

Curriculum vitae
Mark Alun Lewis

- Address:** Department of Mathematics
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e-mail: mlewis@math.utah.edu
- Birth Date:** December 7, 1962
- Nationality:** Canadian; United States permanent resident
- Degrees:** *University of Oxford*
D.Phil. in Mathematics (Mathematical Biology), November 1990. Thesis entitled
“Analysis of Dynamic and Stationary Biological Pattern Formation.” Supervised by Pro-
fessor J. D. Murray, FRS.
- University of Victoria, Canada*
B.Sc., Double Major in Biology and Combined Mathematics/Computer Science, May 1987,
First Class.
- Positions:**
- 7/00–now** *Professor*
Department of Mathematics, University of Utah.
- 7/95–7/00** *Associate Professor*
Department of Mathematics, University of Utah.
- 5/95–now** *Adjunct Faculty*
Department of Biology, University of Utah.
- 7/93–now** *Affiliate Faculty*
Department of Applied Mathematics, University of Washington, Seattle.
- 4/99–7/99** *Senior Visitor*
Institute for Industrial and Applied Mathematics, University of Minnesota.
- 9/98–12/98** *Research Fellow*
Centre for Population Biology at Silwood Park, Imperial College, University of London.
- 95 winter** *Visiting Fellow*
Department of Ecology and Evolution, Princeton University (Sloan Research Fellow).
- 8/92–6/95** *Assistant Professor*
Department of Mathematics, University of Utah.
- 1/91–7/92** *Research Associate*
Mathematical Biology, jointly with the departments of Applied Mathematics and Zoology,
University of Washington, working with Professors J.D. Murray and P. Kareiva, and sup-
ported by an NSERC of Canada Postdoctoral Fellowship Award.
- 10/87–11/90** *Graduate Student*
Mathematical Biology, Mathematical Institute, University of Oxford, supervised by Pro-
fessor J.D. Murray.

- Awards:**
- (Faculty)** Alfred P. Sloan Research Fellowship, June 1994–September 1996; National Young Investigator Award (NSF), October 1994–September 1999, University of Utah Faculty Fellowship, April 1998–June 1998.
- (Postgraduate)** ICIAM Fellowship to give presentation at the International Conference on Industrial and Applied Mathematics, July 8–12, 1991; NSERC Postdoctoral Fellowship, University of Washington; Canadian Centennial Scholarship Fund (UK), Oxford; Overseas Research Studentship Award, Oxford; NSERC Postgraduate Scholarship, Oxford.
- (Undergraduate)** President’s Scholarship, University of Victoria; NSERC University Undergraduate Student Research Award; NSERC Industrial Undergraduate Student Research Award; Freedman King Scholarship for Natural History, University of Victoria.
- Grants:**
- National Science Foundation**, Mathematical Sciences: International Conference on Mathematics in Biology at the University of Utah, August 2000. Total Award amount: \$13,000.00.
- National Science Foundation**, Mathematical Sciences: Discrete-time models for biological invasions, August 1999 — July 2001. Award is joint with M. Neubert, M. Kot and B. Fagan. Total Award amount: \$380,000.00. Utah portion: \$127,500.
- National Science Foundation**, Mathematical Sciences: Gordon Research Conference on Theoretical Biology and Biomathematics, June 1998. Award is joint with J. Milton. Award amount: \$19,296.
- Funding Incentive Seed Grant Program**, University of Utah, Fluid flow model for optimizing high-frequency ventilation of the lung, April 1997 – September 1998. CoPIs D. Eyre, A. Fogelson, and S. Kern. Award amount: \$35,000.
- National Science Foundation**, Mathematical Sciences: Special Year in Mathematical Biology 1995-1996. Award is joint with H. Othmer and F. Adler. Award amount: \$309,124.
- Alfred P. Sloan Research Fellowship**, Mathematics: June 1994–September 1996. Award amount: \$30,000.
- National Science Foundation National Young Investigator Award:** October 1994 – July 2000. Award amount: \$187,802.
- National Science Foundation**, Mathematical Sciences: Modelling Territorial Patterns and Stability of Wolf-Deer Interactions, September 1992 – August 1995. Award amount: \$124,380.
- Environmental Protection Agency:** Developing Guidelines for the Assessment of “Spread Risk” Using Microbe Field Trial Data: A Model Based Approach, September 1992 – August 1994. Award is joint with P. Kareiva (project manager) and J.D. Murray. Award amount: \$163,858.

Selected Presentations (since 1995):

- 1995** Dept. Mathematics and Statistics, University of Victoria; Dept. Applied Mathematics, University of Washington, Seattle; Dept. Mathematics, University of British Columbia, Vancouver; Woods Hole Oceanographic Institute, Woods Hole; SWRIMS Conference on Mathematical Modeling in Population Biology, Logan, Utah.
- 1996** Spatial Ecology Working Group, NCEAS, Santa Barbara; International Conference on Dynamical Systems and Differential Equations, Missouri; Kyoto Conference on Mathematical Biology, Kyoto, Japan; NCEAS workshop on the role of dispersal in the Holocene expansion of trees, Santa Barbara; Society for Mathematical Biology Annual Meeting, Seattle; 3rd European Conference on Mathematics Applied to Biology and Medicine, Heidelberg, Germany.
- 1997** International Conference on Differential Equations with Applications to Biology, Halifax; Society for Mathematical Biology Annual Meeting, Raleigh; Species Range Working Group, NCEAS, Santa Barbara.

- 1998** Dept. Math, University of Minnesota; Dept. Applied Math, University of Washington; Institute for Theoretical Dynamics, University of Davis; Dept. Math, Duke University; Biostatistics, North Carolina State University; AMS Western Division Meeting, Davis; Dept. Biology, Arizona State University; Science at Breakfast Lecture, U Utah; Dept. Math, Bath University; Dept. Biology, Imperial College, University of London; Dept. Math, Heriot Watt University; Dept. Math, Dundee University; Kings College, Cambridge University; Dept. Math, University of Heidelberg; Institute for Theoretical Biology, Leiden University; Dept. Math Utrecht University; AMS Western Division Meeting, Tucson.
- 1999** Institute for Mathematics and its Applications Minneapolis; Theory and Mathematics in Biology and Medicine, Amsterdam; Ecological Society of America, Spokane; Oberwolfach, Germany.
- 2000** Dept. Math, University of Alberta; Dept. Math, University of Alberta; Dept. Math, University of British Columbia; Dept. Biology, University of Santa Barbara; UC San Diego Supercomputer Institute; Alberta Entomological Society; Max Planck Institute, Leipzig.
- Organized:** Co-organizer of Pacific Northwest Workshop in Mathematical Biology (1992); Special Year in Mathematical Biology (1995/96) at University of Utah; Co-chair of Gordon Conference on Theoretical Biology and Biomathematics (1998); Co-organizer of a workshop: 'From Individuals to Aggregations' at the IMA during Spring 1999; Organizer of the International Conference on Mathematics in Biology and Society for Mathematical Biology Annual Meeting (2000) at the University of Utah; Scientific Organizing Committee member, SIAM Life Sciences Conference, Boston (2001); Scientific Organizing Committee member, International Conference on Mathematics in Biology and Society for Mathematical Biology Annual Meeting (2001) in Hawaii.
- Editorial:** *IMA Journal of Mathematics Applied to Biology and Medicine* (Associate Editor from January 1996); *Journal of Theoretical Biology* (Editorial Board Member from March 1997); *Journal of Mathematical Biology* (Editorial Board Member from January 2000).
- Service:** President Elect, Society for Mathematical Biology (2000); Board of Directors, Society for Mathematical Biology (1996-1999).
- Supervised:** Greg Schmitz (MSc. by research, 1993), Shane Coors (MSc. by research, 1998), Steve Parrish (MSc. by research, 1998), Lora Ballinger (MSc. by research 1999), Chris Staskewicz (MSc. by research, current), Heidi Hileman (MSc. by research, current), Brenlyn Thiroit (MStat, current), Robert van Kirk (Ph.D. by research 1995), Tom Robbins (Ph.D. by research, current), Markus Owen (postdoc 1997-99), Bingtuan Li (postdoc 1999-)
- Societies:** American Mathematical Society (AMS), Ecological Society of America (ESA), Society for Industrial and Applied Mathematics (SIAM), Society for Mathematical Biology (SMB)

Journal Publications:

1. Hethcote, H.W., Lewis, M.A., van den Driessche, P.: An epidemiological model with a delay and non-linear incidence rate, *J. Math. Biol.* **27**:49–64 (1989).
2. Grindrod, P., Lewis, M.A., Murray, J.D.: A geometrical approach to wave-type solutions of excitable reaction-diffusion systems, *Proc. R. Soc. Lond.*, **A433**:151–164 (1991).
3. Lewis, M.A., Grindrod, P.: One-way blocks in cardiac tissue: A mechanism for propagation failure in Purkinje fibres, *Bull. Math. Biol.*, **53**:881–899 (1991).
4. Lewis, M.A., Murray, J.D.: Analysis of stable two-dimensional patterns in contractile cytogel, *J. Nonlin. Sci.* **3**:289–311 (1991).
5. Lewis, M.A., Murray, J.D.: Analysis of dynamic and stationary pattern formation in the cell cortex, *J. Math. Biol.* **31**:25–71 (1992).
6. Lewis, M.A., Kareiva, P.: Allee dynamics and the spread of invading organisms, *Theor. Pop. Biol.* **43**:141–158 (1993).
7. Lewis, M.A., van den Driessche, P.: Waves of extinction from sterile insect release, *Math. Biosci.* **116**:221–247 (1993).
8. Lewis, M.A., Murray, J.D.: Modelling territoriality and wolf-deer interactions, *Nature* **366**:738–740 (1993).
9. Sneyd, J., Atri, A., Ferguson, M.W.J., Lewis, M.A., Seward, W., Murray, J.D.: A model for the spatial patterning of teeth primordia in the Alligator: Initiation of the dental determinant, *J. Theor. Biol.* **165**:633–658 (1993).
10. Holmes, E.E., Lewis, M.A., Banks, J.E. and Veit, R.R.: Partial differential equations in ecology: spatial interactions and population dynamics, *Ecology* **75**:17–29 (1994).
11. Lewis, M.A.: Spatial coupling of plant and herbivore dynamics: The contribution of herbivore dispersal to transient and persistent “waves” of damage, *Theor. Pop. Biol.* **45**:277–312 (1994).
12. Sherratt, J.A., Lewis, M.A., Fowler, A.C.: Ecological chaos in the wake of invasion, *Proc. Nat. Acad. Sci.* **92**:2524–2528 (1995).
13. Neubert, M., Kot, M., Lewis, M.A.: Dispersal and pattern formation in a discrete-time predator-prey model, *Theor. Pop. Biol.* **48**:7–43 (1995).
14. White, K.J., Lewis, M.A., Murray, J.D.: A model for wolf-pack territory formation and maintenance *J. Theor. Biol.* **178**: 29–43 (1996).
15. Cruywagen G., Kareiva, P., Lewis, M.A., Murray, J.D.: Modelling the risk of spread of genetically engineered population in a spatially heterogeneous environment, *Theor. Pop. Biol.* **49**: 1–38 (1996).
16. Lewis, M.A., Schmitz, G., Kareiva, P., Trevors, J.: Models to examine containment and spread of genetically engineered microbes *J. Mol. Ecol.* **5**: 165–175 (1996).
17. Veit, R.R., Lewis, M.A.: Dispersal, population growth and the Allee Effect: Dynamics of the House Finch invasion of eastern North America *Am. Nat.* **148**: 255–274 (1996).
18. Kot, M., Lewis, M.A., van den Driessche, P.: Dispersal data and the spread of invading organisms *Ecology* **77**, 2027-2042 (1996).
19. Lewis, M.A., Schmitz, G.: Biological invasion of an organism with separate mobile and stationary states: Modeling and analysis *Forma* **11**: 1–25 (1996).
20. White, K.J., Lewis, M.A., Murray, J.D.: Wolf-deer interactions: a mathematical model. *Proc. Roy. Soc. B* **263**: 299–305 (1996).
21. Van Kirk, R.W., Lewis, M.A.: Integrodifference models for persistence in fragmented habitats *Bull. Math. Biol.* **59**: 107–138 (1997).
22. Lewis, M.A., White, K.A.J., Murray, J.D.: Analysis of a model for territorial pattern formation in wolves *J. Math. Biol.* **35**: 749–774 (1997)
23. Sherratt, J.A., Eagan, B.T., Lewis, M.A.: Oscillations and chaos behind predator-prey invasion: Mathematical artifact or ecological reality? *Phil. Trans. Roy. Soc. B* **352**: 21–38 (1997).
24. Ermentrout, B., Lewis, M.A.: Pattern formation in systems with one spatially distributed species *Bull. Math. Biol.* **59**: 533–550 (1997).
25. Clark, J. Fastie, C. Hurtt, G., Jackson, S., Johnson, C., King, G., Lewis, M., Lynch, J., Pacala, S., Prentice, C., Schupp, G, Webb, T., Wyckoff, P: Dispersal theory offers solutions to Reid’s Paradox of rapid plant migration. *BioScience* **48**:13–24 (1998).

26. Moorcroft, P.R., Lewis, M.A., Crabtree: Home range analysis using a mechanistic home range model. *Ecology* **80**: 1656–1665 (1999).
27. Van Kirk, R.W., Lewis, M.A.: Edge Permeability and population persistence in isolated habitat patches *Natural Resources Modeling* **12**:37–64 (1999).
28. Neubert, M.G., Kot, M., Lewis, M.A.: Invasion speeds in fluctuating environments. *Proc. Roy. Soc. Lond. B* **267** 1603–1610 (2000).
29. Lewis, M.A., Pacala, S.: Modeling and analysis of stochastic invasion processes (in press *J. Math. Biol.*).
30. Lewis, M.A.: Spread rate for a nonlinear stochastic invasion. (in press *J. Math. Biol.*).
31. Clark, J.S., Horvath, L., Lewis, M.A.: On the estimation of spread rate for a biological population. (in press *Statistics and Probability Letters*).
32. Keitt, T.H., Lewis, M.A., Holt, R.D.: Allee dynamics, critical phenomena and species' borders (in press *Am. Nat.*).

Other Publications:

33. Kareiva, P., Settle, W., Lewis, M.A.: The significance of vegetation structure as a constraint on insect mobility: Implications for pest management, *in Ecological Processes in Agro-Ecosystems* (Shiyomi, M., Yano, E., Koizumi, H., Andow, D.A. and Nobuhiko, H., eds.) pp. 67–78 (1992).
34. Lewis, M.A.: Variability, patchiness and jump dispersal in the spread of an invading population, Chapter 3 In: *Spatial Ecology: The Role of Space in Population Dynamics and Interspecific Interactions* (D. Tilman and P. Kareiva Eds.), Princeton University Press, pp. 46–69 (1997).
35. White, K.J., Lewis, M.A., Murray, J.D.: On wolf territoriality and deer survival, Chapter 6 In: *Modeling Spatiotemporal Dynamics* (R.V. Sole and J. Bascompte eds.), Landes Bioscience, pp. 105–126 (1998).

In Review:

36. Clark, J.S., Lewis, M.A., Horvath, L: Invasion by extremes: variation in dispersal and reproduction retards spread. (submitted to *Am. Nat.*)
37. Owen, M, Lewis, M.A.: The mechanics of lung tissue under high frequency ventilation (submitted to *SIAM Journal on Applied Mathematics*).
38. Lewis, M.A., Moorcroft, P.R.: ESS analysis of mechanistic home range models: the value of signals in spatial resource partitioning. (submitted to *Evolutionary Ecology Research*).
39. Weinberger, H.F, Lewis, M.A., Li, B.: Analysis of the linear conjecture for spread in cooperative models (submitted to *J Math. Biol.*).
40. Lewis, M.A., Li, B., Weinberger, H.F.: Spreading speed and the linear conjecture for two-species competition models. (submitted to *J Math. Biol.*).
41. Owen, M, Lewis, M.A.: Can predation slow, stall or reverse a prey invasion? (submitted to *Bull. Math. Biol.*).

Manuscripts:

42. Moorcroft, P., Lewis, M.A.: Home Range Patterns: Mechanistic Approaches to the Analysis of Animal Movement (in preparation). To be published as a Princeton Monograph in Population Biology.
43. Lewis, M.A.: Spatial spread in a stochastic Fisher model. (draft).
44. Fagan, W., Lewis, M.A., Neubert, M.G., van den Driessche P.: Invasion theory and biological control (draft).
45. Lewis, M.A., Stevens, A., Anderson, A.: A stochastic framework for nonlinear PDE fluxes (in preparation).
46. Holt, R., Keitt, T., Lewis, M.A., Maurer, B., Taper, M.: Theoretical models of species' borders: single species approaches (in preparation).

Book:

47. Othmer, H.G., Adler, F.R., Lewis, M.A., Dallon, J.C.: *Mathematical Modeling in Biology: Case Studies in Ecology, Physiology and Cell Biology*. Prentice Hall. (1997). ISBN 0–13–574039–8.

Book Review:

48. Lewis, M.A.: Review of 'Growth and Diffusion Phenomena: Mathematical Frameworks and Applications, by Robert B. Banks' *Bull. Math. Biol.* **58**: 205–206 (1996).