

Curriculum Vitae

John Carlile Dallon

Department of Mathematics
Brigham Young University
344 TMCB
Provo, UT 84602-6539

Tel: (801) 422-6153
Fax: (801) 422-0504
Email: dallon@math.byu.edu
Web page: <http://www.math.byu.edu/~dallon>

Education

- Ph.D. University of Utah, mathematics. Thesis entitled *A Mathematical Study of Chemotaxis in Dictyostelium discoideum*. Supervised by Professor H. G. Othmer, 1996.
- M.A. University of Utah, mathematics, 1991.
- B.A. University of Utah, mathematics, 1989.

Professional Experience

- 2010–present *Professor* Department of Mathematics,
Brigham Young University
- 2018 January–June *Visitor*, Institut Pasteur, Paris France
- 2015 July – Dec *Visitor*, Newton Institute, Cambridge UK
- 2013 June–Dec *Visitor*, Department of Mathematics, Politecnico di Torino
- 2005–2010 *Associate Professor* Department of Mathematics,
Brigham Young University
- 2007 *Visiting Associate Professor* Division of Plastic Surgery, Department of Surgery,
Pennsylvania State University College of Medicine
- 1999–2005 *Assistant Professor* Department of Mathematics,
Brigham Young University
- 1998–1999 *Research Associate* Department of Mathematics,
Heriot-Watt University
EPSRC funded research in mathematical modeling
- 1996–1997 *Research Assistant* Mathematics Institute,
University of Warwick
EPSRC funded research in mathematical modeling

1992–1996	<i>Teaching Fellow and Research Fellow</i> , Department of Mathematics, University of Utah NIH funded research in mathematical modeling; teaching undergraduate mathematics courses
1991–1992	<i>Research Assistant</i> , Utah Supercomputing Institute, University of Utah Developing parallel code to be distributed across several workstations
1990–1991	<i>Vector Assistant</i> , Utah Supercomputing Institute, University of Utah Optimizing and vectorizing code to run on an IBM 3090; providing general assistance for users of the 3090
1989–1990	<i>Teaching Assistant</i> , Department of Mathematics, University of Utah NIH funded research in mathematical modeling; teaching undergraduate mathematics discussions

Research Interests

Mathematical biology - cell motion, chemotaxis in *Dictyostelium discoideum*, scar tissue formation and wound healing

Numerical solutions of non-linear partial differential equations

Multiscale modeling

Publications

Refereed Publications

1. Joy Song, Emily J. Evans, and J. C. Dallon. Cell Motion In Aggregate: A Mathematical Model of the Slug Stage of *Dictyostelium discoideum*. Submitted.
2. J.C. Dallon, Christopher P. Grant, Emily J. Evans, Cécile Leduc, Etienne-Manneville, and Stéphanie Portet. Using Fluorescence Recovery After Photobleaching data to uncover filament dynamics. *PLoS Comput Biol* **18**(9):e1010573 (2022) doi:10.1371/journal.pcbi.1010573
3. Bradley C. Naylor, Christian N. K. Anderson, Marcus Hadfield, David Parkinson, Austin Ahlstrom, Austin Hannemann, Chad R. Quilling, Kyle J. Cutler, Russell L. Denton, Robert Adamson, Thomas Angel, Rebecca S. Burrett, Paul S. Hafen, J. C. Dallon, Mark K. Transtrum, Robert D. Hayldahl, and John Price. Utilizing nonequilibrium isotope enrichments to dramatically increase turnover measurement ranges in single biopsy samples from humans. Accepted *Journal of Proteome Research* (2022) doi:10.1021acs.jproteome.2c00380
4. Stéphanie Portet, Sandrine Etienne-Manneville, Cécile Leduc, and John Dallon. Impact of noise on the regulation of intracellular transport of intermediate filaments. *Journal of Theoretical Biology* **547**:111183 (2022) doi:10.1016/j.jtbi.2022.111183
5. Devin Needs, Jonathan Blotter, J. C. Dallon, and J. Brent Feland. Development of Mathematical Model for Vibration Accelerated Wound Healing. *Journal of Biostatistics and Biometric Applications* **7**(1):101 (2022)

6. Mary Ellen Rosen and J. C. Dallon. A Mathematical Analysis of Focal Adhesion Lifetimes and Their Effect on Cell Motility. *Biophysical Journal* **121**(6):1070-1080 (2022) doi:10.1016/j.bpj.2022.02.003
7. Nathaniel Neubert, Emily J. Evans, and J. C. Dallon. How structural features of a spring-based model of fibrous collagen tissue govern the overall Young's Modulus. *Journal of Biomechanical Engineering* **144**(2):024501 (2022) doi:10.1115/1.4052113
8. Mary Ellen Rosen, Christopher P. Grant, and J. C. Dallon. Mean Squared Displacement for a discrete centroid model of cell motion. *PLOS ONE* **16**(12):e0261021 (2021) doi:10.1371/journal.pone.0261021
9. J. C. Dallon, Lynnae C. Despain, Emily J. Evans, and Christopher P. Grant A continuous-time stochastic model of cell motion in the presence of a chemoattractant. *Discrete Contin. Dyn. Syst. Ser. B.* **25**(12): 4839-4852 (2020) doi:10.3934/dcdsb.2020129
10. J. C. Dallon, E. J. Evans, Christopher P. Grant, and W. V. Smith. Cell Velocity is Asymptotically Independent of Force: A Differential Equation Model with Random Switching. *Journal of Differential Equations* **268**:301-317 (2019) doi:10.1016/j.jde.2019.08.019
11. Stéphanie Portet, Cécile Leduc, Sandrine Etienne-Manneville, and John Dallon. Deciphering the transport of elastic filaments by antagonistic motor proteins. *Physical Review E* (2019) doi:10.1103/PhysRevE.99.042414
12. J. C. Dallon, Cécile Leduc, Sandrine Etienne-Manneville, and Stéphanie Portet. Stochastic modeling reveals how motor protein and filament properties affect intermediate filament transport. *Journal of Theoretical Biology* (2019) **464**:132-148 doi:10.1016/j.jtbi.2018.12.022
13. J. C. Dallon, L. C. Despain, E. J. Evans, C. P. Grant, and W. V. Smith. A Continuous Time Mathematical Model of Centrally Controlled Motion with Random Switching Terms. *Journal of Mathematical Biology* (2017) **74**:727-753 doi:10.1007/s00285-016-1040-2
14. J. C. Dallon, E. J. Evans, and H. Paul Ehrlich. A Mathematical Model of Collagen Lattice Contraction. *Journal of the Royal Society Interface* (2014) **11**:20140598 doi:10.1098/rsif.2014.0598.
15. J. C. Dallon, E. J. Evans, Christopher P. Grant, and W. V. Smith. Cell Speed is Independent of Force in a Mathematical Model of Amoeboidal Cell Motion with Random Switching Terms. *Mathematical Biosciences* (2013) **246**(1): 1-7. doi:10.1016/j.mbs.2013.09.005.
16. J. C. Dallon, Matthew Scott, and W. V. Smith. A Force Based Model of Individual Cell Migration with Discrete Attachment Sites and Random Switching Terms. *Journal of Biomechanical Engineering* (2013) **135**(7):71008. doi: 10.1115/1.4023987.
17. J. C. Dallon, Brittany Dalton, and Chelsea Malani. Understanding Streaming in Dictyostelium discoideum: Theory versus Experiments. *Bulletin of Mathematical Biology* (2011) **73**(7), 1603-1626.
18. J. C. Dallon, H. Paul Ehrlich. Differences in the Mechanism of Collagen Lattice Contraction by Myofibroblasts and Smooth Muscle Cells. *Journal of Cellular Biochemistry* (2010) **111**, 362-369.
19. J. C. Dallon. Multiscale Modeling of Cellular Systems in Biology. *Current Opinion in Colloid and Interface Science* (2010) **15**(1-2), 24-31.

20. J. C. Dallon, Elijah Newren, and Marc D. H. Hansen. Using a mathematical model of cadherin-based adhesion to understand the function of the actin cytoskeleton. *Physical Review E* (2009) **79** (3), 031918.
21. J. C. Dallon, H. Paul Ehrlich. A Review of Fibroblast Populated Collagen Lattices. *Wound Repair and Regeneration* (2008) **16**, 472–479.
22. S. McDougall, J. C. Dallon, J. A. Sherratt and P. K. Maini. Fibroblast migration and collagen deposition during dermal wound healing: mathematical modelling and clinical implications. *Phil. Trans. R. Soc. Lond. A* (2006) **364**, 1385–1405.
23. J. C. Dallon, W. Jang, and R.H. Gomer: Mathematically modeling the effects of counting factor (CF) in Dictyostelium discoideum. *Math. Med. Biol.* (2006) **23**, 45–62.
24. J. C. Dallon and H. G. Othmer. How Cellular movement determines the collective force generated by the Dictyostelium discoideum slug. *Journal of Theoretical Biology* (2004) **231**, 203–222.
25. J. A. Sherratt and J. C. Dallon. Theoretical models of wound healing: past successes and future challenges. *Comptes Rendus de l'Academie des Sciences* (2002) **325**, 557–564.
26. J. C. Dallon, J. A. Sherratt and P. K. Maini. Modeling the Effects of Transforming Growth Factor-beta on Extracellular Matrix Alignment in Dermal Wound Repair. *Wound Repair and Regeneration* (2001) **9**(4), 278–286
27. J. C. Dallon, J. A. Sherratt, P.K. Maini and M. Ferguson. Biological Implications of a Discrete Mathematical Model for Collagen Deposition and Alignment in Dermal Wound Repair. *IMA Journal of Mathematics Applied in Medicine and Biology* (2000) **17**, 379–393.
28. J. C. Dallon and J. A. Sherratt. A Mathematical Model for Spatially Varying Extracellular Matrix. *SIAM Journal of Applied Mathematics* (2000) **61**(2), 506–527.
29. J. C. Dallon. Numerical Aspects of Discrete and Continuum Hybrid Models in Cell Biology. *Applied Numerical Mathematics* (2000) **32**(2), 137–159.
30. J. C. Dallon, J. A. Sherratt and P. K. Maini. Mathematical Modelling of Extracellular Matrix Dynamics using Discrete Cells: Fiber Orientation and Tissue Regeneration. *Journal of Theoretical Biology* (1999) **199**, 449–471.
31. L. Olsen, P. K. Maini, J. A. Sherratt and J. C. Dallon. Mathematical Modelling of Anisotropy in Fibrous Connective Tissue. *Mathematical Biosciences* (1999) **158**, 145–170.
32. J. C. Dallon and H. G. Othmer. A Continuum Analysis of the Chemotactic Signal Seen by Dictyostelium discoideum. *Journal of Theoretical Biology* (1998) **194**, 461–483
33. J. C. Dallon and J. A. Sherratt. A Mathematical Model for Fibroblast and Collagen Orientation. *Bulletin of Mathematical Biology* (1998) **60**(1), 101–129.
34. J. C. Dallon and H. G. Othmer. A Discrete Cell Model with Adaptive Signaling for Aggregation of Dictyostelium discoideum. *Phil. Trans. R. Soc. Lond. B* (1997) **352**, 391–417.

Edited books

35. H. G. Othmer, F. R. Adler, M. A. Lewis and J. C. Dallon, editors, *Case Studies in Mathematical Modeling - Ecology, Physiology, and Cell Biology*, Prentice Hall (1997).

Other publications

36. J. C. Dallon. Models with Lattice-free Center-based Cells Interacting with Continuum Environment Variables. In: *Single-Cell-Based Models in Biology and Medicine* (A.R.A. Anderson, M.A.J. Chaplain, K.A. Rejniak), Birkhaeuser, Basel (2007).
37. H. G. Othmer, B. Lilly and J. C. Dallon. Pattern Formation in a Cellular Slime Mold. *Numerical Methods for Bifurcation Problems and Large-scale Dynamical Systems*, Springer-Verlag. Volumes in Mathematics and its Applications (2000) **119**.
38. J. A. Sherratt, J. C. Dallon, T. Hofer and P. K. Maini. Mathematical modelling of signalling in Dictyostelium discoideum. In: *Microbial Signalling and Communication*, ed. R.R. England, G. Hobbs, N.J. Bainton, D. McL. Roberts, Cambridge University Press, (1999) pp. 241-254.
39. J. C. Dallon and H. G. Othmer. Models of Dictyostelium Aggregation. In: *Dynamics of Cell and Tissue Motion* (W. Alt, A. Deutsch, and G. Dunn editors), Birkhaeuser, Basel (1997).

Students

1. Mary Ellen Furner Rosen, Ph.D, Dissertation: Mean Square Displacement for a Discrete Centroid Model of Cell Motion and a Mathematical Analysis of Focal Adhesion Lifetimes and Their Effects on Cell Motility (2021)
2. Jared McBride, Masters Thesis: Steady State Configurations of Cells Connected by Cadherin Sites (2016)
3. Chris Loomis, Masters Thesis: Alternating Direct Implicit Method with Adaptive Grids for Modeling Chemotaxis in Dd (2015)
4. Lynnae Despain, Masters Thesis: A Mathematical Model of Amoeboid Cell Motion as a Continuous-Time Markov Process (2015)
5. Zijun Lan Dozier, Masters Thesis: Modeling the hydrolyzing action of secretory phospholipase A₂ with ordinary differential equations and Monte Carlo methods (2008)
6. Casey Johnson, Masters Thesis: A Mathematical model of adhesion interactions between living cells (2005)
7. Leslie Foster, Masters Thesis: Exploration of traveling wave solutions in a model for chronic wound healing (2003)
8. Elizabeth Hutchings, Masters Thesis: A mathematical model of collagen using viscoelastic elements (2002)
9. Andrea Perrine, Masters Project: Calcium waves in *Xenopus Laevis* oocytes (2001)

Invited Seminars and Conference Presentations

New Mexico State University, Las Cruces, NM Sept. 2022

Clarkston University, Postdam NY, Virtual, Jan. 2022

BIRS-CMO Workshop, Modeling and Computational Approaches to Individual and Collective Cell Movement in Complex Environments, Virtual, Sept, 2021

Cold Place MathBio Seminar, Virtual, July 2021

SMB annual meeting, Virtual, June 2021

University of Manitoba, Winnipeg Canada, May 2017

The 14th International Symposium on Computer Methods in Biomechanics and Biomedical Engineering, Tel Aviv Isreal, Sept 2016

Workshop: Cell Mechanics, Morphogenesis and Pattern Formation: perspectives from experimental and theoretical points of view, Cambridge UK, Sept 2015

Newton Institute, Cambridge UK, Aug 2015

SMB Georgia State, GA, July 2015

Duke University, NC Sept 10, 2014

Plenary Speaker at WHS Annual Meeting, Orlando Florida April 23-27, 2014

Lyon France, Dec 2013

CNR Rome Italy Oct 2013

INdAM Meeting: The Mathematics of Cells and Tissues, Cortona Italy Sept. 2013

Current Topic Workshop: Tissue Engineering and Regenerative Medicine, Mathematical Biosciences Institute, Ohio State University, April 2012

SIAM Life Science Meeting, Pittsburgh, PA, July 2010

CMPD 3, Bordeaux, France, June 2010

Workshop 5: Wound Healing, Mathematical Biosciences Institute, Ohio State University, March 2009

Workshop 2: Pattern Formation and Development in Colonial Organisms, Mathematical Biosciences Institute, Ohio State University, October 2008

SIAM Life Science Meeting, Montreal Canada, August 2008

Marrakesh World Conference on Differential Equations and Applications, Marrakesh Morocco, June 2006

CM06 Workshop III: Angiogenesis, NeoVascularization and Morphogenesis, IPAM, UCLA, May 2006

First International Conference on Recent Advances in Bifurcation Theory and Applications of Dynamical Systems, Jinhua China, June 2005

Department of Mathematics, Beijing University, June 2005

Department of Mathematics, Iowa State University, Feb 2005

Department of Mathematics, Washington State University, Dec 2004

Biocomplexity IV, Indiana University, May 2003

American Mathematical Association region meeting, University of Utah, Oct 2002

NSF RTG Nonlinear Dynamics in Biology (research training group), University of California, Davis, May 2002

Workshop on Theory and Modeling of Morphogenesis and Cell Interaction, University of Virginia, Departments of Biology, Cell Biology and Physics, Feb 2002

EuroMec Colloquium 422, University of Leeds, Leeds U.K., Dec 2001

Isaac Newton Institute for Mathematical Science program “From Individual to Collective Behaviour in Biological Systems”, Cambridge University, Cambridge U.K., Dec 2001

Brigham Young University, Department of Physics, Oct 2001

Stritch School of Medicine at Loyola University, Burn and Shock Trauma Institute, Chicago, Oct 2001

EuroMediterranean BioMathematics Association School, Siquenza Spain, June 2001 (Instructor)

University of Dundee, Department of Mathematics, Dundee U.K., May 1999

International Centre for Mathematical Sciences, From Single Cells to Continua: Micro-scale to Macro-scale Modelling, Edinburgh U.K., March 1999

Rensselaer Polytechnic Institute, Department of Mathematical Sciences, Feb 1999

Iowa State University, Department of Mathematics, Feb 1999

Arizona State University, Department of Mathematics, Jan 1999

Brigham Young University, Department of Mathematics, Jan 1999

University of Florida, Department of Mathematics, Jan 1999

University of Minnesota, IMA, Pattern Formation and Morphogenesis, Sep 1998

Brigham Young University, Department of Mathematics, April 1998

University of Oxford, Mathematical Institute, Oxford U.K., Nov 1997

University College London, Centre for Nonlinear Dynamics and its Applications, London U.K., Oct 1997

Smith and Nephew Pharmaceutical, York U.K., Oct 1997

University of Manchester, Molecular Basis of Cell and Tissue Organisation, Manchester U.K., Sep 1997

University of Leeds, Department of Mathematics, Leeds U.K., Feb 1997

University of Bristol, Engineering Mathematics Department, Bristol U.K., Feb 1997

Seminars and Conference Presentations

Annual Meeting of the Society of Mathematical Biology, Montreal Canada, July 2019

CAIMS, Edmonton Canada, June 2016

ASME 2012 Summer Bioengineering Conference (SBC2012), Fajardo, Puerto Rico, June 2012

TERMIS-EU, Granada, Spain, Jun 2011

Annual Meeting of the American Society for Cell Biology, Washington D.C., Dec 2007

Conference on Mathematics in Biology, Dundee Scotland, Aug 2003

International Conference on Mathematics in Biology, Hilo Hawaii, July 2001

Annual Educational Symposium of the Wound Healing Society, Albuquerque New Mexico, May 2001

University of Minnesota, Seminar in the Department of Mathematics, Dec 2000

Conference on Mathematics in Biology, Salt Lake City Utah, August 2000

ECMBC96, University of Heidelberg, Heidelberg Germany, Oct 1996