in Faculty of 1000).
11. Oleg Kim, John McMurdy, Collin Lines, Susan Duffy, Gregory Crawford and Mark Alber [2012], Reflectance spectrometry of normal and bruised human skins: Experi-

ments and modeling, *Physiological Measurement* 33, 159-175.

12. Zhiliang Xu, Oleg Kim, Malgorzata Kamocka, Elliot D. Rosen and Mark Alber, Multiscale Models of Thrombogenesis [2012], *WIREs System Biology and Medicine*, Published Online: Jan 13 2012. doi: 10.1002/wsbm.1160.
13. Christopher R. Sweet, Santanu Chatterjee, Zhiliang Xu,Katharine Bisordi, Elliot D. Rosen and Mark Alber [2011], Modeling Platelet-Blood Flow Interaction Using Subcellular Element Langevin Method, *Journal of the Royal Society Interface* 8 (65), 1760-71.
14. Yilin Wu, Yi Jiang, A. Dale Kaiser, Mark Alber [2011], Self-organization in bacterial swarming: Lessons from Myxobacteria, *Physical Biology* 8 (5), 055003.
15. Huijing Du, Zhiliang Xu, Joshua D. Shrout and Mark Alber [2011], Multiscale Modeling of Pseudomonas aeruginosa Swarming, *Mathematical Models and Methods in Applied Sciences*, Vol. 21, Suppl. 939-954.
16. Cameron W. Harvey, Faruck Morcos, Christopher R. Sweet, Dale Kaiser, Santanu Chatterjee, Xiaomin Lu, Danny Chen and Mark Alber [2011], Study of elastic collisions of M. xanthus in swarms, *Physical Biology* 8, 026016.
17. Eungjun Kim, Oleg V. Kim, Kellie R. Machlus, Xiaomin Liu,Timur Kupaev,a Joshua Lioi, Alisa S.Wolberg, Danny Z. Chen, Elliot D. Rosen, Zhiliang Xu, and Mark Alber [2011], Correlation between fibrin network structure and mechanical properties: an experimental and computational analysis, *Soft Matter* 7, 4983.
18. Gennady Margolin, Holly V. Goodson, and Mark S. Alber [2011], Mean-field study of the role of lateral cracks in microtubule dynamics, *Physical Review E* 83, 041905.
19. Xu, Z., M.M. Kamocka, M.S. Alber, and E.D. Rosen [2011], Computational Approaches to Studying Thrombus Development, *Arterioscler Thromb Vasc Biol* 31, 500-505.
20. Jianfeng Zhu, Yong-Tao Zhang, Mark S. Alber and Stuart A. Newman [2010], Bare bones pattern formation: a core regulatory network in varying geometries reproduces major features of vertebrate limb development and evolution, *PLoS ONE* 5 (5): e10892.
21. Xu, Z., J. Lioi, J. Mu, X. Liu, M.M. Kamocka, E.D. Rosen, D.Z. Chen and M.S. Alber [2010], A Multiscale Model of Venous Thrombus Formation with Surface-Mediated Control of Blood Coagulation Cascade, *Biophysical Journal* 98, 9, 1723–1732.
22. Kamocka, M.M., J. Mu, X. Liu, N. Chen, A. Zollman1, B. Sturonas-Brown, K. Dunn, Z. Xu, D.Z. Chen, M.S. Alber and E.D. Rosen [2010], 2-Photon Intravital Imaging of Thrombus Development In Vivo, *Journal of Biomedical Optics* 15, 1, 016020.
23. Morcos, Faruck, Marcin Sikora, Mark Alber, Dale Kaiser, and Jesus A. Izaguirre [2010], Belief Propagation Estimation of Protein and Domain Interactions using the Sum-Product Algorithm, *IEEE Transactions on Information Theory, Special Issue on Molecular Biology* 56, 2, 742–755.
24. Mu, J., X. Liu, M.M. Kamocka, Z. Xu, M.S. Alber, and E.D. Rosen, D.Z. Chen [2010], Segmentation, Reconstruction, and Analysis of Blood Thrombi in 2-Photon Microscopy Images, *EURASIP Journal on Advances in Signal Processing* Vol. 2010,

Article ID 147216, 8 pages. doi:10.1155/2010/147216.

25. Zhenyu Shi, Nan Chen, Yanan Du, Ali Khademhosseini and Mark Alber [2009], Stochastic model of self-assembly of cell-laden hydrogels, *Phys. Rev. E.* **80** 061901 (featured in the December 21, 2009, issue of Virtual Journal of Nanoscale Science & Technology).

26. Alber, M., Gejji, R., B. Kazmierczak [2009], Existence of Global Solutions of a Macroscopic Model of Cellular Motion in a Chemotactic Field, *Applied Mathematics Letters* **22** 1645-1648.

27. Zhu J., Zhang, Y., Newman, S.A., M.Alber [2009], A finite element model based on discontinuous Galerkin methods on moving grids for vertebrate limb pattern formation, *Mathematical Modeling of Natural Phenomena* **4** 4, 131–148.

28. Zhu, J., Y.-T. Zhang, S.A. Newman and M. Alber [2009], Application of discontinuous Galerkin methods for reaction-diffusion systems in developmental biology, *Journal of Scientific Computing* **40** 391-418.

29. Xu, Z., Chen, N., Shadden, S., Marsden, J.E., Kamocka, M.M., Rosen, E.D., and M.S. Alber [2009], Study of Blood Flow Impact on Growth of Thrombi Using a Multiscale Model, *Soft Matter* **5**, 769 –779.

30. Wu, Y., Jiang, Y., Kaiser, D., and M. Alber [2009], Periodic reversal of direction allows Myxobacteria to swarm, *Proc. Natl. Acad. Sci. USA* **106** 4 1222-1227 (featured in the *Nature News*, January 20th, 2009, doi:10.1038/news.2009.43).

31. Lushnikov, P.P., Chen, N., and M.S. Alber [2008], Macroscopic dynamics of biological cells interacting via chemotaxis and direct contact, *Phys. Rev. E.* **78**, 061904 (reviewed in the Faculty of 1000 Biology).

32. Xu, Z., Chen, N., , Kamocka, M.M., Rosen, E.D., and M.S. Alber [2008], Multiscale Model of Thrombus Development, *Journal of the Royal Society Interface* **5** 705-722.

33. Wu, Y., Jiang, Y., Kaiser, D., and M. Alber [2007], Social Interactions in Myxobacterial Swarming, *PLoS Computational Biology* **3** 12, e253.

34. Christley, S., M. Alber, and S.A. Newman [2007], Patterns of mesenchymal condensation in a multiscale, quasi-3D discrete stochastic model, *PLoS Computational Biology* **3** 4, e76.

35. Alber, M., Chen, N., Lushnikov, P., and S. Newman [2007], Continuous macroscopic limit of a discrete stochastic model for interaction of living cells, *Physical Review Letters* **99** 168102.

36. Chen, N., Glazier, J.A., Izaguirre, J.A. and M.S. Alber [2007], A Parallel Implementation of the Cellular Potts Model for Simulation of Morphogenesis, *Computer Physics Communications* **76** 670–681.

37. Christley, S., Newman, S.A., and M. Alber [2007], Agent-based Simulation for Biological Development, *Cybernetics and Systems* **38** 7, 707–727.

38. Trevor Cickovski, Kedar Aras, Maciej Swat, Roeland M. H. Merks, Tilmann Glimm, H. George E. Hentschel, Mark S. Alber, James A. Glazier, Stuart A. Newman, Jesus A. Izaguirre [2007], From Genes To Organisms Via The Cell: A Problem Solving

Environment For Multicellular Development, *Computing in Science and Engineering* **9** 4, 50–60.

39. Jiang,Y., Sozinova, O., and M. Alber [2006], On Modeling Complex Collective Behavior in Myxobacteria, *Advances in Complex Systems* **9** 4, 1–15.
40. Sozinova, O., Y. Jiang, D. Kaiser, and M. Alber [2006], A Three-Dimensional Model of Fruiting Body Formation, *Proc. Natl. Acad. Sci. USA* **103** No.46, 17255-17259.
41. Gregoretti, I., Margolin, G., Alber, M., and H. Goodson [2006], Modeling microtubule dynamic instability, *Journal of Cell Science* **119** (22) 4781–4788.
42. Margolin, G., Gregoretti, I., H. Goodson, and Alber, M. [2006], Analysis of a microscopic stochastic model of microtubule dynamic instability *Phys. Rev. E.* **74** 041920.
43. Alber, M., Chen, N., Glimm, T., and P. Lushnikov [2006], Multiscale dynamics of biological cells with chemotactic interactions: From a discrete stochastic model to a continuous description, *Phys. Rev. E.* **73** 051901.
44. Sozinova, O., Y. Jiang, D. Kaiser, and M. Alber [2005], A Three-Dimensional Model of Myxobacterial Aggregation by Contact-mediated Interactions, *Proc. Natl. Acad. Sci. USA* **102** No.32, 11308-11312.
45. Cickovski, T., C. Huang, R. Chaturvedi, T. Glimm, H.G.E. Hentschel, M. Alber, J. A. Glazier, S. A. Newman, J. A. Izaguirre [2005], A Framework for Three-Dimensional Simulation of Morphogenesis, *IEEE/ACM Transactions on Computational Biology and Bioinformatics* **2** 3,1545-5963.
46. Casal, A., C. Sumen, T. Reddy, M. Alber. P. Lee [2005], Agent-Based Modeling of the Context Dependency in T Cell recognition, *Journal of Theoretical Biology* **236** 376391 (corresponding authors: M.Alber and P. Lee).
47. Chaturvedi, R., C. Huang, B. Kazmierczak, T. Schneider, J. A. Izaguirre, T. Glimm, H.G.E. Hentschel, J. A. Glazier, S. A. Newman, M. Alber [2005], On Multiscale Approaches to 3-Dimensional Modeling of Morphogenesis, *Journal of the Royal Society Interface* **2** 3, 237-253.
48. Alber, M., H.G.E. Hentschel, B. Kazmierczak, S.A. Newman [2005], Existence of Solutions to a New Model of Biological Pattern Formation, *Journal of Mathematical Analysis and Applications* **308** 1 175-194.
49. Alber, M., Glimm, T., Hentschel, H.G.E., Kazmierczak, B., and S. Newman [2005], Stability of n-Dimensional Patterns in a Generalized Turing System: Implications for Biological Pattern Formation, *Nonlinearity* **18** 125-138.
50. Kiskowski, M.A., Y. Jiang, M.S. Alber [2004], Role of Streams in Myxobacteria Aggregate Formation, *Physical Biology* **1** 173-183.
51. Alber, M.S., M.A. Kiskowski, and Y. Jiang [2004], Two-stage aggregate formation via streams in myxobacteria, *Phys. Rev. Lett.* **93** 068301.
52. Alber, M.S., Y. Jiang, and M.A. Kiskowski. [2004], Lattice gas cellular automaton model for rippling and aggregation in myxobacteria, *Physica D* **191**, 343–358.
53. Kiskowski, M.A., M.S. Alber, G.L. Thomas, J.A. Glazier, N. Bronstein, J. Pu, and Newman, S.A. [2004], Interaction between activator-inhibitor coupling and cell-matrix

adhesion in a cellular automaton model for chondrogenic patterning, *Developmental Biology* **271**, 372–387 (corresponding authors: M.Alber and S. Newman).

54. Izaguirre, J. A., Chaturvedi, R., Huang, C., Cickovski, T., Coffland, J., Thomas, G., Forgacs, G., Alber, M., Hentschel, G., Newman, S.A., and Glazier, J.A. [2004], CompuCell, a multi-model framework for simulation of morphogenesis, *Bioinformatics* **20**, 1129–1137.

55. Alber, M.S. and M.A. Kiskowski, M.A. [2001], On Aggregation in CA Models in Biology, *J. Phys. A: Math. Gen.*, **34** 10707-10714.

56. Alber, M.S., R. Camassa, Y. Fedorov, D.D. Holm and J.E. Marsden [2001], The Complex Geometry of Weak Piecewise Smooth Solutions of Integrable Nonlinear PDE's of Shallow Water and Dym Type, *Commun.Math.Phys.* **221** 197–227.

57. Alber, M.S. and Yu.N. Fedorov [2001], Algebraic Geometrical Solutions for Certain Evolution Equations and Hamiltonian Flows on Nonlinear Subvarieties of Generalized Jacobians, *Inverse Problems* **17** 1–26.

58. Alber, M.S., and C. Miller [2001], On Peakon Solutions of the Shallow Water Equation, *Appl.Math.Lett.* **14** 1, 93–98.

59. Alber, M.S. and Yu.N. Fedorov [2000], Wave Solutions of Evolution Equations and Hamiltonian Flows on Nonlinear Subvarieties of Generalized Jacobians, *J.Phys.A: Math.Gen.* **33** 8409–8425.

60. Luther, G.G., M.S. Alber, M.S., J.E. Marsden and J.W. Robbins [2000], Geometry and control of $\chi^{(2)}$ processes and the generalized Poincaré sphere, *J. Opt. Soc. Amer. B.* **17** 6, 932–941.

61. Alber, M.S., G.G. Luther and C. Miller [2000], On Soliton-type Solutions of the Equations Associated with N-component Systems, *J. Math. Phys.* **41** 1, 284–316.

62. Alber, M.S., R. Camassa, Y. Fedorov, D.D. Holm and J.E. Marsden [1999], On Billiard Solutions of Nonlinear PDE's, *Phys. Lett. A* **264** 171–178.

63. Alber, M.S., G.G. Luther, J.E. Marsden and J.W. Robbins [1999], Geometry and Control of Three-Wave Interactions, *Fields Inst. Commun.* **24** 55–80.

64. Alber, M.S., G.G. Luther, J.E. Marsden and J.M. Robbins [1998], Geometric phases, reduction and Lie-Poisson structure for the resonant three-wave interaction, *Physica D* **123** 271–290.

65. Alber, M.S. and G.G. Luther [1997], Nonlinear Waves, Nonlinear Optics and the Future of Communications, *Nonlinear Science Today* **4**.

66. Alber, M.S., G.G. Luther and J.E. Marsden [1997], Energy Dependent Schrodinger Operators and Complex Hamiltonian Systems on Riemann Surfaces, *Nonlinearity* **10** 223-242.

67. Alber, M.S. and J.E. Marsden [1996], Semiclassical Monodromy and the Spherical Pendulum as a Complex Hamiltonian System, *Fields Inst. Commun.* **8** 1-18.

68. Alber, M.S., R. Camassa, D.D. Holm and J.E. Marsden [1995], On Umbilic Geodesics and Soliton Solutions of Nonlinear PDE's, *Proc. R. Soc. London Ser. A* **450** 677-692.

69. Alber, M.S. and J.E. Marsden [1994], Complex Geometric Asymptotics for Nonlinear

Systems on Complex Varieties, *Topol. Methods Nonlinear Anal.* **4** 237-251.

70. Alber, M.S., R. Camassa, D.D. Holm and J.E. Marsden [1994], The geometry of peaked solitons and billiard solutions of a class of integrable pde's, *Lett. Math. Phys.* **32** 137-151.
71. Alber, M.S. and J.E. Marsden [1994], Resonant Geometric Phases for Soliton Equations, *Fields Inst. Commun.* **3** 1-26.
72. Alber, M.S. and J.E. Marsden [1992], On Geometric Phases for Soliton Equations, *Commun. Math. Phys.* **149** 217-240.
73. Alber, M.S. [1991], Hyperbolic Geometric Asymptotics, *Asymptotic Anal.* **5** 161-172.
74. Alber, M.S. [1989], On integrable systems and semiclassical solutions of the stationary Schrodinger equations, *Inverse Problems* **5** 131-148.
75. Alber, M.S. and S.J. Alber [1987], Hamiltonian formalism for nonlinear Schrődinger equations and sine-Gordon equations, *J. London Math. Soc. (2)* **36** 176-192.
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Chapters in Peer-reviewed Books:

77. Zhiliang Xu, Scott Christley, Joshua Lioi, Cameron Harvey, Wenzhao Sun, Elliot Rosen and Mark Alber, Multiscale Modeling of Fibrin Accumulation on Thrombus Surface and Platelet Dynamics, In Computational Methods in Cell Biology, *Methods in Cell Biology Series* (Elsevier) (to appear).
78. Newman, S., Christley, S., Glimm, T., Hentschel, H.G.E., Kazmierczak, B., Zhang, Y.T., Zhu. J., and M. Alber [2008], Multiscale Models for Vertebrate Limb Development, *Curr Top Dev Biol* **81** 311-340.
79. Alber, M., Chen, N., Glimm, T., and P. Lushnikov, A Two-dimensional Multiscale Model of Cell Motion in a Chemotactic Field, A.R.A Anderson, M.A.J. Chaplain, K.A. Rejniak Eds.,Single Cell Based Models in Biology and Medicine, Birkhauser-Verlag, 2007.
80. Christley, S., Newman, S.A., and M. Alber, Agent-Based Model for Developmental Pattern Formation with Multiscale Dynamics and Varying Cell Geometry. In: Mathematical Modeling of Biological Systems, Volume I. A. Deutsch, L. Brusch, H. Byrne, G. de Vries and H.-P. Herzel (eds). Birkhuser, Boston, 155–167 (2007).
81. Alber, M.S., M.A. Kiskowski, Y. Jiang and S.A. Newman [2004], Biological Lattice Gas Models, in Dynamics and Bifurcation of Patterns in Dissipative Systems, G. Dangelmayr and I. Oprea (eds.), World Scientific Series on Nonlinear Science, Vol. 12, World Scientific, Singapore, 2004, pp 274-291.
82. Alber, M.S., Kiskowski, M.A., Glazier, J.A., and Jiang, Y., On Cellular Automaton Approaches to Modeling Biological Cells, in J. Rosenthal and D.S. Gilliam (Eds.), *Mathematical Systems Theory in Biology, Communication, and Finance*, IMA Volume 134, Springer-Verlag, New York, 1-39, 2003.

83. Alber, M.S. [2000], N-Component integrable systems and geometric asymptotics. In "Integrability: the Seiberg-Witten and Whitham equations", eds H.W. Braden and I.M. Krichever, 1–10. Amsterdam: Gordon and Breach Science Publishers.

84. Alber, M.S., G.G. Luther and J.E. Marsden [1997], Complex Billiard Hamiltonian Systems and Nonlinear Waves, Algebraic aspects of integrable systems, 1–16, Progr. Nonlinear Differential Equations Appl., **26**, Birkhuser, Boston, MA.

85. Alber, M.S. and J.E. Marsden [1994], Geometric Phases and Monodromy at Singularities, N.M. Ercolani et al., eds., *NATO ASI Series B* (Plenum Press, New York) **320** 273-296.

Papers in Peer-reviewed Conference Proceedings:

86. X. Liu, J. Mu, K.R. Machlus, A.S. Wolberg, E.D. Rosen, Z. Xu, M.S. Alber, and D.Z. Chen, Automatic Segmentation and Analysis of Fibrin Networks in 3D Confocal Microscopy Images, the SPIE International Symposium on Medical Imaging: Imaging Processing, Feb. 2012 (to appear).

87. C. Lines, O. Kim, S. Duffy, M. Alber, G. Crawford, Modeling and measuring extravascular hemoglobin: aging contusions, Clinical and Biomedical Spectroscopy and Imaging II, Munich, Germany, Proc. SPIE 8087, 80872T (2011); doi:10.1117/12.896610.

88. X. Liu, A.F. Setiadi, M.S. Alber, P.P. Lee and D.Z. Chen, Identification and Classification of Cells in Multi spectral Microscopy Images of Lymph Nodes, Proc. of 2011 SPIE Medical Imaging: Image Processing, Proc. SPIE 7962, 79620J (2011); doi:10.1117/12.878399.

89. Morcos, Faruck, Marcin Sikora, Mark Alber, Dale Kaiser, and Jesus A. Izaguirre [2010], Estimation of Protein and Domain Interactions in the Switching Motility System of Myxococcus xanthus, *Pac Symp Biocomput.* 15, doi: 10.1142/9789814295291 0018, World Scientific, 157–165.

90. Xu, Z., J. Mu, X. Liu, M.M. Kamocka, E.D. Rosen, D.Z. Chen and M.S. Alber [2009], Combined Experimental and Simulation Study of Blood Clot Formation, Proceedings of the 2009 IEEE Toronto International Conference - Science and Technology for Humanity TIC-STH, Toronto, Canada, IEEE Xplore, ISBN: 978-1-4244-3878-5, doi: 10.1109/TIC-STH.2009.5444476, 357–362.

91. Mu, J., X. Liu, M.M. Kamocka, Z. Xu, M.S. Alber, and E.D. Rosen, D.Z. Chen [2009], Segmentation, Reconstruction, and Analysis of Blood Thrombi in 2-Photon Microscopy Images. Proceedings of the 22nd IEEE Symposium on Computer-Based Medical Systems (CBMS), Albuquerque, New Mexico, IEEE Xplore, ISBN: 978-1-4244-4879-1, doi: 10.1109/CBMS.2009.5255347, 1–8.

92. Christley, S., Newman, S.A., and M. Alber, Toward Agent-based Simulation in Development Biology, Proceedings of the Agent-directed Simulation Symposium of the Spring Simulation Multi conference (Ed's. Hamilton et al.), pp. 149-156. April 2-6, 2006, Huntsville, Alabama. SCS Press.

93. Christley, S., Newman, S.A., and M. Alber, Agent-based Simulation for Biological Development, Proceedings of the Eighteenth European Meeting on Cybernetics and Systems Research, Robert Trappl (ed). Austrian Society for Cybernetic Studies, (2006).

94. Christley, S., Newman, S.A., and M. Alber, Modeling of Pattern Formation in Cell Cultures, Proceedings of the Tenth International Conference on the Simulation and Synthesis of Living Systems, Luis M. Rocha, Larry S. Yaeger, Mark A. Bedau, Dario Floreano, Robert L. Goldstone and Alessandro Vespignani, editors, MIT Press, Cambridge, MA, 49–55 (2006).

95. Yilin Wu, Nan Chen, Matthew Rissler, Yi Jiang, Dale Kaiser, and Mark Alber, CA Models of Myxobacteria Swarming,S. El Yacoubi, B. Chopard, and S. Bandini (Eds.): ACRI 2006, LNCS 4173, Springer-Verlag Berlin Heidelberg, pp. 192-203, 2006.

96. N. Chen, J.A. Glazier and M.S. Alber, A Parallel Implementation of the Cellular Potts Model for Simulation of Cell-Based Morphogenesis, S. El Yacoubi, B. Chopard, and S. Bandini (Eds.): ACRI 2006, LNCS 4173, Springer-Verlag Berlin Heidelberg, pp. 58–67, 2006.

97. Casal, A., C. Sumen, T. Reddy, M. Alber. P. Lee, A Cellular Automata Model of Early T Cell Recognition, Lecture Notes in Computer Science, Springer-Verlag, Vol. 3305, Springer-Verlag, New York, pp. 553-560, 2004.

98. Chaturvedi, R., C. Huang, J. A. Izaguirre, S. A. Newman, J. A. Glazier, M. Alber, A Hybrid Discrete-Continuum Model for 3-D Skeletogenesis of Vertebrate Limb, Lecture Notes in Computer Science, Vol. 3305, Springer-Verlag, New York, pp. 543-552, 2004.

99. Chaturvedi, R., Izaguirre, J. A., Huang, C., Cickovski, T., Virtue, P., Thomas, G., Forgacs, G., Alber, M., Hentschel, G., Newman, S. A., and Glazier, J. A. [2003], Multi-model simulations of chicken limb morphogenesis, Lecture Notes in Computer Science, Volume 2659, Springer-Verlag, New York, 39-49.

100. Alber, M.S., R. Camassa and M. Gekhtman [2000], On billiard weak solutions of nonlinear PDE's and Toda flows, *CRM Proc. & Lecture Notes*, AMS, **25** 1–11.

101. Alber, M.S., R. Camassa, D.D. Holm and J.E. Marsden [1995], The geometry of weak solitons of certain integrable nonlinear pde's, Proc. Int. Workshop, Nonlinear Evolution Equations and Dynamical Systems, NEEDS'94, Los Alamos Natl. Lab., NM (World Scientific) 3-8.

102. Alber, M.S. [1992], Complex geometric asymptotics, geometric phases and nonlinear integrable problems. Huygens' principle 1690–1990: theory and applications (The Hague and Scheveningen, 1990), 415–427, Stud. Math. Phys., 3, *North-Holland, Amsterdam.*

103. Alber, M.S. [1992], On geometric phases and braid groups. Proceedings of the XXth International Conference on Differential Geometric Methods in Theoretical Physics, Vol. 1, 2 (New York, 1991), 439–453, *World Sci. Publishing, River Edge, NJ.*

104. Alber, M.S. [1990], Geometric Asymptotics for Integrable Systems, Proc.of the CRM Workshop on Hamiltonian Systems, Transformation Groups and Spectral Transform Methods, CRM, Universite de Montreal (Marquis, Montmagny, Qc).

105. Alber, M.S. [1987], Hamiltonian formalism for finite-zone solutions of nonlinear integrable equations. Proceedings of the VIIIth international congress on mathematical physics (Marseille, 1986), 447–462, *World Sci. Publishing, Singapore.*

Results obtained by the Albers' group were featured in the following newspaper articles:

'Reversing helps bacterial swarms to spread' by Heidi Ledford, Nature News, January 20th, 2009, doi:10.1038/news.2009.43,
http://www.nature.com/news/2009/090120/full/news.2009.43.html

'Bacteria periodically reverse direction', The Times of India, 21 Jan 2009, 1249 hrs IST, ANI: http://timesofindia.indiatimes.com/articleshow/msid-4010918,prtpage-1.cms

Lushnikov, P.P., Chen, N., and M.S. Alber [2008], Macroscopic dynamics of biological cells interacting via chemotaxis and direct contact, Phys. Rev. E. 78, 061904, was reviewed in the Faculty of 1000 Biology.

Recent Invited Talks:

May 1, 2012, Invited Talk, 3rd International Conference on Engineering Frontiers in Pediatric and Congenital Heart Disease, Stanford University, Palo Alto, CA

April 17, 2012, Colloquium, Department of Mathematics, University of South Alabama, Mobile, AL

April 16, 2012, Colloquium, Department of Mathematics, University of South Carolina, Columbia, SC

April 12, 2012, Colloquium, Harper Cancer Research Institute, Indiana University School of Medicine, South Bend, IN

March 1, 2012, Invited Talk, Invited Session: Physical Mechanisms of Collective Microbial Dynamics, American Physical Society March Meeting 2012, Boston, MA

February 9, 2012, Colloquium, Department of Applied Mathematics, University of Washington, Seattle, WA

November 4, 2011, Invited Talk, Department of Mathematics, Duke University, NC

October 13, 2011, Invited Talk, 48th Annual Technical Conference of Society of Engineering Sciences, Northwestern University, Evanston, Illinois.

April 12, 2011, Invited Talk, Principles and Theory of Self-Assembly, 7th Annual Conference on Foundations of Nanoscience: Self-assembled Architecture and Devices (FNANO 2011), Snowbird Cliff Lodge, Snowbird, Utah.

February 24, 2011, Mathematical Physics Colloquium, Rutgers University, New Brunswick, NJ.

February 2, 2011, Colloquium, Department of Mechanical Engineering, UC San Diego, CA.

September 14, 2010, Invited Talk, The Hot Topics Workshop "Medical Device-biological In-

teractions at the Material-tissue Interfaces", Institute for Mathematics and Its Applications (IMA), University of Minnesota, Minneapolis, MN.

June 25, 2010, Applied Mathematics Colloquium, Imperial College, London, UK.

June 21, 2010, Invited Talk, OCCAM Conference on Modelling at different scales in biology, St Anne's College, Oxford University, UK.

May 10, 2010, 103rd Statistical Mechanics Conference, Rutgers University, NJ.

April 17, 2010, Plenary Talk, SIAM Great Lakes Conference: Modeling and Numerical PDEs in Mathematical Biology, University of Michigan-Dearborn, MI.

March 8, 2010, Applied Mathematics Colloquium, Department of Mathematics, Massachusetts Institute of Technology, Boston, MA

January 22, 2010, Mathematics Colloquium, Case Western University, Cleveland, OH

October 27, 2009, Workshop on Self-Organization and Multi-Scale Mathematical Modeling of Active Biological Systems, NSF Statistical and Applied Mathematical Sciences Institute (SAMSI), Research Triangle Park, NC

October 12, 2009, Conference on Agent-Based Complex Systems, NSF Institute for Pure and Applied Mathematics (IPAM), UCLA, Los Angeles, CA

September 26, 2009, Symposium on Engineered and Natural Complex Systems-Modeling, Simulation and Analysis, 2009 IEEE Toronto International Conference - Science and Technology for Humanity, Canada

August 30, 2009, Tutorial Lecture, 2009-10 Program on Stochastic Dynamics, NSF Statistical and Applied Mathematical Sciences Institute (SAMSI), Research Triangle Park, NC

August 24, 2009, Plenary Talk, Workshop, NSF Mathematical Biology Institute, Columbus, OH

July 23, 2009, Invited Talk, Center for Mathematical Biology, Oxford University, UK

July 22, Invited Talk, Conference on Cardiac Physiome Project, Newton Institute, Cambridge University, UK

April 10, 2009, Applied Mathematics Colloquium, Department of Mathematics, Stanford University, Palo Alto, CA

April 3, 2009, Colloquium, Department of Mathematics, New Jersey Institute of Technology, Newark, NJ

April 2, Department of Mathematics, Rutgers University, Piscataway, NJ

March 11, 2009, Department of Mechanical Engineering, University of California, Santa Barbara, CA

November 17, 2008, Department of Control Theory and Dynamical Systems, Caltech, Pasadena, CA

November 14, 2008, Department of Mathematics, University of California, Irvine, CA

October 14, 2008, Pattern Formation and Development in Colonial Organisms, NSF Mathematical Biology Institute, Ohio State University, Columbus, OH

August 6, 2008, Mini symposium on Networks Structure and Dynamics, SIAM Meeting in Life Sciences, Montreal, Canada

July 31, 2008, Mini symposium on Multiscale Modeling in Biology, Annual Meeting of the Society for Mathematical Biology Conference, Toronto, Canada

July 25, 2008, NSF EMT Workshop, Princeton University, NJ

29 February 2008, Department of Systems Biology, Harvard Medical School, Boston

December 10, 2007, Workshop on Biomechanics and Chemotaxis, Johann Radon Institute for Computational and Applied Mathematics (RICAM), Linz, Austria

November 12, 2007, Conference on Microfluids, NSF Mathematical Biosciences Institute, Columbus, Ohio

October 5, 2007, Special Session on Networks, American Mathematical Society regional meeting, De Paul University, Chicago

July 24, 2007, 6th European Conference on Computational Biology (ECCB), Vienna, Austria

June 1, 2007, Plenary Invited Talk, Indy Midwest Regional Bioinformatics Conference, IUPUI Conference Center, Indianapolis, IN

May 21, 2007, Conference on Mathematical Issues in Stochastic Approaches for Multiscale Modeling, Mathematical Sciences Research Institute, Berkeley, CA

March 16, 2007, Applied Mathematics and Computational Science (AMCS) Colloquium, University of Pennsylvania, Philadelphia

March 12, 2007, Department of Genetics, Indiana University Medical School, Indianapolis

December 6, 2006, Inaugural Talk, Center for Complex and Nonlinear Science, University of California at Santa Barbara

October 5, 2006, Perdue University, Lafayette, Indiana

September 21 and 23, 2006, ACRI 2006, University of Perpignan, France

April 19, 2006, International Symposium on Agent Based Modeling and Simulation, Vienna University, Austria

February 16, 2006, University of Michigan, Ann Arbor, MI

February 8, 2006, Johns Hopkins University, MD

December 9, 2005, Special Lecture in Developmental Biology at Stanford University, Palo Alto, CA

December 7, 2005, University of California at Irvine, CA

December 6, 2005, California Institute of Technology, Pasadena

December 5, 2005, University of California at Berkeley, CA

September 7, 2005, Conference on Successes and Failures of Continuous Models for Discrete Systems, University of Bristol, UK

July 18 and 21, 2005, The European Conference on Mathematical and Theoretical Biology - ECMTB05, Dresden, Germany

May 15, 2005, 97th Statistical Mechanics Meeting, Rutgers University, NJ.

March 24, 2005, Special Session on Biological Computations, and Chair, Special Session on Advances in the Biological Physics of Morphogenesis, Annual Meeting of the American Physical Society, Los Angeles

March 12, 2005, Complex Systems Program, Northwestern University, Evanston

March 1, 2005, Colloquium, Department of Biological Sciences, University of Notre Dame

University Service:

2006-2007: Member of the University of Notre Dame Graduate Council

2005-2006: Member of the University of Notre Dame Council for Academic Technologies

2005-2009: Member of the Faculty Advisory Committee of the Center for Research Computing, University of Notre Dame

2006 - 2010: Member of the Board of the Center for Applied Mathematics, University of Notre Dame

Postdoctoral Associates:

2012-present, Ziheng Wu, computational and mathematical biology

2010-present, Oleg Kim, computational and mathematical biology

2011-present, Xiaomin Liu, image reconstruction and analysis

2009-2010, Chris Sweet, computational and mathematical biology

2009-2010, EunJung Kim, computational and mathematical biology

2005-2008, Nan Chen, computational and mathematical biology

2005-2008, Gennady Margolin, computational and mathematical biology

2005-2006, Pavel Lushnikov, mathematical biology

2004-2006, Olga Sozinova, mathematical biology

2001-2004, Rajiv Chaturvedi, mathematical biology

2003-2004, Bogdan Kazmierczak, mathematical biology

2001-2002, Xinan Zhang, mathematical biology

1995-1997, Gregory Luther, NSF Math. Sci. Postdoctoral Industrial Research Fellowship

Graduate Students:

2010-present, Timur Kupaev (Mathemtics)

2008-present, Joshua Lioi (Mathematics)

2008-present, Cameron Harvey (Physics)

2008-present, Huijing Du (Mathematics)

2007-2012, Yuan Liu (Mathematics)

2005-2012, Tanya Salyers (Mathematics)

2005-2010, Richard Gejji (Mathematics) (currently at the NSA)

2005-2009, Jianfeng Zhu (Mathematics)(currently an analyst, Mendoza College of Business, University of Notre Dame)

2005-2009, Yilin Wu (Physics) (currently a postdoctoral associate at Harvard University)

2005-2008, Scott Christley (Computer Science) (currently a research scientist, University of Chicago)

2003-2008, Matt Rissler (Mathematics) (Assistant Professor of Mathematics, Loras College, Iowa)

2003-2008 Ivan Gregoretti (Biochemistry) (currently a postdoctoral associate at NIH)

2000-2004, Audi Kiskowski (Mathematics) (Assistant Professor of Mathematics, University of South Alabama)

1995-2000, Charles Miller (Mathematics) (currently at NSA)

Master's Students (separate from Ph.D. Programs):

2011-current, Stephen Gaudet, ESTEEM Professional Science and Engineering Master's (PSEM) Program

2008-2010, Faruck Morcos (also received Ph.D. in Computer Science and Engineering)(currently a postdoctoral associate at the UC San Diego.)

2007-2008, Zhenyu Shi

2005-2006, Fang Qi

2004-2005, Xuelian Zhu

2002-2004, Mihaela Vajiac

1999-2001, Olga Vasillieva

1998-99, Andrea Bieberich

Undergraduate Students, REU Program:

Summer 2011, John Riley, NSF REU, Myxobacteria project

Summer 2008, Jose Garcia (McNair Scholar), David Sheehan (NSF REU Nano/Bio Summer School)

Summer 2007, Fernando Monjarez (McNair Scholar, now in a Ph.D. program in physics at Texas Tech University), Jeston Edwin Greenwood

Summer 2006, Anudha Mittal (NSF REU Nano/Bio Summer School)

2005-2006: James Boyle

2003-2004: Adam Willis

Summer 2004, Michael Bell

High School Teachers: Summers 2006-2008

Helene Dauerty, Physics teacher, Central High School, Elkhart, Indiana

Tom Finke, Lead Mathematics and Science Teacher, Associate Head of School, Trinity School at Greenlawn, South Bend, Indiana

Mike Sinclair, Physics and mathematics instructor, Kalamazoo Area Mathematics and Science Center, Kalamazoo, Michigan

Professional Societies:

Society for Industrial and Applied Mathematics (SIAM)

American Association for the Advancement of Science (AAAS)

American Physical Society (APS)

Organization of Conferences:

Organizer, Workshop on Interdisciplinary Biomedical Research, July 18-19, 2011, University of Notre Dame London Center, UK.

Organizer, Workshop on Interdisciplinary Biomedical Research, March 1-3, 2009, University of Notre Dame

Organizer, Focus Group Meeting: Multiscale Methods in Biology, NSF Mathematical Biology Institute, Ohio State University, Columbus, OH, November 2-4, 2008

Organizer, Special Session on Multiscale Methods in Biological Modeling: Hybrid Systems and Coarsening Methods, SIAM Meeting in Life Sciences, Montreal, Canada, August 6, 2008

Co-organizer, Workshop on Interdisciplinary Biomedical Research between University of Notre Dame and Indiana University School of Medicine, University of Notre Dame, April 10 - 11, 2008

Organizer, Special Session on Mathematical Biology: Modeling Cancer, AMS Meeting, University of Notre Dame, April 8 - 9, 2006

Co-organizer, Workshop on Stochastic Modelling, Notre Dame, March 24-36, 2006

Co-organizer, Special Session on Mathematical Biology, American Mathematical Society Meeting, Notre Dame, April 7-9, 2006

Co-organizer, Workshop on Applications of Methods of Stochastic Systems and Statistical Physics in Biology, University of Notre Dame, October 28-30, 2005

Member of the Scientific Committee, Managing Complexity - Systems Biology, 7th World Congress of Chemical Engineering (WCCE 2005), Glasgow, Scotland, July 4-7, 2005.

Organizer, Biocomplexity Workshop VIII: Applications of Methods of Stochastic Systems and Statistical Physics to Biology, University of Notre Dame, October 28-30, 2005.

Co-organizer, Special Session on Mathematical Biology, American Mathematical Society Meeting, University of Notre Dame, April 8-9, 2006.

Co-organizer, Biocomplexity Workshop VII: Unravelling the Function and Kinetics of Biochemical Networks: from Experiments to Systems Biology, IU Bloomington, May 9 - 11, 2005.

Co-organizer, Biocomplexity Workshop VI: Complex Behavior in Unicellular Organisms, IU Bloomington, May 12 - 16, 2004.

Organizer, Biocomplexity Workshop V: Multiscale Modeling in Biology, University of Notre Dame, August 14 - 17, 2003.

Co-organizer, Biocomplexity Workshop IV: Regenerative Biology and Medicine, University of Indiana, Bloomington, May 15 - 18, 2003.

Co-organizer, Biocomplexity Workshop III: The Role of Tissue Mechanics in Biological Responses to Mechanical Loading, University of Notre Dame, November 8-10, 2002.

Member of a Program Committee of the 17th International Symposium on Mathematical Theory of Networks and Systems, University of Notre Dame, August 12-16, 2002.
Co-organizer of a mini-symposium on applications to biology.

Co-organizer, Notre Dame Workshop on Modeling Cytoskeleton and Cell Motility, University of Notre Dame, November 10-11, 2001.

Co-organizer of 2 invited Mini-symposiums on Applications of Nonlinear Dynamical Systems in Biology, Fifth SIAM Conference on Control and its Applications held jointly with the 2001 SIAM Annual Meeting, San Diego, July 11-14, 2001.

Co-organizer, Conference on Nonlinear Problems in Applied Mathematics, University of Notre Dame, April 7, 2000.

Co-organizer, Special session on Nonlinear Waves and Integrable Systems, AMS Meeting, University of Notre Dame, April 8-9, 2000.

Newly Developed Courses:

Graduate Course: Multi scale modeling in biology and physics

Graduate Course: Topics in Applied Mathematics, Mathematical Biology

Graduate Course: Nonlinear Dynamical Systems

Cross listed: Mathematical and Computational Modeling in Biology and Physics

Undergraduate Seminar on Interdisciplinary Biological Research: Mathematical and Computational Modeling in Biology

Miscellaneous: Married, two sons