Avril M. Harder

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EDUCATION

PhD, Biological Sciences (August 2015 - present), Purdue University, West Lafayette, Indiana
MS, Biology (August 2015), Central Michigan University, Mt. Pleasant, Michigan
BS, Biological Sciences (December 2012), Eastern Illinois University, Charleston, Illinois
ASA, Science and Arts (May 2010), Olney Central College, Olney, Illinois

PROFESSIONAL APPOINTMENTS

2015-present Graduate assistant, Purdue University
- Design of experimental transcriptomics approach to characterize adaptive responses to selection
- Population genomic analyses to identify patterns of genetic adaptation
- Atlantic salmon (*Salmo salar*) transcriptomics and network analysis

2013-2015 Graduate assistant, Central Michigan University
- Collection and genetic analysis of benthic invertebrates, as part of NSF research cruise LMG-13-12 to the Antarctic Peninsula
- Environmental DNA sampling for invasive species in freshwater systems

2011-2013 Field and laboratory assistant, Eastern Illinois University
- Field and lab support for fisheries and aquatic sciences research projects and Illinois Natural History Survey fieldwork

2010-2012 Undergraduate researcher, Eastern Illinois University
- Transformation of insect cell line to investigate cryogenic injury prevention conferred by intracellular expression of an ice-nucleation protein

REFEREED PUBLICATIONS

1. **Harder AM**, Willoughby JR, Ardren WR, and Christie MR. 2020. Among family variation in survival and gene expression uncovers adaptive genetic variation in a threatened fish. *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.
2. **Harder AM**, Ardren WR, Evans AN, Futia MH, Kraft CE, Marsden JE, Richter CA, Rinchard J, Tillitt DE, and Christie MR. 2018. Thiamine deficiency in fishes: causes, consequences, and potential solutions. *Reviews in Fish Biology and Fisheries* 28:865-88

3. Willoughby JR, **Harder AM**, Tennessen JA, Scribner KT, and Christie MR. 2018. Rapid genetic adaptation to a novel environment despite a genome-wide reduction in genetic diversity. *Molecular Ecology* 27:4041-4051.
4. Dömel JS, Melzer RR, **Harder AM**, Mahon AR, and Leese F. 2017. Nuclear and mitochondrial gene data support recent radiation within the sea spider species complex *Pallenopsis patagonica*. *Frontiers in Ecology and Evolution* 4:139.
5. **Harder AM**, Halanych KM, and Mahon AR. 2016. Diversity and distribution within the sea spider genus *Pallenopsis* (Chelicerata: Pycnogonida) in the Western Antarctic as revealed by mitochondrial DNA. *Polar Biology* 39:677-688.
6. Dietz L, Arango C, Dömel JS, Halanych KM, **Harder AM**, Held C, Mahon AR, Mayer C, M Melzer RR, Rouse GW, Weis A, Wilson NG, and Leese F. 2015. Regional differentiation and extensive hybridization between mitochondrial clades of the Southern Ocean giant sea spider *Colossendeis megalonyx*. *Royal Society Open Science* 2:140424.

SUBMITTED PUBLICATIONS

7. Yin X, Martinez AS, Perkins A, Sparks MM, **Harder AM**, Willoughby JR, Sepúlveda MS, and Christie MR. Incipient resistance to an effective pesticide results from genetic adaptation and the canalization of gene expression. *bioRxiv* 882860
8. Willoughby JR, Sundaram M, **Harder AM**, Mathur S, Bylsma R, and DeWoody JA. Predictors of nuclear and mitochondrial genome divergence in congeneric vertebrates.
9. Willoughby JR, **Harder AM**, Sundaram M, Mathur S, Bylsma R, and DeWoody JA. Vertebrate divergence estimates vary more than two-fold among lineages but far less than expected between nuclear and mitochondrial genomes.

REFEREED EDUCATIONAL RESOURCES

1. **Harder AM**, Willoughby JR, Doyle JM. 2019. Peppered moths and the Industrial Revolution: barking up the wrong tree? *National Center for Case Study Teaching in Science*.
2. Willoughby JR, **Harder AM**, Doyle JM. 2019. Fish out of (salt) water: adaptation of an ocean-going fish to freshwater environment. *National Center for Case Study Teaching in Science*.

NON-REFEREED PUBLICATIONS

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

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

INVITED PRESENTATIONS

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

PRESENTATIONS

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

GRANTS AND AWARDS

2020 NSF Postdoctoral Research Fellowship in Biology, **$138,000**

2020 Waser Graduate Research Assistantship in Ecology and Evolutionary Biology, Purdue University, **$24,500**

2020 Purdue Research Foundation Research Grant (declined), **$18,500**

2020 American Fisheries Society John E. Skinner Memorial Award

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

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

Undergraduate mentoring

2017-2018 Introduction of undergraduate student (Dept. of Forestry and Natural Resources) to molecular laboratory methods and supervision of primer development and PCR optimization for an endangered freshwater fish species, Purdue University

2013-2015 Supervision of undergraduate research describing populations of epibionts and parasites of Antarctic pycnogonids, Central Michigan University

OUTREACH, EXTENSION, AND SERVICE

- *Ad hoc* reviewer for *Molecular Ecology*, *Molecular Ecology Resources*, *PLoS ONE*, *Conservation Biology*, *Conservation Genetics*, *Journal of Applied Ecology*, *Ecology and Evolution*, *Scientific Reports*, *Canadian Journal of Fisheries and Aquatic Sciences*, *Helgoland Marine Research*, *ICES Journal of Marine Science*, *National Center for Case Study Teaching in Science*
- Manuscript reviewer for USGS Fundamental Science Practices process
- Symposium co-organizer for American Fisheries Society annual meeting: Using genomics to explore adaptation and improve management (2020)
- Skype A Scientist participant (2019-present)
- Purdue EEB social media founder and coordinator (2016-2017)

PROFESSIONAL SOCIETIES

- International Association for Great Lakes Research
- American Fisheries Society
- Society for the Study of Evolution
- Ecological Society of America

WORKSHOPS AND TRAINING

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