

Ariadna E. Morales

Gerstner Postdoctoral Scholar at American Museum of Natural History, New York

Contact Information

Division of Vertebrate Zoology
American Museum of Natural History
Central Park West at 79th Street
New York, NY 10024

Email-1: ariadna.biologia@gmail.com

Email-2: amorales@amnh.org

Web: ariadnamorales.info

Research Interests

I am an evolutionary biologist who studies convergent evolution and speciation processes by integrating genomic, environmental and phenotypic data. My goal is to identify genomic regions linked to repeated adaptations and to explore patterns of gene flow, species limits, historical demography and phenotypic variation that might be influenced by environmental forces. Bats are my main model system, but I collaborate with enthusiastic evolutionary biologists to study other organisms. Part of my research involves the development of computational tools that can be used to test evolutionary hypotheses.

Education

The Ohio State University	Evolution and Ecology (Ph.D.)	2013 – 2018
The Ohio State University	Statistics (Graduate Minor)	2013 – 2018
Universidad Nacional Autónoma de México	Environmental Biology (M.Sc.)	2009 – 2012
Universidad Autónoma del Estado de México	Biology (B.Sc.)	2003 – 2008

Appointments

American Museum of Natural History Dept. Vertebrate Zoology and Richard Gilder Graduate School	Gerstner Postdoctoral Scholar	2018 – present
The Ohio State University Dept. Evolution Ecology and Organismal Biology	Graduate Research / Teacher Assistant	2013 – 2018
Universidad Autónoma del Estado de México Instituto de Ecología	Lab manager	2011 – 2013

Publications

According to Google Scholar (April 1, 2019), my work has been cited 280 times, my h-index is 7, and the average Impact Factor of my papers is 6.088.

[Peer-reviewed papers]

12. **Morales AE**, Ruedi M, Field K, Carstens, BC. (2019) Diversification rates have no effect on the convergent evolution of foraging strategies in the most species-rich genus of bats, *Myotis*. *Evolution*. 73: 2263-2280.
11. Mays H, Oehler D, Morrison K, **Morales A**, Lycans A, *et al.*, Weakley L. (2019) Phylogeography, population structure, gene flow and species delimitation in Rockhopper penguins (*Eudyptes chrysocome* and *Eudyptes moseleyi*). *Journal of Heredity*. esz051, doi.org/10.1093/jhered/esz051.
10. Denton RD, **Morales AE**, Gibbs HL (2018) Genome-specific histories of divergence and introgression between an allopolyploid unisexual salamander lineage and two ancestral sexual species. *Evolution*. 72:1689–1700.
9. Carstens BC, **Morales AE**, Field K, Pelletier TA (2018) A global analysis of bats using automated comparative phylogeography uncovers a surprising impact of Pleistocene glaciation. *Journal of Biogeography*. 45:1795–1805.
8. **Morales AE**, De-la-Mora M, Piñero D (2018) Space and environment predict skull variation and genetic structure in the cosmopolitan bat *Tadarida brasiliensis*. *Journal of Biogeography*. 45:1529–1540.
7. **Morales AE**, Carstens BC (2018) Evidence that *Myotis lucifugus* ‘subspecies’ are five non-sister species, despite gene flow. *Systematic Biology*. 67:756–769.
6. Carstens BC, **Morales AE**, Jackson N, O’Meara BC (2017) Objective choice of Phylogeographic

- Models. Molecular Phylogenetics and Evolution. 116:136–140.
5. Jackson N, **Morales AE**, Carstens BC, O'Meara BC (2017) PHRAPL: Phylogeographic Inference using Approximate likelihoods. Systematic Biology. 66:1045–1053.
 4. Jackson N, Carstens BC, **Morales AE**, O'Meara BC (2017) Species delimitation with gene flow. Systematic Biology. 66:799–812.
 3. **Morales AE**, Jackson N, Dewey T, O'Meara BC, Carstens BC (2017) Speciation with gene flow in North American *Myotis* bats. Systematic Biology. 66:440–452.
 2. **Morales A**, Villalobos F, Velazco PM, Simmons NB, Piñero D (2016) Environmental niche drives genetic and morphometric structure in a widespread bat. Journal of Biogeography. 43:1057–1068.
 1. Garrick RC, Bonatelli IAS, Hyseni C, **Morales A**, Pelletier TA, Perez MF, Rice E, Satler JD, Symula RE, Thomé MTC, Carstens BC (2015) The evolution of phylogeographic datasets. Molecular Ecology. 24:1164–1171.

[Chapters in books]

1. Vasquez Lobo A, **Morales Garcia AE** (2014) Microsatélites. Herramientas moleculares aplicadas en ecología (ed. Cornejo Romero A, Serrato Díaz A, Rendón Aguilar B & Rocha Munive MG), pp. 75–100. INECC-SEMARNAT, Mexico. ISBN: 978-607-8246-72-4.

Awarded Grants and Fellowships

[Research (\$59,020), Fellowships/Scholarships (\$228,309), Travel (\$2,950)]

2018. Richard Gilder Graduate School at the American Museum of Natural History. Gerstner Scholarship & Postdoctoral Research Fellowship. Stipend and Research Expenses (\$145,000 divided in two years)
2017. Ohio Supercomputer Center. Research grant [PAS1184-2] (\$4,000)
2016. NSF. Doctoral Dissertation Improvement Grant [DEB-1701810] (\$ 20,020)
2016. Ohio Supercomputer Center. Research grant [PAS1184-1](\$4,000)
- 2013 – 2017. CONACyT. The Mexican National Council for Science and Technology (Consejo Nacional de Ciencia y Tecnología). Ph.D. Fellowship (\$97,359 divided in four years)
2012. University of Washington, 17th SISG. Travel grant (\$1,200)
2011. CONACyT. Internship travel grant (\$1,000)
2010. UNAM. Travel grant (\$750)
2009. CONACyT. M.Sc. Fellowship (\$15,000)
2007. AMC. Mexican Academy of Sciences (Academia Mexicana de Ciencias). Research grant (\$500)
2007. Santander Universia. Scholarship (\$1,950).
2006. AMC. Research grant (\$500)

Software Development

- R package: PHRAPL (phylogeographic model selection using approximated likelihood). In collaboration with Brian O'Meara, Nathan Jackson, Bryan Carstens.
- Code available at: <https://github.com/bomeara/phrapl>.
- User manual: <https://github.com/ariadnamorales/phrapl-manual>.

Research Experience and Projects

- 2018 – 2020. Postdoctoral Scholar and PI. Are phenotypic features in *Myotis* bats predictable by their genome? Richard Gilder Graduate School at the American Museum of Natural History. Several papers are in preparation to be submitted for peer-review.
- 2016 – 2017. Graduate Research Assistant: Behavioral Ecology and Systematics of the Fungus-growing Ants and their Symbionts. PI: Rachell Adams. The Ohio State University. One paper is in preparation to be submitted for peer-review.
- 2013 – present. Ph.D. project. Evolutionary history of *Myotis* bats in the New World. Advisor: Bryan Carstens. The Ohio State University. Three research papers were published in Systematic Biology (2) and Evolution (1). One paper in preparation to be submitted for peer-review.
- 2013 – 2015. Graduate Research Assistant: phrapl – Phylogeographic model selection using Approximate Likelihood (DEB 1257784/DEB 1257669). PI: Bryan Carstens and Brian O'Meara. The Ohio State University. Three research papers were published, in Systematic Biology (2) and Molecular Phylogenetics and Evolution (1).

- 2009 – 2012. M.S. project. Phylogeography of the free-tailed bat *Tadarida brasiliensis* in North America. Advisor: Daniel Piñero. Instituto de Ecología, UNAM. One research paper was published in Journal of Biogeography.
2011. Graduate Internship. Evolutionary morphology and revisionary systematics of *Tadarida brasiliensis*. Supervisor: Dr. Nancy B. Simmons. Mammals collection, American Museum of Natural History. One research paper was published in Journal of Biogeography.
- 2008 – 2009. Undergraduate honors research project. Genetic diversity and structure of the molossid bat *Nyctinomops laticaudatus* in Yucatan peninsula, Mexico. Advisor: Daniel Piñero. Instituto de Ecología, UNAM.
2007. Undergraduate Internship. The National Mammals Collection and its role in the knowledge of biodiversity. Supervisor: Dr. Fernando A. Cervantes. National Mammals Collection (CNMA), Instituto de Biología, UNAM.
2006. Undergraduate Internship. Molecular systematics of two Chiroptera genera: *Myotis* and *Tadarida*. Supervisor: Dr. Omar Chassin-Noria. Multidisciplinary Center of Biotechnology Studies, UMSNH.

Mentoring Experience

[Supervisor and mentor of 4 Undergraduate Research Assistants]

- 2019 (fall) Maria Angelica Rios-Meza [micro-CT scan data processing]
 2019 (summer) Brooke Quinn [morphology and R programming]
 2017 (summer) Kathryn Field [morphology, lab work, R programming]
 2016 (spring) Claire Limbert [R programming]

Teaching Experience

[Lecturer (1), Invited Lecturer (1) and, Teacher Assistant (3)]

- 2020 (spring). Lecturer in the course Topics for Comparative Genomics I. Richard Gilder Graduate School at the American Museum of Natural History.
- 2018 (fall). Invited Lecturer in the course of Evolution taught by Dr. Frank Burbrink at the Richard Gilder Graduate School at the American Museum of Natural History.
- 2018 (spring). Teacher Assistant of Ecology and Evolution of Mammals (EEOB 4220). Dept. Evolution Ecology and Organismal Biology, The Ohio State University.
- 2017 (summer). Teacher Assistant of REU Site: Next generation Evolutionary Biology (NSF 1560116). Dept. Evolution Ecology and Organismal Biology, The Ohio State University.
- 2017 (spring). Teacher Assistant of Ecology and Evolution of Mammals (EEOB 4220). Dept. Evolution Ecology and Organismal Biology, The Ohio State University.

Workshops

[Co-instructor in 4 workshops focused on bioinformatics and phylogeographic analyses]

2020. January 13-17. Population Genetics modeling in R. Richard Gilder Graduate School at the American Museum of Natural History. New York, USA.
2019. November 11. Population Genetic Simulation and Inference – Demographic History. Graduate Center, The City University of New York. New York, USA.
2017. January 8. PHRAPL: phylogeographic model selection using approximated likelihood. Society for Systematic Biologists 2017 Standalone Meeting. Baton Rouge, Louisiana, USA.
2015. May 28-30. Phylogeographic model selection. The Ohio State University. Columbus, Ohio, USA.

[Attendee in 14 workshops focused on diverse topics in Integrative Biology]

2019. November 5-8. SLiM: An Evolutionary Simulation Framework. City University of New York – Graduate Center.
2019. July 15-19. Genome Assembly and Annotation Workshop. New York Genome Center and American Museum of Natural History.
2019. August 26–30. Comparative Phylogeography. Forskerskole i biosystematikk (ForBio) & UiO:Life Science. Oslo, Norway.
2012. November 26–30. Lineal and generalized lineal models using R. Biology Institute, UNAM.
2012. July 9–27. 17th Summer Institute in Statistical Genetics (SIGS). Population Genetics and Association Mapping, Molecular Phylogenetics, Coalescent Theory modules. University of Washington.

2012. January 9–13. Next Generation Sequencing. Biology Institute, UNAM.
2011. January 17–28. Latin American Workshop of Molecular Evolution. Genomic Center Sciences (CCG), UNAM.
2010. February 12 – July 2. Environmental law and management certificate. School of Sciences, UNAM and Law and Environmental Research Center (CEJA).
2010. September 19–20. Echolocation bat bioacoustics workshop: detection, recording, analysis and ecology and conservation application. Mexican Mammalogy Association (AMMAC).
2009. August 9–16. Neotropical bats biology (Field Course). Tirimbina Biological Reserve, Heredia, Costa Rica and UNAM.
2008. July 19–23. Bat's Ecology course. Yucatan Autonomous University (UADY).
2007. March 3–31. Introduction to geographic systems information applied to the management and conservation of wildlife. School of Sciences, UNAM and Mexican Society of Ornithology.
2006. December 1. Scientific collections and preservation of specimens. Biology Institute, UNAM.
2005. October 10 – 14. Radioimmunoassay (RIA) and Enzyme-Linked immunoabsorbent assay (ELISA) Course. MIYMSA.

Invited Talks

[8 presentations as invited speaker]

2020. February 5. The processes that drive diversification and convergence in insectivorous bats. Special Seminar. [Max Planck Institute](#), Dresden, Germany.
2020. January 28. The processes that drive diversification and convergence in insectivorous bats. Recruitment Seminar. [University of Kentucky](#), Lexington, USA.
2019. December 9. The processes that drive diversification and convergence in insectivorous bats. Evolution, Ecology and Behavior Seminar Series. [Indiana University Bloomington](#), Indiana, USA.
2019. December 4. Convergent evolution of foraging strategies in insectivorous bats. Biology Colloquium. [Fordham University](#), New York, USA.
2019. October 18. Convergent evolution and local adaptation in *Myotis* bats. Biology Colloquium. [The City College of New York](#), USA.
2019. September 28. Into the Darkness: Research and Conservation of Cave Organisms Across the Globe. [Metropolitan Society of Natural Historians](#). New York, USA.
2019. June 21. Convergent evolution and local adaptation in the most species-rich genus of bats, *Myotis*. [Evolution Meeting, SSB Ernst Mayr Symposium](#). Rhode Island, USA.
2017. June 26. Unraveling the effects of gene flow on species limits and phylogenetic signal in *Myotis* bats. [Evolution Meeting, SSB Reticulate Evolution Symposium](#). Portland, Oregon, USA.

Abstracts and Presentations

[8 presentations as speaker in scientific meetings]

- Morales A**, Ruedi M, Burbrink F, Carstens BC, Simmons N. Diversification rates have no effect on the convergent evolution of foraging strategies in the most species-rich genus of bats, *Myotis*. 2019 International Bat Research Conference. Phuket, Thailand.
- Morales A**, Ruedi M, Carstens BC. The evolutionary history of the bat genus *Myotis*. 2018 North American Society for Bat Research Meeting. Puerto Vallarta, Guadalajara, Mexico.
- Morales A**, Carstens BC. Genomic evidence that *Myotis lucifugus* 'subspecies' are five non-sister species, despite gene flow. 2017 North American Society for Bat Research Meeting. Knoxville, Tennessee, USA.
- Morales A**, Jackson N, O'Meara BC, Carstens BC. Species delimitation with gene flow in *Myotis lucifugus* bats. Society for Systematic Biologists 2017 Standalone Meeting. Baton Rouge, Louisiana, USA.
- Carstens BC, **Morales A**, Pelletier T. Phylogeographic meta-analysis into global patterns of genetic variation. 2016 Evolution meeting, Austin, Texas, USA.
- Morales A**, Jackson N, O'Meara BC, Carstens BC. Speciation with gene flow in North American *Myotis* bats. 2016 Evolution meeting, Austin, Texas, USA.
- Morales A**, Jackson N, O'Meara BC, Carstens BC. *Myotis* bats diverge, but with migration. 2015 North American Society for Bat Research Meeting, Monterey, California, USA.
- Morales A**, Jackson N, O'Meara BC, Carstens BC. Species delimitation of the western long-eared *Myotis* Bats using approximated likelihood. Society for Systematic Biologists 2015 Standalone Meeting. Ann Arbor, Michigan, USA.

Jackson N, Carstens BC, **Morales A**, O'Meara BC. Phylogeographic model selection using approximated likelihoods. 2014 Evolution Meeting, North Carolina, USA.

Morales A, Piñero D. Phylogeography of *Tadarida brasiliensis* in North America. 2014 Evolution Meeting, North Carolina, USA.

Academic Awards

2017. EEOB Osburn Award for Excellence in Research. The Ohio State University.

2010. Best undergraduate research. Bernardo Villa award. 10th Mexican Mammalogy Conference and 1st Latin-American Mammalogy Conference.

2006. Best student presentation. XXXII and XXXIII Esteban Barcenás Guevara Student Symposium. UAEMex.

Academic Service

[31 reviews for 13 peer-reviewed journals]

2014 – 2020. Systematic Biology (3), Biological Journal of the Linnean Society (1), Evolution and Ecology (2), Evolutionary Biology (1), Ecography (1), Journal of Biogeography (1), Journal of Mammalogy (2), Molecular Ecology (7), Molecular Ecology Resources (5), Molecular Phylogenetics and Evolution (2), PLOS ONE (3), The Southwestern Naturalist (1), Canadian Journal of Zoology (2).

2020. Interview Committee for the Helen Fellowship Program at the American Museum of Natural History.

2019. Reviewer for Graduate Student Research Awards (GSRA) for the Society of Systematic Biology.

2019. Review Committee for the Graduate Women in Science National Fellowship Competition.

Synergistic Activities

2018 – 2019. Public relationships Committee. Graduate Women in Science.

2017. Co-organizer of “5K EEOB Fun Run”, Dept. Evolution Ecology and Organismal Biology, The Ohio State University.

2016 – 2017. Graduate Student Representative at Seminar Committee, Dept. Evolution Ecology and Organismal Biology, The Ohio State University.

Languages

Spanish (native)

English: reading (proficient), conversing (proficient), writing (proficient).