Curriculum Vitae
Dr. Francisco Bilbao-Garay Moore

Department of Biology
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Academic History by Institution

Position and year		*Institution and Department*
Professor	2013	Univ. of Akron, Program in Integrative Bioscience
Assoc. Professor	2007	Univ. of Akron, Program in Integrative Bioscience
Asst. Professor	2001	Univ. of Akron, Dept. of Biology
Research Assoc.	1996	Michigan State Univ., Center for Microbial Ecology
Ph.D.	1996	Michigan State Univ., Kellogg Bio. Station, Dept. of Zoology, and Ecol. And Evol. Bio. Program
B.S.	1989	Michigan State University, Department of Zoology
B.S.	1986	Michigan State University, General Bio. (Biochem. emphasis)

Current Research

I am a systems biologist with a focus on complex interactions. I look for ways to integrate approaches from disparate fields to create a more synthetic underpinning for ecology and evolutionary biology. I am particularly interested in ecological factors influencing phenotypic integration and how this feeds back into the establiment of commmunity patterns through time. My broader interest is in taking insights from my own work and apply them to problems outside my field. In general I look for ways to integrate approaches from disparate fields to create a more powerful understanding of how variation across spatial and temporal scales is created.

Current projects in my lab integrate population and community ecology, developmental biology, physiology, behavior, and quantitative genetics. I work in temperate and polar systems in marine, freshwater, terrestrial and laboratory settings. My research includes within-generation studies and long-term experimental evolution approaches in population, molecular and quantitative genetics. In my lab we explore evolution of niche utilization, influence of genetic background and trait integration across micro, meso and macro time scales. I have projects that include microbial (enteric bacteria, leprosy and protists), invertebrate (ostracods and copepods) and vertebrate species (rayfined fish, armadillos, lizards and salamanders). In addition my lab computationally models complex systems in order to develop a more complete understanding of the dynamics of extremely complex systems.

Peer Reviewed Publications (Student Authors in Bold *Undergraduates in Italics*)

Fraser, L.H., ***K. Mulac***, F. B. G. Moore 2014. Germination of 14 freshwater wetland plants as affected by oxygen and light. Aquatic Botany 114: 29-34

Flynn, K.M., T.F. Cooper, F.B.G. Moore, V.S. Cooper 2013. The environment affects epistatic interactions to alter the topology of an empirical fitness landscape. PLoS genetics 9 (4), e1003426

Marks, C., ***S. M. Lombardo, K. L. Formanik***; F. B. G. Moore, B. Bagatto. 2012. The influence of ontogenetic dietary fluctuations on zebrafish size and swimming performance. Frontiers in Physiology 3: 310 DOI:10.3389/fphys.2012.00310

Marks, C., K.P. Kaut, F. B. G. Moore, B. Bagatto. 2012. Ontogenetic Oxygen Changes Alter Zebra Fish Size, Behavior, and Blood Glucose. Physiological and Biochemical Zoology. 85:635-644

Taylor, P. R., G. K. Koski, C. C. Paustian, E. Bailey, P. A. Cohen, F. B. G. Moore, D. H. Zimmerman, and K. S. Rosenthal. 2010. J-LEAPS vaccines initiate murine Th1 responses by activating dendritic cells. Vaccine 28:5533-5542.

Purrenhage J.L., Niewiarowski P.H., Moore F.B.-G. 2009. Population structure of spotted salamanders (*Ambystoma maculatum*) in a fragmented landscape. Molecular Ecology 18: 235-247

Ramlo, S. E., McConnell, D., Duan, Z.-H. and Moore F. B. 2008. Evaluating an Inquiry-based Bioinformatics Course Using Q Methodology. J Sci Educ Technol 17(3): 219-225.

O'Connor, B.C., J. Kearns, F. B.-G. Moore, 2007 Provocations on the Structure of Scholarly Writing in the Digital Era. On The Horizon 15(4): 222-238

Kharsikar, S., D. Mugler, D. Sheffer, F. B.-G. Moore and Z.-H. Duan 2007. A Weighted k-Nearest Neighbor Method for Gene Ontology Based Protein Function Prediction. IMSCCS||07 Proceedings, IEEE Computer Society, USA. 2: 25-31

Widmer, S., F. B.-G. Moore, and B. Bagatto. 2006 The effects of chronic developmental hypoxia on swimming performance in zebrafish. Journal of Fish Biology 69: 1885-1891

Moore F. B.-G., ***M. Hosey***, and B. Bagatto. 2006 Cardiovascular system in larval zebrafish responds to developmental hypoxia in a family specific manner. Frontiers in Zoology 3:4

Moore, F. B.-G., and **R. Woods**. 2006. Tempo and constraint of adaptive evolution in *Escherichia coli* (Enterobacteriaceae, Enterobacteriales). Biological Journal of the Linnean Society 88:403-411.

Petruzzi, E.P., P.H. Niewiarowski, and F.B.-G. Moore. 2006 The role of thermal niche selection in maintenance of a colour polymorphism in redback salamanders (Plethodon cinereus). Frontiers in Zoology 4:11

Duff, R.J. and Moore F.B.-G. 2005 Pervasive RNA editing inferred among hornwort rbcL transcripts except Leiosporoceros. Journal of Molecular Evolution 61(5): 571-578

Marks, C., ***West, T***., Bagatto B., and Moore, F.B.-G. 2005 Developmental Environment Alters Conditional Aggression in Zebrafish. Copeia 2005(4): 901-908

Tonsor, S. J. and Francisco B.-G. Moore. 2002 Evolution: Shifting Balance Theory. Encyclopedia of Life Sciences Nature Publishing Group (Macmillan)

Moore, Francisco B.-G., and **D. E. Rozen**, and R. E. Lenski. 2000 Pervasive

compensation for deleterious mutations in experimental populations of E. coli. Proceedings of the Royal Society London B. 267: 515-522.

Whitlock, M. C., P. C. Phillips, F. B.-G. Moore and S. J. Tonsor. 1995 Multiple fitness peaks and epistasis. Annual Review of Ecology and Systematics 26: 601-629.

Moore, Francisco B.-G., and S. J. Tonsor. 1994 A simulation of Wright's shifting-balance process: migration and the three phases. Evolution 48: 69-80.

Representative Draft Manuscripts in Revision/Preparation

Lengyel M., **J. Steuber**, R. Truman, F. Knight, B. Bagatto F. B-.G. Moore. Armadillos of the dead: Leprosy costs in nine banded armadillos.

Hall, A.E., T.F. Cooper, V.S. Cooper, F.B.G. Moore, The evolutionary play moves off broadway: No generalities hold when adaptive landscapes are compared across resource environments.

Knapp, E., *K. Wheeler*, .F. Cooper, V.S. Cooper, F.B.G. Moore. The impact of ecological environment, phylogenetic background and their interaction on adaptive mutations.

Buk T., **S. Thomas**, R.J. Mitchell, and F.B.G. Moore, Geneflow within and between relic populations of an Ohio lizard.

Jones A. T., and F.B.G. Moore. The zookeepers paradox: Inbreeding perserves variance in captive bred populations.

Marks, C., B. Bagatto and F. B. G. Moore, Ontogenetic programming of body shape in zebrafish: The role of fluctuating oxygen during development in shaping the P matrix

Marks, C., **A. V. Michelson**, B. Bagatto and F. B. G. Moore, A quantitative genetic analysis of canalization: The evolutionary synthesis revisited.

Select Fellowships and Grants

2009-2012 National Science Foundation - Cooper, T.F., V.S. Cooper and F.B.-G. Moore Collaborative research: Understanding the basis of interactions between adaptive mutations and their environment.

2008-2009 GOJO Hand Hygiene Research Fund – Dynamics of Skin Microflora

2004-2007 National Science Foundation - Course, Curriculum and Laboratory Improvement Program. Duan Z.-H., Moore F., McConnell D. Teaching Bioinformatics through Collaboration and Inquiry.

1996-1997 Michigan State University College of Natural Sciences – Minority Post Doctoral Fellowship

1990-1993 National Science Foundation - F. B.-G. Moore Graduate Research Fellowship.

Courses Taught

Undergraduate
Evolutionary Biology
Natural Sciences- Biology
Herpetology
Tropical Field Biology
Marine Field Studies
Introduction to Bioinformatics

Graduate
Graduate Evolutionary Biology
Evolutionary Ecology
Ecological Developmental Biology
Quantitative Methods in Biology
Biometry

Sponsored Workshops Presented

2006 NSF funded four day workshop on "Teaching Bioinformatics Using Collaboration and Inquiry." Co-presented with Dr. Z.-H. Duan
2009 Two day workshop on "Dynamics of Skin Microflora" Funded by GOJO Hand Hygiene Research Fund

Graduate Student Mentorship

Master's Students Advised (* indicates successfully defended thesis)
Erin Petruzzi* – Maintenance of Colour Polymorphism in *Plethodon cinereus*.
Lauren Smith* – Maintenance of Polymorphism in Experimental Populations of *E. coli*.
Simon Dinehart* – Breeding Pond Buffer Zones and Amphibian Diversity in N.E. Ohio.
Chris Marks* – Quantitative Genetics and Plasticity in Zebrafish Behaviour.
Julie Nieset*– The influence of protozoan predtors on evolution of *E. coli*. (co-advised)
Jarod Steuber* – Metabolic consequences of leprosy in armadillos. (co-advised)
Colleen Sharp* – Influence of UV light and toxic metals on amphibian survivorship.
Ashley Wain* – Origin of the metazoa: Experimental Evolution of Choanoflagellates.
Andrew Jones* – Inbreeding, Captive Breeding and the Maintanance of Variation
E. Ashley Bair* - Evolution in Extreme Environments.
Anne Hall* – Phylogenetic influences on evolutionary dynamics.
Ramsey Langford* – Comparitive Physiology of Unisexual Hybrid Salamanders
Tara Buk* - Geneflow Within and Between Relic Populations of a Ohio Lizard
Chelsea Smith- Genetic Environment, Ecological Environment and Evolutionary Dynamics

Doctoral Students Advised (dissertation completed * and expected completion year)
Chris Marks* – Quantitative genetics and plasticity in zebrafish. (2012*)
Ethan Knapp – Bioinformatics, phylogenetics, and microbial evolution. (2016)
Andrew Jones – Ecological radiation in the enteric bacteria (2017)
Ashley Wain* – Origin of the metazoa: Evolution of Choanoflagellates. (2015)
Scott Thomas - Temporal and Spatial Population Genetic Structure in Ambystomatid salamanders (2019)
Sabastian Englehart – Desalination and Water Reclaimation: A Biomimicry Approach (2019)
E. Ashley Bair - Evolutionary Ecology (2019)

Service: University of Akron

Department of Biology and Integrated Biosciences

Chair of Biology teaching Assessment Committee
Member of Martin Field Station Committee
Member of Integrated Biological Science Program Doctoral Curriculum Committee

University

2013- current Member Biomimicry Research and Innovation Center Initiative (http://uabiomimicry.org/)
2013 – 2015 Chair of University Wide Graduate Faculty Membership Committee
2015 Chair of Graduate Faculty Presidential Liazon Committee
2014 – 2015 Chair of College Promotion to Full Professor Review Committee
2007- 2010, 2013- 2015 Member of Graduate Council
2012-Current Member of Media Committee for the Psychology Archives
2008-2009 Vice Chair of Graduate Council
2007-2010 Chair of University Wide Graduate Curriculum Committee

Service: Outreach

Industrial Outreach

Current

Collaborative biomimicry graduate training alliance with Ross Environmental.

Past

Collaborative alliance with GOJO Industries
Collaborative graduate training alliance with BenVenue Laboratories.

Public-Private Outreach

2015-Current Lead Investigator/Organizer of Lake Erie Ecological Monitoring alliance between Lorain County Community College, U of A Biomimicry and Avon Lake Regional Water. This is a newly formed alliance with a public announcement slated for 2/25/2015. Biomimicry methods will be applied in the development of a novel sensor strategy to determine the dynamics of Toxic Algal populations and their relationship to biotic and abiotic factors in Lake Erie.

Public Outreach

2012-current Member Synapse Arts and Science Initiative. The goal of this initiative is to develop collaboration between art and science though public events. In addition to participation at an organizer I am a frequent participant in public Synapse workshops and panel discussions. (https://synapseartscience.wordpress.com/)

2003-2006 Planning partner/mentor/senior scientist for Muehlstein Academy of Math and Sciences. I participated in the planning of a tiered mentoring grant that was submitted to the Muehlstein Foundation ans subsequently funded. The grant brought teams of high school students from underrepresented communities into research labs. I mentored a team of students in all three years that the program operated.

1990-1992 Coordinator ***Habitats and Organisms Summer Science Institute.*** I developed

curriculum, led field and lab work in a summer field research experience for high school students at the Kellogg Biological Station.

Academic Advisors

Ph.D. advisor: Stephen J. Tonsor, University of Pittsburgh
Post Doctoral advisor: Richard E. Lenski, Michigan State University