

Biographical Sketch

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A. Expertise I am a mathematical biologist with particular interest and expertise in models of population dynamics and the role of tradeoffs in maintaining biodiversity. My work has focused on developing novel modeling approaches to the tradeoffs involved in interaction among many different sorts of organism, including the competition-colonization tradeoff, the dominance-discovery tradeoff, and the growth-defense tradeoff. My work on host-pathogen dynamics has examined how these tradeoffs interact with defenses, space and specialization to shape ecological communities and the evolution of pathogen virulence.

My experience with fitting models to long-term data includes analysis of a complex multi-year/multisite measurements of Sin Nombre hantavirus and deer mice to deduce which characteristics of males and females lead to higher infection prevalence in males. I have statistically analyzed short-term interactions between species of ants in order to predict patterns of coexistence and rarity, and used carefully parameterized models to make long-term theoretical predictions.

My skill in cross-disciplinary graduate training, recognized recently by the University of Utah's Distinguished Mentor award, and in collaboration will enhance both training and building of intellectual infrastructure in interdisciplinary research.

B. Professional Training

Harvard-Radcliffe College	Mathematics,	B.A. , 1984
Cornell University	Applied Mathematics,	M.A. , 1989
Cornell University	Applied Mathematics,	Ph.D. , 1991
University of California, Davis	Center for Population Biology	Post-doc, 1991-1992

C. Professional Appointments

University of Utah	Professor of Biology and Mathematics	2004-present
University of Utah	Associate Professor of Biology and Mathematics	1999-2004
Princeton University	Visiting Faculty Fellow	2000
University of Utah	Assistant Professor of Biology and Mathematics	1993-1999

D. Products Five publications most relevant to proposed project

1. F. R. Adler. The effects of intraspecific density dependence on species richness and species abundance distributions. *Theoretical Ecology*, 4:153–162, 2011.
2. 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.
3. 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.

4. F. R. Adler and Muller-Landau, H. C. When do localized natural enemies increase species richness? *Ecology Letters*, 8: 438–447, 2005.
5. 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.

Five other significant publications

1. C. H. Remien, F. R. Adler, L. Waddoups, T. D. Box, and N.L. Sussman. Mathematical modeling of liver injury and dysfunction after acetaminophen overdose: Early discrimination between survival and death. *Hepatology*, 56:727–734, 2012
2. F.R. Adler. *Modeling the Dynamics of Life: Calculus and Probability for Life Scientists: 3rd edition*. Brooks/Cole, Pacific Grove, 2012.
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*, 73:1754–1773, 2011.
4. J. Waite, A. Henry, F. R. Adler, and D. Clayton. Sex-specific effects of an avian malaria parasite on an insect vector: support for the resource limitation hypothesis. *Ecology*, 93:2448–2455, 2012.
5. T. G. Liou, F. R. Adler, B. Cahill and D. R. Cox. The Effects of Lung Transplantation on Survivorship in Children with Cystic Fibrosis. *New England Journal of Medicine*, 357:2143–2152, 2007.

E. Synergistic Activities

1. Appointed “College of Science Professor” at the University of Utah to develop a new course “The Role of Mathematics in Medicine” for undergraduates in biology and mathematics.
2. Development of a new course “Urban Ecology” at the University of Utah, textbook *Urban Ecosystem: Ecological Principles for the Built Environment*, to appear in April 2013 from Cambridge University Press.
3. Organized summer Research Experience for Undergraduates on “Ants, Immunology and Epidemiology” for the VIGRE program at the University of Utah (June, 2009).
4. Development of a new course “Calculus for Biologists” and the University of Utah, including writing the textbook *Modeling the Dynamics of Life: Calculus and Probability for Life Scientists*, Third edition (Brooks/Cole, Pacific Grove, 2012).
5. Organized a minicourse on “The Mathematics behind Biological Invasions” as part of the VIGRE program at the University of Utah (2003).