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FREDERICK R. ADLER

Curriculum vitae

Professor
Department of Mathematics and Department of Biology
University of Utah
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Research interests: Mathematical ecology, mathematical epidemiology, mathematical immunology, biodiversity, optimal foraging theory, evolutionary ecology, cystic fibrosis

EDUCATION

Ph.D. Cornell University, Applied Mathematics, August 1991
Thesis title: *Models of Structured Populations*
Thesis advisor: Simon A. Levin

M.S. Cornell University, Applied Mathematics, July 1989

B.A. Harvard-Radcliffe College, Mathematics, June 1984

HONORS AND AWARDS

2009 Faculty of 1000 Biology

2009 University of Utah Distinguished Mentor Award

1989-90 Mathematical Sciences Institute Graduate Fellow

1985-87 A.D. White Fellowship, Cornell University

1984 Phi Beta Kappa, Harvard University

PROFESSIONAL EXPERIENCE

2004- Professor, Department of Mathematics and
Department of Biology, University of Utah

2000 Visiting Faculty Fellow, Department of Ecology and Evolutionary Biology
Princeton University

1998-04 Associate Professor, Department of Mathematics and
Department of Biology, University of Utah

1993-98 Assistant Professor, Department of Mathematics and
Department of Biology, University of Utah

1991-92 Visiting Postdoctoral Researcher, Center for Population Biology
University of California at Davis
Marc Mangel, Mentor

1987-90 Teaching Assistant, Cornell University

1984-85 Research Assistant, National Water Alliance, Washington, D.C.

RECENT GRANTS

2011-13 Mitochondrial fitness variation in a naturally replicated evolutionary experiment (NSF, J. Seger, PI)

2011-12 Mathematical modeling and statistical analysis of interacting respiratory infections (University of Utah, F. R. Adler)

2009-14 Pathogen adaptation to specific host genotypes (NSF, W. Potts, PI)

2007-11 The Ecology and Evolution of the Common Cold (James S McDonnell Foundation, F. Adler, PI)

2006-08 Polymicrobial disease and inflammation in cystic fibrosis (NIH, T. G. Liou, PI)

2004-08 The Effect of Anthropogenic Disturbance on the Dynamics of Sin Nombre (NSF, D. Dearing, PI)

2004-07 How Competition and Parasitism Control Diversity in Ant Communities: Testing a Mechanistic Theory, (NSF, D. H. Feener, PI)

POST-DOCTORAL SCHOLARS

2011- Suma Ghosh

2010- Samit Bhattacharyya

2010- Nicole Lewis-Rogers

2009-11 Subhra Bhattacharya

2008-11 Peter Kim

2007-10 Damon Toth

2005-07 Jonathan Forde

GRADUATE STUDENTS: PhD

2010- Benjamin Hardisty, Department of Biology

2009- Andrew Basinski, Department of Mathematics

2007- James Moore, Department of Mathematics

2007- Chris Remien, Department of Mathematics

2007- Erica Graham, Department of Mathematics

2006-11 Sean Laverty, Department of Mathematics

2005-10 Giao Huynh, Department of Mathematics

2004-08 Brendan O'Fallon, Department of Biology

2002-08 Luciano Valenzuela, Department of Biology

2003-09 Amber Smith, Department of Mathematics

2003-10 Courtney Davis, Department of Mathematics

2002-07 Meagan McNulty, Department of Mathematics

2002- Aaron McDonald, Department of Mathematics

2002-07 John Zobitz, Department of Mathematics

2002-08 Colby Tanner, Department of Biology

1999-06 Tim Brown, Department of Biology

1996-02 Thomas Hills, Department of Biology, PhD

1993-00 Stephen Proulx, Department of Biology, PhD
1996-00 Adam Kay, Department of Biology, PhD

RECENT COURSES TAUGHT

2011 Mathematical Models in Biology, Biology 5910
2011 Mathematics for Life Scientists, Mathematics 1170
2011 Mathematical Biology II, Mathematics 5120
2010 Mathematical Biology I, Mathematics 5110
2010 Advanced Statistics in R, Biology 6500
2010 Summer REU in mathematical biology
2010 Mathematical Biology II, Mathematics 6780
2009 Science and Literature (with K. Coles) Math 5750
2009 Urban Ecology, Biology 5440
2008-09 Calculus for Biologists (Math 1170-1180)
2007 Science and Literature (with K. Coles), Biology 5960-5
2007 Urban Ecology (with C. Tanner), Biology 5960-3

EDITORIAL BOARDS

1998-02 Ecology, Ecological Applications, Ecological Monographs
2007- PLoSONE
2008- The American Naturalist
2009- Ecology Letters

CONFERENCES ORGANIZED

2010 Organized Oral Session on Plant Signaling, Ecology Society of America
2009 Quantitative Biology Workshop
Utah Symposium on Science and Literature:
Mathematics, Language and Imagination
2008 RTG Workshop: Mathematical Perspective on Cancer Immunology
Utah Symposium on Science and Literature: Measuring Scale
2005 Utah Symposium on Science and Literature: Some Re-Assembly Required
2003 Session Chair, Gordon Conference on Theoretical Ecology
2003 VIGRE Minicourse on Biological Invasions
1995 Fall Quarter of Special Year in Mathematical Biology
Organized Mathematics 675 with visiting lecturers
Minisymposium on Territoriality with 6 invited speakers

References

[1] Remien, C.H. and Adler, F.R. and Waddoups, L. and Box, T.D. and Sussman, N.L. Mathematical modeling of liver injury and dysfunction after acetaminophen overdose: Early discrimination between survival and death. *Hepatology*, (in press), 2012.

[2] J.M.C. Pearce-Duvet, M. Moyano, F.R. Adler, and D.H. Feener. Fast food in ant communities: how competing species find resources. *Oecologia*, 167: 229-240, 2011.

[3] G.T. Huynh and F.R. Adler. Alternating Host Cell Tropism Shapes the Persistence, Evolution and Coexistence of Epstein–Barr Virus Infections in Human. *Bulletin of Mathematical Biology*, (in press), 2011.

[4] G.T. Huynh and F.R. Adler. Mathematical modeling the age dependence of Epstein-Barr virus associated infectious mononucleosis. *Mathematical Medicine and Biology*, (in press), 2011.

[5] F. R. Adler. The effects of intraspecific density dependence on species richness and species abundance distributions. *Theoretical Ecology*, 4:153–162, 2011.

[6] A.M. Smith, J.A. McCullers, and F.R. Adler. Mathematical model of a three-stage innate immune response to a pneumococcal lung infection. *Journal of Theoretical Biology*, (in press), 2011.

[7] A.M. Smith, F.R. Adler, J. L. McAuley, R. N. Gutenkunst, R. M. Ribeiro, J. A. McCullers, and A. S. Perelson. Effect of 1918 PB1-F2 expression on influenza A virus infection kinetics. *PLoS Computational Biology*, 7:e1001081, 2011.

[8] S. R. Proulx and F.R. Adler. The standard of neutrality: still flapping in the breeze?. *Journal of Evolutionary Biology*, 23:1339-1350, 2010.

[9] J. Seger, W.A. Smith, J.J. Perry, J. Hunn, Z.A. Kaliszewska, L. La Sala, L. Pozzi, V.J. Rowntree, and F.R. Adler. Gene genealogies strongly distorted by weakly selected mutations in constant environments. *Genetics*, 184:529-545, 2010.

[10] B. O'Fallon, J. Seger, and F. R. Adler. A continuous-state coalescent and the impact of weak selection on the structure of gene geneaologies. *Molecular Biology and Evolution*, 27:1162–1172, 2010.

[11] A.M. Smith, F.R. Adler, and A.S. Perelson. An accurate two-phase approximate solution to an acute viral infection model. *Journal of Mathematical Biology*, 60:711-726, 2010.

[12] M.A. Christman, J.S. Sperry, and F.R. Adler. Testing the 'rare pit' hypothesis for xylem cavitation resistance in three species of Acer. *New Phytologist*, 182:664–674, 2009.

[13] C. J. Tanner and F. R. Adler. To fight or not to fight: context-dependent interspecific aggression in competing ants. *Animal Behaviour*, 77:297–305, 2009.

[14] S. M. Laverty and F. R. Adler. The role of age structure in the persistence of a chronic pathogen in a fluctuating population. *Journal of Biological Dynamics*, 3:224-234, 2009.

[15] F. R. Adler, C. A. Clay and E. M. Lehmer. The role of heterogeneity in the persistence and prevalence of Sin Nombre Virus in deer mice. *American Naturalist*, 172:855-867, 2008.

[16] F. R. Adler, J. M. C. Pearce-Duvet and M. D. Dearing. How host dynamics translate into time-lagged prevalence: an investigation of Sin Nombre Virus in deer mice. *Bulletin of Mathematical Biology*, 70:236-252, 2008.

[17] B. O'Fallon, Adler F. R., and S. R. Proulx. Quasispecies evolution in subdivided populations favours maximally deleterious mutations. *Proc. Roy. Soc. of London B* 274:3159–3164, 2007.

[18] T. G. Liou, F. R. Adler, B. Cahill and D. R. Cox. Lung Transplantation and Survival in Children with Cystic Fibrosis. *New England Journal of Medicine*, 357:2143-2152, 2007.

[19] K. R. Groch, J. T. Palazzo Jr., P. A. C. Flores, F. R. Adler, and M. E. Fabian. Recent rapid increases in the right whale (*Eubalaena australis*) population off southern Brazil. *LAJAM*, 4:41–47, 2007.

[20] F. R. Adler and E. G. LeBrun and D. H. Feener Jr.. Maintaining diversity in an ant community: Modeling, extending, and testing the dominance-discovery tradeoff. *The American Naturalist* 169:323–333, 2007.

[21] F. R. Adler. Commentary on Calcagno *et al* (2006): Coexistence in a metacommunity: the competition-colonization tradeoff is not dead. *Ecology Letters*, 9:907–909, 2006.

[22] B. O'Fallon and F. R. Adler. Stochasticity, complex spatial structure, and the feasibility of the shifting balance theory. *Evolution* 60: 448-459, 2006.

[23] W. J. Koppelman and F. R. Adler. Do rhinoviruses follow the neutral theory? the role of cross-immunity in maintaining the diversity of the common cold. In Z. L. Feng, U. Dieckmann, and S. A. Levin, editors, *Disease evolution: Models, concepts, and data analyses*, 181–192. American Mathematical Society, 2006.

[24] K. Chase, D. R. Carrier, F. R. Adler, E. A. Ostrander, and K.G. Lark. Interaction between the X chromosome and an autosome regulates size sexual dimorphism in Portuguese Water Dogs. *Genome Research*, 15:1820–1824, 2005.

[25] B. R. Jackson, A. Thomas, K. C. Carroll, F. R. Adler, and M. H. Samore. Use of strain typing data to estimate bacterial transmission rates in healthcare settings. *Infection Control and Hospital Epidemiology*, 26:638–645, 2005.

[26] F. R. Adler and Muller-Landau, H. C. When do localized natural enemies increase species richness? *Ecology Letters*, 8: 438–447, 2005.

[27] T. G. Liou, F. R. Adler and D. Huang. Use of Lung Transplantation Survival Models to Refine Patient Selection in Cystic Fibrosis, *American Journal of Respiratory and Critical Care Medicine*, 171: 1053–1059 2005.

[28] F.R. Adler. *Modeling the Dynamics of Life: Calculus and Probability for Life Scientists: 2nd edition.* Brooks/Cole, Pacific Grove, 2005.

[29] E. E. McClelland, Adler F.R., Granger D.L., and Potts W.K. Major histocompatibility complex controls the trajectory but not host-specific adaptation during virulence evolution of the pathogenic fungus cryptococcus neoformans. *Proc. Roy. Soc. of London B*, 271:1557–1564, 2004.

[30] K. Chase, D.F. Lawler, F.R. Adler, E. A. Ostrander, and K.G. Lark. Bilaterally asymmetric effect of quantitative trait loci (QTLs):QTLs that affectlaxity in the right versus left coxofemoral (hip) joints of the dog (Canis familiaris). *American Journal of Medical Genetics*, 124A:239–247, 2004.

[31] A. D. Kay and F. R. Adler. Optimal tempo and defense for consumers of multiple resources. *Evolutionary Ecology Research*, 5:701–716, 2003.

[32] F. R. Adler and D. M. Gordon. Optimization, conflict, and non-overlapping foraging ranges in ants. *American Naturalist*, 162: 529-543, 2003.

[33] S. L. Elliot, F. R. Adler, and M. W. Sabelis. How virulent should a parasite be to its vector? *Ecology*, 84:2568-2574, 2003.

[34] K. McCulloh, F. R. Adler and J. Sperry. Water transport in plants obeys Murray's law. *Nature*, 421:939–942, 2003.

[35] F. R. Adler and J. Mosquera. Super- and coinfection: Filling the range. In U. Dieckmann, H. Metz, M. Sabelis, and K. Sigmund, editors, *Virulence Management: The Adaptive Dynamics of Pathogen-Host Interactions*, pages 138–149. Cambridge University Press, 2002.

[36] K. Chase, D. R. Carrier, F.R. Adler, T. Jarvik, E. A. Ostrander, T. D. Lorentzen, and K.G. Lark. Genetic basis for systems of skeletal quantitative traits: Principal component analysis of the canid skeleton. *Proc. Nat. Acad. Sci.*, 99:9930–9935, 2002.

[37] J. L. Cherry, F. R. Adler, and K. P. Johnson. Islands, equilibria, and speciation. *Science*, 296:975, 2002.

[38] T. T. Hills and F. R. Adler. Time's crooked arrow: Rate-biased time perception and optimal foraging. *Animal Behavior*, 64:589–597, 2002.

[39] T. G. Liou, F. R. Adler, B. C. Cahill, S. C. FitzSimmons, D. Huang, J. R. Hibbs, and B. C. Marshall. Priorities for lung transplantation among patients with cystic fibrosis. *Journal of the American Medical Association*, 287:1525, 2002.

[40] T. G. Liou, B. C. Cahill, F. R. Adler, and B. C. Marshall. Selection of patients with cystic fibrosis for lung transplantation. *Current Opinion in Pulmonary Medicine*, 8:535–541, 2002.

[41] J. Seger and F. R. Adler. Mathematical models. In M. Pagel, editor, *Encyclopedia of Evolution*, pages 684–688. Oxford University Press, 2002.

[42] T. Milac, F. R. Adler, and G. R. Smith. Maximal power tests for detecting defects in meiotic recombination. *Genetics*, 161:1333–1337, 2002.

[43] F. R. Adler, A. de Roos, and S. Richards. Patterns of patch rejection in size-structured populations: Beyond the ideal free distribution and size segregation. *Evolutionary Ecology Research*, 3:805–827, 2001.

[44] T. G. Liou, F. R. Adler, B. C. Cahill, S. C. FitzSimmons, J. R. Hibbs, and B. C. Marshall. A predictive 5-year survivorship model of cystic fibrosis. *American Journal of Epidemiology*, 153:345–352, 2001.

[45] T. G. Liou, F. R. Adler, B. C. Cahill, S. C. FitzSimmons, D. Huang, J. R. Hibbs, and B. C. Marshall. Survival effect of lung transplantation among patients with cystic fibrosis. *Journal of the American Medical Association*, 286:2683–2689, 2001.

[46] F. R. Adler and J. Mosquera. Is space necessary? Interference competition and limits to biodiversity. *Ecology*, 81:3226–3232, 2000.

[47] J. Cherry and F. R. Adler. How to make a biological switch. *Journal of Theoretical Biology*, 203:117–133, 2000.

[48] K. J. Johnson, F. R. Adler, and J. Cherry. Evolutionary and phylogenetic predictions of island biogeography. *Evolution*, 54:387–396, 2000.

[49] F. R. Adler. The balance of terror: An alternative mechanism for competitive tradeoffs and its implications for invading species. *American Naturalist*, 154:497–509, 1999.

[50] F. R. Adler and D. Grunbaum. Evolution of forager responses to inducible defenses. In C. D. Harvell and R. Tollrian, editors, *Ecology and Evolution of Inducible Defenses*, pages 259–285. Princeton University Press, 1999.

[51] F. R. Adler and M. Kotar. Departure time versus departure rate: How to forage optimally when you are stupid. *Evolutionary Ecology Research*, 11:411–421, 1999.

[52] K.G. Lark, K. Chase, F.R. Adler, L.M. Mansur, and J.H. Orf. Genetics of soybean agronomic traits: Comparison of three related recombinant inbred populations. *Crop Science*, 39:1642–1651, 1999.

[53] K.G. Lark, K. Chase, F.R. Adler, L.M. Mansur, and J.H. Orf. Genetics of soybean agronomic traits ii: Interactions between yield quantitative trait loci in soybean. *Crop Science*, 39:1652–1657, 1999.

[54] F.R. Adler. *Modeling the Dynamics of Life: Calculus and Probability for Life Scientists*. Brooks/Cole, Pacific Grove, 1998.

[55] K. Chase, F. R. Adler, K. Miller-Stebbings, and K. G. Lark. Teaching a new dog old tricks: Identifying quantitative trait loci using lessons from plants. *Journal of Heredity*, 90:43–51, 1998.

[56] J. Mosquera and F. R. Adler. Evolution of virulence: A unified framework for coinfection and superinfection. *Journal of Theoretical Biology*, 195:293–313, 1998.

[57] J. Sperry, F. R. Adler, G. S. Campbell, and J. C. Comstock. Limitation of plant water use by rhizospher and xylem conductance: results from a model. continuum: results from a model. *Plant, Cell and Environment*, 21:347–360, 1998.

[58] K. Chase, F. R. Adler, and K. G. Lark. Epistat: a computer program for identifying and testing interactions between pairs of quantitative trait loci. *Theoretical and Applied Genetics*, 94:724–730, 1997.

[59] M. A. Lewis H. G. Othmer, F.R. Adler and J. C. Dallon. *Case Studies in Mathematical Modeling: Ecology Physiology and Cell Biology*. Prentice Hall, Upper Saddle River, New Jersey, 1997.

[60] F. R. Adler. A model of self-thinning through local competition. *Proc. Nat. Acad. Sci.*, 93:9980–9984, 1996.

[61] R. Karban and F. R. Adler. Induced resistance to herbivores and the information content of early season attack. *Oecologia (Berlin)*, 107:379–385, 1996.

[62] D. W. Winkler and F. R. Adler. Dynamic state variable models for parental care: I. A submodel for the growth of the chicks of passerine birds. *Journal of Avian Biology*, 27:343–353, 1996.

[63] J.B. Losos and F.R. Adler. Stumped by trees? a generalized null model for patterns of organismal diversity. *American Naturalist*, 145:329–342, 1995.

[64] K.G. Lark, K. Chase, F.R. Adler, L.M. Mansur, and J.H. Orf. Interactions between quantitative trait loci in soybean in which trait variation at one locus in conditional upon a specific allele at another. *Proc. Nat. Acad. Sci.*, 92:4656–4660, 1995.

[65] W.F. Morris, M. Mangel, and F.R. Adler. Mechanisms of pollen deposition by insect pollinators. *Evolutionary Ecology*, 9:304–317, 1995.

[66] F. R. Adler and R. Karban. Defended fortresses or moving targets? another model of inducible defenses inspired by military metaphors. *American Naturalist*, 144:813–832, 1994.

[67] F. R. Adler and B. Nuernberger. Persistence in patchy, irregular landscapes. *Theoretical Population Biology*, 45:41–75, 1994.

[68] F. R. Adler and W. F. Morris. A general test for interaction modifications. *Ecology*, 75:1552–1559, 1994.

[69] M. Mangel and F.R. Adler. Construction of multidimensional clustered spatial patterns. *Ecology*, 75:1289–1298, 1994.

[70] M. Mangel, J.A. Rosenheim, and F.R. Adler. Clutch size, offspring performance, and intergenerational fitness. *Behavioral Ecology*, 5:412–417, 1994.

[71] F. R. Adler. Migration alone can produce persistence of host-parasitoid models. *American Naturalist*, 141:642–650, 1993.

[72] M. Kretzschmar and F. R. Adler. Aggregated distributions in models for patchy populations. *Theoretical Population Biology*, 43:1–30, 1993.

[73] F. R. Adler. The effects of averaging on the basic reproductive ratio. *Mathematical Biosciences*, 111:89–98, 1992.

[74] F. R. Adler and D. M. Gordon. Information collection and spread by networks of patrolling ants. *American Naturalist*, 140:373–400, 1992.

[75] F. R. Adler and M. Kretzschmar. Aggregation and stability in parasite-host models. *Parasitology*, 104:199–205, 1992.

[76] F. R. Adler and R. Brunet. The dynamics of simultaneous infection with altered susceptibilities. *Theoretical Population Biology*, 40:369–410, 1991.

[77] F. R. Adler. Coexistence of two types on a single resource in discrete time. *Journal of Mathematical Biology*, 28:695–713, 1990.

[78] F. R. Adler and C. D. Harvell. Inducible defenses, phenotypic plasticity and biotic environments. *Trends in Ecology and Evolution*, 5:407–410, 1990.

[79] S. A. Levin, L. A. Segel, and F. R. Adler. Diffuse coevolution in plant-herbivore communities. *Theoretical Population Biology*, 37:171–191, 1990.