

# Matthew K. Lau

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## 1 Education

Ph.D. Biology, Northern Arizona University, NSF IGERT Fellow, 2009–2014

*Topic:* The genetics of ecological networks.

*Advisor:* Dr. Thomas G. Whitham

M.S. Biology, Northern Arizona University, 2008

*Thesis:* Host species and site contribute to variation in foliar endophyte abundance, diversity and community composition.

*Advisor:* Dr. Nancy C. Johnson

B.S. Biology, Humboldt State University, 2004

*Emphasis:* Fungal Ecology

*Advisors:* Dr. Nathan J. Sanders and Dr. Terry W. Henkel

*Advanced Study:* Harvard Forest REU, Summer 2003

*Mentor:* Dr. Aaron M. Ellison

## 2 Awards and Fellowships

ARCS Foundation Scholarship (Phoenix Chapter), 2013–2014

Chateaubriand Fellowship (French Embassy), 2011–2012

NSF IGERT Fellowship (Northern Arizona University), 2008–2010

ARCS Foundation Scholarship (Phoenix Chapter), 2007–2008

ARCS Foundation Scholarship (Phoenix Chapter), 2006–2007

Northern Arizona University Minority Student Development Fellowship, 2005–2008

## 3 Computer Software and Language Proficiencies

Computer: R, Python, Matlab,  $\text{\LaTeX}$ , HTML, Bash, Emacs, git, MacOS, Linux/Unix and Windows

Human: English (native speaker), French (not fluent), Mandarin (not fluent) and Spanish (not fluent)

## 4 Research Experience

Visiting Researcher, Community Genetics Laboratory (Dr. Richard Michalet), Fall 2011  
Visiting Researcher, Systems Ecology and Ecoinformatics Lab (Dr. Stuart Borrett), Summer 2011  
Research Assistant, Cottonwood Ecology Group (Dr. Thomas G. Whitham), 2010–2011  
Research Assistant, The Soil Ecology Lab (Dr. Nancy C. Johnson), 2005–2008  
Research Assistant, Humboldt State University Ant Ecology Lab (Dr. Nathan J. Sanders), 2003

## 5 Teaching Experience

Seminar on Ethics in Computational Ecology (Harvard Forest, Harvard University), Summer 2014  
BIO326L Ecology Lab (Northern Arizona University), Fall 2012–Spring 2013  
Introduction to Programming in R (University of North Carolina Wilmington), Summer 2011  
BIO181 Introductory Biology: The Unity of Life (Northern Arizona University), Fall 2010  
BIO680 Introduction to Ecological Analyses in R (Northern Arizona University), Fall 2008 and Fall 2009

## 6 Contributed Software

Matthew K. Lau, Stuart R. Borrett and David E. Hines (2014) enaR: Tools for Ecological Network Analysis. R package version 2.7.  
Matthew K. Lau and Raj Whitlock (2009) DiversitySampler: Functions for re-sampling a community matrix to compute diversity indices at different sampling levels.. R package version 2.0.  
Matthew K. Lau (2009) DTK: Dunnett-Tukey-Kramer Pairwise Multiple Comparison Test Adjusted for Unequal Variances and Unequal Sample Sizes. R package version 3.0.

## 7 Publications

Flores-Rentería L, Lau MK, Lamit LJ, Gehring CA (2014) An elusive ectomycorrhizal fungus reveals itself: A new species of *Geopora* (Pyronemataceae) associated with *Pinus edulis*. *Mycologia*. DOI 10.3852/13-263.  
Lamit LJ, Lau MK, Sthultz CM, Wooley SC, Whitham TG, & Gehring CA (2014) Tree genotype and genetically based growth traits structure twig endophyte communities. *American Journal of Botany*. DOI 10.3732/ajb.1400034.  
Ikeda DH, Bothwell HM, Lau MK, O'Neill G, Grady K, Ferrier SM, Allan G, Shuster SM & Whitham TG (2013) A genetics-based Universal Community Transfer Function for predicting the impacts of climate change on future communities. *Functional Ecology* 28:65–74.  
Lau MK, Arnold EA & Johnson NC (2013) Factors influencing communities of foliar fungal endophytes in riparian woody plants. *Fungal Ecology* 6: 365–378.

Álvarez-Sánchez FJ, Johnson NC, Antoninka AJ, Chaudhary VB, Lau MK, Owen SM, Sánchez-Gallen I, Guadarrama P, & Castillo S (2012) Large-scale diversity patterns in spore communities of arbuscular mycorrhizal fungi. In M. Pagano, editor, *Mycorrhiza: Occurrence in Natural and Restored Environments*, Nova Science Publishers, New York (USA).

Bowker MA, Muñoz A, Martinez T & Lau MK 2012 Rare drought-induced mortality of juniper is enhanced by edaphic stressors and influenced by stand density. *Journal of Arid Environments* 76:9–16.

Lau MK, Whitham TG, Lamit LJ & Johnson NC (2010) Ecological & Evolutionary Interaction Network Exploration: Addressing the Complexity of Biological Interactions in Natural Systems with Community Genetics and Statistics. *JIFS* 7:17–25

Price LB, Johnson KE, Aziz M, Lau MK, Bowers J, Ravel J, Keim PS, Serwadda D, Wawer MJ & Gray RH (2010) The effects of circumcision on the penis microbiome. *PLoS One* 5(1):e8422.

Chaudhary VB, Lau MK & Johnson NC (2008) Macroecology of microbes – biogeography of the Glomeromycota. In V. Ajit, editor, *Mycorrhiza* (3rd Edition), Springer-Verlag, Germany.

Ellison AM, Chen J, Diaz D, Kammerer-Burnham C & Lau M (2005) Changes in ant community structure and composition associated with hemlock decline in New England. Pages 280-289 in B. Onkenand and R. Reardon, editors. *Proceedings of the 3rd Symposium on Hemlock Woolly Adelgid in the Eastern United States*. U.S. Department of Agriculture – U.S. Forest Service – Forest Health Technology Enterprise Team, Morgantown, West Virginia.

### 7.1 Manuscripts In Progress

Lau MK, Borrett SR, Keith AR, Shuster SM & Whitham TG (In Prep) Genotypic variation in foundation species generate ecological network structure.

Butterfield BJ, Lau MK, Shutters S, (In Review Ecology Letters) Merging positive and negative interaction networks provides new insights into community assembly rules.

Floate KD, Godbout J, Lau MK, Whitham TG, Isabel N (Submitted) Plant-herbivore interactions in a trispecific hybrid swarm of cottonwoods: Genetic similarity and the hybrid bridge hypothesis.

Smith DS, Lamit LJ, Lau MK, Gehring CA & Whitham TG (In Review Ecological Entomology) Change of plant traits by introduced elk negatively affects associated arthropod communities and network structure.

Borrett SR & Lau MK (Submitted) An open-source package for ecological network analysis in R.

Stone AC, Gehring CA, Lau MK, Cobb NS & Whitham TG (In Prep) Plant mediated indirect effects on communities reduce diversity andPlant mediated indirect genetic effects of scale herbivory alter arthropod community networks on a foundation tree.

## 8 Presentations

Lau MK, Borrett SR *enaR: Free, open-source tools for ecological network analysis*. Ecological Society of America Meeting (ESA), Minneapolis, MN, August 2013

Lau MK, Lamit LJ, Gehring CA, and Whitham TG *Cottonwood genetics influence lichen interaction network structure*. Université Bordeaux 1, Talence, France, December 2011

Whitham TG, Lau MK, Lamit LJ, Smith DS, Busby PE, Schweitzer JA, Gehring CA, Allan GJ, Shuster SM and Newcombe G *A Community Genetics Approach for Understanding Microbial Community Structure and Feedbacks on a Foundation Tree Species*. Ecological Society of America Meeting (ESA), Pittsburgh, PA, August 2010

Lau MK, Keith AR and Whitham TG *Network structure is linked to the community stability of canopy arthropods associated with Populus angustifolia*. Ecological Society of America Meeting (ESA), Pittsburgh, PA, August 2010

Lau MK, Johnson NC, Whitham TG, Hagenauer LE, Lamit LJ and Lonsdorf EV *A Community Genetics Approach for Understanding Complex Biological Interactions*. 7th International Symposium on Integrated Field Science, Tohoku University, Sendai, Japan, October 2009

Lau MK, Hagenauer LE and Whitham TG *Assemblage-structuring force of species interactions varies spatially and temporally: Co-occurrence analysis of canopy arthropod distributions*. Ecological Society of America Meeting (ESA), Albuquerque, NM, August 2009

Lau MK, Johnson NC *Fungal foliar endophyte communities exhibit host species fidelity in woody plants of Arizona riparian forests*. Ecological Society of America Meeting (ESA), Milwaukee, WI, August 2008

Lau MK *Unusual absence of asymptomatic fungal leaf endophytes of Populus fremontii: a potential phytochemical mechanism*. (poster) Ecological Society of America Meeting (ESA), San Jose, CA, August 2007

\*Whitewater L, Lau MK, Johnson NC *Investigating the potential for local adaptation of the arbuscular mycorrhizal fungus Gigaspora gigantea*. (poster) REU Summer Research Symposium, Northern Arizona University, Aug 2007.

Lau MK, Johnson NC *Do AMF cultivate their favorite bacteria? A hypothesis for a potential mechanism of AMF adaptation*. (poster) 5th International Conference on Mycorrhiza (ICOM5), Granada, Spain, July 2006

\* Denotes undergraduate author.

## 9 Professional Activities

### 9.1 Article Reviewer

*Ecological Monographs*

*Ecology*

*Botany* (formerly *The Canadian Journal of Botany*)

*Acta Oecologia*

*Nature*

### 9.2 Professional Memberships

Society for Conservation Biology (SCB), 2008–present

British Ecological Society (BES), 2008

American Association for the Advancement of Science (AAAS), 2008

Ecological Society of America (ESA), 2005–present

### 9.3 Meeting and Workshop Organization

Workshop Coordinator, EU Sponsored White Paper Workshop on Foundation Species Genetics Research Directions, Flagstaff, AZ Spring 2011

Meeting Organizer, Western Mycorrhiza Gathering, Flagstaff, AZ, 2008

Workshop Organizer, IGERT Workshop: Bayesian Statistics in Ecology, Flagstaff, AZ, 2007

Meeting Organizer, Soil Ecology Society Conference, Moab, UT, 2007

### 9.4 Education and Outreach

Research featured in PBS documentary, One Thousand Invisible Cords

Secretary, CO Plateau Chapter of the Society for Conservation Biology, 2010–2012

### 9.5 Student Services

President, Biology Graduate Student Association (Northern Arizona University), 2009–2011

Email List Curator, Biology Graduate Student Association (Northern Arizona University), 2008

Social Coordinator, Biology Graduate Student Association (Northern Arizona University), 2006

## 10 References

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