

Paul David Nability

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Academic Appointments

- Assistant Professor of Plant-Insect Ecology. January 2017. Department of Botany and Plant Sciences. Cooperating Faculty Member. Department of Entomology, and Department of Evolution, Ecology, and Organismal Biology, University of California, Riverside.
Affiliate, Graduate Program in Genetics, Genomics, and Bioinformatics
- Assistant Professor. 2015-2016. Department of Entomology. Washington State University.

Professional Preparation

- USDA-NIFA Postdoctoral Fellow. 2012-2014.
University of Arizona. Department of Ecology and Evolutionary Biology.
Mentor: Noah K. Whiteman.
- Doctorate of Philosophy. 2012.
University of Illinois at Urbana-Champaign. Plant Biology.
Advisor: Evan H. DeLucia.
- Organization for Tropical Studies: Ecology of Plant-Animal Interactions. 2010.
La Selva Biological Station.
Coordinators: Katja Poveda, Andre Kessler.
- Master of Science. 2005.
University of Nebraska, Lincoln. Entomology.
Co-advisors: Leon Higley and Tiffany Heng-Moss.
- Bachelor of Science. 2002.
University of Nebraska, Lincoln. Majors: Environmental Studies, Water Science.
Minors: Diversified Agriculture, Insect Science, Forestry/Fisheries and Wildlife, Mathematics.

Grants, Fellowship, and Awards

- 9/01/2021-8/31/2024 USDA-NIFA-SCRI \$789,141
- 12/01/2021-12/31/2022 University of California Office of the President (UCOP) -HBCU Initiative \$52,247
- 7/01/2021-6/30/2022 California Department of Food and Agriculture (CDFA-IAB) \$33,014
- 4/25/2021-6/30/2022 California Conservation Genetics Project (<https://www.ccgproject.org>) \$42,763
- 1/1/2018-12/31/2019. University of California Office of the President (UCOP) Instructional Learning Technology Initiative (ILTI) \$227,000. Ecology and Conservation Biology; Global Change Ecology
- 3/1/2016-2/28/2019. Washington Tree Fruit Research Commission. PI. \$164,987. Assessment of apple immune responses to wooly apple aphid saliva
- 2012. AFRI-USDA-NIFA Postdoctoral Fellowship. \$130,000
- 2012. Ecological Society of America Physiological Ecology Section: Billings Award (for best presentation)
- 2012. New Phytologist Trust Travel Award
- 2010. University of Illinois Robert Emerson Memorial Award (top biology award)

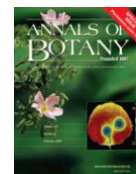
- 2010. American Society of Plant Biologists Travel Award
- 2007. University of Illinois Plant Biology Departmental Fellowship
- 2007. University of Illinois John R. Laughnan Travel Award
- 2001-2002. University of Nebraska Agricultural Research Division (ARD) Honors Undergraduate Thesis Grant for independent research. \$2500

Publications

30. Zhao C, Miao S, Yin Y, Zhu Y, **Nabity P**, Bansal R, Liu C. 2021. Tripartite parasitic and symbiotic interactions as a possible mechanism of horizontal gene transfer. *Ecology and Evolution*. DOI: 10.1002/ece3.7550
29. **Nabity PD**, Barron-Gafford G, Whiteman NK. 2021. Intraspecific competition for host resources in a parasitic plant. *Current Biology* 31:1344-1350
28. Krey K, **Nabity PD**, Blubaugh C, Fu D, Van Leuven J, Reginald J, Berim A, Gang D, Jensen A, Snyder W. 2020. Organic farming sharpens plant defenses in the field. *Frontiers in Sustainable Food Systems* 4:97
27. Risper C, Legeai F, **Nabity PD** et al. 2020. The genome of the grape phylloxera provides insights into the evolution, adaptation and invasion routes of an iconic pest. *BMC Biology* 18:90.
26. Rafferty NR, Agnew L, **Nabity PD**. 2019. Parasitism modifies the direct effects of warming on a hemiparasite and its host. *PLoS One*. doi.org/10.1371/journal.pone.0224482
25. Zhao C, Risper C, **Nabity PD**. 2019. Secretory RING finger proteins function as effectors in a grapevine gall-forming insect. *BMC Genomics* 20:923
24. Zhao C, **Nabity PD**. 2017. Phylloxerids share ancestral carotenoid biosynthesis genes of fungal origin with aphids and adelgids. *PLoS One* <https://doi.org/10.1371/journal.pone.0185484>
23. Zhao C, **Nabity PD**. 2017. Plant manipulation through gall formation constrains amino acid transporter evolution in sap-feeding insects. *BMC Evolutionary Biology* 17:153. DOI: 10.1186/s12862-017-1000-5
22. Rafferty NE, **Nabity PD**. 2017. A global test for phylogenetic signal in shifts in flowering time under climate change. *Journal of Ecology*. DOI: 10.1111/1365-2745.12701. *Editor's Choice, cover photo*
21. **Nabity PD**. 2016. Insect-induced plant phenotypes: Revealing mechanisms through comparative genomics of gall-forming insects and their hosts. *American Journal of Botany* 103:979-981.
20. **Nabity PD**, MJ Haus, MR Berenbaum, EH DeLucia. 2013. Leaf-galling phylloxera on grapes reprograms host metabolism and morphology. *PNAS* 110:16663-16668.
19. **Nabity PD**, JA Zavala, EH DeLucia. 2013. Herbivore induction of jasmonic acid and chemical defenses reduces photosynthesis in *Nicotiana attenuata*. *Journal of Experimental Botany* 64:685-694.
18. Zavala JA, **PD Nabity**, EH DeLucia. 2013. An emerging understanding of mechanisms governing insect herbivory under elevated CO₂. *Annual Review of Entomology* 58:79-97.
17. Zangerl AR, S Miresmailli, **PD Nabity**, A Lawrence, A Yanahan, CA Mitchell, KJ Anderson-Teixeira, MB David, MR Berenbaum, EH DeLucia. 2012. Role of arthropod communities in biofuel crop litter decomposition. *Insect Science* 20:671-678.
16. DeLucia EH, **PD Nabity**, JA Zavala, MR Berenbaum. 2012. Climate change: resetting plant insect interactions. *Plant Physiology* 160:1677-1685.
15. Donovan MD, **PD Nabity** EH DeLucia. 2012. Salicylic acid mediated reductions in yield in *Nicotiana attenuata* challenged by aphid herbivory. *Arthropod Plant Interactions* 7:45-52.
14. **Nabity PD**, S Miresmailli, R Orpet, MR Berenbaum, EH DeLucia. 2012. Silica-based defenses of crops selected for biofuel production. *Journal of Economic Entomology* 105:878-883.



13. **Nabity PD**, ML Hillstrom, RL Lindroth, EH DeLucia. 2012. Elevated CO₂ interacts with herbivory to alter chlorophyll fluorescence and leaf temperature in *Betula papyrifera* and *Populus tremuloides*. Oecologia 169:905-913.
12. **Nabity PD**, AR Zangerl, MR Berenbaum, EH DeLucia. 2011. Bioenergy crops *Miscanthus x giganteus* and switchgrass (*Panicum virgatum*) reduce growth and survivorship of *Spodoptera frugiperda* (Lepidoptera: Noctuidae). Journal of Economic Entomology 104:459-464.
11. De Freitas Bueno A, de Freitas Bueno RC, **PD Nabity**, LG Higley, OA Fernandes. 2009. Photosynthetic response of soybean to two-spotted spider mite (Acari: Tetranychidae) injury. Brazilian Archives of Biology and Technology 52:825-834.
10. Zavala JA, CL Casteel, **PD Nabity**, MR Berenbaum, EH DeLucia. 2009. Role of cysteine proteinase inhibitors in preference of Japanese beetles (*Popillia japonica*) for soybean (*Glycine max*) leaves of different ages and grown under elevated CO₂. Oecologia 161:1432-1439.
9. **Nabity PD**, JA Zavala, EH DeLucia. 2009. Indirect effects of arthropod herbivory on leaf-level photosynthesis. Annals of Botany 103:655–663. (Cover photo)
8. DeLucia EH, CL Casteel, **PD Nabity**, BF O’Neill. 2008. Insects take a bigger bite out of plants in a warmer, higher carbon dioxide world. PNAS 105:1781-1782.
7. Spomer SM, **PD Nabity**, ML Brust. 2008. Larval description of *Cicindela (Dromochorus) pruina* (Casey) (Coleoptera: Carabidae: Cicindelinae) with notes on habitat and adult behavior Coleopterists’ Bulletin 62:37-41.
6. **Nabity PD**, LG Higley, TM Heng-Moss. 2007. Light-induced variability in development of forensically important blow fly, *Phormia regina* (Diptera: Calliphoridae). Journal of Medical Entomology 44:351–358.
5. **Nabity PD**, TM Heng-Moss, LG Higley. 2006. Effects of insect herbivory on physiological and biochemical (oxidative enzyme) responses of the halophyte *Atriplex subspicata* (Chenopodiaceae). Environmental Entomology 35:1677–1689.
4. **Nabity PD**, LG Higley, TM Heng-Moss. 2006. Effects of temperature on development of *Phormia regina* and use of development data in determining time intervals in forensic entomology. Journal of Medical Entomology 43:1276–1286.
3. **Nabity PD**, KD Hoagland. 2006. Seedbank viability of potential saline wetland restoration sites in agro-ecosystems. Great Plains Research 16:173–180.
2. Brust ML, WW Hoback, SM Spomer, WJ Allgeier, **PD Nabity**. 2005. New county records for Nebraska tiger beetles. Cicindela 37:37–58.
1. Spomer, SM, WJ Allgeier, **PD Nabity**. 2004. A fall collecting trip to southwestern and western Nebraska and a new state record for *Cicindela decemnotata*. Cicindela 36:57–59.



Teaching

Teaching Interests: Plant-Insect Interactions, Global Change Biology/Ecology, Field Ecology

Teaching Experience:

- *Winter 2018-2020, Spring 2021, University of California-Riverside*, Senior Seminar in Plant Biology, BPSC 193, 2 credits, undergraduate capstone course for botany majors.
- *Fall 2017, 2019-2020 University of California-Riverside*, Foundations of Plant Biology, BIOL/BPSC 104, 4 credits, undergraduate student course on plant form and function.
- *Spring 2017, University of California-Riverside*, Plant Biology Core, BPSC 200B, Co-Instructor 2 credits, graduate student course on professional development.
- *Fall 2016, Washington State University*, General Entomology (Entomology 343), Co-Instructor 3 credits, upper level undergraduate, **writing intensive** course required by majors related to agriculture, 65 students;
- *Fall 2015, Washington State University*, General Entomology (Entomology 343)

3 credits, upper level undergraduate, **writing intensive** course required by majors related to agriculture, 67 students; Overall Instructor rating (mean/median) 3.6/4 out of 5, Overall Course rating 3.2/3 out of 5

Teaching experience as a graduate student:

- *Spring 2010 and 2009, University of Illinois, Field Ecology (Integrative Biology 447)*
- *Fall 2009 and 2007, University of Illinois, Ecology (Integrative Biology 203)*
- *Spring 2007, University of Illinois, CSI Biology (Integrative Biology 199)*
- *Spring 2007, University of Illinois, Introductory Plant Biology (Integrative Biology 103)*
- *Spring 2005, University of Nebraska, Forensic Entomology (Distance 414/814)*
- *Fall 2001 and 2004, Spring 2004, University of Nebraska, Insect Identification (Entomology 116)*
- *Fall 2003, University of Nebraska, Aquatic Insect Identification (Entomology 402/802)*

Presentations

Invited Talks (Bold venues are Departmental Seminars)

- *Deconstructing a complex, induced plant phenotype. **Department of Plant Biology, Michigan State University.** Nov 12 2021.*
- *Molecular mechanisms underlying function and evolution of insect extended phenotypes. Pacific Branch Entomological Society of America. San Diego, CA. Apr 3, 2019 (JW Presenting)*
- *Mechanisms underlying insect-induced phenotypes in plants. **Department of Entomology, University of Georgia.** Mar 18, 2019.*
- *Manipulation of plant primary metabolism by a galling insect, grape phylloxera. Entomological Society of America. Vancouver, BC. Nov 11-14, 2019.*
- *Competition for resources between desert mistletoe on mesquite. Ecological Society of America, New Orleans, LA. Aug 11-16, 2018.*
- *Discovery and validation of plant-manipulating effector proteins in grape phylloxera. Entomological Society of America and International Aphid Genomics Consortium meeting. Denver, CO. Nov 5-8, 2017. (CZ presenting)*
- *Understanding how insects manipulate plant resources: Implications for resource use under climate-change. In the symposium: Insect-plant Interactions in a Changing Climate: Effects on Populations Dynamics and Biological Control, International Congress of Entomology, Orlando, FL. Sept 25-30, 2016.*
- *Mechanisms underlying insect-induced phenotypes in plants. **Department of Botany and Plant Science, University of California-Riverside.** Jun 27, 2016*
- *Genes underlying insect-induced phenotypes in the Phylloxeridae. **Department of Entomology, North Carolina State University.** Apr 18, 2016.*
- *How do the Phylloxeridae co-opt plant form and function? Pacific Branch Entomological Society of America. Honolulu, HI. Apr 5, 2016*
- *Defining the Cecidome: Mechanisms underlying insect-induced phenotypes in plants. Molecular Plant Science Recruitment Weekend, WSU. Mar 5, 2016*
- *Mechanisms underlying insect-induced phenotypes in plants. **Molecular Plant Science Program, Washington State University.** Feb 17, 2016.*
- *Genomic basis of insect-induced phenotypes within the Phylloxeridae. IN Insects, Pathogens, and Plant Reprogramming: From effector molecules to ecology. Tours, France. Oct 4, 2015.*
- *Genomic basis of insect induced phenotypes. Pacific Branch Entomological Society of America. Coeur d'Alene, ID. Apr 13, 2015.*
- *Reduced antagonism by a galling parasite through a novel induced phenotype. Entomological Society of America. Portland, OR. Nov 19, 2014.*

- *The extended phenotype of grape-phylloxera interactions*. Department of Entomology, University of Arizona. Oct 3, 2013.
- *The extended phenotype of gall forming insects*. Department of Ecology and Evolutionary Biology, University of Arizona. Sept 25, 2012.

Presentations as a graduate student

- **Nabity PD**, MR Berenbaum, EH DeLucia. 2012. *Testing the extended phenotype hypothesis as phylloxera induce stomata and reorganize metabolism in grapes*. Ecological Society of America. Portland, OR.
- **Nabity PD**, MR Berenbaum, EH DeLucia. 2011. *The galling parasite *Daktulosphaira vitifoliae* induces novel morphological change in *Vitis**. Entomological Society of America. Reno, NV.
- **Nabity PD**, JA Zavala, EH DeLucia. 2011. *Herbivore induction of jasmonate-dependent defenses reduces photosynthesis in *Nicotiana attenuata** Ecological Society of America. Austin, TX.
- **Nabity PD**, M Hillstrom, R Lindroth, EH DeLucia. 2008. *Herbivory induced spatial patterns in plant physiology and gene expression under predicted future climate conditions*. Entomological Society of America. Reno, NV.
- **Nabity PD**, JA Zavala, IT Baldwin, EH DeLucia. 2007. *Guild-specific herbivory alters physiology and the induction of plant defenses in *Nicotiana attenuata**. Ecological Society of America. San Jose, CA.

Posters

- **Nabity PD**, RT Lapoint, NK Whiteman. 2014. *How do insect herbivores live inside their plant hosts: genomic architecture underlying the transition to endophagy*. Pacific Branch Entomological Society of America. Tucson, AZ.
- **Nabity PD**, MR Berenbaum, EH DeLucia, RT LaPoint, NK Whiteman. 2013. *Physiological and genomic basis for herbivore induced phenotypes in plants*. Gordon Research Conference on Plant-Herbivore Interactions. Ventura, CA.
- **Nabity PD**, MJ Segura, MR Berenbaum, EH DeLucia. 2012. *Insect-induced stomata attenuate sink strength and enhance parasite fitness*. New Phytologist Symposium on Stomata. Manchester, England.

Post Doctoral Researcher and Visiting Scientist Mentoring

- Dr. Adeel Zafar, January 2021 – present, functional analysis of insect effector genes
- Dr. Liming Cai, September 2020 – present, comparative genomics of insect herbivores
- Dr, Mohamed Ali, January 2020 – present; functional analysis of insect effector genes
- Jiri Skorepa, summer 2019, genes underlying plant hormone synthesis by insects
- Dr, Chaoyang Zhao, 2015-2019: aphidomorph effector functional genetics and evolution
- Wenhua Tian, 2017-2018: aphidomorph effector functional genetics
- Eva Morton, 2016-2017: molecular ID of hosts and insects, and pollinator-herbivore-phenology studies

Graduate Student Mentoring

- Nate Collison, Rotation Student BPSC, 2021
- Conner Lay, PhD student in EEOB, beginning Fall 2021 (advisor)
- Miranda Buckley, PhD student in EEOB, beginning Fall 2021 (advisor)
- Ryan Traband, Rotation Student BPSC, 2020
- Fatma Celikli, MS student in Botany & Plant Sciences 2020-present (committee member)
- Alex Valenzuela, PhD student in Botany & Plant Sciences 2019-present (committee member)
- Alex Borowsky, Rotation Student BPSC, 2018
- Patrick Thomas, PhD candidate in Botany & Plant Sciences 2017-present (committee member)

- Joshua Wemmer, MS student in Entomology, 2016- 2019 (advisor)
- Karol Krey, PhD candidate in Entomology, 2015-2017 (committee member), graduated
- Léa Fléchon, PhD student in Entomology 2015-2016, left program.

Undergraduate Mentoring

- Jacob Jauregui – molecular biology of effector genes, 2021-present
- Jenni Kao – gene family evolution, 2020-2021
- Kaitlin Chau-Giang - plant care and histology of *Vitis* leaves, 2019-2020
- Ashil Koranne – *Buchnera* genome analysis of a galling aphid, 2018-2019
- Tamara Taylor – Phylloxerid effector identification and validation *Honors Thesis*, 2017-2019
- Timothy Dang – DNA extraction and sequence phylogenetics, 2017-2018
- Emmanuel Cuevas, REU student, CEPCEB: Center for Plant Cell Biology, 2017
- Rachel Maughan – plant care and DNA extraction, 2017
- Skyler Kim – Bioinformatics: transcriptome analyses, 2017
- Richard Ellis – worked on carotenoid gene characterization and bioinformatics pipeline development, 2016
- Sierra Gallaway – worked on woolly apple aphid proteomics, 2016
- Madison Armstrong – characterized natural history of *Vitis* species and identified both host and insect COI genes using PCR. 2016
- Angel Marquez (high school student) – tested hypotheses on insect-induced phenotypes on grapes. 2013-2014
- Robert Orpet – worked on silica-based defenses in crops selected for biofuels. 2010-2011 (co-authored manuscript)
- Michael Donovan – completed Honors project with Distinction on aphid-induced defenses in *Nicotiana* species. 2009-2011 (first-authored manuscript)

Professional Experience

2021 reviews, NSF panel, Molecular Ecology, OENO

2020 reviews, NSF panel, New Phytologist, Molecular Ecology, Arthropod-Plant Interactions

2019 reviews: Insect Molecular Biology, PLoS Genetics, **Israel Science Foundation**

2018 reviews: Journal of Economic Entomology, Environmental Entomology, Current Biology, Frontiers Plant Science, Genome Biology & Evolution, Molecular Plant Microbe Interactions, PLoS Genetics, *Vitis*;

NSF ad hoc (2),; Israel Science Foundation

2017 reviews: Environmental Entomology, Journal of Economic Entomology, Journal of Insect Science, Oecologia, Biological Control, Annales Botanici Fennici,

Previously Reviewed for:

- American Journal of Botany, Arthropod-Plant Interactions, Basic and Applied Ecology, Climatic Change, Ecological Entomology, Environmental Entomology, Global Change Biology, International Journal of Plant Science, Journal of Experimental Botany, New Phytologist, Oecologia, Photosynthesis Research, Plant, Cell & Environment, Plant Physiology, Plants, PLoS Biology, PLoS One, Scientific Reports
- Israel Science Foundation, Austria Science Foundation

Service, Outreach, & Extension:

Internal

- 2020-present Diversity, Equity, and Inclusion Committee, departmental

- 2019-present Greenhouse & Environmental Facilities Academic Advisory Committee, CNAS
- 2018-present University of California, Riverside Division Committee on Memorial Resolutions, UC Senate
- 2018-present Undergraduate Education and Advisory Committee, departmental
- 2018- Merit review committee; Coordinator/Scientist seeking advancement, departmental
- 2017- 2018 Awards committee, departmental
- 2017 Merit review committee; Specialist seeking advancement, departmental

External

- 2016 Co-organized (NK Whiteman, UC Berkeley) Pacific Branch ESA symposium *Strategies underlying the evolution of herbivory*
- 2015, 2016 WSU Showcase for Undergraduate Research Creative Activities (SURCA), Judge.
- 2013, UA Ecology and Evolutionary Biology Undergraduate Poster Session, Judge.
- 2009-2010, UIUC Plant Biology Association of Graduate Students, Chair.
- 2008-2009, UIUC Plant Biology Association of Graduate Students, Instructional Committee.
- 2009, National Pollinator Week in Champaign-Urbana, Co-organized all events, presented seminars and nature walks.
- 2008, UIUC Pollinatarium, Panel designer and editor.
- 2008, National Pollinator Week in Champaign-Urbana, Led nature walk identifying prairie plants and pollinators.
- 2007, UI Day at Chicago Public Schools, Presented four interactive lessons on forensic entomology to 7th and 8th grade students.
- 2005. Nebraska State Fair, Helped judge insect collections for various ages and skill levels of participants in the 4-H program.