Amanda R. Meier

Visiting Assistant Professor of Biology

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Education

Ph.D. University of Michigan, Ecology and Evolutionary Biology — August 2018

B.S. Muhlenberg College, Biology (with highest honors) and Environmental Science — May 2013
summa cum laude

Experience

Visiting Assistant Professor of Biology — July 2021-present
Dept. of Biology, Davidson College

USDA-NIFA Postdoctoral Research Fellow — February 2019-June 2021
Dept. of Entomology, University of Georgia
(Mentor: Bill Snyder)

Postdoctoral Research Associate — September 2018-February 2019
Dept. of Entomology, Washington State University
(Mentor: Bill Snyder)

NSF Graduate Research Fellow and Teaching Assistant — September 2013-August 2018
Dept. of Ecology and Evolutionary Biology, University of Michigan
(Mentor: Mark Hunter)

Publications

1. **Meier A. R**. and Hunter M. D. 2021. Variable effects of mycorrhizal fungi on predator-prey dynamics under field conditions. Journal of Animal Ecology 90(5):1341-1352.

2. Crossley, M. S., Smith, O. M., Berry, L. L., Phillips-Cosio, R., Glassberg J. Holman, K. M., Holmquest, J. G., **Meier A. R.,** Varriano, S. A., McClung, M. R., Moran, M. D., Snyder, W. E. 2021. Recent climate is creating hotspots of butterfly increase and decline across North America. Global Change Biology 27(12): 2702:2714.

3. Crossley M. S., **Meier A. R.**, Baldwin E. M., Berry L. L., Crenshaw L. C., Hartman G. L., Lagos-Kutz D., Nichols D. H., Patel K., Varriano S., Snyder, W. E., Moran M. D. 2020. No net insect abundance and diversity declines across US Long Term Ecological Research sites. Nature Ecology and Evolution 4:1368-1376.

4. Miller T, Crossley M. S., Fu Z., **Meier A. R.**, Crowder D. W., Snyder, W. E. 2020. Exposure to predators, but not competitors, heightens herbivore susceptibility to entomopathogens. Biological Control 151:104403.

5. Fu Z., **Meier A. R.**, Epstein B., Bergland A. O., Castillo-Carrillo C., Cooper W. R., Cruzado R. K., Horton D. R., Jensen, A. S., Kelley J. L., Rashed A., Reitz S. R., Rondon S. I., Thinakaran J., Wenninger E. J., Wohleb C. H., Crowder D. W., Snyder W. E. 2020. Host plants and endosymbionts shape the population genetics of sympatric vectors. Evolutionary Applications 13(10): 2740-2753

6. Smith O. M., Cohen A. L., Rieser C. J., Davis A., Taylor J. M., Adesanya A. W., Jones M. J., **Meier A. R.,** Reganold J. P., Orpet R. J., Northfield T. D., Crowder D. W. 2019. Organic farming provides reliable environmental benefits but increases variability in crop yields: a global meta-analysis. Frontiers in Sustainable Food Systems 3:82.

7. **Meier A. R.,** and M. D. Hunter. 2019. Mycorrhizae alter constitutive and herbivore-induced volatile emissions by milkweeds. Journal of Chemical Ecology 45:610-625.

8. **Meier A. R.**, and M. D. Hunter. 2018. Arbuscular mycorrhizal fungi mediate herbivore-induction of plant defenses differently above and belowground. Oikos 127:1759-1775.

9. **Meier A. R.**, and M. D. Hunter. 2018. Mycorrhizae alter toxin sequestration and performance of two specialist herbivores. Frontiers in Ecology and Evolution 6:33.

Publications in advanced stages

In prep. **Meier A. R.**, Scharle P., Campbell T., Blubaugh C. K., Michelotti, L. A., Snyder W. E. Organic amendments alter plant resistance to insect herbivores and a soil-borne pathogen by shaping soil microbial communities.

Grants, Fellowships, and Awards — Over $275,000 total

Davidson College Research in Science Experience (2022) $1,500
Awarded funding to support undergraduate researcher's independent project

Davidson College Faculty Study and Research Grant (2022) $1,500
"Identifying on-farm microbial communities that enhance plant resistance to insect pests"

USDA-NIFA Postdoctoral Research Fellowship & Grant (2019-2023) $148,000
"Managing soil microbes to promote natural pest control"

University of Michigan Undergraduate Research Opportunities Program (2016, 2017) $2,500
Awarded funding to support undergraduate researchers' independent projects

Rackham Graduate Student Research Grants (2014, 2017) $4,500
Awarded funding for various aspects of my dissertation research

University of Michigan Ecology and Evolutionary Biology Block Grants (2014, 2016, 2017) $8,542
Awarded funding for various aspects of my dissertation research

Matthaei Botanical Gardens Research Award (2013, 2014, 2015, 2016) $4,191
Awarded funding for various aspects of my dissertation research

Emma J. Cole Fellowship (2015) $2,502
"Investigating the effects of mycorrhizal fungi on multitrophic interactions"

Matthaei Botanical Gardens Winifred B. Chase Fellowship (2015) $2,000
"Investigating the influence of root-microbe symbioses on aboveground multitrophic species interactions in milkweed (*Asclepias*) species"

NSF Graduate Research Fellowship (2015-2018) $102,000
"Investigating the effects of nutritional mutualisms on multitrophic interactions"

University of Michigan Biological Station Graduate Research Fellowship Award (2014) $3,556
"The influence of mycorrhizae on aboveground tritrophic interactions"

Ayala Fellowship, University of California-Irvine ($15,000, *declined* 2013)

Goldwater Scholar, Phi Beta Kappa, Udall Honorable Mention (2012)

Teaching

Lead Instructor

Integrated Concepts in Biology II (BIO 114), Davidson College Spring 2022
Introduction to biology's core concepts from organisms through ecological systems including information, evolution, cells, emergent properties, and homeostasis. Weekly lab emphasizes the process of science and data interpretation through hypothesis-driven, authentic research experiences.

Biostatistics for Life Scientists (BIO 240), Davidson College Fall 2021
Introducing science majors to experimental design, probability, descriptive and inferential statistics, and the R programming language for biological research.

Insects and the Environment (ENTO 2010E), University of Georgia Spring 2021, Fall 2020
Large-enrollment, synchronous online course introducing Entomology to undergraduate non-majors. Co-taught with graduate student Conor Fair.

Agroecology in a Changing World (ENTO 8900), University of Georgia Spring 2020
Interdepartmental agroecology seminar for graduate students

Teaching Assistant

General Ecology (BIO 281), University of Michigan Winter 2015
Led two discussion sections for upper-level undergraduates

Introductory Biology: Ecology and Evolution (BIO 171), University of Michigan Winter 2014
Led three discussion sections for a large-enrollment introductory biology course

General Ecology Lab (EEB 372), University of Michigan Fall 2013
Led field-based labs, taught science writing and statistics, mentored students in independent research projects

Tutor and Learning Assistant, Muhlenberg College 2010-2013
General Chemistry, Organic Chemistry, and Environmental Science

Invited Guest Lecturer

Biological Control (online course), University of Georgia January 2020
"Ecology of Plant-Insect Interactions" Developed an asynchronous module on multitrophic interactions and the implications for biocontrol.

Insect Ecology, University of Georgia October 2019
"Building from the ground up: Microbes, Plants, and Herbivores"

Plants and Society, Washington State University November 2018, 2019
"The chemistry of plant-insect interactions"

Ecology, University of Michigan April 2016
"The far-reaching effects of mutualisms"

Pedagogical Training

Fostering Inclusivity and Research in Science Together (FIRST) events (Davidson College)
e.g. Fostering an Antiracist Research Group; Inclusive Grading Fall 2021 – present

The Inclusive STEM Teaching Project Summer 2021

Advancing Learning through Evidence-Based STEM Teaching Winter 2021
Center for the Integration of Teaching, Research and Learning (CIRTL)

Workshops on promoting diversity, equity and inclusion through STEM teaching (CIRTL)
We're Not There Yet: Reexamining our Frameworks for Equity Fall 2020
Black, Brown, Bruised: How Racialized STEM Education Stifles Innovation Fall 2020

Basics of Online Learning and Teaching (CIRTL) Summer 2020

Johns Hopkins Teaching Institute June 2020

University of Michigan Graduate Teacher Certificate December 2017

Science Communication Fellow Winter 2016
NSF-sponsored program through the University of Michigan Natural History Museum

Teaching College Science Winter 2014

EEB 494; University of Michigan course on Scientific Teaching

Mentoring

All students carried out independent projects and presented their findings.

Davidson College

1. **Sam Van Horn**. "On-farm microbial communities shape tomato plant growth and resistance to tomato hornworms" (Summer 2022)
2. **Kayleigh Davies**. "Beet armyworm survival is suppressed by specific on-farm microbial communities" (Summer 2022)
3. **Kate Pottle.** "Impact of crop domestication on plant recruitment of natural enemies: a systematic review" (Spring 2022)

University of Georgia

4. **Phoebe Scharle**. "Effects of organic fertilizers on microbial communities and pest management" (2019-2021) *awarded a Summer Research Assistantship through the Center for Undergraduate Research Opportunities ($1000, May 2020) and presented her findings at NCUR 2021.
5. **Tatyanna Campbell**. "Suppression of soil-borne disease by naturally-occurring microbial communities*"* (2019-2021) *awarded a Summer Research Assistantship through the Center for Undergraduate Research Opportunities ($1000, May 2020).
6. **Kamaya Brantley**. *"*Soil amendments affect plant resistance to insect pests*"* (2019-20) *awarded an Undergraduate Research Initiative Grant from the College of Agricultural and Environmental Sciences ($495, February 2020).
7. **Nicholas Miller**. "The effects of soil amendments on the susceptibility of plants to *Sclerotium rolfsii*" (2019)

University of Michigan, Undergraduate Research Opportunities Program

8. **Abigail Randall**. "Arbuscular mycorrhizal fungi alter plant reproduction, growth, and defense in the field" (2017-2018)
9. **Anne Bonds**. "Mycorrhizae alter aphid-induction of plant direct and indirect defenses" (2017-2018)
10. **Kamren Johnson.** "The impact of mycorrhizal fungi on plant direct and indirect defenses" (2017-2018)
11. **Isabelle Katz.** "Mycorrhizal fungi influence aphid population growth" (2016-2017). *selected to present at the Michigan Research Community Spring Symposium
12. **Victoria Varnau**. "Do soil microbes affect plant phenotypes and interactions with insects?" (2016-2017).
13. **Hannah Fuller**. "Impact of mycorrhizal fungi on plant growth and defense" (2016-2017). *awarded a ribbon for her poster at the Undergraduate Research Program symposium.
14. **Harrison Watson**. "Influence of mycorrhizal fungi on milkweed defense traits and growth" (2016-2017).
15. **Fauna Mahootian**. "Plant root fungal symbionts influence above ground plant traits" (2016-2017)

Academic Presentations

Ecological Society of America 2021: Virtual Conference (2021, August)
"Variable effects of mycorrhizal fungi on predator-prey dynamics under field conditions."
(Invited symposium talk)

University of North Carolina - Pembroke, Department of Biology (2021, May)
"Effects of microbial mutualists belowground on multitrophic interactions aboveground."
(Invited seminar)

University of Georgia, Department of Entomology: Athens, GA (2020, November)
"Effects of soil microbes on multitrophic interactions aboveground." (Invited seminar)

Entomological Society of America 2019: St. Louis, MO (2019, November)
"Arbuscular mycorrhizal fungi alter herbivore-predator interactions." (Invited symposium talk)

Gordon Research Seminar (Plant-Herbivore Interactions): Ventura, CA (2019, February)
"Arbuscular mycorrhizal fungi alter herbivore-predator interactions" (Symposium talk)

Gordon Research Conference (Plant-Herbivore Interactions): Ventura, CA (2019, February)
"Arbuscular mycorrhizal fungi alter herbivore-predator interactions" (Poster)

PhD Defense Seminar: Ann Arbor, MI (2018, July)
"The influence of mutualisms below ground on multitrophic interactions above ground"

Ecological Society of America 2017: Portland, OR (2017, August)
"Effects of arbuscular mycorrhizal fungi on aboveground multitrophic interactions" (Talk)

Plant-Insect Ecology Group, Michigan State University: East Lansing, MI (2017, February)
Impacts of arbuscular mycorrhizal fungi on multitrophic interactions (Invited seminar)

Gordon Research Seminar & Conference (Plant-Herbivore Interactions): Ventura, CA (2017, February) "Impacts of arbuscular mycorrhizal fungi on interactions between plants and herbivores" (Poster)

Ecological Society of America 2016: Fort Lauderdale, FL. (2016, August)
"Impacts of arbuscular mycorrhizal fungi on interactions between plants and herbivores" (Talk)

University of Michigan Ecology and Evolutionary Biology Seminar: Ann Arbor, MI (2015, April)
"The influence of a belowground mutualism on multitrophic interactions above ground" (Seminar)

Muhlenberg College Common Hour Seminar: Allentown, PA (2013, April)
"The ontogeny of defense: Age specific leaf characters and herbivory in sun and shade leaves of *Lindera benzoin"* (Honors thesis defense seminar)

Ecological Society of America 2012: Portland, OR (2012, August)
"The ontogeny of defense: Age specific leaf characters and herbivory in sun and shade leaves of *Lindera benzoin"* (Poster)

Public Outreach and Service

Invited seminars to the public

Master Gardener Workshop: MSU Extension Tollgate Farm, Novi, MI (2017, September)
"The secret world of plants: exploring the invisible among microbes, plants, and insects in your garden"

Matthaei Botanical Gardens Seminar: Ann Arbor, MI (2017, June)
"Mycorrhizal fungi shape multitrophic interactions aboveground"

Michigan Botanical Society Seminar: Ann Arbor, MI (2016, November)
"Soil fungi effects on plant-insect interactions"

Wildflower Association of Michigan Seminar: East Lansing, MI (2016, March)
"Soil fungi effects on plant-insect interactions"

Outreach

Field Day at the University of Georgia Horticultural Farm: Watkinsville, GA (2019, June)
Discussed research findings with local farmers and gardeners

Ecology Workshop at the Matthaei Botanical Gardens: Ann Arbor, MI (2016 & 2017, October)
Developed and ran a hands-on, workshop about Ecology research for 70 Huron High School students

Scientist Spotlight, **University of Michigan Natural History Museum**: Ann Arbor, MI (2016)
Ran hands-on, inquiry-based activities about plant-insect communication via volatiles for the public

Science Olympiad Assistant Coach, **Washtenaw International Middle Academy**: Ypsilanti, MI (2015-2016) Coached middle-school students in topics such as Ecology, Forensics, and Meteorology

Green Generation Event Supervisor, **Holt Invitational Science Olympiad Tournament**: Holt, MI (2016, March)

Washtenaw County Middle School Science Fair Judge: Ann Arbor, MI (2015, March)

Ecology Coordinator, Future U Program, University of Michigan (2014-2015)
Held hands-on workshops to excite diverse students from local middle schools about Biology careers. Students toured the lab and carried out mini-experiments.

Service

Reviewer: *Functional Ecology, Oecologia, Plant Ecology, PLOS ONE, Environmental Entomology, Ecology and Evolution, Biology Letters, Entomologia Experimentalis et Applicata*

Assessment Committee, Davidson College (Fall 2021)
Assisting in administering GenBio-MAPS assessments and summarizing annual assessment reports to evaluate Biology majors' achievement of Biology learning outcomes throughout their time at Davidson College.

Graduate Student Teaching Mentor, University of Michigan (2016-2017)
Conducted classroom observations, individual consultations, and group discussions on inclusive teaching and active learning strategies with first-time teaching assistants.

Diversity, Equity, and Inclusion Committee, Graduate Student Representative (2015-2017)
Department of Ecology and Evolutionary Biology, University of Michigan

Worked with faculty and staff to address departmental diversity, equity, and inclusion initiatives including student recruitment, annual departmental Town Hall meetings, departmental training, increasing diversity in faculty searches and graduate student applications, and reviewing applications for departmental and college-wide diversity, equity, and inclusion programs.