Dr. Nate B. Hardy

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Curator of Insects, Auburn University Museum of Natural History
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Education

2008	PhD, University of California, Davis, Department of Entomology
2002	BS, Cornell University, Department of Entomology

Employment

2019-	Associate Professor, Auburn University (AU), Department of Entomology and Plant Pathology
2013-2019	Assistant Professor, AU, Department of Entomology and Plant Pathology
2012-2013	Postdoc, Cleveland Museum of Natural History
2011-2012	Postdoc, University of New Mexico
2008-2011	Research Entomologist, Queensland Department of Primary Industries and Fisheries, Brisbane, Queensland, Australia
2008	Postdoc, University of California, Davis

Publications

(http://scholar.google.com/citations?user=KxXQV14AAAAJ&hl=en)
Students in my group are denoted with an asterisk.

1. Liu R, Pilar M, Arias-Giraldo LF, Donegan M, Potnis N, Hardy NB, Castillo AI, Almeida RPP, Landa BB, De La Fuente, L. 2025. Natural competence in the bacterial pathogen *Xylella fastidiosa* varies across genotypes and is associated with adhesins. *PLoS Pathogens*. https://doi.org/10.1371/journal.ppat.1013757 .
2. Hardy NB, 2025. How does robustness affect evolvability? *Evolution*, 79:1996-2006. https://doi.org/10.1093/evolut/qpaf116
3. *Yang Z, *Woodruff E, Held D, Hardy NB. 2025. Predicting the Phenology of Herbivorous Insects. *Ecology and Evolution*, 15:p.e71734. https://doi.org/10.1002/ece3.71734
4. *Woodruff E, Hardy NB. 2024. Virulence Evolution via Pleiotropy in Vector‐Borne Plant Pathogens. *Ecology and Evolution*, 14: p.e70741. https://doi.org/10.22541/au.172114685.58624588/v1

5. Kawahara et al. 2023. A global phylogeny of butterflies reveals their evolutionary history, ancestral hosts and biogeographic origins. *Nature Ecology and Evolution*, 7:903-913. https://doi.org/10.1038/s41559-023-02041-9
6. Ziabari OS, Li B, Hardy NB, Brisson JA. 2023. Aphid wing polymorphisms are transient and have evolved repeatedly. *Evolution*, 77:1056-1065 https://doi.org/10.1093/evolut/qpad024
7. Hardy NB, Forister M. 2023. ML.Niche specificity, polygeny, and pleiotropy in herbivorous insects. *The American Naturalist*, 201:376-388. https://doi.org/10.1086/722568
8. *Bevers N, Sikora E, Hardy NB. 2022. Soybean Disease Identification Using Original Field Images and Transfer Learning with Convolutional Neural Networks. *Computers and Electronics in Agriculture*, 203:107449. https://doi.org/10.1016/j.compag.2022.107449
9. Hardy NB. 2022. Delaying polygenic resistance to pesticides and antibiotics. *BioRXiv*. doi: https://www.biorxiv.org/content/10.1101/2022.08.14.503896v1 *Evolutionary Applications*, 15:2067-2077
10. Hardy NB, *Kaczvinsky C, *Bird G, Brunet B, Maw E, Foottit R. 2022. Geographic isolation drives speciation in Nearctic aphids. *Nature Communications Biology*, 5:1-6. https://doi.org/10.1038/s42003-022-03771-5
11. *Bird G, Wilson AE, Williams GR, Hardy NB. 2021. Parasites and pesticides act antagonistically on honey bee health. *Journal of Applied Ecology*, 58:997-1005. https://doi.org/10.1111/1365-2664.13811
12. Crossley MS, Snyder WE, Hardy NB. 2021. Insect–plant relationships predict the speed of insecticide adaptation. *Evolutionary Applications,* 14:290-296. https://doi.org/10.1111/eva.13089
13. Peterson DA, Hardy NB, Morse GE, Itioka T, Wei J, Normark BB. 2020. Non-adaptive host-use specificity in tropical armored scale insects. *Ecology and Evolution*, 10:12910-12919. https://doi.org/10.22541/au.159112665.50767244
14. Hardy NB, *Kaczvinsky C, *Bird G, Normark BB. 2020. What We Don't Know About Diet-Breadth Evolution in Herbivorous Insects. *Annual Review of Ecology, Evolution, and Systematics*, 51:103-22. https://doi.org/10.1146/annurev-ecolsys-011720-023322
15. *Kaczvinsky C, Hardy NB. 2020. Do major host shifts spark diversification in butterflies? *Ecology and Evolution*, 10:3636-3646. https://doi.org/10.1002/ece3.6116
16. *Oforka LC, Adeleke MA, Anikwe JC, Hardy NB, Mathias DK, Makanjuola WA, Fadamiro HY. 2020. Biting Rates and Onchocerca Infectivity Status of Black Flies from the *Simulium damnosum* Complex (Diptera: Simuliidae) in Osun State, Nigeria. *Journal of Medical Entomology.* https://doi.org/10.1093/jme/tjz250

17. *Bird G, Kaczvinsky C, Wilson AE, Hardy NB. 2019. When do herbivorous insects compete? A phylogenetic meta‐analysis. *Ecology Letters* 22, 875-883. https://doi.org/10.1111/ele.13245
18. Hardy NB, Beardsley JW, Gullan PJ. 2019. A revision of *Lachnodius* Maskell (Hemiptera, Coccomorpha, Eriococcidae). *ZooKeys*, 818: 43. doi:10.3897/zookeys.818.32061
19. Johnson KP, Dietrich CH, Friedrich F, Beutel RG, Wipfler B, Peters RS, Allen JM, Petersen M, Donath A, Walden KKO, Kozlov AM, Podsiadlowski L, Mayer C, Meusemann K, Vasilikopoulos A, Waterhouse RM, Cameron SL, Weirauch C, Swanson DR, Percy DM, Hardy NB, Terry I, Liu S, Zhou X, Misof B, Robertson HM, Yoshizawa K. 2018. Phylogenomics and the evolution of hemipteroid insects. *Proceedings of the National Academy of Sciences*, 115: 12775-12780. https://doi.org/10.1073/pnas.1815820115
20. Hardy NB, Williams DJ, 2018. Doubling the known endemic species diversity of New Caledonian armored scale insects (Hemiptera, Diaspididae). *Zookeys* 782, 11-47. doi:10.3897/zookeys.782.27938
21. Oforka LC*, Adeleke MA, Anikwe JC, Hardy NB, Mathias DK, Makanjuola WA, Fadamiro HY. 2018. Species diversity of the *Simulium damnosum* complex (Diptera: Simuliidae). *Systematic Entomology* 43, 123-135. https://doi.org/10.1111/syen.12256
22. Hardy NB, Peterson DA, Ross L, Rosenheim J. 2018. Does a plant-eating insect's diet govern the evolution of insecticide resistance? Comparative phylogenetic tests of the pre-adaptations hypothesis. *Evolutionary Applications* 11, 739-747. https://doi.org/10.1111/eva.12579
23. Hardy NB. 2018. "The Biodiversity of Sternorrhyncha: Scale Insects, Aphids, Psyllids, and Whiteflies." *Insect Biodiversity: Science and Society*. Ed. Foottit RG, Adler PH. 2, 591-625.
24. Hamilton FB*, Williams DJ, Hardy NB. 2017. Five new species of the armored scale genus *Andaspis* Macgillivray (Hemiptera, Coccomorpha, Diaspididae) from New Caledonia. *Zookeys* 693, 17-31.
25. Hardy NB. 2017. Do plant-eating insect lineages pass through phases of host-use generalism during speciation and host-switching? Phylogenetic evidence. *Evolution* 71, 2100-2109. https://doi.org/10.1111/evo.13292
26. Christodoulides N*, Van Dam AR, Peterson DA, Frandsen RJN, Mortensen UH, Petersen B, Rasmussen S, Normark BB, Hardy NB. 2017. Gene expression plasticity across hosts of an invasive scale insect species. *PLoS ONE* 12, e0176956.
27. Hardy NB, Peterson DA, Normark BB. 2016. Nonadaptive Radiation: Pervasive diet specialization by drift in scale insects? *Evolution* 70, 2421-2428. https://doi.org/10.1111/evo.13036

28. Peterson D, Hardy NB, Normark BB. 2016. Micro-and macroevolutionary trade-offs in plant-feeding insects. *The American Naturalist* 188, 640-650. https://doi.org/10.1086/688764
29. García Morales M*, Denno B, Miller DR, Miller GA, Ben-Dov Y, Hardy NB. 2016. ScaleNet: A literature-based model of scale insect biology and systematics. *Database* 2016, p.bav118. https://doi.org/10.1093/database/bav118
30. Winterton SL, Hardy NB, Gaimari SD, Hauser M, Hill HN, Holston KC, Irwin ME, Lambkin CL, Metz MA, Turco F, Webb D, Yang L, Yeates DK, Wiegmann BM. 2016. The phylogeny of stiletto flies (Diptera Therevidae). *Systematic Entomology* 41, 144-161. https://doi.org/10.1111/syen.12147
31. Hardy NB, Peterson DA, Normark BB. 2015. Scale insect host ranges are broader in the tropics. *Biology Letters* 11, 20150924. https://doi.org/10.1098/rsbl.2015.0924
32. Blackmon H, Hardy NB, Ross L. 2015. The evolutionary dynamics of haplodiploidy: genome architecture and haploid viability. *Evolution* 69, 2971-2978. https://doi.org/10.1111/evo.12792
33. Peterson DA, Hardy NB, Morse GE, Stocks IC, Okusu A, Normark BB. 2015. Phylogenetic analysis reveals positive correlations between adaptations to diverse hosts in a group of pathogen-like herbivores. *Evolution* 69, DOI: 10.1111/evo.12772. https://doi.org/10.1111/evo.12772
34. Svenson GJ, Hardy NB, Whiteman HMC, Wieland F. 2015. Of flowers and twigs: phylogenetic revision of the plant-mimicking praying mantises (Mantodea: Empusidae and Hymenopodidae) with a new suprageneric classification. *Systematic Entomology* 40, 789-834. https://doi.org/10.1111/syen.12134
35. Hardy NB, Peterson DA, von Dohlen CD. 2015. The evolution of life cycle complexity in aphids: ecological optimization or historical constraint? *Evolution* 69, 1423-1432. https://doi.org/10.1111/evo.12643
36. Semple T, Gullan P, Hodgson C, Hardy NB, Cook LG. 2015. Systematic review of the Australian “bush coconut” genus (Hemiptera: Eriococcus: *Cystococcus*) uncovers a new species from Queensland. *Invertebrate Systematics* 29, 287-312. https://doi.org/10.1071/IS14061
37. Ross L, Blackmon H, Lorite P, Gokhman VE, Hardy NB. 2015. Recombination, chromosome number and eusociality in the Hymenoptera. *Journal of Evolutionary Biology* 28, 105-116. https://doi.org/10.1111/jeb.12543
38. Hardy NB, Otto SP. 2014. Specialization and generalization in the diversification of phytophagous insects: tests of the musical chairs and oscillation hypotheses. *Proceedings of the Royal Society B* 281, 20132960. https://doi.org/10.1098/rspb.2013.2960
39. Cook LG, Hardy NB, Crisp MD. 2014. Three explanations for biodiversity hotspots: small range size, geographic overlap and time for species accumulation. An Australian case study. *New Phytologist* 207, 390-400. https://doi.org/10.1111/nph.13199

40. Crisp MD, Hardy NB, Cook LG. 2014. Clock model makes a large difference to age estimates of long-stemmed clades with no internal calibration: A test using Australian grass trees. *BMC Evolutionary Biology* 14, 263. https://doi.org/10.1186/s12862-014-0263-3
41. Ross L, Gardner A, Hardy N, West SA. 2013. Ecology, not the genetics of sex determination, determines who helps in eusocial populations. *Current Biology* 23, 2382-2387. https://doi.org/10.1016/j.cub.2013.10.013
42. Miller K, Jean A, Alariae Y, Hardy N, Gibson R. 2013. Phylogenetic placement of North American subterranean diving beetles (Insecta: Coleoptera: Dytiscidae). *Arthropod Systematics and Phylogeny* 71, 75-90.
43. Hodgson CJ, Hardy NB. 2013. The phylogeny of the superfamily Coccoidea (Hemiptera: Sternorrhyncha) based on the morphology of extant and extinct macropterous males. *Systematic Entomology* 38, 794-804.
44. Hardy NB. 2013. The status and future of scale insects (Coccoidea) systematics. *Systematic Entomology* 38, 453-458.
45. Ross L, Hardy NB, Okusu A, Normark BB. 2013. Large population size predicts the distribution of asexuality in scale insects. *Evolution* 67, 196-206. https://doi.org/10.1111/j.1558-5646.2012.01784.x
46. Hardy NB, Cook LG. 2012. Testing for ecological limitation of diversification: a case study using parasitic plants. *The American Naturalist* 180, 438-449. https://doi.org/10.1086/667588
47. Cranston PS, Hardy NB, Morse GE. 2012. A dated molecular phylogeny for the Chironomidae (Diptera). *Systematic Entomology* 37, 172-188.
48. Hardy NB, Henderson RC. 2011. Revision of *Poliaspis* (Hemiptera: Coccoidea: Diaspididae), with descriptions of eight new species from Australia. *Zookeys* 137, 1-40.
49. Hardy NB, Beardsley JW, Gullan PJ. 2011. Uncovering diversity of Australian *Eucalyptus*-constrained felt scales (Hemiptera: Coccoidea: Eriococcidae). *Systematic Entomology* 36, 497-528.
50. Gruwell ME, Hardy NB, Gullan PJ, Dittmar K. 2010. Evolutionary relationships among primary endosymbionts in the mealybug subfamily Phenacoccinae (Hemiptera: Coccoidea: Pseudococcidae). *Applied and Environmental Microbiology* 76, 7521-7525.
51. Hardy NB, Gullan PJ. 2010. Australian gall-inducing scale insects on *Eucalyptus*: revision of *Opisthoscelis* Schrader (Coccoidea, Eriococcidae) and descriptions of a new genus and nine new species. *Zookeys* 58, 1-74.
52. Cook LG, Edwards RD, Crisp M, Hardy NB. 2010. Need morphology always be required for new species descriptions? *Invertebrate Systematics* 24, 322-326.
53. Hardy NB, Cook LG. 2010. Gall-induction in insects: evolutionary dead-end or speciation driver? *BMC Evolutionary Biology* 10, 257.

54. Cranston PS, Hardy NB, Morse GE, Puslednick L, McCluen SR. 2010. When molecules and morphology concur: the 'gondwanan' midges (Diptera: Chironomidae). *Systematic Entomology* 35, 636-648.
55. Winterton SL, Hardy NB, Wiegmann BM. 2010. On wings of lace: phylogeny and Bayesian divergence time estimates of Neuropterida (Insecta) based on morphological and molecular data. *Systematic Entomology* 35, 349-378.
56. Gullan PJ, Kaydan MB, Hardy NB. 2010. Molecular phylogeny and species recognition in the mealybug genus *Ferrisia* (Hemiptera: Pseudococcidae). *Systematic Entomology* 35, 329-339.
57. Hardy NB, Gullan, PJ. 2009. *Opisthoscelis nigra* Froggatt (Eriococcidae) is an armoured scale Maskellia nigra (Froggatt) (Diaspididae). pp. 59–62. In: Branco, M., Franco, J.C. & Hodgson, C. (Eds) *Proceedings of the XI International Symposium of Scale Insect Studies, Oeiras, Portugal*, 24–27 September 2007. ISA Press, Lisbon, Portugal.
58. Kondo T, Hardy NB. 2008. Redesciption of *Inglesia vitrea* Cockerell (Hemiptera, Coccidae) and its transfer to the genus *Pseudokermes* Cockerell. *Zookeys* 3, 11-21.
59. Hardy NB, Gullan PJ, Henderson RC, Cook LG. 2008. Relationships among scale insects (Hemiptera: Coccoidea: Eriococcidae) of southern beech, *Nothofagus* (Nothofagaceae), with the first descriptions of Australian species of the *Nothofagus-feeding* genus *Madarococcus* Hoy. *Invertebrate Systematics* 22, 365-405.
60. Kondo T, Hardy NB. 2008. Synonymy of *Etiennea* Matile-Ferrero with *Hemilecanium* Newstead (Hemiptera: Coccidae), based on morphology of adult females, adult males and first-instar nymphs, and description of a new species from Okinawa, Japan. *Entomological Science* 11, 189-213.
61. Hardy NB, Gullan PJ. 2008. Pseudococcini Cockerell, 1905: proposed precedence over Sphaerococcini Cockerell, 1899. Case number 3424. *The Bulletin of Zoological Nomenclature* 65, 24-64.
62. Hardy NB, Gullan PJ, Hodgson CJ. 2008. A classification of mealybugs (Hemiptera: Pseudococcidae) based on integrated molecular and morphological data. *Systematic Entomology* 33, 51-71.
63. Hardy NB. 2007. A new mealybug species (Hemiptera: Coccoidea: Pseudococcidae) from the ant-plant *Hydnophytum* (Rubiaceae) in Fiji. Fiji Arthropods In: Evenhuis NL & Bickel DJ (eds). Fiji Arthropods IX. *Bishop Museum Occasional Papers*. 94, 35-40.
64. Hardy NB, Gullan PJ. 2007. A new species of *Phacelococcus* Miller (Hemiptera: Coccoidea: Eriococcidae) on *Bursaria* (Pittosporaceae). *The Australian Entomologist* 34, 85-91.
65. Hardy NB. 2007. Phylogenetic utility of dynamin and triose phosphate isomerase. *Systematic Entomology* 32, 396-403.

66. Hardy NB, Gullan PJ. 2007. A new genus and four new species of felt scales on *Eucalyptus* (Hemiptera: Coccoidea: Eriococcidae) in south-eastern Australia. *Australian Journal of Entomology* 46, 106-120.
67. Kondo T, Hardy NB, Cook LG, Gullan PJ. 2006. Description of two new genera and species of Eriococcidae (Hemiptera: Coccoidea) from southern South America. *Zootaxa* 1349, 19-36.

Presentations

Invited talks

1. Hardy NB. 2025. Paradox Schmaradox! When more robust phenotypes are more evolvable. Michigan State University Evolution and Ecology Group Seminar.
2. Hardy NB. 2021. The evolution of herbivores served three ways. North Carolina State University, Department of Entomology and Plant Pathology Seminar.
3. Hardy NB. 2020. Consider the herbivore: Old, new, and made-up host-use evolution in herbivorous insects. University of Nevada, Reno, Department of Biology Seminar.
4. Hardy NB. 2018. Asymmetrical Specialization: More polyphagous scale insects have more specialist natural enemies. Advances in Coccoidea Research: New Perspectives on Scale Insect and Mealybug Biology and Management, Entomological Society of America Annual Meeting, Vancouver BC, 10 minute talk.
5. Hardy NB. 2018. Evolution of plant-eating insect diversity. University of Idaho Department of Entomology, Plant Pathology and Nematology seminar.
6. Hardy NB. 2016. Musical chairs and dead ends: The macroevolution of diet diversity in plant-eating insects. International Congress of Entomology, Orlando, Florida, 15 minute talk in Symposium: From diet breadth to diversification: Understanding host shifts in phytophagous insects.
7. Hardy NB. 2015. Evolution of life cycle complexity and phenotypic plasticity in plant-feeding insects. Santa Fe Institute, Evolutionary Ecology of Complex Investment Strategies Workshop.
8. Hardy NB. 2015. Host-use evolution in plant-feeding insects: comparative analyses of bugs, butterflies and moths. University of Georgia, Department of Entomology seminar.
9. Hardy NB, Normark BB. 2015. We should do Sternorrhyncha systematics! Illinois Natural History Survey, NSF Assembling the Hemipteroid Tree of Life workshop.
10. Hardy NB. 2014. Jack of all trades makes no tradeoffs: host breadth evolution in plant feeding insects. Florida State University, Department of Biological Sciences, Evolution and Ecology seminar.
11. Hardy NB. 2014. Jack of all trades makes no tradeoffs: host breadth evolution in plant feeding insects. University of Florida, Department of Entomology and Nematology seminar.

Conference talks

Students in my group are denoted with an asterisk.

1. Hardy NB, *Yang Z. 2025. Cyclical parthenogenesis (like in many aphids) can boost evolvability on rugged adaptive landscapes. Entomological Society of America Annual meeting, Portland OR. 10 minute talk.
2. Yang Z*, Hardy NB. 2025. Cyclical parthenogenesis can help adaptation to marginal habitats. Annual Meeting for the Society of Molecular Biology and Evolution. Poster.
3. Yang Z*. 2025. The joint evolution of plasticity and dispersiveness in a population of gene regulatory networks. Evolution Meeting, Athens GA, Poster.
4. Woodruff E*. 2024. Virulence Evolution via Pleiotropy in Vector‐Borne Plant Pathogens. Entomological Society of America Annual Meeting, Phoenix AZ, 10 minute talk.
5. Ziabari OS, Hardy NB, Brisson J. 2021. Transient wing polymorphisms in aphid males. Evolution 2021 Virtual Conference.
6. Bird G*, Williams G, Wilson A, Hardy NB. 2020. Parasites and pesticides act antagonistically on honey bee health. Entomological Society of America Annual Meeting, Virtual, 10 minute talk.
7. Kaczvinsky C*, Hardy NB. 2018. Comparative phylogenetic test of Escape and Radiate. Entomological Society of America Annual Meeting, Vancouver BC, 10 minute talk.
8. Bird G*, Hardy NB. 2018. Do phytophagous insects compete? A phylogenetic meta-analysis. Entomological Society of America Annual Meeting, Vancouver BC, 10 minute talk.
9. Hardy NB, Peterson DA, Ross L, Rosenheim J. 2017. Does a plant-eating insect's diet govern the evolution of insecticide resistance? Comparative phylogenetic tests of the pre-adaptation hypothesis. Entomological Society of America Annual Meeting, Denver CO, 15 minute talk.
10. Hamilton F*, Hardy NB. 2017. Diversity of hickory phylloxerans (Hemiptera: Phylloxeridae: *Phylloxera* spp.) and their gall morphologies in the U.S. Entomological Society of America Annual Meeting, Denver CO, 10 minute talk.
11. García Morales M*, Hardy NB. 2016. Diversification of plant-feeding insects is positively correlated with natural enemy pressure. International Congress of Entomology, Orlando, 15 minute talk.
12. Christodoulides N*, Hardy NB. 2016. The role of gene expression evolution in scale insect host use adaptation. International Congress of Entomology, Orlando, 15 minute talk.
13. Hamilton R*, Hardy NB. 2016. New species of armored scale insects (Hemiptera: Diaspididae) described from New Caledonia. International Congress of Entomology, Orlando, 15 minute talk.

14. Hardy NB, Peterson DA, Normark BB. 2016. Geographic and phylogenetic patterns in scale insect diversity and diet breadth. International Symposium on Scale Insect Studies, Catania, Italy, 15 minute talk.
15. Hardy NB. 2015. Non-adaptive host-plant specialization in plant-feeding insects. Entomological Society of America Annual Meeting, Minneapolis, MN, 10 minute talk.
16. Hardy NB, Peterson D, Normark BB. 2014. Effects of plant species-richness of host breadth evolution in armored scales. Entomological Society of America Annual Meeting, Portland, OR, 10 minute talk.
17. Hardy NB. 2013. Testing the adaptiveness of complex life cycles in aphids. Entomological Society of America Annual Meeting, Austin, TX, 10 minute talk.
18. Hardy NB. 2013. The status and future of scale insect (Coccoidea) systematics. International Symposium on Scale Insect Studies, Sofia, Bulgaria, 15 minute talk.
19. Hardy NB. 2012. Large population size predicts the distribution of asexuality in scale insects. Annual Meeting of the Entomological Society of America, Knoxville, TN, 10 minute talk.
20. Hardy NB. 2012. Species diversification of evolutionary oddballs. Cleveland Museum of Natural History, Explorer Lecture Series, Cleveland, OH, 45 minute talk.
21. Hardy NB, Svenson GJ, Cook LG. 2011. Biogeography of Southern Hemisphere arthropods. Annual Meeting of the Entomological Society of America, Reno, NV, 10 minute talk.
22. Hardy NB. 2010. Rebuilding ScaleNet: new architecture, administration, and access. XII International Symposium on Scale Insect Studies, Xania, Crete, 15 minute talk.
23. Hardy NB, Trewick S, Cook LG. 2010. Biogeography of Austral arthropods: a comparative molecular phylogenetics approach. Southern Connections Congress, Bariloche, Argentina, 15 minute talk.
24. Hardy NB. 2009. Is gall-induction a key innovation in insects? Darwin 200: Evolution and Biodiversity, Darwin, Australia, 15 minute talk.
25. Hardy NB, Gullan PJ, Hodgson CJ. 2007. A subfamily classification of mealybugs (Hemiptera: Pseudococcidae) based on integrated molecular and morphological data. Annual Meeting of the Entomological Society of America, San Diego, CA, 10 minute talk.
26. Hardy NB, Gullan PJ, Hodgson CJ. 2007. Mealybug phylogeny and classification revisited (Hemiptera: Coccoidea: Pseudococcidae). International Symposium of Scale Insect Studies, Oeiras, Portugal, 15 minute talk.
27. Hardy NB. 2005. Evolution of gall-induction within the Australian felt scales (Hemiptera: Coccoidea: Eriococcidae). Annual Meeting of the Entomological Society of America, Ft Lauderdale, FL, 10 minute student talk.

Grants and Awards

2025-2029	PI, NSF DEB Grant: Aphid Phylogeny and Invasiveness. ($920,000)
2021-	PI, AU RSP Gant: The evolution of virulence in *Xylella fastidiosa*. CoPI, Leo De La Fuente. ($25,000)
2020-2022	PI, Alabama Soybean Board Grant: Machine learning foliar diseases of soybeans. ($25,000)
2018-2020	PI, NSF EAGER Grant: What drives speciation in Nearctic aphids? ($150,000)
2016-2018	PI, Hatch Seed Grant: How do sap-sucking bugs overcome plant defenses? ($50,000)
2014-2018	PI, USDA Specific Cooperative Research Agreement: Rebuilding ScaleNet, a literature-based model of scale insect diversity. ($120,000)
2014-2016	PI, Hatch New Investigator Award: Evolution of polyphagy in plant-feeding insects. ($30,000)
2009-2011	PI, Australian Biological Resources Study, National Taxonomy Research Grant: Describing Australia's armored scales. ($30,000)
2008	Winner, Kinsella Memorial Prize for the Outstanding Graduate Student in the UC Davis College of Agricultural Sciences. ($3,000)

Teaching

Courses

2025-	General Entomology (ENTM 3040)
2021-	Insect Diversity (ENTM 5300/6300)
2021-	Practical Evolution (ENTM 7230)
2013-2020	Insect Systematics (ENTM 5300/6300)
2013-2019	Insect Morphology (ENTM 5440/6440)

Graduate students

As major professor

2025-	PhD student Pryce Millikin is studying aphid diversity and invasion biology. He earned an honorable mention for the NSF Graduate Research Fellowship.
2025-	MS student Lilley Brookeshire is using comparative phylogenetic analyses of aphids to better understand invasion biology.
2024-	MS student Zimo Yang is using simulation models to advance our understanding of the evolution of evolvability. He was awarded a Simons Foundation Graduate Fellowship in Ecology and Evolution.
2023-	PhD Student Stephen Tansie (Co-advised by Tonia Schwartz in Biology) studies the evolution of virulence in plant pathogens.

2022-2024 MS Student Elise Woodruff combined molecular biology and population genetic modeling to improve our understanding of the evolution of the virulence of plant pathogens.

2020-2022 MS student Noah Bevers used machine learning to increase the sustainability of the ways in which we manage agricultural pests.

2018-2021 PhD student Gwendolyn Bird used comparative approaches to study diversity of herbivorous insects.

2018-2020 MS student Chloe Kaczvinsky used comparative phylogenetics to study the evolution of diet breadth in plant-eating insects. She was awarded an Oxford-Oxitec Scholarship to support her PhD at Oxford University.

2015-2019 PhD student Ricki Hamilton studied the species diversity of hickory-galling phylloxerans.

2015-2017 MS student Nick Christodoulides studied the genetic architecture of host-use adaptation in plant-eating insects.

2014-2016 MS Mayrolin García Morales upgraded ScaleNet and studied the role of natural enemy pressure in driving plant-eating insect speciation. She was awarded an NSF Graduate Research Fellowship.

As committee member

2025- MS student Becca Valentine studies the evolutionary ecology of termites.

2024- PhD student Kyndall Skelton studies the evolution of polymorphisms.

2023-2025 MS student Navdeep Kaur studied the diversity of pseudogenes in *Xylella fastidiosa*.

2023-2025 PhD student Ranlin Liu studied recombination rate variation in plant pathogenic bacteria.

2022-2024 MS student Ivory Russel studied the evolution of plant pathogens.

2022-2025 PhD student Brennan Cliver does plant conservation genetics. (They relocated with their primary advisor to Clemson University)

2022-2025 PhD student Tanner Myers studied the genetics of speciation in lizards and butterflies.

2021-2023 MS student Noel Claudio Soto studied how multiple strains of plant pathogenic bacteria interact in their hosts.

2021-2023 MS student Amelia Grider studied the conservation of biodiversity in grasslands.

2020-2022 MS Student Tori Spencer studied the impacts of invasive species on ant food webs.

2019-2021 MS student Bryant Bird studied the biology of pest insects.

2015-2018 PhD student Rebecca Godwin studied the phylogeny and biogeography of mygalomorph spiders in Jason Bond's lab, which moved from AU to The University of California, Davis in 2018.

2013-2015 MS student Zi Ye looked at mosquito olfaction in Nannan Liu's lab at AU.

2014-2017 MS student Xinmi Zhang studied midge-transmitted hemorrhagic diseases in Derrick Mathias's lab at AU.

As host

2016 PhD student Linda Oforka came from the University of Lagos, Nigeria, to work on the biodiversity of the blackflies that transmit River Blindness.

Web

- http://scalenet.info: An online catalog of scale insect biology and systematics.
- http://specimens.mantodearesearch.com/mantispp/default/species: A database of high-resolution images of mantis type specimens.
- http://sickbeans.skullisland.info: An automated classifier of digital images of foliar diseases of soybeans.

Service

Professional community

- Panelist for 1 USDA NIFA grant competition
- Panelist for 6 NSF DEB grant competition
- Ad hoc reviewer for 4 NSF grants

2008- Manuscript referee for *Proceedings of the National Academy of Sciences*, *Nature Communications*, *Science Advances*, *Evolution, Ecology, Ecology Letters, Proceeding of the Royal Society B, Systematic Biology, Heredity, Biological Reviews, Systematic Entomology, Molecular Phylogenetics and Evolution, Molecular Ecology, Oecologia, Genetics and Evolution, The Journal of Biogeography*, and many others.

2026- Subject Editor, *Insect Systematics and Diversity*

2013- Editorial Board Member of *Systematic Entomology*.

2025 Czech Science Foundation, ad hoc reviewer of grant proposal

2025 Swiss National Science Foundation, *ad hoc* reviewer of grant proposal

2022 National Science Center, Poland *ad hoc* reviewer of grant proposal

2022 Nebraska-EPSCoR, panelist

2018 French National Research Agency *ad hoc* reviewer of grant proposal

2016 Deutsche Forschungsgemeinschaft (German Research Foundation) *ad hoc* reviewer of grant proposal

2016 CONICYT (Chilean National Commission for Scientific and Technological Research) *ad hoc* reviewer of grant proposal

Auburn University

2023	Peer Review of NIFA proposal for Lori Eckhardt, AU Forestry
2022	External Reader of the dissertation of Randy Klabacka, AU Biology
2023-	Department of Entomology and Plant Pathology, Peer-Review of Teaching Committee, chair
2022	Department of Entomology and Plant Pathology, Insect Ecologist Search Committee
2022	AU Postdoc Retreat panelist
2021-2023	Department of Entomology and Plant Pathology Mentoring Committee
2021-2024	AU University Senate, Diversity, Equity and Inclusion Committee
2021-	Strategic Advisory Committee of the Alabama Prison Arts and Education Program
2021-2022	College of Agriculture Diversity Equity and Inclusion Committee
2020-2021	Department of Entomology and Plant Pathology Mentoring Task Force
2015-2021	Department of Entomology and Plant Pathology Curriculum Committee
2018-	Entomology Graduate Program Assessment Coordinator
2021	Department of Entomology and Plant Pathology, Insect Diagnostician Search Committee
2020-2021	Chair of the College of Agriculture Diversity Equity and Inclusion Education Task Force
2014-2020	Department of Entomology and Plant Pathology Web Committee
2020	Judge of the College of Agriculture Graduate Student Poster Competition
2020	External Reader of the dissertation of Victoria Bogantes Aguilar, AU Biology
2018	External Reader of the Dissertation of Pavlo Voitenko, AU Civil Engineering
2018	External Reader of the dissertation of Nicole Garrison, AU Biology
2017	External Reader of the dissertation of Yuanning Li, AU Biology
2017	External Reader of the dissertation of Carla Stout, AU Biology
2016	Director of the AU Museum of Natural History Search Committee
2016	Co-chair of Assistant Professor in Apiculture and Pollination Biology Search Committee
2016	External Reader, Dissertation of Milton Tan, AU Biology
2016	External Reader, Dissertation of Raphael Orelis-Ribeiro, AU Fisheries
2014-2016	Department of Entomology and Plant Pathology Executive Committee
2015	Distinguished Dissertation Award Committee

2015 External Reader, Dissertation of Chris Hamilton, AU Biology
2014 Assistant Professor in Mycology Search Committee