

## Matthew L. Aardema

Department of Biology  
Montclair State University  
1 Normal Ave  
Montclair, New Jersey 07043

+1 (616) 799-2918  
aardemam@mail.montclair.edu  
maardema@gmail.com  
aardemalab.weebly.com

### Current Positions

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| <b>Assistant Professor</b> , Department of Biology<br>Montclair State University, Montclair, NJ                            | 2017 - present |
| <b>Visiting Scientist</b> , Sackler Institute for Comparative Genomics<br>American Museum of Natural History, New York, NY | 2017 - present |

### Past Position

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| <b>Gerstner Scholar in Bioinformatics and Computational Biology</b><br>American Museum of Natural History, New York, NY | 2015 - 2017 |
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### Education

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| <b>Ph.D.</b> Department of Ecology & Evolutionary Biology, Princeton University   | 2015 |
| <b>M.S. (dual degree)</b> Department of Entomology and Program in Ecology,<br>Evolutionary Biology & Behavior (EEBB), Michigan State University | 2010 |
| <b>B.S.</b> Department of Zoology, Michigan State University  | 2008 |

### Editorial Boards

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| <b>Associate Editor</b> , Environmental Entomology | 2019 - present |
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### Peer-Reviewed Publications

(\*student mentored co-author)

- 23) **Aardema ML**, vonHoldt BM, Fritz ML, Davis SR (in review) Global evaluation of taxonomic relationships and genetic exchange within the *Culex pipiens* complex of mosquitoes. *Parasites & Vectors*.
- 22) Langenwalder D, Schmidt S, Gilli U, Pantchev N, Ganter M, **Aardema ML**, Silaghi C, von Loewenich FD (in review) 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*.
- 21) Hekkala ER, Smith O, **Aardema ML**, Narechania A, Amato G, Ikram S, Gilbert TP (in review) The Secrets of Sobek-An ancient crocodile mummy mitogenome from Kom Ombo in Egypt identified as the sacred crocodile (*Crocodylus suchus*). *Journal of Archaeological Science: Reports*.
- 20) Schmidt KL, **Aardema ML**<sup>†</sup>, Amato G (in press) Genetic analysis reveals strong phylogeographic divergences within the Scarlet Macaw, *Ara macao*. *IBIS* [<sup>†</sup>corresponding author]
- 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* (Danaiidae) 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*. doi: 10.1111/1744-7917.12423.
- 14) **Aardema ML**, Andolfatto P (2016) Phylogenetic incongruence and the evolutionary origins of cardenolide-resistant forms of Na<sup>+</sup>,K<sup>+</sup>-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, Bañuls 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, Wolfsperger T, Wüppenhörst 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<sup>+</sup>,K<sup>+</sup>-ATPase in Danainae butterflies. *Molecular Ecology* 21:340-349.
- 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) Ording, 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.

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

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NSF-DEB Proposal (submitted): The Emergence of Insecticide Resistance in Prairie Dog Flea Holobionts, (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): Complex life-history evolution in parallel: molecular basis for the repeated emergence of social insect symbiosis in rove beetles, (PI, Co-PIs: Joseph Parker, Steve, Robert DeSalle)	2017
NIH-NRSA Fellowship (declined): Relationship between passage history and genetic diversity in a rodent malaria model system, [PI, co-PIs: Jane Carlton & Andrea Graham]	2015
Princeton Center for Health and Wellbeing, Research Grant (\$6500)	2014
NSF-DEB Preliminary Proposal (not invited): The influence of divergent adaptation on patterns of genetic diversity in <i>Papilio</i> butterflies, [co-wrote, PI: Peter Andolfatto]	2013
NSF-DDIG (declined): Analysis of selection in ecologically divergent Lepidopteran species, [wrote, PI: Peter Andolfatto]	2012
NSF-DEB Preliminary Proposal (not invited): Genetically mapping diapause induction strategy and mimetic coloration in tiger swallowtail butterflies with an investigation of trait-related gene flow, [co-wrote, PI: Peter Andolfatto]	2012
Walbridge Award, Princeton Environmental Institute (\$7000)	2011
NSF-DEB Full Proposal (declined): The genetic basis of chronobiology in <i>Schistosoma</i> : a mechanism for host-switching? [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): Assessing temperature-related changes in introgression of hybridizing species across time and space (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): Female-limited, secondary sexual characteristics in <i>Papilio</i> male mate recognition [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
Outstanding Biology Student of the Year, Grand Rapids Community College	2006

## Select Academic Presentations

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17th Annual Ecology and Evolution of Infectious Diseases (EEID) meeting Poster Presentation: "Increase in host population size facilitated the emergence of a specialist strain in the tick-vectoring bacterium, <i>Anaplasma phagocytophilum</i> "	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 <sup>rd</sup> 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
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

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Faculty Instructor, Montclair State University BIOL 486 "Selected Topics, Forensic Biology"	2019
BIOL 432 "Medical Entomology"	2019
BIOL 431/BIOL 532 "Entomology/Advanced Entomology"	2017, 2018
BIOL 213 "Introduction to Ecology"	2017 - present
Guest Lecturer, RGG674, "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 "Immune Systems: from Molecules to Populations", Princeton University	2015

## Teaching Experience (cont.)

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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

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### *Graduate Students*

Montclair State University:

Natalie Epstein (2018-present)  
Domenica Mousa (2018-present)  
Sufiyanu Ahmed (2018-present)  
Kelly Zimmerman (2018-present)  
Karen Catalina (2018-present)  
Dylan Jones (2017-2018)

Yale University: Stephen Gaughran (2017-present)

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

### *Undergraduate Students (last 5 years)*

Montclair State University: Kevin Saez (2017-present), Brian Toedtmann (2018-present),  
Nina Bates (2018-present), 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)

University of Arkansas at Pine Bluff: Elizabeth Pérez-Rodríguez (2014, at Princeton)

### *High School Students*

Montclair High School: Hanan Abdellatif (2018, 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

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Mentor, Weston Program, Montclair State University	2018, 2019
Scientific Advisor, California Science Center, Los Angeles CA	2018
Poster Judge, Metropolitan Association of College and University Biologists (MACUB)	2017
Class visit & demonstration, Ben Samuels Children's Center, “Insect Friends”	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

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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*

Current Society Memberships:

- New York Entomological Society
- American Mosquito Control Association
- Lepidopterist's Society

## Professional Development

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Attendee, NIH Regional Seminar on Program Funding and Grants Administration

2018