

Emily K. Meineke
Assistant Professor of Landscape Entomology
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EDUCATION

North Carolina State University

Ph.D., Entomology 2016

Dissertation: Understanding the Consequences of Urban Warming for
Street Trees and their Insect Pests

Advisor: Steven D. Frank, Co-advisor: Robert R. Dunn

University of North Carolina at Chapel Hill

B.S., Environmental Science, minor in Biology, 2008

EMPLOYMENT

2020 Assistant Professor of Urban Landscape Entomology at University of California, Davis
2019 Postdoctoral Associate at Harvard University Herbaria and Duke University
2017 NSF Postdoctoral Fellow at Harvard University Herbaria
2016 Postdoctoral Fellow at Harvard University Herbaria and McGill University
2010 Seasonal Research Technician at Washington University and University of Wisconsin
2010 Seasonal Research Technician at Eastern Nevada Landscape Coalition
2009 Seasonal Research Technician at Dartmouth College
2006 Intern at Appalachian Highlands Learning Center

FELLOWSHIPS, AWARDS, AND GRANTS

National

2022 NSF CAREER

2021 USDA NIFA Foundational and Applied Sciences

2016 NSF Postdoctoral Research Fellowship

2015 Lillian and Alex Feir Travel Award

2014 Student Appreciation for the Biology of Insect Pests Award

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2013 Garden Club of America Urban Forestry Fellowship
2012 EPA Science to Achieve Results (STAR) Fellowship

University

2022 UC Davis Hellmann Fellowship
2022 UC Davis Small Grant for Research
2022 UC Davis Hellman Fellowship
2021 Diversity and Principles of Community Team Award
2020 UC Davis Committee on Research Large Grant
2018 Gund Postdoctoral Fellowship at University of Vermont (declined)
2016 Keck Center Travel Grant
2015 Best presentation at NCSU Dept. of Entomology symposium
2014 North Carolina Entomological Society Travel Award
2014 Preparing the Professoriate Fellowship
2013 North Carolina Entomological Society Outstanding Ph.D. Student Award
2011 North Carolina State Foundation Fellowship
2011 North Carolina State Graduate Student Research Fellowship
2008 Francis L. Phillips Travel Scholarship
2007 University of Montana Biological Station Summer Scholarship

RESEARCH PUBLICATIONS

2024

30. A Swain, LE Azevedo-Schmidt, SA Maccracken, ED Currano, EK Meineke, ... Interactive effects of temperature, aridity, and plant stoichiometry on insect herbivory: past and present. *The American Naturalist*.

2023

29. **Meineke, EK**, Youngsteadt, E, Lippey, MK, Baldock, KCR. Urbanization shapes insect diversity. Routledge handbook of urban biodiversity.

28. **Jenny, LA***, Shapiro, LR, Davis, CC, Jonathan Davies, T, Pierce, NE and **Meineke, EK**, **2023**. Herbarium specimens reveal herbivory patterns across the genus *Cucurbita*. *American Journal of Botany*.

27. **Meineke, EK**, Eng, DS, Karban, R. Vehicle pollution is associated with elevated insect damage to street trees. *Journal of Applied Ecology*.

*Undergraduate mentee

2022

26. Azevedo-Schmidt, L., **Meineke, EK**, Currano, ED. Insect herbivory within modern forests is greater than fossil localities due to human influence. *PNAS*.

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25. Santangelo, JS + 247 others. Global urbanization drives parallel environmental and evolutionary change. *Science*.

24. Daru, BH, Willis, CG, **Meineke, EK**, Ronk, A, Zobel, M, Pärtel, M, Antonelli, A, Davies, TJ, Davis, CC. Biotic invasions drive widespread homogenization of plant communities in the Anthropocene. *Nature Communications*.

2021

23. **Meineke, EK**+, Daru, BH+. Bias assessments to expand research harnessing biological collections. *Trends in Ecology and Evolution*. *In Press*. +contributed equally

22. **Meineke, EK**, Davis, CC, Davies, TJ. Plant phenological sensitivity to temperature elevates herbivory. *Global Change Biology*. doi: 10.1111/gcb.15600.

21. Ossola, A, Cadenasso, M, **Meineke, EK**. Valuing the role of time in urban system science and ecology. *Frontiers in Ecology and Evolution*, doi: 10.3389/fevo.2021.620620.

2020

20. Soltis, PS, Nelson, G, Zare, A, and **Meineke, EK**. Plants meet machines: Prospects in machine learning for plant biology. *Applications in Plant Sciences*; 8(6); doi: 10.1002/aps3.11371.

19. Pryer, KM, Tomasi, C, Wang, X, **Meineke, EK**, Windham, MD. Assessing the utility of computer vision for discriminating among closely related horsetails (*Equisetum*) using herbarium specimen images. *Applications in Plant Sciences*; 8(6); doi: 10.1002/aps3.11372.

18. **Meineke, EK**, Tomasi, C, Yuan, S, Pryer, KM. Applying machine learning to investigate long-term insect-plant interactions preserved within digitized herbarium specimens. *Applications in Plant Sciences*; 8(6); doi: 10.1002/aps3.11369.

17. Pearson, KD, Nelson, G, Aronson, MFJ, Bonnet, P, Brenskelle, L, Davis, CC, Denny, EG, Ellwood, ER, Goëau, H, Heberling, JM, Joly, A, Lorieul, T, Mazer, SJ, **Meineke, EK**, Stucky, BJ, Sweeney, P, White, AE, Soltis, PS. Machine learning using digital herbarium specimens to accelerate phenological research. *BioScience*; doi: 10.1093/biosci/biaa044.

16. Adams, BJ, Li, E, Bahlai, CA, **Meineke, EK**, Brown, BV. Local and landscape-scale variables shape flying insect diversity in an urban environment. *Ecological Applications*; 30(4). doi: 10.1002/eap.2089.

15. Hedrick, BP, Heberling, M+, **Meineke, EK**+, Turner, KG+, Grassa, CJ, Kennedy, J, Clarke, J, Cook, J, Edwards, SV, Davis, C. Digitization and the future of natural history collections. *BioScience*, 2020; doi: 10.1093/biosci/biz163. +Contributed equally

2019

14. McGlynn, TP+, **Meineke, EK+**, Bahlai, CA, Li, E, Hartop, EA, Adams, BJ, and Brown, BV. Thermal gradients account for the biodiversity of a hyperdiverse group of insects in urban Los Angeles. *Proceedings of the Royal Society B*, **2019**; 286(1912). doi: 10.1098/rspb.2019.1818. +Contributed equally

13. Lucas, J, Madden, AA, Penick, CA, Epps, MJ, Marting, PR, Stevens, JL, Fergus, DJ, Dunn, RR, **Meineke, EK**. Azteca ants maintain unique microbiomes across functionally distinct nest chambers. *Proceedings of the Royal Society B*, **2019**. doi: 10.1098/rspb.2019.1026

12. Daru, BH, Kling, ML, **Meineke, EK**, van Wyk, A. The use of herbarium specimens for establishing long-term trends in the flowering phenology of *Protea* (Proteaceae). *Invited contribution to special issue in *Applications in Plant Sciences*, **2019**. doi: 10.1002/aps3.1232

11. **Meineke, EK+**, Davies, TJ+, Daru, BH, Davis, CC. Biological collections for understanding biodiversity in the Anthropocene. *Philosophical Transactions of the Royal Society B*, **2019**. doi: 10.1098/rstb.2017.0386. +Contributed equally

10. **Meineke, EK** & Davies, TJ. Museum specimens provide novel insights into changing plant-herbivore interactions. *Philosophical Transactions of the Royal Society B*, **2019**. doi: 10.1098/rstb.2017.0393

9. **Meineke, EK**, Classen, AT, Sanders, NJ, Davies, TJ. Herbarium specimens reveal increasing herbivory over the past century. *Journal of Ecology*, **2019**. doi: 10.1111/1365-2745.13057.

2018

8. **Meineke, EK**, Davis, CC, Davies, TJ. The unrealized potential of herbaria for global change biology. *Ecological Monographs*, **2018**. doi: 10.1002/ecm.1307. *Top cited paper in *Ecological Monographs* for 2018-2019

7. Terando, AJ, Youngsteadt, E, **Meineke, EK**, and Prado, SG. Accurate near surface air temperature measurements are necessary to gauge ecological responses to global climate change. Response to Ashcroft (2017). *Ecology and Evolution*, **2018**; 8, doi: 10.1002/ece3.3972.

6. **Meineke, EK** and Frank, SD. Water availability drives tree growth responses to herbivory and warming. *Journal of Applied Ecology*, **2018**; 55, doi: 10.1111/1365-2664.13130.

2017

5. Terando, AJ, Youngsteadt, E, **Meineke, EK**, and Prado, SG. Ad hoc instrumentation methods in ecological studies produce highly biased temperature measurements. *Ecology and Evolution*, **2017**; 7, doi: 10.1002/ece3.3499.

4. **Meineke, EK**, Holmquist, AJ *, Wimp, GM, and Frank, SD. Changes in spider community composition are associated with urban temperature, not herbivore abundance. *Journal of Urban*

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Ecology, **2017**; 3 (1), doi:10.1093/jue/juw010.

*undergraduate mentee

Before 2017

3. **Meineke, EK**, Youngsteadt, E, Dunn, RR, and Frank, SD. Urban warming reduces aboveground carbon storage. *Proceedings of the Royal Society B*, **2016**; 283, doi: 10.1098/rspb.2016.1574.
(Featured in *Nature*: <http://www.nature.com/nature/journal/v538/n7624/full/538143a.html>)

2. **Meineke, EK**, Dunn, RR, and Frank, SD. Early pest development and loss of biological control are associated with urban warming. *Biology Letters*, **2014**; 10 (11), doi: 10.1098/rsbl.2014.0586.

1. **Meineke EK**, Dunn RR, Sexton JO, and Frank SD. 2013. Urban warming drives insect pest abundance on street trees. *PLoS ONE*, **2013**; 8 (3), doi: 10.1371/journal.pone.0059687.
(Featured in *PLoS Collection: Ecological Impacts of Climate Change* and in top 10% most cited articles in *PLoS ONE*)

Book Reviews

Meineke, EK. Book Review: Innumerable insects: the story of the most diverse and myriad animals on earth. *American Entomologist*, **2019**; 65(3): 205-206.

Meineke, EK. The Structure & Dynamics of Human Ecosystems: Toward a Model for Understanding and Action. *Quarterly Review of Biology*, **2018**; 93 (2).

Meineke, EK. The Insect Crisis: The Fall of the Tiny Empires That Run the World. *American Entomologist*.

INVITED TALKS

International

- 2024 Evolution
- 2022 Ecological Society of America/ Canadian Society for Ecology and Evolution Conference
- 2022 European Conference for Conservation Biology
- 2021 Beaty Center for Species Discovery, Canadian Museum of Nature
- 2021 Imperial University of London
- 2019 International Biogeography Society Conference, Málaga, Spain
- 2018 Seminar speaker, Université de Sherbrooke, Canada
- 2018 Seminar speaker, Concordia University, Canada
- 2018 Le Studium, Orléans, France. “Species spread in a warmer and globalized world” conference, coauthor presented
- 2017 Muséum National d'Histoire Naturelle, Paris, France.

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2016 International Congress of Entomology, Orland, Florida, USA

2016 Seminar speaker, CMEC, University of Copenhagen, Denmark

National

2022 New York Botanical Garden

2022 UC Berkeley, Essig Brunch Entomology Seminar

2022 University of Wyoming, Keynote speaker at annual graduate student PIE symposium

2022 Entomological Society of America, Social Justice in Entomology Webinar

2021 University of Illinois, Champagne-Urbana

2021 University of Nevada, Reno

2021 West Virginia University

2021 Entomological Society of America

2020 University of Wyoming Biodiversity Institute

2020 Seminar Speaker, Carnegie Museum of Natural History

2019 Entomological Society of America. "Recent Approaches to Studying Invertebrate Responses to Rapid Environmental Change" symposium

2019 Seminar Speaker, Brown University

2019 Seminar Speaker, UC Davis

2019 The National Academy of Sciences, Washington, D. C.

2019 Keynote Speaker, Annual meeting of the Mid-Atlantic Megalopolis Thematic Collections Network

2019 Seminar Speaker, Rutgers University

2019 Seminar Speaker, Fordham University

2019 Seminar Speaker, UCLA

2019 Seminar Speaker, University of North Carolina at Chapel Hill

2018 Seminar Speaker, Duke University

2018 Seminar Speaker, Harvard Forest

2018 Seminar Speaker, Drexel

2018 Botanical Society of America Conference. "Tools, Standards, Techniques, and Methods for Using Herbarium Specimens in Phenological Research" symposium

2018 Ecological Society of America Conference. "New uses for old collections: Herbarium data in an era of ecological change" symposium, coauthor presented

2018 Harvard University Plant Biology Symposium

2017 Seminar Speaker, Harvard University Herbaria

2017 Chicago Botanic Garden Annual Symposium. "Timing is Everything: The Impacts of Changes in Phenology"

2016 Seminar Speaker, Natural History Museum of Los Angeles

2016 Ecological Society of America Conference. "Leveraging the Power of Biodiversity Specimen Data for Ecological Research" symposium

2016 Seminar Speaker, Shaw University

2015 Southeastern Branch of the Entomological Society of America Conference

2015 Entomological Society of America Conference. "Effects of Global Climate Change on Species Interactions and Biological Control" symposium

2015 Entomological Society of America Conference. "Are We Stressed Enough Yet? Interdisciplinary Partnerships to Evaluate the Consequences of Plant Abiotic and Biotic Stresses" symposium

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2015 Entomological Society of America Conference. PBT Networking Symposium.
2015 NSF Integrated Digitized Biological Collections Network Webinar
2015 Society for Preservation of Natural History Collections Conference
2015 19th Workshop on Pests of Ornamental Plants.
2014 Entomological Society of America
2013 Triangle and Landscape Researchers seminar
2012 Entomological Society of America, “Turfgrass and Ornamentals” symposium

TEACHING EXPERIENCE

University of California, Davis, Instructor

Art, Science, and the World of Insects, Fall 2022, Fall 2024

University of California, Davis, co-Instructor

Art, Science, and the World of Insects, Spring 2022

University of California, Davis, Instructor

Biological Control, Fall 2021

University of California, Davis, Invited guest lecturer

Plants in the City, Spring 2021

University of California, Davis, Instructor

Animal Biology, Winter 2021

University of California, Berkeley, Invited guest lecturer

Museum Sciences, Fall 2020

Harvard University, Invited guest lecturer

Conservation Biology, Fall 2016

North Carolina State University, Instructor

Ecology of Cities: How organisms die, cope, flee, or evolve and what it means for our future, Spring 2015

North Carolina State University, Co-Instructor

Introduction to Ecology, Fall 2014

North Carolina State University, Teaching Assistant

Ornamental and Turf Insects, Spring 2011

North Carolina State University, Invited guest lecturer

Introduction to Landscape Performance and Metrics, Spring 2015

Ornamental and Turf Insects, Spring 2013, 2014, and 2015

Islands and Evolution, Spring 2013

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PROFESSIONAL ASSOCIATIONS

Society for Conservation Biology
Ecological Society of America
Botanical Society of America
Entomological Society of America

REVIEWER

PNAS
Ecology Letters
New Phytologist
Methods in Ecology and Evolution
Philosophical Transactions of the Royal Society B
Journal of Ecology
Journal of Animal Ecology
Ecological Applications
Ecology and Evolution
Evolutionary Applications
Biological Conservation
BioScience
Urban Ecosystems
American Journal of Botany
Applications in Plant Sciences
Global Ecology and Conservation
Frontiers in Plant Science

EDITORIAL EXPERIENCE

Philosophical Transactions of the Royal Society B

Lead editor for special issue:

“Biological collections for understanding biodiversity in the Anthropocene” (2019)

Co-editors: Barnabas H. Daru, T. Jonathan Davies, Charles C. Davis

Applications in Plant Sciences,

Co-editor for two special issues:

“Machine Learning in Plant Biology: Examples Using Images of Herbarium Specimens” (2020)

“Machine Learning in Plant Biology: From Genomics to Field Studies” (2020)

Co-editors: Pamela S. Soltis, Gil Nelson, and Alina Zare