

## Mark Alber

### Publications

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

1. Mark Alber, Editor of the Section on Mathematical and Computational Methods in Biosciences and Medicine of the Encyclopedia of Applied and Computational Mathematics, *Springer*, 2016, 1676 p. In 2 volumes.
2. Special Issue of the Bulletin of Mathematical Biology, Biomedical Modeling, M.Alber, P.Maini, G. Niebur, Editors, Volume 75, Issue 8, August 2013. ISSN: 0092-8240.
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:*

##### **Applied Mathematics/Multi-scale Modeling in Biology and Medicine**

7. Kim O, Liang X, Litvinov RI, Weisel JW, Alber MS, Purohit PK. [2016], Foam-like compression behavior of fibrin networks, *Biomech Model Mechanobiol.* 15: 213. doi:10.1007/s10237-015-0683-z
8. Giordano Tierra, Juan P. Pavissich, Robert Nerenberg, Zhiliang Xu and Mark S. Alber [2015], Multicomponent model of deformation and detachment of a biofilm under fluid flow, *J. R. Soc. Interface* 12: 20150045.
9. Morgen E. Anyan, Aboutaleb Amiri, Cameron W. Harvey, Giordano Tierra, Nydia Morales-Soto, Callan M. Driscoll, Mark S. Alber, Joshua D. Shrout [2014], Type IV Pili Interactions Promote Intercellular Association and Moderate Swarming of *Pseudomonas aeruginosa*, *Proc. Natl. Acad. Sci. USA* vol. 111, no. 50, 18013-18018 (authors for correspondence: J. Shrout and M. Alber).
10. Wu Z, Xu Z, Kim O, Alber M. [2014], Three-dimensional multi-scale model of deformable platelets adhesion to vessel wall in blood flow. *Philos Trans A Math Phys Eng Sci.* 6 372 (2021), doi: 10.1098/rsta.2013.0380.
11. Chunlei Li, Jun Li, Holly V. Goodson and Mark S Alber [2014], Microtubule Dynamics Instability: the Role of Cracks between Protofilaments, *Soft Matter* 10, 2069-2080.

12. Amy Buchmann, Mark Alber and Jeremiah J. Zartman [2014], The mechanical feedback hypothesis of organ growth regulation, Modelling developmental signalling, *Seminars in Cell and Developmental Biology* 35, 7381.
13. Oleg Kim, John McMurdy, Gregory Jay, Collin Lines, Gregory Crawford, and Mark Alber [2014], Combined Reflectance Spectroscopy and Stochastic Modeling Approach for Noninvasive Hemoglobin Determination via Palpebral Conjunctiva, *Physiological Reports*, Vol. 2, 1, e00192.
14. Gupta, K., Li, C., Duan, A.R., Alberic, E.O., Kim, O.V., Alber M.S., and Goodson, H. V. [2013], A mechanism for the catastrophe-promoting activity of the microtubule destabilizer Op18/stathmin, *Proc. Natl. Acad. Sci. USA*, 2013 Dec 17;110(51):20449-54. doi: 10.1073/pnas.1309958110.
15. Oleg V. Kim, Zhiliang Xu, Elliot D. Rosen and Mark S. Alber [2013], Fibrin Networks Regulate Protein Transport during Thrombus Development, *PLoS Computational Biology* 9 (6), e1003095.
16. Cameron Harvey, Mark Alber, Lev Tsimring, Igor Aronson [2013], Continuum modeling of clustering of myxobacteria, *New Journal of Physics* 15, 035029.
17. Yong-Tao Zhang, Mark S. Alber and Stuart A. Newman [2013], Mathematical Modeling of Vertebrate Limb Development, *Mathematical Biosciences* 243, 117 (one of 5 most downloaded papers in 2013).
18. Cameron W Harvey, Huijing Du, Zhiliang Xu, Dale Kaiser, Igor Aranson, Mark Alber [2012], Interconnected Cavernous Structure of Bacterial Fruiting Bodies, *PLoS Computational Biology* 8 (12), e1002850.
19. Huijing Du, Zhiliang Xu, Morgen Anyan, Oleg Kim, W. Matthew Leevy, Joshua D. Shrout and Mark Alber [2012], High density waves of the bacterium *Pseudomonas aeruginosa* in propagating swarms result in efficient colonization of surfaces, *Biophysical Journal* 103(3), 601-609.
20. Richard Gejji, Pavel Lushnikov and Mark Alber [2012], Macroscopic model of self-propelled bacteria swarming with regular reversals, *Physical Review E* 85, 021903 (highlighted in Faculty of 1000).
21. Richard Gejji, Bogdan Kazmierczak and Mark Alber [2012], Classification and Stability of Global Inhomogeneous Solutions of a Macroscopic Model of Cell Motion, *Mathematical Biosciences*, 238(1) 21–31.
22. Gennady Margolin, Ivan V. Gregoretto, 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 (highlighted in Faculty of 1000).
23. Oleg Kim, John McMurdy, Collin Lines, Susan Duffy, Gregory Crawford and Mark Alber [2012], Reflectance spectrometry of normal and bruised human skins: Experiments and modeling, *Physiological Measurement* 33, 159-175.
24. Zhiliang Xu, Oleg Kim, Malgorzata Kamocka, Elliot Rosen and Mark Alber, Multi-scale Models of Thrombogenesis [2012], *Wiley Interdiscip Rev Syst Biol Med.* 4(3):237-46.

25. Christopher R. Sweet, Santanu Chatterjee, Zhiliang Xu, Katharine Bisordi, Elliot D. Rosen and Mark Alber [2011], Modeling Platelet-Blood Flow Interaction Using Sub-cellular Element Langevin Method, *Journal of the Royal Society Interface* 8 (65), 1760-71.
26. Yilin Wu, Yi Jiang, A. Dale Kaiser, Mark Alber [2011], Self-organization in bacterial swarming: Lessons from Myxobacteria, *Physical Biology* 8 (5), 055003.
27. Huijing Du, Zhiliang Xu, Joshua D. Shrouf and Mark Alber [2011], Multiscale Modeling of *Pseudomonas aeruginosa* Swarming, *Mathematical Models and Methods in Applied Sciences*, Vol. 21, Suppl. 939-954.
28. 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.
29. 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.
30. 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.
31. 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.
32. 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): e10892.
33. 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.
34. 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.
35. 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.
36. 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.
37. 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.
38. 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.

39. 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.
40. 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).
41. Mark Albera, Tilmann Glimmb, H.G.E. Hentschelc, Bogdan Kazmierczakd, Yong-Tao Zhanga, Jianfeng Zhua, Stuart A. Newmane [2008], The Morphostatic Limit for a Model of Skeletal Pattern Formation in the Vertebrate Limb, *Bulletin of Mathematical Biology* **70**: 460-483.
42. 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 (highlighted in the Faculty of 1000 Biology).
43. 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.
44. Wu, Y., Jiang, Y., Kaiser, D., and M. Alber [2007], Social Interactions in Myxobacterial Swarming, *PLoS Computational Biology* **3** 12, e253.
45. 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.
46. 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.
47. 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.
48. Christley, S., Newman, S.A., and M. Alber [2007], Agent-based Simulation for Biological Development, *Cybernetics and Systems* **38** 7, 707–727.
49. 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.
50. Jiang, Y., Sozinova, O., and M. Alber [2006], On Modeling Complex Collective Behavior in Myxobacteria, *Advances in Complex Systems* **9** 4, 1–15.

51. 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.
52. Gregoretto, I., Margolin, G., Alber, M., and H. Goodson [2006], Modeling microtubule dynamic instability, *Journal of Cell Science* **119** (22) 4781–4788.
53. Margolin, G., Gregoretto, I., H. Goodson, and Alber, M. [2006], Analysis of a microscopic stochastic model of microtubule dynamic instability *Phys. Rev. E.* **74** 041920.
54. 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.
55. 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.
56. 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.
57. 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.
58. 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.
59. 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.
60. 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.
61. Kiskowski, M.A., Y. Jiang, M.S. Alber [2004], Role of Streams in Myxobacteria Aggregate Formation, *Physical Biology* **1** 173-183.
62. Alber, M.S., M.A. Kiskowski, and Y. Jiang [2004], Two-stage aggregate formation via streams in myxobacteria, *Phys. Rev. Lett.* **93** 068301.
63. 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.
64. 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).

65. Kim O, Liang X, Litvinov RI, Weisel JW, Alber MS, Purohit PK. [2015], Foam-like compression behavior of fibrin networks, *Biomech Model Mechanobiol*. *Biomech Model Mechanobiol* (2016) 15: 213. doi:10.1007/s10237-015-0683-z
66. 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.
67. 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.

### **Biology and Biomaterials**

68. Oleg V. Kim, Rustem I. Litvinov, John W. Weisel and Mark S. Alber [2014], Structural basis for the nonlinear mechanics of fibrin networks under compression, *Biomaterials* **35**, 6739–6749.
69. Morales-Soto, N., Anyan, M. E., Mattingly, A. E., Madukoma, C. S., Harvey, C. W., Alber, M., Dziel, E., Kearns, D. B., and J.D. Shrout [2015], Preparation, Imaging, and Quantification of Bacterial Surface Motility Assays. *Journal of Visualized Experiments*, (98), e52338, doi:10.3791/52338.
70. Cameron W. Harvey, Chinedu S. Madukoma, Shant Mahserejian, Mark S. Alber and Joshua D. Shrout [2014], Cell Division Resets Polarity and Motility for the Bacterium *Myxococcus xanthus*, *Journal of Bacteriology* **196**, *22*, 3853-3861.
71. 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.

### **Biological Image Analysis**

72. J. Chen, C.W. Harvey, M.S. Alber, and D.Z. Chen [2014], A Matching Model Based on Earth Mover’s Distance for Tracking *Myxococcus xanthus*, *Med Image Comput Assist Interv.* **17**(Pt 2):113-20.
73. Chen, J., M.S. Alber, and D.Z. Chen, A Hybrid Approach for Segmentation and Tracking of *Myxococcus xanthus* Swarms, *IEEE Transactions on Medical Imaging* (to appear).
74. 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.
75. Kamocka, M.M., J. Mu, X. Liu, N. Chen, A. Zollman, 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.

## Applied Mathematics

76. 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.
77. 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.
78. Alber, M.S., and C. Miller [2001], On Peakon Solutions of the Shallow Water Equation, *Appl.Math.Lett.* **14** 1, 93–98.
79. 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.
80. 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.
81. 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.
82. 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.
83. 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.
84. 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.
85. Alber, M.S. and G.G. Luther [1997], Nonlinear Waves, Nonlinear Optics and the Future of Communications, *Nonlinear Science Today* **4**.
86. 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.
87. 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.
88. 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.
89. Alber, M.S. and J.E. Marsden [1994], Complex Geometric Asymptotics for Nonlinear Systems on Complex Varieties, *Topol. Methods Nonlinear Anal.* **4** 237-251.
90. 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.
91. Alber, M.S. and J.E. Marsden [1994], Resonant Geometric Phases for Soliton Equations, *Fields Inst. Commun.* **3** 1-26.

92. Alber, M.S. and J.E. Marsden [1992], On Geometric Phases for Soliton Equations, *Commun. Math. Phys.* **149** 217-240.
93. Alber, M.S. [1991], Hyperbolic Geometric Asymptotics, *Asymptotic Anal.* **5** 161-172.
94. Alber, M.S. [1989], On integrable systems and semiclassical solutions of the stationary Schrödinger equations, *Inverse Problems* **5** 131-148.
95. Alber, M.S. and S.J. Alber [1987], Hamiltonian formalism for nonlinear Schrödinger equations and sine-Gordon equations, *J. London Math. Soc. (2)* **36** 176-192.
96. Alber, M.S. and S.J. Alber [1985], Hamiltonian formalism for finite-zone solutions of integrable equations, *C. R. Acad. Sci. Paris Sr. I Math.* **301** 777-781.

***Chapters in Peer-reviewed Books:***

97. Yolande Chen, Seth Joel Corey, Oleg V. Kim, Mark S. Alber, Chapter 6: Systems Biology of Platelet-Vessel Wall Interactions, in: A Systems Biology Approach to Blood, Seth Corey, Marek Kimmel, Joshua Leonard Eds., Series: Advances in Experimental Medicine and Biology, Vol. 844, Springer International, 85–99, 2014.
98. Cameron W. Harvey, Oleg A. Igoshin, Roy D. Welch, Mark Alber, and Lawrence J. Shimkets, Computational biology: From observation to statistical image analysis to modeling and back to biology, in Myxobacteria: Genomics, Cellular and Molecular Biology, ed. Z. Yang and P.I. Higgs, Caister Academic Press, 2014 ISBN: 978-1-908230-34-8.
99. Oleg Kim, Collin Lines, Susan Duffy, Mark Alber, and Gregory Crawford, Modeling and Measuring Extravascular Hemoglobin: Aging Contusions, M. Schlesinger (ed.), Applications of Electrochemistry in Medicine, Modern Aspects of Electrochemistry 56 DOI 10.1007/978-1-4614-6148-7-10, Springer New York 2013.
100. Zhiliang Xu, Scott Christley, Joshua Lioi, Cameron Harvey, Wenzhao Sun, Elliot Rosen and Mark Alber [2012], Multiscale Modeling of Fibrin Accumulation on Thrombus Surface and Platelet Dynamics, *Methods Cell Biol.* **110** 367-88.
101. 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.
102. 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.
103. 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).



104. 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.
105. 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.
106. 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.
107. 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.
108. 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:*

109. J. Chen, S. Mahserejian, M.S. Alber, and D.Z. Chen, A Hybrid Approach for Segmentation and Tracking of Myxococcus Xanthus Swarms, Medical Image Computing and Computer-Assisted Intervention MICCAI 2015, Lecture Notes in Computer Science, Volume 9351, pp 284-291
110. Jianxu Chen, Oleg V. Kim, Rustem I. Litvinov, John W. Weisel, Mark S. Albery, Danny Z. Chen, An Automated Approach for Fibrin Network Segmentation and Structure Identification in 3D Confocal Microscopy Images, Proceedings of The 27th IEEE International Symposium on Computer-Based Medical Systems (CBMS 2014).
111. Xiaomin Liu, Cameron W. Harvey, Haitao Wang, Mark S. Alber, Danny Z. Chen , Detecting and Tracking Motion of Myxococcus xanthus Bacteria in Swarms, Medical Image Computing and Computer-Assisted Intervention, MICCAI 2012, Lecture Notes in Computer Science, Volume 7510, 373-380 (2012); doi: 10.1007/978-3-642-33415-3-46.
112. 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, SPIE International Symposium on Medical Imaging: Imaging Processing, Proc. SPIE 8314, 831439 (2012); doi: 10.1117/12.911712.
113. 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.
114. 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, SPIE Medical Imaging: Image Processing, Proc. SPIE 7962, 79620J (2011); doi:10.1117/12.878399.

115. 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: 10.1142/97898142952910018, World Scientific, 157–165.
116. 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.
117. 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.
118. 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.
119. 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).
120. 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).
121. 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.
122. 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.
123. 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.
124. 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.
125. 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.

126. 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.
127. 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.
128. 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*.
129. 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*.
130. 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).
131. 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 Alber's group were featured in the following newspaper articles and reviews:**

'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>

July 1, 2013 cover story in The Scientist mentions Alber group's results on social behavior of *Myxococcus xanthus* and includes an interview with the former student Yilin Wu: <http://www.the-scientist.com/?articles.view/articleNo/36101/title/Crowd-Control/>

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 highlighted in the Faculty of 1000 Biology and Medicine: <http://f1000.com/prime>.

Gennady Margolin, Ivan V. Gregoretto, 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, was highlighted in the Faculty of 1000 Biology and Medicine: <http://f1000.com/prime>

Group's results on modeling bacterial collective motion were reviewed in: Tamas Vicsek and Anna Zafeiris, Collective motion, *Physics Reports* 517 (2012) 71140.

Optical Coherence Tomography News featured the groups' paper on collaborative project with Argonne National laboratory "Cameron W Harvey, Huijing Du, Zhiliang Xu, Dale Kaiser, Igor Aranson, Mark Alber [2012], Interconnected Cavernous Structure of Bacterial Fruiting Bodies, PLoS Computational Biology 8 (12), e1002850": <http://www.octnews.org/>  
<http://www.octnews.org/articles/4355516/feature-of-the-week-2-17-13-using-optical-coherenc/>