

Michael A. Gilchrist, Ph.D.
Associate Professor

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Faculty Positions

2010 - Present

Associate Professor
Department of Ecology & Evolutionary Biology
University of Tennessee, Knoxville TN

2004 - 2010

Assistant Professor
Department of Ecology & Evolutionary Biology
University of Tennessee, Knoxville TN

Research Positions

2002 - 2004

Post-Doctoral Research Associate
Department of Biology
University of New Mexico, Albuquerque NM
Supervisor: Dr. Andreas Wagner

2001 - 2002

Post-Doctoral Research Associate
Division of Theoretical Biology and Biophysics
Los Alamos National Laboratory, Los Alamos NM
Supervisor: Dr. Alan S. Perelson

Education

1996 - 2001

Ph.D. Department of Biology
Duke University, Durham NC
Supervisors: Drs. William G. Wilson and Janis Antonovics

1994 - 1996

M.A. Department of Ecology, Evolution, and Marine Biology
University of California, Santa Barbara
Supervisor: Dr. Alice Alldredge

1989 - 1993

B.A. Environmental Sciences
University of California at Berkeley
Emphasis: Biology

Grants

Funded

TITLE: Employing Models of Evolution and Protein Translation to Infer Protein Production Rates from Genomic Data

FUNDING AGENCY: National Science Foundation: Division of Molecular and Cellular Biosciences, Program on Genetic Mechanisms

FUNDING PERIOD: August 2011 to July 2014

AMOUNT: \$711,501

ROLE: PI

TITLE: National Institute for Mathematical and Biological Synthesis

FUNDING AGENCY: National Science Foundation: Emerging Frontiers Panel

FUNDING PERIOD: September 2009 - August 2013

AMOUNT: \$16,000,000

ROLE: Senior Personnel

TITLE: Integrating Models of Protein Translation & Gene Fixation with Experimental Data in the Archaeal System: *Ignicoccus-Nanoarchaeum*.

FUNDING AGENCY: The Science Alliance Joint Directed Research and Development Funds

FUNDING PERIOD: May 2009 to April 2011

AMOUNT: \$122,940

ROLE: PI

In Review

TITLE: Agent Based Modeling and Dynamical System Analysis of Toxoplasmosis

FUNDING AGENCY: National Institutes of Health: Life and Physical Sciences Study Section, Bioengineering Sciences & Technologies

FUNDING PERIOD: July 2012 to June 2016

AMOUNT: \$1,260,855

ROLE: Co-PI

Teaching Experience

2004-Present

Department of Ecology and Evolutionary Biology
University of Tennessee, Knoxville

COURSES: General Genetics
Evolution and Society
Introduction to Mathematical Models in Ecology
Model Based Approaches to Data Analysis
Evolution Core: Section on Gene and Genome Evolution
Ecology and Evolution of Emerging Infectious Diseases
Genome Evolution

Invited Seminars

2010 Department of Biology, York College City University of New York, Jamaica, NY

- Department of Biology, Indiana University, Bloomington, IN
- 2008** Department of Biology, Simon Fraser University, Burnaby BC Canada
 Evolution and Ecology Research Centre, University of New South Wales, Sydney Australia
 Department of Evolution, Ecology, & Organismal Biology, Ohio State University, Columbus OH
- 2007** Departments of Biology & Mathematics, University of New Mexico, Albuquerque, NM
 Department of Genetics, University of Georgia, Athens, GA
 Department of Biology, Dartmouth University, Hanover, NH
 Department of Mathematics, University of Tennessee, Knoxville, TN
 Department of Mathematics, University of British Columbia, Vancouver, BC Canada
- 2006** Division of Biological Sciences, Ecology, Behavior, and Evolution Section, University of California, San Diego
 Theoretical Biology and Biophysics, Los Alamos National Laboratory, Los Alamos NM
- 2004** Mathematical Biology Seminar, Mathematics Department, University of British Columbia, Vancouver, BC
- 2001** Brown Bag Seminar Series, Department of Biology, University of New Mexico, Albuquerque NM
- 2000** Gunter Wagner Laboratory, Dept. of Ecology and Evolutionary Biology, Yale University, New Haven, CT
 Bio-Mathematics Group, Department of Biology, Kyushu University, Fukuoka, Japan
- 1999** Department of Biology, Lake Forest College, Lake Forest, IL

Peer Reviewed Publications

*Graduate student co-author; †Post-Doctorate co-author

1. **Gilchrist, M.A.**, and H.F. Nijhout. 2001. Nonlinear Developmental Processes as Sources of Dominance. *Genetics* 159: 423-432. [\[REPRINT\]](#)
2. **Gilchrist, M.A.** and A. Sasaki. 2002. Modeling host-parasite coevolution: a nested approach based on mechanistic models. *Journal of Theoretical Biology* 218: 289-308. [\[REPRINT\]](#)
3. Hickerson, M.J., **M.A. Gilchrist**, and N. Takebayashi. 2003. Calculating a Molecular Clock from Phylogeographic Data: Moments and Likelihood Estimators. *Evolution* 57: 2216-2225. [\[REPRINT\]](#)
4. Coombs, D., **M.A. Gilchrist**, J. Percus, and A.S. Perelson. 2003. Optimal Viral Production. *Bulletin of Mathematical Biology* 65: 1003-1023. [\[REPRINT\]](#)
5. **Gilchrist, M.A.**, L.A. Salter, and A. Wagner. 2004. A Statistical Framework for Combining and Interpreting Proteomic Datasets. *Bioinformatics* 20: 689-700. [\[REPRINT\]](#)
6. **Gilchrist, M.A.**, D. Coombs, and A.S. Perelson. 2004. Optimizing Within-host Viral fitness: Infected Cell Lifespan and Virion Production Rate. *Journal of Theoretical Biology* 229: 281-288. [\[REPRINT\]](#)
7. Nelson, P.W., **M.A. Gilchrist**, D. Coombs, J.M. Hyman, and A.S. Perelson. 2004. An age-structured model of HIV infection that allows for variations in the production rate of viral particles and the death rate of productively infected cells. *Mathematical Biosciences & Engineering* 1: 267-288. [\[REPRINT\]](#)

8. **Gilchrist, M.A.** and D. Coombs. 2006. Evolution of Virulence: Interdependence, Constraints, and Selection using Nested Models. *Theoretical Population Biology* 63: 145-153. [\[REPRINT\]](#)
9. **Gilchrist, M.A.** and A. Wagner. 2006. A Model of Protein Translation Including Codon Usage Bias, Nonsense Errors, and Ribosome Recycling. *Journal of Theoretical Biology* 239: 417-434. [\[REPRINT\]](#)
10. **Gilchrist, M.A.**, D.L. Sulsky, and A. Pringle. 2006. Identifying Fitness and Optimal Life-History Strategies for an Asexual Filamentous Fungus. *Evolution* 60: 970-979. [\[REPRINT\]](#)
11. Ball, C.L.* , **M.A. Gilchrist**, and D. Coombs. 2007. Modeling Within-Host Evolution of HIV: Mutation, Competition and Strain Replacement. *Bulletin of Mathematical Biology* 69: 2361-2385. [\[REPRINT\]](#)
12. Rong, L.* , **M.A. Gilchrist**, Z. Feng. and A.S. Perelson. 2007. Modeling within-host HIV-dynamics and the evolution of drug resistance: Trade-offs in viral enzyme function and drug susceptibility. *Journal of Theoretical Biology* 247: 804-818. [\[REPRINT\]](#)
13. **Gilchrist, M.A.** 2007. Combining Models of Protein Translation and Population Genetics to Predict Protein Production Rates from Codon Usage Patterns. *Molecular Biology & Evolution* 24: 2362-2373. [\[REPRINT\]](#)
14. White, E.P. and **M.A. Gilchrist**. 2007. Effects of Temporal Structure of Individuals on the Species-Time Relationship in Two Desert Communities. *Evolutionary Ecology Research* 9: 1329-1347. [\[REPRINT\]](#)
15. Coombs, D., **M.A. Gilchrist**, and C.L. Ball*. 2007. Evaluating the Importance of Within- and Between-Host Selection Pressures in the Evolution of Chronic Pathogens. *Theoretical Population Biology* 72: 576-591. [\[REPRINT\]](#)
16. **Gilchrist, M.A.**, H. Qin[†] and R. Zaretzki. 2007. Model for SAGE Data Analysis Accounting for Cleavage and Sampling Errors. *BMC Bioinformatics* 8: 403-411. [\[REPRINT\]](#)
17. **Gilchrist, M.A.**, P. Shah*, and R. Zaretzki. 2009. Measuring and detecting molecular adaptation in codon usage against nonsense errors during protein translation. *Genetics* 183:1493-1505. [\[REPRINT\]](#)
18. Zaretzki, R., **M.A. Gilchrist**, W.M. Briggs, and A. Armagan.[†] 2010. Bias Correction and Bayesian Analysis of Aggregate Counts in SAGE Libraries. *BMC Bioinformatics* 11: 72. [\[REPRINT\]](#)
19. Roy*, B., J.N. Vaughn*, B-H Kim*, F. Zhou*, **M.A. Gilchrist**, and A.G. Von Arnim. 2010. The h Subunit of eIF3 Helps to Maintain Reinitiation Competence during Translation of mRNAs Harboring Upstream Open Reading Frames. *RNA* 16: 748-761. [\[REPRINT\]](#)
20. Shah, P.* and **M.A. Gilchrist**. 2010. Thermosensing Property of RNA Thermometers Is Not Unique. *PLoS One* 5:e11308. [\[REPRINT\]](#)
21. Shah, P.* and **M.A. Gilchrist**. 2010. Effect of Correlated tRNA Abundances on Translation Errors and Evolution of Codon Usage Bias. *PLoS Genetics* 6:e1001128. [\[REPRINT\]](#)
22. Harp, J.R.* , **M.A. Gilchrist**, and T.M. Onami. 2010. Memory T cells are enriched in lymph nodes of selectin-ligand deficient mice. *Journal of Immunology* 185: 5751-5761. [\[REPRINT\]](#)
23. Shah, P.* and **M.A. Gilchrist**. In Press. Explaining complex codon usage patterns with selection for translational efficiency, mutation bias, and genetic drift. *Proceedings of the National Academy of Sciences U.S.A.* 108: 10231-10236. [\[REPRINT\]](#)

Citation Metrics as of September 8, 2011	
Total number of citations:	277
Average citations per article:	12
h-index:	10

September 9, 2011