

Manuel Leal
Curriculum Vitae
Research
update May 2013

Education

Washington University, St. Louis (Ph.D., Population and Evolutionary Biology) 1995–2000
Dissertation: Intra- and inter-specific differences in the behavioral responses
given to an approaching predator by *Anolis* lizards
Advisor: Dr. Jonathan B. Losos

University of Puerto Rico, Río Piedras, Puerto Rico (M.S., Biology) 1990–1994
Thesis: Antipredator behaviors of *Anolis cristatellus* (Sauria: Polychrotidae)
Advisor: Dr. Richard Thomas

University of Puerto Rico, Río Piedras, Puerto Rico (B.S., Science; 1983–1990
Major: Biology)

Academic Positions

Assistant Professor, Department of Biology, Duke University, Durham, NC 2006–present

Adjunct Professor, Graduate Program in Ecology 2007–present

Adjunct Scientist, Center for Cognitive Neuroscience 2007–present

Assistant Professor, Department of Biology, Vanderbilt University, 2003–2006
Nashville, TN

National Science Foundation Postdoctoral Fellow, Union College, NY 2000–2003
Advisor: Dr. Leo J. Fleishman

Lecturer, Department of Biology, University of Puerto Rico, Río Piedras 1994–1995

Awards and Fellowships

National Science Foundation, Postdoctoral Fellowship 2000–2003

National Science Foundation, Doctoral Dissertation Improvement Award 1999–2000

Research Grants

Current

“Collaborative Research: Elucidating the interactive effects of sensory 2011–2015
response and signal function on the evolution of signal diversity”
Role: PI. Agency: National Science Foundation
Total amount: \$573,311 (institutional amount: \$330,000)

“Collaborative Research: A field-experimental test for evolutionary 2010–2014
trait-mediated indirect effects in food webs”
Role: PI. Agency: National Science Foundation

Total amount: \$1,099,998 (institutional amount: \$291,417)

Previous

“Collaborative Research: Species diversity and abundance in insular systems” 2005–2009

Role: co-PI. Agency: National Science Foundation

Total amount: \$680,000

Researcher Starter Grant 2004–2006

Role: PI. Agency: National Science Foundation

Total amount: \$49,912

“Habitat light, signal detectability, and species diversity” 2004–2006

Role: PI. Source: Discovery Grants Program, Vanderbilt University

Total amount: \$34,650

Minority Postdoctoral Research Fellowship – Extension 2002–2003

Role: PI. Agency: National Science Foundation

Total amount: \$50,000

Minority Postdoctoral Research Fellowship: “To see or not to see: 2000–2002

the effect of habitat light on the evolution of signal design and

visual-system function in allopatric populations of the lizard

Anolis cristatellus”

Role: PI. Agency: National Science Foundation

Total amount: \$100,000

Doctoral Dissertation Improvement Grant: “Survival of the gutsiest: 1999–2000

a study on function and quality of signals given to an incoming predator

by *Anolis* lizards”

Agency: National Science Foundation

Total amount: \$9,693

Other Sources of NSF funding to my Graduate Students

Doctoral Dissertation Improvement Grant to Alex Gunderson 2011–2013

“The evolution of thermal physiology within the *Anolis* adaptive radiation.”

Agency: National Science Foundation

Total amount: \$14,898.

Pre-doctoral Fellowship to David Steinberg 2010–2013

Agency: National Science Foundation

Total amount: \$121,500

Publications

A. Refereed

36. Jezkova, T., M. Leal, and J. A. Rodríguez-Robles. 2013. Genetic drift or natural selection? Hybridization and asymmetric mitochondrial introgression in two Caribbean lizards

- (*Anolis pulchellus* and *Anolis krugi*). *Journal of Evolutionary Biology* 26, in press. (doi: 10.1111/jeb.12149)
35. Steinberg, D. S., and M. Leal. 2013. Sensory system properties predict signal modulation in a tropical lizard. *Animal Behaviour* 85: 623–629.
 34. Leal, M., and A. R. Gunderson. 2012. Rapid change in thermal tolerance of a tropical lizard. *American Naturalist* 180: 815–822. (Recommended by the Faculty of 1000)
 33. Powell, B. J., and M. Leal. 2012. Brain evolution across the Puerto Rican anole radiation. *Brain, Behavior and Evolution* 80: 170–180.
 32. Gunderson, A. R., and M. Leal. 2012. Geographic variation in vulnerability to climate warming in a tropical Caribbean lizard. *Functional Ecology* 26: 783–793. (Selected for video highlight in *Functional Ecology*)
 31. Kolbe, J. J., M. Leal, T. W. Schoener, D. A. Spiller, and J. B. Losos. 2012. Founder effects persist despite adaptive differentiation: a replicated field experiment in lizards. *Science* 335: 1086–1089. (Cover story)
 30. Leal, M., and B. J. Powell. 2012. On the flexibility of lizard's cognition: a response to Vasconcelos et al. *Biology Letters* 8: 44–45.
 29. Leal, M., and B. J. Powell. 2012. Behavioural flexibility and problem solving in a tropical lizard. *Biology Letters* 8: 28–30. (Highlighted in News of the Week in Behavior in *Science and Nature*)
 28. Gunderson, A. R., J. Siegel, and M. Leal. 2011. Tests of the contribution of acclimation to geographic variation in water loss rates of the West Indian lizard *Anolis cristatellus*. *Journal of Comparative Physiology B* 181: 965–972.
 27. Rodríguez-Robles, J. A., T. Jezkova, and M. Leal. 2010. Climatic stability and genetic divergence in the tropical insular lizard *Anolis krugi*, the Puerto Rican “Lagartijo Jardinero de la Montaña.” *Molecular Ecology* 19: 1860–1876.
 26. Rodríguez Schettino, L., J. B. Losos, P. E. Hertz, K. de Queiroz, A. R. Chamizo, M. Leal, and V. Rivalta González. 2010. The anoles of Soroa: aspects of their ecological relationships. *Breviora* (Museum of Comparative Zoology, Harvard University) 520: 1–22.
 25. Fleishman, L. J., M. Leal, and M. H. Persons. 2009. Habitat light and dewlap color diversity in four species of Puerto Rican anoline lizards. *Journal of Comparative Physiology A* 195: 1043–1060.
 24. Leonhardt, S. D., J. Tung, J. B. Camden, M. Leal, and C. M. Drea. 2009. Seeing red: behavioral evidence of trichromatic color vision in strepsirrhine primates. *Behavioral Ecology* 20: 1–12.
 23. Jezkova, T., M. Leal, and J. A. Rodríguez-Robles. 2009. Living together but remaining apart: comparative phylogeography of *Anolis poncesis* and *A. cooki*, two lizards endemic to the aridlands of Puerto Rico. *Biological Journal of the Linnean Society* 96: 617–643.
 22. Rodríguez-Robles, J. A., T. Jezkova, and M. Leal. 2008. Genetic structuring in the threatened “Lagartijo del Bosque Seco” (*Anolis cooki*) from Puerto Rico. *Molecular Phylogenetics and Evolution* 46: 503–514.
 21. Johnson, M. A., M. Leal, L. Rodríguez-Schettino, A. Chamizo-Lara, L. J. Revell, and J. B. Losos. 2008. A phylogenetic perspective on foraging mode evolution and habitat use in West Indian *Anolis* lizards. *Animal Behaviour* 75: 555–563.

20. Fleishman, L. J., M. Leal, and J. Sheehan. 2006. Illumination geometry, detector position and objective determination of animal signal colours in natural light. *Animal Behaviour* 71: 463–474.
19. Rodríguez-Robles, J. A., M. Leal, and J. B. Losos. 2005. Habitat selection by the Puerto Rican Yellow-chinned anole, *Anolis gundlachi*. *Canadian Journal of Zoology* 83: 983–988.
18. Leal, M., and L. J. Fleishman. 2004. Differences in visual signal design and detectability between allopatric populations of *Anolis* lizards. *American Naturalist* 163: 26–39.
17. Losos, J. B., M. Leal, R. E. Glor, K. de Queiroz, P. E. Hertz, L. Rodríguez Schettino, A. Chamizo-Lara, T. R. Jackman, and A. Larson. 2003. Niche lability in the evolution of a Caribbean lizard community. *Nature* 423: 542–545.
16. Fuller, R. C., L. J. Fleishman, M. Leal, J. Travis, and E. R. Loew. 2003. Intraspecific variation in retinal cone distribution in bluefin killifish, *Lucania goodei*. *Journal of Comparative Physiology A* 189: 609–616.
15. Leal, M., A. K. Knox, and J. B. Losos. 2002. Lack of convergence in aquatic *Anolis* lizards. *Evolution* 56: 785–791.
14. Leal, M., and L. J. Fleishman. 2002. Evidence for habitat partitioning based on adaptation to environmental light in a pair of sympatric lizard species. *Proceedings of the Royal Society of London, B* 269: 351–359. (Highlighted by *Proceedings of the Royal Society and Behavioral Ecology*)
13. Leal, M., and J. B. Losos. 2000. Behavior and ecology of the Cuban “Chipojos Bobos” *Chamaeleolis barbatus* and *C. porcus*. *Journal of Herpetology* 32: 318–322.
12. Torres, J., R. Thomas, M. Leal, and T. Gush. 2000. Ant and termite predation by the tropical blindsnake *Typhlops platycephalus*. *Insectes Sociaux* 47: 1–6.
11. Leal, M. 1999. Honest signalling during prey-predator interactions in the lizard *Anolis cristatellus*. *Animal Behaviour* 58: 521–526.
10. Leal, M., J. A. Rodríguez-Robles, and J. B. Losos. 1998. An experimental study of interspecific interactions between two Puerto Rican *Anolis* lizards. *Oecologia* 117: 273–278.
9. Leal, M., and J. A. Rodríguez-Robles. 1997. Signalling displays during predator-prey interactions in a Puerto Rican anole, *Anolis cristatellus*. *Animal Behaviour* 54: 1147–1154.
8. Leal, M., and J. A. Rodríguez-Robles. 1997. Antipredator responses of the Puerto Rican giant anole, *Anolis cuvieri* (Sauria: Polychrotidae). *Biotropica* 29: 372–375.
7. Leal, M., and J. A. Rodríguez-Robles. 1995. Antipredator responses of *Anolis cristatellus* (Sauria: Polychrotidae). *Copeia* 95: 155–161.
6. Leal, M., and R. Thomas. 1994. Notes on the feeding behavior and caudal luring by juvenile *Alsophis portoricensis* (Serpentes: Colubridae). *Journal of Herpetology* 28: 126–128.
5. Rodríguez-Robles, J. A., and M. Leal. 1993. *Alsophis portoricensis* (Puerto Rican Racer). Diet. *Herpetological Review* 24: 150–151.
4. Fleishman, L. J., E. R. Loew, and M. Leal. 1993. Ultraviolet vision in lizards. *Nature* 365: 397. (Cover story)
3. Rodríguez-Robles, J. A., and M. Leal. 1993. Effects of prey type on the feeding behavior of *Alsophis portoricensis* (Serpentes: Colubridae). *Journal of Herpetology* 27: 163–168.

2. Thomas, R., and M. Leal. 1993. Feeding envenomation by *Arrhyton exiguum* (Serpentes: Colubridae). *Journal of Herpetology* 27: 107–109.
1. Leal, M., and R. Thomas. 1992. *Eleutherodactylus coqui* (Puerto Rican Coquí). *Prey. Herpetological Review* 23: 79–80.

B. Non-refereed

Book review

Leal, M. 1997. Anoles are smarter than humans. *Journal of Biogeography* 24: 536–537.

Invited commentaries

- Losos, J. B., and M. Leal. 2013. The evolution of species recognition signals. *Molecular Ecology* 22: in press.
- Leal, M., and J. B. Losos. 2010. Evolutionary Biology. Communication and speciation. *Nature* 467: 159–160.

Newsletter

Losos, J. B., and M. Leal, editors. 1999. *Anolis Newsletter V*. Washington University, St. Louis, Missouri. 125 pp.

First Author Presentations at Meetings (since 2002)

7 th World Congress of Herpetology, Vancouver, British Columbia, Canada	2012
Annual Meeting of the Animal Behavior Society, Albuquerque, New Mexico	2012
Annual Meeting of the Society for Integrative and Comparative Biology, Salt Lake City, Utah	2011
Annual Meeting of the Animal Behavior Society, Williamsburg, Virginia	2010
1 st Latin American Animal Behavior Meeting, Xico, Mexico	2006
5 th World Congress of Herpetology, Stellenbosch, South Africa	2005
Annual Meeting of the Animal Behavior Society, Oaxaca, Mexico	2004
Annual Meeting of the Animal Behavior Society, Bloomington, Indiana	2002

Invited presentations (since 2003)

North Carolina Herpetological Society, Raleigh, North Carolina	2012
Bahamas Science Alliance, Bahamas	2012
Union College, Schenectady, New York	2011
North Carolina State University, Raleigh, North Carolina	2010
College of Charleston, Charleston, South Carolina	2010
University of North Carolina, Chapel Hill, North Carolina	2007
University of Kansas, Lawrence, Kansas	2007
University of Nevada, Las Vegas, Nevada	2007
Florida State University, Tallahassee, Florida	2006
University of Colorado, Fort Collins, Colorado	2006
Duke University, Durham, North Carolina	2006
University of Puerto Rico, Río Piedras, Puerto Rico	2006
University of Florida, Gainesville, Florida	2005
University of Massachusetts, Amherst, Massachusetts	2005
University of Memphis, Memphis, Tennessee	2005
University of Tennessee, Knoxville, Tennessee	2004
University of Missouri, St. Louis, Missouri	2004

Washington University, St. Louis, Missouri	2004
University of Washington, Seattle, Washington	2003
New Mexico State University, Las Cruces, New Mexico	2003
Vanderbilt University, Nashville, Tennessee	2003
University of Texas, Austin, Texas	2003

Professional Activities

Associate Editor, <i>Evolutionary Ecology</i>	2010–present
Panelist, National Science Foundation Integrative Biology Cluster, Animal Behavior	2011
Panelist, National Science Foundation Evolutionary Process Cluster, Evolutionary Ecology	2010
Review Panelist, Animal Behavior Society, Student Research Grants	2009
Panelist, National Science Foundation Behavioral Systems Cluster, Dissertation Improvement Grants	2008
Review Panelist, International Ethological Conference Student Travel Grants	2006
Steering Committee Member, Animal Behavior Society Latin American Affairs Committee	2005–2007

Ad hoc proposal reviewer for the following agencies and entities: 2006–2012
*National Science Foundation, National Geographic, Department of Energy,
 National Institute of Climatic Change Research*

Manuscript reviewer for the following journals: *Animal Behaviour, American Naturalist,
 Biological Journal of the Linnean Society, Biology Letters, Biotropica, Behaviour, Behavioral
 Ecology, Behavioral Ecology and Sociobiology, Canadian Journal of Zoology, Caribbean
 Journal of Science, Copeia, Current Zoology, Ethology, Evolution, Evolutionary Ecology,
 Journal of Comparative Physiology A, Journal of Ethology, Journal of Herpetology, Journal of
 Zoology, Herpetologica, Learning and Behavior, PLoS Biology, Proceedings of the Royal
 Society of London B*

Graduate Students Supervised

Brian J. Powell	2006–2012
Alexander Gunderson (NSF Dissertation Improvement Grant)	2007–present
Dave Steinberg (NSF Predoctoral and James B. Duke Fellow)	2009–present
Ellee Cook	2013–present

Graduate Student Committees (from Duke University, unless otherwise indicated)

Christopher Brown (Vanderbilt University)	2003–2009
Audrey Chang	2007–2009
Daniel Speiser	2007–2010
Mimi Lin	2008–2010
Barry P. Stephenson (University of Miami, Coral Gables)	2005–2010
Jamie Baldwin	2007–2012
Cynthia Tedore	2008–present
Nicholas C. Brandley	2011–present
Sondra I. Vega Castillo (University of Puerto Rico, Río Piedras)	2011–present

Michael M. Webber (University of Nevada, Las Vegas)	2010–present
Joseph Petty	2010–present
Sheena L. Faherty	2012–present
Justa Heinen (North Carolina State University)	2012–present
Mercy Akinyi	2012–present
Diana Friedeberg	2013–present

Undergraduate Research Students (from Duke University, unless otherwise indicated)

Nicole Dautel	2008–2010
Maria Wojakowski	2008–2010
Jeremy Siegel	2010–2011
Christina Thompson	2010–2011
Alana Bossen	2010
Kristin Ocasio (University of Puerto Rico, Bayamón)	2010
Maria Campano (Cornell University)	2011
Dustin Owen (Ball State University)	2011
Angela M. Les (University of Connecticut, Storrs)	2011
Beatriz Romero Cordero (University of Puerto Rico, Mayagüez)	2011
Aditi Sabhlok (Duke Research Scholars Program)	2012
Fiamma Li	2012
Catherine Chen	2012–present

High School Research Students

Kai Ray (Biotechnology High School, New Jersey)	2011–2012
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Published Undergraduate Research

- *Gunderson, A. R., J. Siegel, and M. Leal. 2011. Tests of the contribution of acclimation to geographic variation in water loss rates of the West Indian lizard *Anolis cristatellus*. *Journal of Comparative Physiology B* 181: 965–972.
- *Campano, M., and A. M. Les. 2012. *Leiocephalus carinatus* (Northern Curly-tailed lizard). Diet. *Herpetological Review* 43: 333–334.

Websites

I currently maintain two websites: a Duke University laboratory homepage (<http://www.chipojoland.org/>), and a regularly updated web-blog and (<http://chipojoland.blogspot.com/>). The laboratory website discusses our broad interests and focused research goals, with the intention of educating the public about behavioral and evolutionary ecology. It also features an open letter to prospective graduate students and a library of publications.

The “Chipojo Lab” blog consists of day-to-day discussions of our research placed alongside photographs and videos taken at various field sites. Posts, which are often uploaded from remote localities, are varied in content and include regular updates of our ongoing experiments, descriptions of the potential pitfalls of tropical field research, intellectual critiques of methodologies, and realistic, often humorous accounts of life in the field. In the three years since its creation, the blog has become very popular, with over 20,000 visitors. Evidence of the blog’s wide reach is that I am consistently contacted by elementary and high school students who

have visited the blog and want to learn more about our research, or who seek help with their own classroom biology projects.