

## Avril M. Harder

Department of Biological Sciences • Purdue University  
harder@purdue.edu • (773) 688-8564

### EDUCATION

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**PhD, Biological Sciences** (2015 - present), Purdue University, West Lafayette, Indiana

**MS, Biology** (Aug. 2015), Central Michigan University, Mt. Pleasant, Michigan

**BS, Biological Sciences** (Dec. 2012), Eastern Illinois University, Charleston, Illinois

### RESEARCH EXPERIENCE

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#### Purdue University

- Atlantic salmon (*Salmo salar*) spawning and husbandry
- RNA sequencing and differential gene expression analyses

#### Central Michigan University

- Collection and genetic analysis of benthic invertebrates, as part of NSF research cruise LMG-13-12 to the Antarctic Peninsula
- Sampling and sample processing associated with environmental DNA surveillance for invasive species in freshwater systems

#### Eastern Illinois University

- Transformation of insect cell line to investigate cryogenic injury prevention conferred by intracellular expression of an ice-nucleation protein
- Field and lab assistance for fisheries and aquatic sciences research projects and Illinois Natural History Survey fieldwork

### REFEREED PUBLICATIONS

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1. **Harder AM**, Willoughby JR, Ardren WR, and Christie MR. 2019. Among family variation in survival and gene expression uncovers adaptive genetic variation in a threatened fish. *Molecular Ecology* doi:10.1111/mec.15334
  - Featured as a 'From the Cover' article
2. 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
3. **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* 28:865-886

4. 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.
5. 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.
6. **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.
7. 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. Regional differentiation and extensive hybridization between mitochondrial clades of the Southern Ocean giant sea spider *Colossendeis megalonyx*. *Royal Society Open Science* 2:140424.

#### *Educational resources*

8. **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*.
9. 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*)

#### PRESENTATIONS

- 2019 Identifying the genetic basis for tolerance to an emerging conservation threat. Ecological Society of America (Louisville, KY)
- 2018 Vitamin B<sub>1</sub> 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

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- 2019 NEON-ESA Early Career Scholar, Purdue University, **\$1,500**
- 2019 Summer Institute in Statistical Genetics Tuition Scholarship, Purdue University, **\$1,150**
- 2019 Purdue Graduate Student Government Professional Grant, Purdue University, **\$360**
- 2019 Purdue Graduate Student Government Travel Grant, Purdue University, **\$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

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### **Guest lectures**

- 2019 Salmonid ecology and genetically guided harvest, Ecology, Purdue University
- 2019 Rapid evolution, Evolution, Purdue University
- 2018 Predator-prey dynamics: salmonids, alewife, and thiamine deficiency, Ecology, Purdue University
- 2018 Signals of adaptation, active-learning class taught via case study, Evolution, Purdue University
- 2018 Controversy in science, active-learning class taught via case study, Evolution, Purdue University
- 2018 Overexploitation and invasive species: balancing economy and ecology, Conservation Biology, Purdue University
- 2018 Rapid adaptation, Evolution, Purdue University
- 2017 Salmonid conservation genetics, Ecology, Purdue University

- 2017 What is a fish?, Ecology and Systematics of Fishes, Amphibians and Reptiles, Purdue University
- 2016 Phylogenetics and the pattern of evolution, Introduction to Ecology and Evolution, Purdue University

### **Teaching assistant**

- 2019 Evolution, Purdue University
- 2017-2019 Diversity, Ecology, and Behavior/Biology Resource Seminar, Purdue University
- 2016-2017 Fundamentals of Biology, Purdue University
- 2016 Introduction to Ecology and Evolution, Purdue University
- 2015 Biodiversity, Ecology and Evolution, Purdue University
- 2013, 2015 General Biology, Central Michigan University
- 2011 Molecular and Cellular Biology, 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**

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- *Ad hoc* reviewer for *Molecular Ecology*, *Molecular Ecology Resources*, *PLoS ONE*, *Conservation Biology*, *Conservation Genetics*, *Journal of Applied Ecology*, *Scientific Reports*, *Canadian Journal of Fisheries and Aquatic Sciences*
- Manuscript reviewer for USGS Fundamental Science Practices process
- Skype A Scientist participant (2018)
- Purdue EEB social media founder and coordinator (2016-2017)
- International Association for Great Lakes Research (IAGLR), member
- American Fisheries Society (AFS), member
- Society for the Study of Evolution (SSE), member
- Ecological Society of America (ESA), member

### **WORKSHOPS AND TRAINING**

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- 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