

Liza M. Holeski

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APPOINTMENTS

2013-present. Assistant Professor, Northern Arizona University. Flagstaff, AZ.
2011-2013. Assistant Scientist, University of Wisconsin. Madison, WI.
2007-2011. Post-doctoral Research Associate, University of Wisconsin. Madison, WI.

EDUCATION

2007. Ph. D. in Ecology and Evolutionary Biology (with Honors) University of Kansas, Lawrence, KS.
2001. B.A. in Biology (with Distinction), B.A. in Philosophy. St. Olaf College, Northfield, MN.

RESEARCH INTERESTS

Plant evolutionary genetics and ecology
Plant-herbivore interactions, plant response to changing climate
Quantitative genetics and trait evolution in plant populations

PUBLICATIONS

Rotter, M.C., and **L.M. Holeski**. 2017. The Lepidopteran herbivores of the model plant *Mimulus guttatus*. *Journal of the Lepidopterist's Society*, Accepted.
Kooyers, N., Blackman, B., and **L.M. Holeski**. 2017. Optimal defense theory explains deviations from latitudinal herbivory defense hypothesis. *Ecology* 98: 1036-1048.
Holeski, L.M., S.C. McKenzie, E.L. Kruger, J.J. Couture, K. Rubert-Nason, and R.L. Lindroth. 2016. Phytochemical traits underlie genotypic variation in susceptibility of quaking aspen (*Populus tremuloides*) to browsing by a keystone forest ungulate. *Journal of Ecology* 104: 850-863.
Whipple, A.V., and **L.M. Holeski**. 2016. Epigenetic inheritance across the landscape. *Frontiers in Genetics*, doi: 10.3389/fgene.2016.00189
Lamit, L.J., **L.M. Holeski**, L. Flores-Rentería, T.G. Whitham, and C.A. Gehring. 2016. Tree genotype influences ectomycorrhizal fungal community structure: ecological and evolutionary implications. *Fungal Ecology*, doi:10.1016/j.funeco.2016.05.013.
Mason, C. J., J.A. Pfammatter, **L.M. Holeski** and K.F. Raffa. 2015. Foliar bacterial community of trembling aspen (*Populus tremuloides*) in a common garden. *Canadian Journal of Microbiology* 61: 143-149.

- Keefover-Ring, K., **L.M. Holeski**, M.D. Bowers, A. Clauss, and R.L. Lindroth. 2014. Phenylpropanoid glycosides of *Mimulus guttatus* (yellow monkeyflower). Phytochemistry Letters 10: 132-139.
- Holeski, L.M.**, P. Monnahan, B. Koseva, N. McCool, R.L. Lindroth, and J.K. Kelly. 2014. A high-resolution genetic map of yellow monkeyflower identifies chemical defense QTLs and recombination rate variation. G3-Genes, Genomes, Genetics 4: 813-821.
- Couture, J.J., **L.M. Holeski**, and R.L. Lindroth. 2014. Long-term exposure to elevated CO₂ alters aspen foliar chemistry across developmental stages. Plant, Cell, and Environment 37: 758-765.
- Rubert-Nason, K., C.J. Hedman, **L.M. Holeski**, and R.L. Lindroth. 2014. Determination of salicinoids by micro-high-performance liquid chromatography and photodiode array detection. Phytochemical Analysis 25:185-191.
- Holeski, L.M.**, M.S. Zinkgraf, T.G. Whitham, and R.L. Lindroth. 2013. Maternal herbivory reduces offspring allocation to resistance traits, but not growth, in cottonwood. Journal of Ecology 101: 1062-1073.
- Holeski, L.M.**, K. Keefover-Ring, M.D. Bowers, Z.T. HarnEz*, and R.L. Lindroth. 2013. Patterns of phytochemical variation in *Mimulus guttatus* (yellow monkeyflower). Journal of Chemical Ecology 39: 525-536.
- Rubert-Nason K.F., **L.M. Holeski**, A. Gusse, D. J. Undersander, and R.L. Lindroth. 2013. Rapid phytochemical analysis of birch (*Betula*) and poplar (*Populus*) foliage by near infrared reflectance spectroscopy. Journal of Analytical Chemistry 405: 1333-1344.
- Holeski, L.M.**, G. Jander, and A. Agrawal. 2012. Transgenerational induction of defense and epigenetic inheritance in plants. Trends in Ecology and Evolution 27: 618-626.
- Holeski, L.M.**, M.L. Hillstrom, T.G. Whitham, and R.L. Lindroth. 2012. Relative importance of plant species identity, genotype, ontogeny, induction, and temporal variation in producing a mosaic of defenses by a foundation tree species. Oecologia 170: 695-704.
- Lamit, L.J., M.A. Bowker, **L.M. Holeski**, R.R. Naesborg, S.C. Wooley, M. Zinkgraf, R.L. Lindroth, T.G. Whitham, and C.A. Gehring. 2011. Genetically-based trait variation within a foundation tree species influences a dominant bark lichen. Fungal Ecology 4: 103-109.
- Holeski, L.M.**, R. Chase-Alone*, and J.K. Kelly. 2010. The genetics of phenotypic plasticity in plant defense: Trichome production in *Mimulus guttatus*. The American Naturalist 175: 391-400.
- Holeski, L.M.**, M.J.C. Kearsley, and T.G. Whitham. 2009. Separating ontogenetic and environmental variation in resistance to herbivory in cottonwood. Ecology 90: 2969-2973. (A "Featured Article").
- Holeski, L.M.**, A. Vogelzang, G. Stanosz, and R.L. Lindroth. 2009. Incidence of *Venturia* shoot blight in aspen (*Populus tremuloides* Michx.) varies with tree chemistry and genotype. Biochemical Systematics and Ecology 37: 139-145.
- Kelly, J.K., **L.M. Holeski**, and H.S. Arathi. 2008. The genetic correlation between flower size and water use efficiency in Monkeyflowers. Evolutionary Ecology Research 10: 147-152.

- Holeski, L.M.** 2007. Within and among generation phenotypic plasticity in trichome density of *Mimulus guttatus*. Journal of Evolutionary Biology 20: 2092-2100.
- Holeski, L.M.** and J.K. Kelly. 2006. Mating system and the evolution of quantitative traits: An experimental study of *Mimulus guttatus*. Evolution 60: 711-723.

* Indicates female, minority undergraduate mentored by L.M.H.

GRANTS and AWARDS

2016. Dept. of Biological Sciences (NAU), Jerry O. Wolff Distinguished Faculty award. L. Holeski. (\$2690).
2016. Northern Arizona University Faculty Grants Program (\$14,984, 1 year). L. Holeski (PI). Fitness costs of defense traits in a model plant species.
2014. Northern Arizona University Faculty Grants Program (\$14,980, 1 year). L. Holeski (PI). Identification of genetic loci underlying plant defense against insect herbivores in *Mimulus guttatus* (yellow monkeyflower).
2013. McIntire-Stennis (\$210,457, 4 years). E. Kruger (PI), R. Lindroth, L. Holeski, and K. Mock (Co-PIs). Implications of polyploidy for the ecology of trembling aspen, a foundation species in Wisconsin.
2011. McIntire-Stennis (\$133,400, 4 years). R. Lindroth and L. Holeski (Co-PIs). The genetic and ecological bases of traits influencing sustainable use of aspen as a biofuel crop.
2011. Hilldale-Holstrom Award for Undergraduate Research (\$5000, 1 year). M. Montenero (undergraduate mentee), L. Holeski and R. Lindroth: Herbivory defense in *Mimulus guttatus* (yellow monkeyflower): consequences for generalist and specialist herbivores.
2011. Travel grant (\$4000, 1 year). L. Holeski (PI) and R. Lindroth. University of Wisconsin, Madison, College of Agriculture and Life Sciences, Internship development travel grant. Funds to develop undergraduate internships for UW students at the Umeå Plant Science Centre and the Swedish University of Agricultural Sciences.
2008. Argersinger Award for Outstanding Dissertation, University of Kansas Graduate School.
2002. First-Year Graduate Fellowship, University of Kansas.

TEACHING

Courses taught (Northern Arizona University):

- 2016, 2017. Graduate seminar: Plant Evolutionary Ecology and Genetics
2016. Graduate seminar: Meta-analysis
2016. Evolution
2015. Meta-analysis for Ecology and Evolution (Graduate-level)
2014. Graduate seminar: Genetics and Evolution of Plant Defenses
2014. Graduate seminar: Genes to Environment
- 2014, 2015, 2017. Genetics and Evolution
- 2013, 2014, 2016. Population Genetics (Graduate-level)

Courses taught (University of Wisconsin, Madison):

- 2010. Insect Ecology (co-taught with Rick Lindroth)
- 2010. Graduate seminar: Roles of Insects in Emerging Environmental Issues (co-taught with Rick Lindroth)
- 2008. Undergraduate Research seminar: Entering Research, Part 2 (co-taught with Janet Branchaw).

Guest lectures (University of Wisconsin, Madison):

Each guest lecture was focused on genetics, population-level processes, and evolution.

- 2010. Plant-Insect Interactions
- 2009. Ecotoxicology (multiple lectures given)
- 2008. Insect Ecology (multiple lectures given)

Training:

2007-2008. University of Wisconsin Program for Scientific Teaching. Program Fellow.

Laboratory teaching (University of Kansas):

- Biostatistics
- Introductory Biology
- Genetics*
- Biometry*

*I designed or co-designed the curriculum for these labs.

MENTORING

Undergraduate students

37+ undergraduates mentored, including over 21 females and over 14 minorities.
8 minority undergraduate students completed independent research projects under my mentorship. To date, one of these students presented her research at a national meeting, seven presented research at university-level forums, and two are co-authors on publications.

ACADEMIC SERVICE and PUBLIC OUTREACH

Editorial board:

Genetica

Reviewer:

- National Science Foundation (panelist; external reviewer, Population & Evolutionary Processes group)
- Austrian Science Fund (external reviewer, Biological and Medical Sciences)
- Israel Science Foundation (external reviewer)
- American Journal of Botany
- Annals of Botany

Basic and Applied Ecology
Biochemical Systematics and Ecology
Ecological Monographs
Ecology Letters
Evolutionary Ecology
Evolutionary Ecology Research
Functional Ecology
Heredity
Journal of Ecology
Journal of Evolutionary Biology
Molecular Ecology
New Phytologist
Philosophical Transactions of the Royal Society, B
Plant Ecology
PLoS One
Tree Genetics and Genomes
Tree Physiology
Trends in Plant Science

Public outreach:

2015, 2016. Northern Arizona University Undergraduate Research Symposium. Judge.
2015. Flagstaff Festival of Science. Interactive evolution exhibit.
2015. Discover NAU Days. Volunteer.
2014, 2017. Flagstaff STEM night. Interactive evolution exhibit.
2011. Wisconsin Science Festival volunteer. J.F. Crow Institute for the Study of Evolution.
2001-2002. AmeriCorps volunteer, Whidbey Island, WA. Designed and implemented “Young Naturalist” and outdoor education programs for kindergarten – 8th grade students.
2001. Study-service in South India. Worked with conservation and research agencies in South India to design and perform studies of water quality and avian diversity.

Administrative committees:

2015-present. Executive Committee. Merriam-Powell Center for Environmental Research, Northern Arizona University.
2014-2016. Advisory Committee. Dept. of Biological Sciences, Northern Arizona University.
2013-2014, 2016-present. Assessment and Evaluation Committee. Dept. of Biological Sciences, Northern Arizona University.
2011-2013. Evolution Coordinating Committee. J.F. Crow Institute for the Study of Evolution, University of Wisconsin, Madison.
2003-2004. Undergraduate Research and Education Committee, Dept. of Ecology and Evolutionary Biology, University of Kansas.
2003-2004. Colloquium Committee, Dept. of Ecology and Evolutionary Biology, University of Kansas

SELECTED PRESENTATIONS AT NATIONAL MEETINGS

2016. American Society of Naturalists (Asilomar, CA): Genetic architecture of defense traits in *Mimulus guttatus*. L.M. Holeski.
2015. 35th New Phytologist Symposium: The genomics of forest trees: New frontiers of forest biology (Harvard University): Linking *Populus* genes to ecologically important traits and associated insect communities (poster). Hilary Bultman, L.M. Holeski, P. Ingvarsson, and R. Lindroth.
2014. International Society for Chemical Ecology meeting (Urbana, IL): Determining the genetic underpinnings of phytochemistry and associated arthropod communities in aspen (poster). Hilary Bultman, L.M. Holeski, P. Ingvarsson, and R. Lindroth.
2014. *Mimulus* annual meeting (Duke University, Durham, NC): Genetics of herbivore defense in *Mimulus guttatus*. Liza M. Holeski.
2013. Gordon Research Conference: Plant-Herbivore Interactions (Ventura, CA): Genetic variation among *Mimulus guttatus* populations in resistance to a generalist and a specialist herbivore. Liza M. Holeski, J.J. Couture, and R.L. Lindroth.
2011. Gordon Research Conference: Ecological and Evolutionary Genomics (Biddeford, ME): Transgenerational induction in cottonwood (poster). Liza M. Holeski, M. Zinkgraf, T.G. Whitham, and R.L. Lindroth.
2010. Society for the Study of Evolution meeting (Portland, OR): Phytochemical variation in *Mimulus guttatus* (yellow monkeyflower). Liza M. Holeski, K. Keefover-Ring, M.D. Bowers, and R.L. Lindroth.
2010. Gordon Research Conference: Plant-Herbivore Interactions (Galveston, TX): Developmental variation and induction in cottonwood (poster). Liza M. Holeski, T.G. Whitham, and R.L. Lindroth.
2010. Annual Cottonwood Symposium (Northern Arizona University, Flagstaff, AZ): Transgenerational phytochemical induction in cottonwoods. Liza M. Holeski, T.G. Whitham, and R.L. Lindroth.
2009. Annual Cottonwood Symposium (Northern Arizona University, Flagstaff, AZ): Ontogeny of phytochemical induction in cottonwoods. Liza M. Holeski, T.G. Whitham, and R.L. Lindroth.
2008. Society for the Study of Evolution meeting (Minneapolis, MN): Genetics of constitutive and induced trichome density in *Mimulus guttatus*. Liza M. Holeski, R. Chase Alone, J.K. Kelly.
2006. Ecological genomics symposium “Genes in ecology, ecology in genes” (Overland Park, KS): Genetics and fitness consequences of trichome variation in *Mimulus guttatus* (yellow monkeyflower) (poster). Liza M. Holeski.
2006. Society for the Study of Evolution meeting (Stony Brook, NY): Genetics and fitness consequences of trichome variation in *Mimulus guttatus* (yellow monkeyflower). Liza M. Holeski.
2006. NSF FIBR (*Mimulus*) annual meeting (Duke University, Durham, NC): Population level divergence in herbivory resistance in *Mimulus guttatus*. Liza M. Holeski.

2006. Society for the Advancement of Chicanos and Native Americans in Science (SACNAS) meeting (Tampa, FL Induced defense of *Mimulus guttatus* (poster). Ronnette Chase Alone (mentors: Liza Holeski and John Kelly)
2005. Society for the Study of Evolution meeting (Fairbanks, AK): Mating system and the evolution of quantitative traits: An experimental study of *Mimulus guttatus*. Liza M. Holeski and John K. Kelly

Presentations are talks unless identified as a poster.