Avril M. Harder

College of Forestry, Wildlife and Environment • Auburn University
avrilharder@gmail.com • (773) 688-8564 • https://avril-m-harder.github.io
Citizenship: Canada and United States

EDUCATION

PhD, Biological Sciences (December 2020), Purdue University, West Lafayette, Indiana
Dissertation: *Declining populations in changing environments: adaptive responses, genetic diversity, and conservation*

MS, Biology (August 2015), Central Michigan University, Mt. Pleasant, Michigan
Thesis: *Diversity within the sea spider genus* Pallenopsis *(Chelicerata: Pycnogonida) in the Western Antarctic*

BS, Biological Sciences (December 2012), Eastern Illinois University, Charleston, Illinois
Honors Thesis: *Intracellular expression of an ice nucleation protein reduces cryoinjury in insect cells*

ASA, Science and Arts (May 2010), Olney Central College, Olney, Illinois

PROFESSIONAL APPOINTMENTS

2021-present	NSF Postdoctoral Fellow, Auburn University
2015-2020	Graduate assistant, Purdue University
2013-2015	Graduate assistant, Central Michigan University
2011-2013	Aquatic ecology field and laboratory assistant, Eastern Illinois University
2010-2012	Cellular physiology undergraduate researcher, Eastern Illinois University

REFEREED PUBLICATIONS

1. *Epigenetics in ecology, evolution, and conservation.*
   Lamka GF, **Harder AM**, Sundaram M, Schwartz T, Christie MR, DeWoody JA, and Willoughby JR. 2022. *Frontiers in Ecology and Evolution*: 307.

2. *High-quality reference genome for an arid-adapted mammal, the banner-tailed kangaroo rat (*Dipodomys spectabilis*)*.
   Harder AM, Walden KKO, Marra NJ, Willoughby JR. 2022. *Genome Biology and Evolution* 14:evac005.

3. *Genomic signatures of adaptation to novel environments: hatchery and life-history associated loci in landlocked and anadromous Atlantic salmon (*Salmo salar*)*.
   Harder AM and Christie MR. 2022. *Canadian Journal of Fisheries and Aquatic Sciences* (in press)

4. *The long-standing significance of genetic diversity in conservation*.
   DeWoody JA, **Harder AM**, Mathur S, and Willoughby JR. *Molecular Ecology* 30:4147-4154.

5. *Incipient resistance to an effective pesticide results from genetic adaptation and the canalization of gene expression.*
   Yin X, Martinez AS, Perkins A, Sparks MM, **Harder AM**, Willoughby JR, Sepúlveda MS, and Christie MR. 2021. *Evolutionary Applications* 14:847-859.

6. *Among family variation in survival and gene expression uncovers adaptive genetic variation in a threatened fish.*
   Harder AM, Willoughby JR, Ardren WR, and Christie MR. 2020. *Molecular Ecology* 29:1035-1049.
   - Featured as a 'From the Cover' article. From the Cover articles are described as primary research papers of exceptional interest to a wide audience in the field of ecology and evolution.

7. *Thiamine deficiency in fishes: causes, consequences, and potential solutions.*
   Harder AM, Ardren WR, Evans AN, Futia MH, Kraft CE, Marsden JE, Richter CA, Rinchard J, Tillitt DE, and Christie MR. 2018. *Reviews in Fish Biology and Fisheries* 28:865-88

8. *Rapid genetic adaptation to a novel environment despite a genome-wide reduction in genetic diversity.*
   Willoughby JR, **Harder AM**, Tennessen JA, Scribner KT, and Christie MR. 2018. *Molecular Ecology* 27:4041-4051.

9. *Nuclear and mitochondrial gene data support recent radiation within the sea spider species complex* Pallenopsis patagonica*.*
   Dömel JS, Melzer RR, **Harder AM**, Mahon AR, and Leese F. 2017. *Frontiers in Ecology and Evolution* 4:139.

10. *Diversity and distribution within the sea spider genus* Pallenopsis *(Chelicerata: Pycnogonida) in the Western Antarctic as revealed by mitochondrial DNA.*
    Harder AM, Halanych KM, and Mahon AR. 2016. *Polar Biology* 39:677-688.

11. *Regional differentiation and extensive hybridization between mitochondrial clades of the Southern Ocean giant sea spider* Colossendeis megalonyx*.*
    Dietz L, Arango C, Dömel JS, Halanych KM, **Harder AM**, Held C, Mahon AR, Mayer C, Melzer RR, Rouse GW, Weis A, Wilson NG, and Leese F. 2015. *Royal Society Open Science* 2:140424.

SUBMITTED PUBLICATIONS

Detectability of runs of homozygosity is influenced by analysis parameters and population-specific demographic history.
Harder AM, Kirksey KB, Mathur S, and Willoughby JR. *bioRxiv*. doi:10.1101/2022.09.29.510155 (submitted to *Molecular Ecology Resources*)

REFEREED EDUCATIONAL RESOURCES

1. *Peppered moths and the Industrial Revolution: barking up the wrong tree?*
   Harder AM, Willoughby JR, Doyle JM. 2019. *National Center for Case Study Teaching in Science*.

2. *Fish out of (salt) water: adaptation of an ocean-going fish to freshwater environment.*
   Willoughby JR, **Harder AM**, Doyle JM. 2019. *National Center for Case Study Teaching in Science*.

INVITED PRESENTATIONS

2022 Genetic adaptation in response to thiamine deficiency in Atlantic salmon. American Fisheries Society (Spokane, WA)

2021 Novel transcriptomic approach identifies adaptive genetic variation before selection occurs. Seminar Series, School of Forestry and Wildlife Sciences, Auburn University

2020 Predicting adaptive responses to selection in a threatened fish. American Fisheries Society (meeting held virtually due to COVID-19 pandemic)

PRESENTATIONS

2021 Exploring genomic determinants of fitness: a pedigree-informed design. Selected for the American Genetics Association President's Symposium (Snowbird, UT)

2021 Assessing the past and predicting the future: identifying adaptive variation within and among populations in changing environments. Society for the Study of Evolution (meeting held virtually due to COVID-19 pandemic)

2019 Identifying the genetic basis for tolerance to an emerging conservation threat. Ecological Society of America (Louisville, KY)

2018 Vitamin B_1 deficiency: metabolic impacts and potential for adaptation in Atlantic salmon. EcoLunch Seminar Series, Department of Biological Sciences, Purdue University

2018 Impacts of thiamine deficiency on metabolic pathways and genetic influences on disease outcomes in Atlantic salmon (*Salmo salar*). American Fisheries Society (Atlantic City, NJ)

2017 Overview of thiamine deficiency complex and identification of underlying genetic mechanisms. International Association for Great Lakes Research (Detroit, MI)

2015 Genetic diversity of *Pallenopsis* in the Western Antarctic. Society for Integrative and Comparative Biology (West Palm Beach, FL)

2014 Genetic diversity of *Pallenopsis* in the Western Antarctic. Scientific Committee on Antarctic Research (Auckland, New Zealand)*

2012 Intracellular ice nucleation protein reduces cryogenic injury in eukaryotic cells. Biomedical Engineering Society (Atlanta, GA)*

* poster presentation

ORGANIZED SYMPOSIA

2020 Using genomics to explore adaptation and improve management. American Fisheries Society (meeting held virtually due to COVID-19 pandemic)

AWARDS, GRANTS AND FELLOWSHIPS

2021 American Genetics Association Travel Award, $400
2021 Research Support Program Award, Auburn University (Co-PI), $50,000
2020 NSF Postdoctoral Research Fellowship in Biology, $207,000
2020 Waser Graduate Research Assistantship in Ecology and Evolutionary Biology, Purdue University, $24,500
2020 Purdue Research Foundation Research Grant (declined), $24,500
2020 American Fisheries Society John E. Skinner Memorial Award, $100
2020 Purdue Graduate Student Government Travel Grant (declined), $250
2019 NEON-ESA Early Career Scholar, $1,500
2019 University of Washington Summer Institute in Statistical Genetics Scholarship, $1,150
2019 Purdue Graduate Student Government Professional Grant, $360
2019 Purdue Graduate Student Government Travel Grant, $250

2018 Yeunkyung Woo Achieve Excellence Travel Award, Purdue University, $500
2017 Graduate School Summer Research Grant, Purdue University, $3,300
2017 Robert Ricklefs Travel Award, Purdue University, $500
2016 Alton A. Lindsey Graduate Fellowship in Ecology, Purdue University, $1,000
2012 Errett Warner Presidential Award, Eastern Illinois University, $1,200
2012 G. B. Dudley Award, Eastern Illinois University, $1,000

TEACHING EXPERIENCE

Guest lectures

2022 Discussion moderator, *Conservation Genetics* (WILD 5350/6350), Auburn University
2021 Introduction to high performance computing, *Developing Agent-Based Models for Wildlife* (WILD 7400), Auburn University
2020 Genomes and bioinformatics, active-learning class taught via case study, *Evolution* (BIOL 580), Purdue University
2019 Salmonid ecology and genetically guided harvest, *Ecology* (BIOL 595), Purdue University
2019 Rapid evolution, *Evolution* (BIOL 580), Purdue University
2018 Predator-prey dynamics: salmonids, alewife, and thiamine deficiency, *Ecology* (BIOL 595), Purdue University
2018 Signals of adaptation, active-learning class taught via case study, *Evolution* (BIOL 580), Purdue University
2018 Controversy in science, active-learning class taught via case study, *Evolution* (BIOL 580), Purdue University
2018 Overexploitation and invasive species: balancing economy and ecology, *Conservation Biology* (BIOL 483), Purdue University
2018 Rapid adaptation, *Evolution* (BIOL 580), Purdue University
2017 Salmonid conservation genetics, *Ecology* (BIOL 595), Purdue University
2017 What is a fish?, *Ecology and Systematics of Fishes* (FNR 241), Purdue University
2016 Phylogenetics and the pattern of evolution, *Introduction to Ecology and Evolution* (BIOL 286), Purdue University

Teaching assistant

2019 Evolution (BIOL 580), Purdue University
2017-2019 Diversity, Ecology, and Behavior/Biology Resource Seminar (BIOL 121/115), Purdue University
2016-2017 Fundamentals of Biology (BIOL 110/111), Purdue University
2016 Introduction to Ecology and Evolution (BIOL 286), Purdue University
2015 Biodiversity, Ecology and Evolution (BIOL 195), Purdue University
2013, 2015 General Biology (BIO 110), Central Michigan University
2011 Molecular and Cellular Biology (BIO 3120), Eastern Illinois University

Mentoring

2021-2022 Led Appalachian State University graduate student through design and execution of program capstone project, generating preliminary data for manuscript currently submitted to *Molecular Ecology Resources*. Auburn University.
2017-2018 Trained senior undergraduate student (Department of Forestry and Natural Resources) on molecular laboratory methods and advised on primer development and PCR optimization for an endangered freshwater fish species. Purdue University.

2013-2015 Supervised two undergraduate student projects describing epibiont assemblages on Antarctic pycnogonids and advised on molecular laboratory techniques. Central Michigan University.

OUTREACH PRODUCTS

R Shiny app: Use of COVID-19 Information Sources in the American Southeast
Harder, AM. 2022.

- Built to support NSF Grant No. 2032133, "RAPID: A participatory study of how decision makers and marginalized communities in the U.S. Southeast consume and act on scientific information to mitigate COVID-19"
- Investigators: Kelly Dunning (PI), Janna Willoughby (Co-PI), Sarah Bergquist (Co-PI), and Ryan Williamson (Co-PI)

Public comment on U.S. Fish and Wildlife Service Docket ID No. FWS-HQ-ES-2021-0033
Harder, AM, Willoughby JR, Lamka GF, Swank AR. 2022.

- Comment written in support of proposed rule change to allow experimental populations to be established outside of their "historic" ranges

Great Lakes steelhead win the adaptation lottery
Harder, AM, Willoughby JR. 2018. *The Osprey* 91:19-21.

- Communicates results presented in Willoughby et al. 2018 (*Molecular Ecology*)

OUTREACH AND SERVICE ACTIVITIES

- *Ad hoc* reviewer for *Molecular Ecology*, *Molecular Ecology Resources*, *PLoS ONE*, *Conservation Biology*, *Conservation Genetics*, *Journal of Applied Ecology*, *Ecology and Evolution*, *Scientific Reports*, *Evolutionary Applications*, *Canadian Journal of Fisheries and Aquatic Sciences*, *Helgoland Marine Research*, *ICES Journal of Marine Science*, *Journal of Sea Research*, *Fisheries Research*, *Aquaculture Research*, *Journal of Great Lakes Research*, *National Center for Case Study Teaching in Science*
- Alabama Chapter of The Wildlife Society Conservation Policy Committee member (2023-present)
- Breakthrough Birmingham activity leader (2022)
- Central Michigan University Biology Department Careers in Conservation and Natural Resources alumni panelist (2022)
- Society for Advancement of Chicanos/Hispanics and Native Americans in Science (SACNAS) research presentation application reviewer (2021)
- American Fisheries Society John E. Skinner Memorial Award application reviewer (2021)
- Skype A Scientist participant (2019-2020)
- Manuscript reviewer for U.S. Geological Survey Fundamental Science Practices process (2019)
- Purdue Ecology and Evolutionary Biology social media founder and coordinator (2016-2017)

PROFESSIONAL SOCIETIES

- American Fisheries Society
- Society for the Study of Evolution
- The Wildlife Society
- American Genetics Association

WORKSHOPS AND TRAINING

2021 The Inclusive STEM Teaching Project
2019 University of Washington Summer Institute in Statistical Genetics: Pathway and Network Analysis
2019 Workshop: Creating classroom environments that promote and support inclusion and equity
2015 Auburn University Bioinformatics Bootcamp