

Olivia M. Bernauer, PhD

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Research Interests

I am an entomologist and ecologist interested in studying the impacts of emerging global change stressors on ecosystem function. I use a combination of on-farm studies and manipulative experiments to understand basic pollinator biology and drivers of pollination success to address applied questions for sustainable agricultural production and the conservation of natural resources.

Research Positions

2021-present **USDA-NIFA Postdoctoral Fellow**, University of Wisconsin-Madison, USA.
2018-2021 **PhD Candidate**, Western Sydney University, AUS.
2017-2018 **Research Assistant**, University of Wisconsin-Madison, USA.
2017 **Field Technician**, Michigan State University, East Lansing, MI, USA.
2015-2017 **Graduate Research Assistant**, University of Maryland, College Park, USA.
2014-2015 **Undergraduate Researcher**, University of Wisconsin, Madison, USA.
2012 **Field Researcher and Mentor**, University of Wisconsin, Madison, USA.

Education

2022 **Ph.D.** Hawkesbury Institute for the Environment, Western Sydney University, AUS.
2017 **M.S.** Entomology. University of Maryland, College Park, USA.
2014 **B.S.** Biology with a mathematics certificate. University of Wisconsin-Madison, USA.

Publications

* Shared first authorship, ^Δ Undergraduate mentee

10. **Bernauer, OM***, Jain, A*, de Bivort, B, Holbrook, NM, Myers, S, de Oliveira Júnior, CR, Trowbridge, A, Ziska, LH Crall, J. Elevated atmospheric CO₂ has weak and species-specific responses on pollen chemistry and plant growth. *In prep, Scientific Reports*.
9. **Bernauer, OM**, Branstetter, MB, Cook, JM, Tierney, SM. Functional trait mismatch between native and introduced bee pollinators servicing a global fruit crop. *In prep, BMC Eco Evo*
8. Hemberger, J, **Bernauer, OM**, Gaines-Day, H, Gratton, C. Landscape-scale floral resource discontinuity decreases bumble bee occurrence and alters community composition. *In revision, Ecological Applications*.
7. Tierney, SM, **Bernauer, OM**, King, L^Δ, Spooner-Hart, R, Cook, JM (2023) Bee pollination services and the burden of biogeography. *Proc Royal Soc B*. 290(2000), 20230747. <https://doi.org/10.1098/rspb.2023.0747>
6. Nacko, S, Hall, M, Spooner-Hart, R, Cook, J., **Bernauer, OM**, Riegler, M (2022) Cucurbit crops in temperate Australia are visited more by native solitary bees than stingless bees. *Journal of Apicultural Research*, 61(5), 675-687. <https://doi.org/10.1080/00218839.2022.2110742>
5. **Bernauer, OM**, Tierney, SM, Cook, JM (2022) Efficiency and effectiveness of native bees and honey bees as pollinators of apples in New South Wales orchards.

Agriculture Ecosystems and Environment, 337.

<https://doi.org/10.1016/j.agee.2022.108063>

4. **Bernauer, OM**, Cook, JM, Tierney, SM (2022) Division of foraging behaviour: assessments of pollinator traits when visiting a model plant species. *Animal Behaviour*, 188, 169-179. <https://doi.org/10.1016/j.anbehav.2022.03.018>
3. **Bernauer, OM**, Cook, JM, Tierney, SM (2021) Nesting biology and social organization of the allodapine bee *Exoneura angophorae* (Hymenoptera: Apidae): montane environmental constraints yield biased sex allocation yet phenology is unhindered. *Insectes Sociaux*, 68(4), 337-349. <https://doi.org/10.1007/s00040-021-00832-6>
2. Garrett, MPD, DeGroot, GA, Albrecht, M, ... **Bernauer, OM** and 33 others (2021) Opportunities to reduce pollination deficits and production shortfalls in a globally important crop. *Ecological Applications*, 31(8), 1-12. <https://doi.org/10.1002/eap.2445>
1. **Bernauer, OM***, Gaines-Day, HR*; Steffan, SA (2015) Colonies of Bumble Bees (*Bombus impatiens*) Produce Fewer Workers, Less Bee Biomass, and Have Smaller Mother Queens Following Fungicide Exposure. *Insects*, 6, 478–488. <https://doi.org/10.3390/insects6020478>

Grants and Awards

2023-2025: WI DATCP Specialty Crop Block Grant, USDA, Madison, WI, **\$99,965**.

Quantifying the impacts of wildflower plantings on cranberry flower visitation by bees using automated monitoring.

2022: IUSSI Travel Grant, XIX International Congress of IUSSI, San Diego, CA, **\$3,500**.

Division of foraging behaviour: adapting social insect indices for pollination.

2021-2023: USDA NIFA Postdoctoral Fellowship, USDA, Madison, WI, **\$164,999**. Effects of rising CO₂ levels on bumble bees: nutrition, foraging, and physiology

2019: 2nd place Graduate Virtual Poster – Entomological Society of America Annual Meeting, P-IE section, Student Competition.

2019-2021: Research Grant, Illawarra Amateur Beekeepers Association, Sutherland, NSW, **A\$2,500**. Foraging behaviour of apple & cherry pollinators.

2019-2021: F.G. Swain Award, Western Sydney University, Richmond, NSW, **A\$9860.30**. Understanding native orchard pollinators: foraging behaviour, pollination efficiency, phylogenetic diversity, and the natural history of an allodapine bee.

2018-2021: Postgraduate Research Award. Western Sydney University, Richmond, NSW, **A\$90,000**. Understanding native orchard pollinators: foraging behaviour, pollination efficiency, phylogenetic diversity, and the natural history of an allodapine bee.

Teaching

Fall 2016: **Teaching Assistant, Beekeeping**, University of Maryland, College Park, USA.

Designed course content, prepared lesson plans, and created assignments. Conducted experiments and activities in the classroom and the apiary with undergraduate students.

Spring 2016: **Teaching Assistant, Biology of Insects Lab**, University of Maryland, College Park, USA.

Redesigned the course curriculum to include ecology activities in addition to taxonomy.

Mar 2014: **Volunteer Limnology Educator**, Trout Lake, Wisconsin.

Educated elementary school children on limnology, aquatic invertebrates, and how to make sustainable choices to preserve water quality in local lakes.

2012 to 2014: **Rooftop Intern**, Madison Children’s Museum, Madison, WI, USA.

Conducted educational programs for children about local plants, animals, and sustainable living.

2010 to 2015: **Private and Volunteer Tutor**, Madison, Wisconsin.

Tutored students from elementary school to college students with and without learning disabilities in a variety of subjects from Spanish to mathematics.

Guest lectures

2022 **Natural & Applied Sciences**, University of Wisconsin-Green Bay, USA. (*Virtual*)

2022 **Agroecology 103**, University of Wisconsin-Madison, USA.

2022 **Biodiversity and Global Change**, University of Wisconsin-Madison, USA.

2022 **Land Use Planning**, University of Wisconsin–Stevens Point, USA. (*Virtual*)

2020 **Invertebrate Biology Laboratory**, Western Sydney University, AUS. (*Virtual*)

2015 **BSCI121: Beekeeping**, University of Maryland, College Park, USA.

Mentoring

2 Graduate students resulting in 2 conference talks, 1 poster presentation, 1 NSF-GRFP and 1 small grant (<\$10k).

1 Undergraduate senior thesis supervisor.

8 Independent undergraduate researchers leading to 2 oral and 2 poster presentations and 1 published manuscript.

9 Undergraduates supervised while conducting field work.

3 High school student researchers leading to 1 oral and 2 poster presentations.

Professional Service

2023-present: **Associate Editor, Ecology and Evolution**.

2022-2023: **Organizer, Celebration of Postdoc Excellence**. University of Wisconsin Postdoctoral Association, Madison, WI, USA.

2022-2023: **2023 Joint North Central & Southwestern Branch Meeting symposium organization**, “How Plant Stress Affects Insects: Herbivores, Pollinators, and More”.

2022-2023: **Creator, Wisconsin Pollinator Meeting**. Madison, WI, USA.

2021-present; 2017-2018: **Volunteer Board of Directors & Hiring committee**, Upper Sugar River Watershed Association, Mount Horeb, Wisconsin, USA.

2019-2021: **IUSSI Europe 2020 Symposium organization**, “Understanding social insect pollination: behavioural and genetic approaches” **Postponed & virtual due to COVID-19*.

2018-2020: **ESA P-IE Committee Service**, Entomological Society of America

2016-2017: **Treasurer, Entomology Student Organization**, University of Maryland, College Park, USA.

2016: **Facilitator, Maryland Managed Pollinator Protection Plan**, University of Maryland, College Park, USA.

Ad hoc Reviewer: *Scientific Reports, PLOS ONE, Proceedings of the Royal Society B: Biological Sciences, Agriculture Ecosystems and Environment, Ecology and Evolution, International Journal of Agricultural Sustainability, PNAS, Frontiers in Bee Science, Ecological Entomology*

Professional Presentations (selected)

^Δ Undergraduate mentee

30. **Bernauer, OM**. Global change and pollinators: functional diversity and resilience
Department of Entomology seminar at Texas A&M University, College Station, TX,
USA. (*upcoming*).
29. Melone, G, Smith M, **Bernauer, OM**, Wiessing, J^Δ, Crall, J. Using Computer Vision to
Understand the Effects of Flowering Stage and Temperature on Insect Visitation in an
Apple Orchard. Presented at: Ecological Society of America, 2023 Aug 6-11, Portland
OR, USA. (*upcoming*)
28. Tierney, S, **Bernauer, O**, King, L^Δ, Spooner-Hart, R, Cook, J. The Tyranny of Distance:
bee pollination services in Australian agroecosystems. Presented at: Hawkesbury
Institute for the Environment Research Symposium, 2023 July 20; Richmond, AUS.
27. Tierney, S, **Bernauer, O**, King, L^Δ, Spooner-Hart, R, Cook, J. The Tyranny of Distance:
bee pollination services in Australian agroecosystems. Presented at: Australasian
Society for the Study of Animal Behaviour 2023 Conference, 2023 June 26-28;
Macquarie University, Sydney, AUS.
26. **Bernauer, OM**, Smith M A-Y, Wiessing, J^Δ, Salas, R^Δ, Hemberger, J, Groves, R,
Gratton, C, Crall, JD. AutoPollS: A low-cost, field-deployable device to automatically
monitor pollinators. Presented at: International Conference on Pollinator Biology,
Health, Policy, 2023 June 3-6; State College, PA, USA.
25. **Bernauer, OM**, Wartell, T^Δ, Tang, A, Crall, JD. Do bumble bees have an optimal
temperature for learning while foraging? Presented at: North Central Southwest Joint
Branch meeting of the Entomological Society of America, Apr 16-19, Oklahoma City,
OK, USA.
24. Jain, A, **Bernauer, OM**, Crall, JD. Species-specific effects of elevated atmospheric
carbon dioxide on pollen chemistry. Presented at: North Central Southwest Joint
Branch meeting of the Entomological Society of America, Apr 16-19, Oklahoma City,
OK, USA.
23. **Bernauer, OM**. Global change and pollinators: functional diversity and resilience
Presented at: Biological Sciences Seminar at Wayne State University, 2023 April 10;
Detroit, MI, USA.
22. **Bernauer, OM**. Global change and pollinators: functional diversity and resilience.
Presented at: the University of Wisconsin-Madison's Department of Entomology
Spring Colloquium, 2023 March 10; Madison, WI, USA.
21. Crall, JD, Easton-Calabria, A, Graham, B, Smith, M A-Y, **Bernauer, OM** & 5 others.
Toward an integrative understanding of plant-pollinator interactions using automated
monitoring. Presented at: The Society for Integrative & Comparative Biology, 2023
January 3-7; Austin, TX, USA.
20. Wartell, TM^Δ, **Bernauer, OM**, Tang, A, Crall, JD. Optimal learning temperature in
Bombus impatiens. Poster presented at UW Madison's Biology 152 independent
research poster session, 2022 December 12, Madison, WI, USA.
19. **Bernauer, OM**, Cook, JM, Tierney, SM. Division of foraging behaviour: adapting social
insect indices for pollination. Presented at: XIX International Congress of IUSI, 2022
July 3-7; San Diego, CA, USA.

18. VanDerhei, GC^Δ, **Bernauer, OM**, Crall JD. The impact of carbon dioxide and nitrogen-fertilization on angiosperm phenology. Poster presented at UW Madison's Biology 152 independent research poster session, 2022 May 2, Madison, WI, USA.
17. **Bernauer, OM**, Ziska, LH, Crall, JD. CO₂ in the atmosphere is rising, how will this impact bumble bee foraging? Poster presented at: North Central Branch Meeting of the Entomological Society of America, 2022 March 20-23; Minneapolis, MN, USA.
16. Jain, A, **Bernauer, OM**, Crall, J. Species-Specific Effects of Elevated Atmospheric Carbon Dioxide on Pollen Macronutrients. Poster presented at: North Central Branch Meeting of the Entomological Society of America, 2022 March 20-23; Minneapolis, MN, USA.
15. **Bernauer, OM**, Tierney, SM, Cook, JM. Division of foraging behaviour: adapting social insect indices for pollination. Presented at: IUSSI Europe 2020, October-November 2021; Virtual.
14. **Bernauer, OM**, Tierney, SM, Cook, JM. Nesting biology, annual life cycle, and social organization of a montane population of *Exoneura angophorae*. Presented at: Entomological Society of America Annual Meeting, 2020 November 16-19; Virtual.
13. **Bernauer, OM**, Tierney, SM, Cook, JM. If honey bees decline, wild Australian bees could secure apple pollination in New South Wales orchards. Presented at: Ecological Society of America Annual Meeting, 2020 August 3-6; Virtual.
12. **Bernauer, OM**, Cook, JM, Tierney, SM. Linking bee pollinators to fruit yield and quality: combining functional trait analysis with phylogenetic relatedness. Presented at: Australian Bee Genomics Meeting, 2019 December 5-7; Brisbane, Queensland, AUS. (Invited)
11. Mortys, T^Δ, **Bernauer, OM**, Cook, JM, Tierney, SM. Insect Pollen Transport: An assessment of pollen vectors in orchard crops. Presented at: Summer Scholarship Symposium, 2020 February 14; Parramatta, New South Wales, AUS.
10. **Bernauer, OM**, Tierney, SM, Cook, JM. Pollinator efficiency in Australian apple crops: single visit experiment and pollen analysis. Virtually presented at the Entomological Society of American meeting 2019, 2019 November 17-20; St. Louis, Missouri, USA.
9. **Bernauer, OM**, Cook, JM, Tierney, SM^Δ. Social biology of an allodapine bee in the Blue Mountains Range. Presented at: Australasian Evolution Society, 2019 November 24-27, Sydney, New South Wales, AUS.
8. **Bernauer, OM**, Tierney, SM, Cook, JM. A year in the life of a Blue Mountains Allodapine bee. Presented at the 2019 Linnaean Society of NSW Natural History Field Symposium, 2019 November 8; Springwood, New South Wales, AUS. (Invited)
7. **Bernauer, OM**, Tierney, SM, Cook, JM. Understanding apple and cherry pollinators: comparing pollinator effectiveness. Presented at: The Art and Science of Beekeeping, 2019 June 7-9; Richmond, New South Wales, AUS.
6. King, L^Δ, **Bernauer, OM**, Tierney, SM. Seasonal differences in insect community abundance within horticultural settings of the lower Blue Mountains. Presented at: Summer Scholarship Symposium, 2019; 2019 February 13; Parramatta, New South Wales, AUS.
5. Tierney, SM, Brettell, LE, **Bernauer, OM**, and 3 others. The nascent potential of Australian native bee pollination services. Presented at: First Australian Native Bee Conference, 2018 June 1; Gold Coast, Queensland, AUS.

4. **Bernauer, OM**, vanEngelsdorp, D. The Maryland Native Pollinator Survey: utilizing Citizen Scientists to determine the floral preferences of Maryland's native pollinators. Poster presented at: XXV International Congress of Entomology, 2016 September 25-30; Orlando, Florida, USA.
3. **Bernauer, OM**, vanEngelsdorp, D. The Maryland Native Pollinator Survey: utilizing Citizen Scientists to determine the floral preferences of Maryland's native pollinators. Poster presented at: International Conference on Pollinator Biology, Health and Policy, 2016 July 18-20; State College, Pennsylvania, USA.
2. **Bernauer, OM**, vanEngelsdorp, D. The Maryland Native Pollinator Survey: utilizing Citizen Scientists to determine the floral preferences of Maryland's native pollinators. Poster presented at: Smithsonian Botanical Symposium, 2016 May 20; Washington, DC, USA.
1. **Bernauer, OM**, Traynor, KS, vanEngelsdorp, D. Honey Bee Health: The Complex Web of Colony Losses. Presented at: Protecting Pollinators in Ornamental Landscapes Conference; 2015 Oct 12-14; Hendersonville, North Carolina, USA. (*Keynote*)

Extension and Outreach

Publications

7. **Bernauer, OM**. If honey bees decline, Australian native bees can secure apple pollination in NSW. The Cross-Pollinator Newsletter for the Australian Native Bee Association; 2020, Dec. 17.
6. **Bernauer, OM**, Tierney, SM, Cook, JM. It's good to 'bee' aware. Australian Tree Crop magazine; 2020, Dec/Jan 2020, 3.
5. **Bernauer, OM**, Gaines Day, HR, Mallinger, R, Gratton, C. Wild pollinators in Wisconsin apple orchards. Extension publication; 2017 July 18; Madison, Wisconsin, USA.
4. **Bernauer, OM**, Seargent, C, Shrewsbury, P, Raupp, M, and vanEngelsdorp, D. Maryland Native Pollinator Survey: Citizen Science Pollinator Monitoring Guide. 2nd ed. Extension publication; 2016 May; College Park, Maryland, USA.
3. **Bernauer, OM**, Seargent, C, Shrewsbury, P, Raupp, M, and vanEngelsdorp, D. Maryland Native Pollinator Survey: Citizen Science Pollinator Pocket Guide. 2nd ed. Extension publication; 2016 May; College Park, Maryland, USA.
2. **Bernauer, OM**, Seargent, C, Shrewsbury, P, Raupp, M, and vanEngelsdorp, D. Maryland Native Bee Survey: Citizen Science Pollinator Monitoring Guide. Extension publication; 2015 May; College Park, Maryland, USA.
1. **Bernauer, OM**, Seargent, C, Shrewsbury, P, Raupp, M, and vanEngelsdorp, D. Maryland Native Bee Survey: Citizen Science Pollinator Pocket Guide. Extension publication; 2015 May; College Park, Maryland, USA.

Presentations

12. **Bernauer, OM**, Conversations about conservation: apple pollination in Wisconsin and beyond. Presented at the USRWA's Conversations about Conservation series, 2021 Dec. 7. Virtual.
11. **Bernauer, OM**, Tierney, SM, Cook, JM. Pollinator foraging behavior on apple and sweet cherry. Presented at: Illawarra Beekeeping Club; 2019 August 8; Sutherland, New South Wales, AUS.

10. **Bernauer, OM**, Tierney, SM, Cook, JM. Understanding apple and cherry pollination. Presented at: Sydney Bee Club; 2019 March 25; Bondi Junction, New South Wales, Australia.
9. **Bernauer, OM**, Planting for pollinators. Presented at: Maple Bluff Garden Club; 2017 June 6; Maple Bluff, Wisconsin, USA.
8. **Bernauer, OM**, Fluehr-Lobban, C, Morgan, R, Ramsey, S, Welker, M. Bees and Beekeeping Today. Presenter and Panelist at: The Clarke Forum for Contemporary Issues at Dickinson College; 2017 March 1; Carlisle, Pennsylvania, USA. (Invited)
7. **Bernauer, OM**. How to plant a successful pollinator garden and an introduction to the insects enjoying it. Presented at: South Jersey Beekeepers Association; 2016 Oct 8; Germania, New Jersey, USA.
6. **Bernauer, OM**. How to plant a successful pollinator garden and an introduction to the insects enjoying it. Presented at: District of Columbia Department of Parks and Recreation; 2016 June 21; Washington, DC, USA.
5. **Bernauer, OM**. How to plant a successful pollinator garden and an introduction to the insects enjoying it. Presented at: Baltimore City Master Gardener Meeting; 2016 Apr 19, Baltimore City, Maryland, USA.
4. **Bernauer, OM**, Raupp, M, Shrewbury, P, vanEngelsdorp, D. Maryland Native Bee Survey: 2015 Results and plans for 2016. Presented at: The First Ever State-Wide Master Gardener Pollinator and Natural Enemies Meeting; 2015 Dec 11; Cockeysville, Maryland, USA.
3. **Bernauer, OM**. Bees! Presented at: D.C. Beekeepers Alliance; 2015 Nov 18, Washington, D.C., USA. (Invited)
2. **Bernauer, OM**. How to get Involved in Research and an Introduction to Native Bees. Presented at: Lake Braddock Secondary School; 2015 Oct 7; Burke, Virginia, USA.
1. Gaines-Day, HR, **Bernauer, OM**, Steffan, SA, Do Fungicide Applications Affect Bee Fidelity to Cranberries? Presented at: 2015 Wisconsin Cranberry School; 2015 Jan 21-22; Stevens Point, Wisconsin, USA.

◇ *Presenting author*

Events (selected)

- 2023 **PEOPLE program** conversations about ecology careers, Belleville, WI, USA.
- 2022 **Monarch party**, Oregon, WI, USA.
- 2021 **Career week presentation**, Wilson Elementary School, Mequon, WI, USA. (*Virtual*)
- 2020 **National Pollinator Week** event at Kurrajong Secondary School, Kurrajong, AUS.
- 2019 **Kurrajong-a-buzz**, Kurrajong, NSW, AUS.
- 2019 **Sydney Science Week**, Parramatta, NSW, AUS.
- 2017 **Maple Bluff Garden Club**, Madison, WI, USA.
- 2016 **National Pollinator Week**, Smithsonian Natural History Museum, DC, USA.
- 2015 **DC Beekeepers Alliance**, DC, USA.
- 2015 **Maryland Day**, College Park, MD, USA.
- 2015 **WI Cranberry School**, Stevens Point, WI, USA.