

Matthew L. Aardema

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Current Positions

- Assistant Professor**, Department of Biology
Montclair State University, Montclair, NJ 2017 - present
- Doctoral Faculty**, Ph.D. program in Environmental Science and Management
Montclair State University, Montclair, NJ 2019 - present
- Visiting Scientist**, Sackler Institute for Comparative Genomics
American Museum of Natural History, New York, NY 2017 - present

Past Position

- Gerstner Scholar in Bioinformatics and Computational Biology** 2015 - 2017
American Museum of Natural History, New York, NY

Education

- Ph.D.** Department of Ecology & Evolutionary Biology, Princeton University 2015
- M.S. (dual degree)** Department of Entomology and Program in Ecology,
Evolutionary Biology & Behavior (EEBB), Michigan State University 2010
- B.S.** Department of Zoology, Michigan State University 2008

Editorial Boards

- Associate Editor**, Environmental Entomology 2019 - present

Peer-Reviewed Publications

(*student mentored co-author)

- 26) Hekkala E, Gatesy J, Narechania A, Meredith R, Russello M, **Aardema ML**, Jensen E, Montanari S, Brochu C, Norell M, Amato G (submitted) Ancient DNA illuminates the evolutionary history of the extinct Holocene crocodile of Madagascar, *Voay robustus*. *Current Biology*.
- 25) **Aardema ML**, Stiasny MLJ, Alter SE (revision submitted) Genomic analysis of the only blind cichlid reveals extensive inactivation in eye and pigment formation genes. *Genome Biology and Evolution*.
- 24) vonHoldt BM, **Aardema ML** (2020) Updating the bibliography of interbreeding among *Canis* in North America. *Journal of Heredity*, <https://doi.org/10.1093/jhered/esaa004>.
- 23) **Aardema ML**, vonHoldt BM, Fritz ML, Davis SR (2020) Global evaluation of taxonomic relationships and genetic exchange within the *Culex pipiens* complex of mosquitoes. *Parasites & Vectors*. 13:8.
- 22) von Loewenich FD, Seckert C, Dauber E, Kik MJL, de Vries A, Sprong H, Buschmann K, **Aardema ML**, Brandstetter M (2020) Prosthetic Valve Endocarditis with *Bartonella washoensis* in a Human European Patient and its Detection in Red Squirrels (*Sciurus vulgaris*). *Journal of Clinical Microbiology*. 58: e01404-19.

- 21) Langenwalder D, Schmidt S, Gilli U, Pantchev N, Ganter M, **Aardema ML**, Silaghi C, von Loewenich FD (2019) Genetic characterization of *Anaplasma phagocytophilum* strains from goats and water buffalo by 16S rRNA gene, ankA gene and multilocus sequence typing. Ticks and Tick-Borne Diseases. 10: 101267.
- 20) Schmidt KL, **Aardema ML**[†], Amato G (2019) Genetic analysis reveals strong phylogeographic divergences within the Scarlet Macaw, *Ara macao*. IBIS [[†]corresponding author]. doi:10.1111/ibi.12760.
- 19) Myers EA, Bryson Jr. RW, Hansen RW, **Aardema ML**, Lazcano D, Burbrink FT (2019) Exploring Chihuahuan Desert diversification in the graybanded kingsnake, *Lampropeltis alterna* (Serpentes: Colubridae). Molecular Phylogenetics and Evolution. 131: 211-218.
- 18) **Aardema ML**, Andrea MR (2018) Likely extirpation of the previously common milkweed butterfly *Danaus eresimus* (Danainae) from Grand Cayman Island. Journal of the Lepidopterists' Society. 72:329-333.
- 17) vonHoldt BM, Ji SS, **Aardema ML**, Stahler D, Udell MAR, Sinsheimer JS (2018) Activity of genes with functions in human Williams-Beuren Syndrome are impacted by mobile element insertions in the gray wolf genome. Genome Biology and Evolution 10:1546-1553.
- 16) McCulloch KJ, Yuan F, Zhen Y, **Aardema ML**, Smith G, Llorente-Bousquets J, Andolfatto P, Briscoe AD (2017) Sexual dimorphism and retinal mosaic diversification following the evolution of a violet receptor in butterflies. Molecular Biology and Evolution 34:2271-2284.
- 15) Ryan SF, Valella P, Thivierge G, **Aardema ML**, Scriber JM (2017) The role of latitudinal, genetic and temperature variation in the induction of diapause of *Papilio glaucus* (Lepidoptera: Papilionidae). Insect Science. 25:328-336.
- 14) **Aardema ML**, Andolfatto P (2016) Phylogenetic incongruence and the evolutionary origins of cardenolide-resistant forms of Na⁺,K⁺-ATPase in *Danaus* butterflies. Evolution 70:1913-1921.
- 13) Vu B, Jafari A*, **Aardema ML**, Tran H, Nguyen D, Dao T, Nguyen T, Tran T, Nguyen C, Fox A, Bañals A-L, Thwaites G, Nguyen K, Wertheim H (2016) Population structure of colonizing and invasive *Staphylococcus aureus* strains in northern Vietnam. Journal of Medical Microbiology 65: 298-305
- 12) **Aardema ML**, von Loewenich FD (2015) Varying influences of selection and demography in host adapted populations of the tick-transmitted bacterium, *Anaplasma phagocytophilum*. BMC Evolutionary Biology 15:58.
- 11) **Aardema ML**, Scriber JM (2015) Ultraviolet coloration in tiger swallowtail butterflies (*Papilio glaucus* group, Papilionidae) with a method for objectively quantifying adult butterfly wing wear. Journal of the Lepidopterists' Society 69:58-62.
- 10) Huhn C, Winter C, Wolfspurger T, Wüppenhorst N, Strašek Smrdel K, Skuballa J, Pfäffle M, Petney T, Silaghi C, Dyachenko V, Straubinger RK, Schaarschmidt-Kiener D, Ganter M, **Aardema ML**, von Loewenich FD (2014) Analysis of the population structure of *Anaplasma phagocytophilum* using multilocus sequence typing. PLoS One 9:e93725.
- 9) **Aardema ML**, Scriber JM (2013) No evidence that male choice contributes to the maintenance of a shared, sex-limited trait in mimetic and non-mimetic female tiger swallowtail butterflies, *Papilio glaucus*. Evolutionary Biology 40:108-116.
- 8) Zhen Y, **Aardema ML**, Medina EM, Schumer M, Andolfatto P (2012) Parallel molecular evolution in an herbivore community. Science 337:1634-1637.
- 7) Scriber JM, Maher E*, **Aardema ML** (2012) Differential effects of short term winter thermal stress on diapausing tiger swallowtail butterflies (*Papilio* spp.). Insect Science 19:277-285.
- 6) **Aardema ML**, Zhen Y, Andolfatto P (2012) The evolution of cardenolide-resistant forms of Na⁺,K⁺-ATPase in Danainae butterflies. Molecular Ecology 21:340-349.

Peer-Reviewed Publications (cont.)

- 5) **Aardema ML**, Scriber JM, Hellmann JJ (2011) Considering local adaptation in issues of Lepidopteran conservation-a review and recommendations. *American Midland Naturalist* 165:294-303.
- 4) Kunte K, Shea C, **Aardema ML**, Scriber JM, Juenger TE, Gilbert LE, Kronforst MR (2011) Sex chromosome mosaicism and hybrid speciation among Tiger Swallowtail Butterflies. *PLoS Genetics* 7:e1002274.
- 3) Ordning, GJ, Mercader RJ, **Aardema ML**, Scriber JM (2010) Allochronic isolation and incipient speciation in tiger swallowtail butterflies. *Oecologia* 162:523-531.
- 2) Mercader RJ, **Aardema ML**, Scriber JM (2009) Hybridization leads to host-use divergence in a polyphagous butterfly sibling species pair. *Oecologia* 158: 651-662.
- 1) Mercader RJ, **Aardema ML**, Scriber JM (2008) Old hickory records and John Abbot's drawings: North American host records evaluated for *Papilio glaucus*. *Journal of the Lepidopterists' Society* 62:166-170.

Other Publications

Aardema ML (2020) "Hybrid speciation in the *Culex pipiens* mosquito complex?" BugBitten (Blog hosted by the journal Parasites and Vectors)

Research Grants, Fellowships and Awards (including non-funded NSF & NIH submissions)

NSF-CNH2: Dynamics of Integrated Socio-Environmental Systems (pending): <i>"Novel Edible Insects for Reducing Illegal Hunting and Improving Global Food Security"</i> (Co-PI, PI: Cortni Borgerson)	2019
Morris Animal Foundation, Established Investigator Grant Proposal, Wildlife/Exotics (pending): <i>"A better understanding of emerging insecticide resistance in flea vectors of plague will Improve management of the endangered black footed ferret"</i> (PI, Co-PIs: Hugh Britten, Jose Pietri, David Eads)	2019
NSF-DEB Proposal (declined): <i>"The Emergence of Insecticide Resistance in Prairie Dog Flea Holobionts"</i> , (PI, Co-PIs: Hugh Britten, Jose Pietri)	2019
Summer Grant Proposal Development Award (\$4000), Montclair State University	2018
Student Faculty Scholarship Internal Award (\$2000), Montclair State University	2018
NSF-DEB Preliminary Proposal (not invited): <i>"Complex life-history evolution in parallel: molecular basis for the repeated emergence of social insect symbiosis in rove beetles"</i> , (PI, Co-PIs: Joseph Parker, Steve, Robert DeSalle)	2017
NIH-NRSA Fellowship (declined): <i>"Relationship between passage history and genetic diversity in a rodent malaria model system"</i> , [PI, co-PIs: Jane Carlton & Andrea Graham]	2015
Princeton Center for Health and Wellbeing, Research Grant (\$6500)	2014
NSF-DEB Preliminary Proposal (not invited): <i>"The influence of divergent adaptation on patterns of genetic diversity in Papilio butterflies"</i> , [co-wrote, PI: Peter Andolfatto]	2013
NSF-DDIG (declined): <i>"Analysis of selection in ecologically divergent Lepidopteran species"</i> [wrote, PI: Peter Andolfatto]	2012
NSF-DEB Preliminary Proposal (not invited): <i>"Genetically mapping diapause induction strategy and mimetic coloration in tiger swallowtail butterflies with an investigation of trait-related gene flow"</i> , [co-wrote, PI: Peter Andolfatto]	2012
Walbridge Award, Princeton Environmental Institute (\$7000)	2011

Research Grants, Fellowships and Awards (cont.)

NSF-DEB Full Proposal (declined): “ <i>The genetic basis of chronobiology in Schistosoma: a mechanism for host-switching?</i> ” [co-wrote, PIs: Peter Andolfatto & Andrew Dobson]	2011
Dr. Paul Wooley Memorial Award for Outstanding MS Degree	2011
Hutson Research Grant (\$1200)	2009
NSF-DEB, Collaborative Research (Awarded: \$110,653): “ <i>Assessing temperature-related changes in introgression of hybridizing species across time and space</i> ” (Award #0918879) [co-wrote and managed grant research, PI: Mark Scriber]	2009
Plant Sciences Recruitment Fellowship (2 yrs. stipend, tuition) Michigan State University	2008 – 2010
NSF-REU, (Awarded: \$4600): “ <i>Female-limited, secondary sexual characteristics in Papilio male mate recognition</i> ” [co-wrote, PI: Mark Scriber]	2008
Scriber Scholar Award in Butterfly Biology and Conservation (\$2000)	2007
Enhancing Linkages between Mathematics and Ecology (ELME) Fellowship (\$8300), Kellogg Biological Station, Michigan State University	2007

Select Academic Presentations

New York Area Population Genomics (NYAPG) Meeting Poster Presentation: “The use of (mostly) publicly available data to assess global admixture and taxonomic relationships within the <i>Culex pipiens</i> species complex of mosquitos”	2020
Rutgers University, Entomology Department Seminar Series Invited Talk: “Patterns of Evolutionary Divergence and Genetic Exchange in <i>Danaus</i> Butterflies and <i>Culex</i> Mosquitoes”	2019
17th Annual Ecology and Evolution of Infectious Diseases (EEID) meeting Poster Presentation: “Demographic expansion of a host-specialist strain of the tick-vectorred bacterium <i>Anaplasma phagocytophilum</i> correlates with a population increase in its host”	2019
Seton Hall University, Biology Department Seminar Series Invited Talk: “Insect Adaptations to Toxic Diets”	2019
II Joint Congress on Evolutionary Biology, Poster Presentation: “Demographic reconstruction and mutation accumulation in genomes of seal species with dramatically different population histories” (with S. Gaughran, M. Stoffel, J. Hoffman, A. Caccone, J. Powell & G. Amato)	2018
New Jersey Mosquito Control Association (NJMCA), Annual Convention, Poster Presentation: “Protein variation in the larval diet directly effects the development time and adult size of <i>Culex pipiens</i> f. <i>molestus</i> , but maternal effects are minimal” (with D. Jones)	2018
Michigan Entomological Society, 63 rd Annual Meeting, Invited Keynote Talk: “Unraveling evolutionary processes in milkweed herbivores and their kin”	2017
EEB research symposium, City University of New York (CUNY) Invited talk: “Evolutionary processes in butterflies and bacteria”	2016
Center for Infectious Disease Dynamics, Penn State University, Invited talk: “Strain divergence in <i>Plasmodium chabaudi</i> ”	2016

Select Academic Presentations (cont.)

Infectious Disease Genomics, Wellcome Genome Campus, Poster Presentation: "Genomic comparisons of phenotypically distinct isolates of the rodent malaria <i>Plasmodium chabaudi</i> reveal genes of potential functional importance" (with A. Graham)	2015
Conférences Jacques-Monod, Infectious Diseases as Drivers of Evolution, Oral Presentation: "Divergent demographic histories among host-adapted populations of a tick-borne infectious bacteria"	2014
Society for Molecular Biology and Evolution (SMBE) Annual Meeting, Oral Presentation: "Contrasting influences of natural selection across multiple Lepidopteran species" (with P. Andolfatto)	2014
Entomological Society of America (ESA) Annual Meeting Members Symposia Co-organizer: "Conservation of Lepidoptera"	2009

Teaching Experience

Faculty Instructor, Montclair State University	
BIOL 213 "Introduction to Ecology"	2017 - present
BIOL 486 "Selected Topics, Forensic Biology"	2019
BIOL 432 "Medical Entomology"	2019
BIOL 431/BIOL 532 "Entomology/Advanced Entomology"	2017, 2018
Guest Lecturer, RGG5674, "Modern Techniques and Evo-Devo" Richard Gilder Graduate School, American Museum of Natural History	2018
Adjunct Lecturer, MBIO 652 "Advanced Computational Molecular Biology" Cabrini University	2017
Assistant in Instruction (AI), EEB 327 "Evolutionary Immunology", Princeton University	2015
Assistant in Instruction (AI), EEB 309 "Evolutionary Biology", Princeton University	2011 - 2013
Statistics Workshop Leader for Senior Thesis Writing, Princeton University	2011 - 2013
Assistant in Instruction (AI), EEB/MOL 355 "Intro to Statistics for Biology" Princeton University	2013
Teachers Aid, ISB 202, "Applications of Environmental and Organismal Biology" Michigan State University	2008

Student Mentoring

Graduate Students

Montclair State University:

 Kelly Zimmerman, PhD, Aardema Lab (2019-present)

 David Walker, MS, Smallwood Lab (2019-present)

 Natalie Epstein, MS, Aardema Lab (2018-present)

 Domenica Mousa, MS, Aardema Lab (2018-present)

 Sufiyanu Ahmed, MS, Aardema Lab (2018-present)

 Karen Catalina, MS, Aardema Lab (2018-present)

 Dylan Jones, MS, Hazard Lab (2017-2018)

Yale University: Stephen Gaughran, PhD (2017-present)

Princeton University: Lu Yang (2015-2017), Patrick Riley (2015-2017)

Student Mentoring (cont.)

Undergraduate Students (last 5 years)

Montclair State University: Kevin Saez (2017-2019), Brian Toedtman (2018-2019),
Nina Bates (2018-2019), Emma Akuffo (2018), Sumaya Islam (2017-2018)
University of Chicago: Emily Lipstein (2016, at AMNH)
Karolinska Institute, Sweden: Sanna Edwin (2015, at Princeton)
Princeton University: Alex Jafari (2015), Adam Rosenstein (2015)

High School Students

Montclair High School: Hanan Abdellatif (2018, 2019 at Montclair State U.)
Putnam Valley High School: Karina Davis (2018, at Montclair State U.)
Pelham Memorial High School: James Chandler (2016, at AMNH)
St. Paul's High School: Fiona Zhang (2015, at Princeton)
Morris Knolls High School: Emily Chen (2012, at Princeton)

Additional Outreach

CSAM Mentoring and Student Research Oversight Committee, Montclair State Univ.	2019 - present
Darwin Day, Dept. of Biology, Montclair State University	2020
Mentor, Weston Program, Montclair State University	2018, 2019
Class visit & demonstration, Ben Samuels Children's Center, "Insect Friends"	2017, 2019
Mentor, Montclair High School's Career Internship Program	2019
Public lecture for MSU Presidential Scholars, "Adaptation: Friend or Foe"	2019
Scientific Advisor, California Science Center, Los Angeles CA	2018
Poster Judge, Metropolitan Association of College and University Biologists (MACUB)	2017
Discussion Panelist, SEISMIC: The Science Mindset Collaborative (pre-college science program for high school students), The New York Academy of Sciences	2016
Presenter, BridgeUp: STEM program (for high school women), Computing and its applications in the biological sciences, American Museum of Natural History	2016
Consultant, Elephants Alive! (in collaboration with Save the Elephants)	2013 - 2017

Professional Service

Sample provider, Iridian Genomes
Non-profit organization, "dedicated to genomic studies of Earth's biota"

Sponsor, Biodiversity Heritage Library

Reviewer for:

Biological Journal of the Linnean Society
BMC Evolutionary Biology
Environmental Entomology
Molecular Ecology

Molecular Ecology Resources
PLoS Neglected Tropical Diseases
Journal of Insect Behavior
Wellcome Open Research

PNAS
Evolution
Current Biology
Bioinformatics

Current Society Memberships:

- Entomological Society of America
- New York Entomological Society
- American Mosquito Control Association
- Lepidopterists' Society

Professional Development

Engaged Teaching Fellows Program, Montclair State University	2019-2020
Participant, NIH Regional Seminar on Program Funding and Grants Administration	2018