# **GLEN RAY HOOD**

Assistant Professor, Department of Biological Sciences

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**RESEARCH INTERESTS**

Evolutionary ecology, speciation, experimental evolution, tri-trophic interactions, plant-insect interactions, population genetics, phytoscreening, cecidology, DNA diagnostics, eco-epidemiology

**ACADEMIC APPOINTMENTS**

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| **Assistant Professor***Wayne State University*Department of Biological Sciences**Research Assistant Professor***Wayne State University*Department of Biological Sciences**Postdoctoral Fellow, Rice Academy of Fellows***Rice University*Department of BiosciencesMajor Advisor: Scott Egan | Aug. 2019-Present*Detroit, MI*Aug. 2018-Aug. 2019*Detroit, MI*Sept. 2016­–Aug. 2018*Houston, TX* |
| **EDUCATION**

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| --- | --- |
| **Doctorate of Philosophy, Biological Sciences***University of Notre Dame* | July 2016*Notre Dame, IN* |
| Department of Biological Sciences |  |
| Dissertation: Sequential divergence and the multiplicative origin of community diversitySecondary Research: Ecological adaptation and speciation in *Rhagoletis pomonella* fruit fliesAdvisor: Jeffrey Feder |

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| **Master of Science, Population and Conservation Biology** | Aug. 2009 |
| *Texas State University–San Marcos* | *San Marcos, TX* |
| Department of Biology |  |
| Thesis: Effects of prior defoliation on the timing of life cycle events and susceptibility to natural enemies of a host specific gall-formerSecondary Research: Determinants of scaling of gall size, body size and fecundity in the sexual and asexual generations of a cyclically parthenogenic cynipid |
| Advisor: James Ott |  |
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| **Bachelor of Science, Biology (Minor in Chemistry)**  | May 2006 |
| *Texas State University–San Marcos* | *San Marcos, TX* |
| Department of BiologyResearch Projects: |  |
| * A comparison of bio-mineralization in terrestrial and freshwater organisms
* Induced hypersensitive response of host-plants by a gall-forming cynipid
* Ecological evidence for allochronic speciation in a specialized insect herbivore
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**PEER REVIEWED PUBLICATIONS** (\*undergraduate co-author; #graduate co-author)

77 accepted or published peer-reviewed manuscripts from 2009–2024, 1 in revision, 5 in review, 5 drafts in preparation (available upon request), and 7 natural history notes; 1,5815 citations; H-Index = 25, 10-Index = 48

***In review***

**Hood GR**, Gompert Z, Zhang L, Comerford MS, Drummond JA, Driscoe AL, Martinson EO, Linnen C, Bendall EE, Souza V, Nosil P, Feder JL, Ott JR, Egan SP. Natural selection promotes rapid and predictable genome-wide divergence in haplodiploids.

Lecic S‡, Wolfe T, Gosh A, Satar S, Souza Beraldo C, Smtih E, Dambroskie JJ, Jernigan E, **Hood GR***^*‡, Schuler H*^*, Stauffer C*^*. Spatial variation in *Wolbachia* frequencies predict the invasion origin of an insect pest recently introduced to North America from Europe. *^Equally contributing senior authors*; ‡*Corresponding author*

**Hood GR,** Powell THQ, Forbes AA, Egan SP, Harada A\*, Feder JL. Interspecific competition and temporal resource partitioning promote speciation and the rapid formation of community diversity.

Battlay P,…[**Hood GR**]…Kooyers NJ. Structural variants underlie parallel adaptation following worldwide introduction of a cosmopolitan invasive plant.

 \*\**One of a team of >50 scientists contributing to the Global Urban Evolution Project (GLUE), aimed at understanding how urbanization effect evolution in a cosmopolitan plant across the globe* \*\*

O’Leary BFO, Miller CJ, Selegean K, **Hood GR**. Comparing conventional an dphytoscreening methods to detect subsurface chemical contaminants: a test case of volatile organic compounds in an urban setting.

***In revision***

Caizergues AE, Santangelo JS, Ness RW, Angeoletto F, Anstett DN, Anstett J, Baena-Diaz F, Carlen EJ, Chaves JA, Comerford MS, Dyson K, Falahati-Anbaran F, Fellowes MDE, Hodgines KY, **Hood GR**, Iniquez-Armijos C, Kooyers NJ, Lazaro-Lobo A, Moles AT, Munshi-South J, Paule J, Porth IM, Santiago-Rosario LY, Whitney KS, Tack AJM, Johnson MTJ. Does urbanization lead to parallel demographic shifts across the world in a cosmopolitan plant? ***Molecular Ecology. In revision.***

***2024***

(77)Angeoletto F,…[**Hood GR**]…Johnson MTJ. (2024) GLUEingthe world: the GLobal Urban Evolution Project and its importance to urban biodiversity conservation. In R Angeoletto, P Tryjanowski, MDE Fellowes (eds), **Ecology of Tropical Cities–Natural and Social Sciences Applied to the Conservation of Urban Biodiversity**. Springer Nature, New York.

(76) Roush AM, Zhang L, **Hood GR,** Ott J, Egan SP. 2024. Trade-off in dispersal and reproduction between sister species of specialist insect herbivores. ***Oecologia***. ***In press.***

(75) Zhang L, **Hood GR**, Ott JR, Egan SP. 2024. The role of ecology and geography in the evolution of habitat isolation and sexual isolation among sister species of a host-plant-specific insects. ***Journal of Evolutionary Biology. In press.***

***2023***

(74) Yee, WL, Milnes JM, Goughnour RB, Bush MR, **Hood GR**, Feder JL. (2023) Evidence for adaptation of *Rhagoletis pomonella* (Diptera: Tephritidae) on large-thorn hawthron, *Crataegus macracantha*, in Okanogan County, Washington State, USA. (2023) ***Environmental Entomology*** 52:455-464.

(73) McIntyre T\*, Andaloori L\*, **Hood GR**, Feder JL, Hahn DA, Ragland GJ, Toxopeus J. (2023) Cold tolerance and diapause within and across trophic levels: endoparasitic wasps and their fly host have similar phenotypes. ***Journal of Insect Physiology*** 146:104501.

(72) **Hood GR**. *Sequential Speciation and Cascading Divergence*. Oxford Bibliographies. Oxford Press*.* DOI: 10/1093/OBO/9780199941728-0145.

***2022***

(71) Ward AKG, Bagley RK, Egan SP, **Hood GR**, Ott JR, Prior KM, Sheikh SI, Weinersmith KL, Zhang L, Zhang YM, Forbes AA. (2022) Speciation in Neartic oak gall wasps is frequently correlated with changes in host plant, host organ, or both. ***Evolution*** 76:1849-1867.

(70) Ward AKG, Busbee RW, Chen RA, Davis CK, Driscoe AL, Egan SP, Goldberg BAR, **Hood GR**, Jones D, Kranz AJ, Meadley-Dunphy SA, Milks AK, Ott JR, Prior KM, Sheikh SI, Shzu S, Weinersmith KL, Zhang L, Zhang WM, Forbes AA. (2022) The arthropod associates of 155 North American cynipid oak galls. ***Zoological Studies*** 61:e57.

(69) Santangelo JS, … [**Hood GR**] … Johnson MTJ. (2022) Global urban environmental change drives adaptation in white clover. ***Science*** 375:1275-1281.

 \*\**One of a team of >280 scientists contributing to the Global Urban Evolution Project (GLUE), aimed at understanding how urbanization effect evolution in a cosmopolitan plant across the globe at 160 cities in 26 countries on 7 continents*\*\*

(68) Powell THQ, **Hood GR**, Doellman MM, Deneen PM, Smith JJ, Berlocher SH, Feder JL. (2022) The build-up of population genetic divergence along the speciation continuum during recent adaptive radiation of *Rhagoletis* flies. ***Genes*** 13:275.

(67) Mattsson MM‡, **Hood GR**‡^, Yee WL, Doellman MM, Goughnour RB, Driscoe AL, Van Dexter S, Bruzzese DJ, Tait C, Glover MM, Ruedas LA, Feder JL. (2022) Recursive adaptation in action: allochronic isolation and divergence of host-associated populations of *Rhagoletis* *pomonella* (Diptera: Tephritidae) following its recent introduction to the western United States. ***Entomologia Experimentalis et Applicata*** 170:48-63. ‡*Denotes equal author contribution; ^Corresponding author;* \*\**Special issue on host race formation and speciation\*\**

(66) Inskeep KA, Doellman MM, Powell THQ, Berlocher SH, Seifert NR, **Hood GR**, Ragland GJ, Meyers PJ, Feder JL. (2021) Divergent diapause life history timing drive both allochronic speciation and reticulate hybridization in an adaptive radiation of *Rhagoletis* flies. ***Molecular Ecology*** 31:4031-4049.

(65) **Hood GR**, Jennings JH, Beehler M\*, Yew J, Bruzzese DJ, Feder JR, Etges WJ. (2021) Cuticular hydrocarbon variation among *Rhagoletis* fruit flies (Diptera: Tephritidae): implications for premating reproductive isolation and ecological speciation. ***Ecological Entomology*** 47:192-207.

(64) Calvert MB, Doellman MM, Feder JL, **Hood GR**, Meyers P, Egan SP, Powell THQ, Glover MM, Tait C, Schuler H, Berlocher SH, Smith JJ, Nosil P, Hahn DA, Ragland GJ. (2021) Genomically correlated trait combinations and antagonistic selection contributing to counterintuitive genetic patterns of adaptive diapause divergence in *Rhagoletis* flies. ***Journal of Evolutionary Biology*** 35:146-163.

(63) Bruzzese DJ, Schuler H, Wolfe TM, Glover MM, Mastroni J, Doellman MM, Tait C, Yee WL, Rull J, Aluja M, **Hood GR**, Goughnour R, Nosil P, Feder JL. (2021) Testing the potential contribution of *Wolbachia* to speciation when cytoplasmic incompatibility becomes associated with host-related reproductive isolation. ***Molecular Ecology*** 31:2935-2950.

***2021***

(62) **Hood GR**‡, Socrates C\*, Rankin K\*, Hwang K, Papuga SA‡. (2021) On the phytoscreening potential of insect-induced plant galls. ***Plant and Soil*** 467:569-578.

 ‡*Denotes equal author contribution and co-corresponding authors*

 *Featured on the Entomological Society of American’s website “Entomology Today” and the podcast “InsectView”.*

(61) **Hood GR**, Blankinship D\*, Doellman MM, Feder JL. (2021) Temporal partitioning promotes parasitoid biodiversity. ***Biological Reviews*** 96:1969-1988.

(60) Zhang L, **Hood, GR**, Carroo I\*, Ott JR, Egan SP. (2021) Context-dependent reproductive isolation: Host plant variability drives fitness of hybrid herbivores. ***American Naturalist***197:732-739.

(59) Feder JL, **Hood GR**, Doellman MM, Schuler H, Miller A, Tait C, Glover MM, Meyers PJ. (2021) *Speciation, Process of*. In: Reference Module in Life Sciences (LIFE). Elsevier Press: Amsterdam, The Netherlands.

(58) Zhang L, **Hood GR**, Roush AM\*, Shzu S\*, Comerford MS, Ott JR, Egan SP. (2021) Asymmetric, but opposing reductions in immigrant viability and fecundity promote reproductive isolation among host-associated populations of an insect herbivore. ***Evolution*** 75:476-489.

***2020***

(57) Doellman MM, St. Jean G, Egan SP, Powell THQ, **Hood GR**, Schuler H, Bruzese DJ, Glover MM, Smith JJ, Yee W, Goughnour RB, Rull J, Aluja M, Feder JL. (2020) Evidence for spatial clines and mixed geographic modes of speciation for North American cherry-infesting *Rhagoletis* flies. ***Ecology and Evolution.*** 10:12727-12744.

(56) Weaver AK\*, **Hood GR**, Foster M, Egan SP. (2020) Tradeoff between fecundity and survival generates stabilizing selection on gall size. ***Ecology and Evolution*** 10:10207-10218.

(55) Meyers PJ, Doellman MM, Ragland GJ, **Hood GR**, Egan SP, Powell THQ, Nosil P, Feder JL. (2020) Can the genomics of ecological speciation be predicted across the divergence continuum from host races to species? A case study in *Rhagoletis*. ***Philosophical Transactions of the Royal Society B: Biological Sciences*** 375:20190534.

(54) **Hood GR**, Powell THQ, Doellman MM, Sim, SB, Glover M, Yee WL, Goughnour RB, Mattson M, Schwarz D, Feder JL. (2020) Rapid and repeatable host plant shifts drive reproductive isolation following a human-mediated introduction. ***Evolution*** 74:156-168.

(53) Doellman MM**‡^**, **Hood GR‡^**, Xu CCY, Gersfeld J, Holmes N, Yee W, Feder JL. (2020) Identifying diagnostic genetic markers for a cryptic invasive agricultural pest: a test case using the apple maggot fly, *Rhagoletis pomonella* (Diptera: Tephritidae). ***Annals of the Entomological Society of America*** 113:246-256. *^Authors contributed equally*; ‡*Corresponding author*

***2019***

(52) **Hood GR**, Weaver AK\*, ComerfordMS, Morton PM, Egan SP. (2019) Human-mediated disturbance in multitrophic interactions results in outbreak levels of North America’s most venomous caterpillar. ***Biology Letters*** 15:20190407.

**\*\*Featured in the following news outlets:** Houston Chronicle, Newsweek, KHOU 11 News Channel in Houston, Science Daily, Houstonia, Phys.org.

(51) **Hood GR**, ZhangL, Hu EG\*, Ott JR, Egan, SP. (2019) Cascading reproductive isolation: plant phenology drives temporal isolation among populations of a host-specific herbivore*.* ***Evolution***73:554-568.

(50) Doellman MM, Schuler H, St. Jean G, **Hood GR**, Egan SP, Powell THQ, Glover MM, Bruzzese DJ, Smith JJ, Yee W, Goughnour RB, Rull J, Aluja M, Feder JL. (2019) Geographic and ecological dimensions of host plant associated genetic differentiation and speciation in the *Rhagoletis* *cingulate* sibling species group. ***Insects*** 10:275.

(49) Tvedte ES, Walden KKO, McElroy KE, Forbes AA, **Hood GR**, Logsdon Jr JM, Feder JL Robertson HM. (2019) Genome of the parasitoid wasp *Diachasma alloeum*, an emerging model for ecological speciation and transitions to asexual reproduction. ***Genome Biology and Evolution*** 11:2767-2773.

(48) Zhang L, **Hood GR**, Ott JR, Egan SP. (2019) Temporal isolation between sympatric host plants cascades across multiple trophic levels of host-associated insects. ***Biology Letters*** 15:20190507.

(47) Driscoe AL, Nice CC, Busbee RW, **Hood GR**, Egan SP, Ott JR. (2019) Host plant association and spatial autocorrelation as drivers of genetic differentiation among populations of a regionally host-specific insect herbivore. ***Molecular Ecology*** 28:4197-4211.

(46) Doellman MM, Egan SP, Ragland GJ, Meyers PJ, **Hood GR**, Powell THQ, Lazorchak P, Hahn DA, Berlocher SH, Nosil P, Feder JL. (2019) Standing genetic variation in eclosion time and genome wide patterns of geographic and host related differentiation in *Rhagoletis pomonella*. ***Ecology and Evolution*** 9:393-409.

(45) Schuler H, Lopez JA, Doellman MM, **Hood GR**, Egan SP, Feder JL. (2019) Target-enriched RAD sequencing (teRADseq): A new high-throughput sequencing approach applied to the comprehensive characterization of endosymbionts. In *Methods in Molecular Biology: Insect Genomics*, eds. S. Brown & M. Pfrender (Springer, New York, NY), pp 195-212.

(44) Duran DP, Herrmann DP, Roman SJ, Gwiazdowski RA, Drummond JA, **Hood GR**, Egan SP. (2019) Congruence-based method for species discovery: cryptic diversity in the North American *Dromochorus* tiger beetles (Coleoptera: Carabidae: Cicindelinae). ***Zoological Journal of the Linnean Society*** 186:250-285*.*

***2018***

(43) Egan SP, Comerford M, **Hood GR**, Zhang L, Weinersmith K. Borders on the rise: the unintended evolutionary consequences of border barriers on natural populations. (2018) Public Policy Brief­-Bake Institute for Public Policy.

(42) Hulbert D, Jackson MD, **Hood GR**, Smith JJ. (2018) Description of a new *Rhagoletis* (Diptera: Tephritidae) species in the *tabellaria* species group. ***Insect Systematics and Diversity***2:1.

(41)Egan SP, **Hood GR,** Martinson E, Ott JR. (2018) Quick guide: Cynipid gall wasps. ***Current Biology*** 28:R1370-R1374.

(40) St. Jean G, **Hood GR**, Egan SP, Powell THQ, Schuler H, Doellman MM, Glover M, Smith JJ, Yee WL, Goughnour RB, Rull J, Aluja M, Feder JL. (2018) Limited genetic evidence for host plant-related differentiation in western cherry fruit fly, *Rhagoletis indifferens*. ***Entomologia Experimentalis et Applicata*** 166:739-751.

(39) **Hood GR**, Zhang L, Egan SP. (2018) Digest: Disentangled bank: less diverse urban environments modify the shape and magnitude of natural selection. ***Evolution*** 72:1972-1973.

(38) Egan SP, Zhang L, Comerford M, **Hood GR**. (2018) Botanical parasitism of an insect by a parasitic plant.***Current Biology*** 28:R863-R864*.* (*F1000 Prime Recommended*)

**\*\*Featured in the following news outlets:** The Atlantic, BBC Wildlife Magazine, Canadian Broadcasting Corporation, Cosmosmagazine.com, Dailymail, Earthsky.org Futurity, Live Science, Miami Herald (and 25 other newspapers), New York Times, News Week, Phys.org, Popular Science, The Scientist, *Science* Magazine, Sciendaily.com, SciShow, ‘Quirks and Quarks’ Podcast, Question on Jeopardy gameshow.

(37) Doellman MM, Ragland GJ, **Hood GR**, Meyers PJ, Egan SP, Powell THQ, Lazorchak P, Glover MM, Tait C, Schuler H, Hahn DA, Berlocher SH, Smith JJ, Nosil P, Feder JL. (2018) Genomic differentiation during speciation-with-gene-flow: comparing geographic and host-related variation in divergent life history adaptation in *Rhagoletis pomonella*. ***Gene*** 9:262*.*

\*\*Special issue on *Evolutionary Genetics of Reproductive Isolation*\*\*

(36) **Hood GR,** Zhang L, Topper L\*, Pinto PBDF, del Pino G, Comerford MS, Egan SP. (2018) ‘Closing the life cycle’ in *Andricus quercuslanigera* (Ashmead 1881) (Hymenoptera: Cynipidae)*.* ***Annals of the Entomological Society of America*** 111:103-113*.*

(35) **Hood GR**, Egan SP. (2018) *Ecological Relevance of Speciation*. Oxford Bibliographies. Oxford Press*.* DOI: 10.1093/OBO/9780199830060-0197.

(34) Schuler H, Egan SP, **Hood GR**, Driscoe A, Ott JR. (2018) Diversity and distribution of *Wolbachia* in relation to geography, host plant affiliation and life cycle of a heterogonic gall wasp. ***BMC Evolutionary Biology*** 18:1*.*

(33) Glover MM, Egan SP, **Hood GR**, Rull J, Martin A, Feder JL. (2018) Phylogeography of walnut-infesting *Rhagoletis suavis* (Diptera: Tephritidae) flies. ***Insect Systematics and Diversity*** 2:1.

***2017***

(32) Sim SB, Doellman MM, **Hood GR**, Powell THQ, Schwarz D, Goughnour R, Egan SP, St. Jean G, Smith JJ, Arcella TE, Dzurisin DK, Feder JL. (2017) Genetic evidence for the introduction of *Rhagoletis pomonella* (Diptera: Tephritidae) into the Northwestern United States. ***Journal of*** ***Economic Entomology*** 110:2599-2608.

(31) Ragland GJ, Meyers PJ, Doellman MM, **Hood GR**, Egan SP, Powell THQ, Hahn DA, Nosil P, Feder JL. (2017) A test of genomic modularity among life history adaptations promoting speciation-with-gene-flow. ***Molecular Ecology*** 26:3926-3942.

(30) **Hood GR**, Ott JR. (2017) Independent life history evolution between generations of bivoltine species: a case study of cyclical parthenogenesis. ***Oecologia*** 183:1053-1064.

(29) Cha DH, Olsson SB, Yee WL, Goughnour RG, **Hood GR**, Mattsson M, Schwarz D, Feder JL, Linn CE. (2017) Identification of host fruit volatiles from snowberry (*Symphoricarpos albus*) attractive to *Rhagoletis zephyria* flies from the western United States. ***Journal of Chemical Ecology*** 43:188-197.

(28) Feder JL, **Hood GR**, Doellman MM, Schuler H, Miller A, Tait C, Glover MM, Meyers PJ. (2017) *Speciation, Process of*. In: Reference Module in Life Sciences (LIFE). Elsevier Press: Amsterdam, The Netherlands.

***2016***

(27) **Hood GR**, Feder JL. (2016) *Sequential Speciation*, In Encyclopedia of Evolutionary Biology (ed. RM Kliman). Oxford University Press, Oxford, pg. 41-48**.**

(26) Egan SP, **Hood** **GR**, Feder JL. (2016) *Speciation-with-Gene-Flow,* In Encyclopedia of Evolutionary Biology (ed. RM Kliman). Oxford University Press, pg. 209-215.

(25) Schuler H, **Hood GR,** Egan SP, Feder JL. (2016) Modes and mechanisms of speciation. ***Reviews in Cell Biology and Molecular Medicine*** 2:60-93.

(24) Hamerlinck G., Lemoine NP, **Hood** **GR**, Abbott KC, Forbes AA. (2016) Meek mothers with powerful daughters: effects of novel host environments and small trait differences on parasitoid competition. ***Oikos*** 1:1-12.

(23) Hamerlinck G, Hulbert D, **Hood GR**, Smith JJ, Forbes AA. (2016) Histories of host shifts and cospeciation among free-living parasitoids of *Rhagoletis* flies. ***Journal of Evolutionary Biology*** 29:1766-1779.

(22) Forbes AA, Hall MC, Lund J, **Hood GR**, Izen R, Egan SP, Ott JR. (2016) Parasitoids, hyperparasitoids and inquilines associated with the sexual and agamic generations of the oak gall former, *Belonocnema treatae* (Hymenoptera: Cynipidae). ***Annals of the Entomological Society of America*** 109:49-63*.*

***2015***

(21) Mattsson M, **Hood GR**, Feder JL, Ruedas LA. (2015) Rapid and repeatable shifts in life history timing of *Rhagoletis pomonella* (Diptera: Tephritidae) following colonization of novel host plants in the Pacific Northwestern United States. ***Ecology and Evolution*** 5:5823-5837.

(20) **Hood GR**, Forbes AA, Powell THQ, Egan SP, Hamerlinck G, Smith JJ, Feder JL. (2015) Sequential divergence and the multiplicative origin of community diversity. ***Proceedings of the National Academy of Science USA*** 112:E5980-E5989.

**\*\*Featured in the following news outlets:** American Association for the Advancement of Scientists, DNA Barcoding, Eco-evolutionary Dynamics Blog, Gizmodo, Health Medicinet Network, IFL Science, National Geographic, Nature World News, Phys.org, redOrbit, Science Daily, Technology.org, Wall Street Journal, ZME Science.

(19) Yee WL, Goughnour RB, **Hood GR,** Forbes AA, Feder JL. (2015) Chilling and host plant/site-associated eclosion times of western cherry fruit fly (Diptera: Tephritidae) and a host-specific parasitoid. ***Environmental Entomology*** 44:1029-1042.

(18) Arcella T**‡**, **Hood GR‡^**, Powell THQ**‡**, Sim SB, Yee WL, Schwarz D, Egan SP, Goughnour RB, Smith JJ, Feder JL. (2015) Hybridization and the spread of the Apple Maggot Fly, *Rhagoletis pomonella* (Diptera: Tephritidae), in the Northwestern United States. ***Evolutionary Applications*** 8:834-846. ***‡****Equal author contribution;* ***^****Corresponding authors*

(17) Egan, SP, Ragland GR, Assour L, Powell THQ, **Hood GR**, Emrich S, Nosil P, Feder JL. (2015) Experimental evidence of genome-wide impact of natural selection during early stages of speciation-with-gene-flow. ***Ecology Letters***18:817-825*.* (*F1000 Prime Recommended*)

(16) Yee WL, Lawrence TW, **Hood GR**, Feder JL. (2015) New records of *Rhagoletis* Loew, 1862 (Diptera: Tephritidae) and their host plants in western Montana, U.S.A*.* ***Pan-Pacific Entomologist*** 91:39-57.

***2014***

(15) **Hood GR**, Glover M, Tait C, Yee WL, Feder JL. (2014) Detection of an apple-infesting population of *Rhagoletis pomonella* (Walsh) 1867 (Diptera: Tephritidae) in the state of Colorado, USA. ***Pan-Pacific Entomologist***90:4-10.

(14) Smith JJ, Powel THQ, Teixeira L, Armstrong WO\*, McClowry RJ, Isaacs R, **Hood GR**, Feder JL, Gut L. (2014) Genetic structure of cherry fruit fly (*Rhagoletis cingulata*) populations across managed, unmanaged, and natural habitats. ***Entomologia Experimentalis et Applicata*** 150:157-165.

(13) Powell, THQ, Forbes AA, **Hood GR**, Feder JL. (2014) Ecological adaptation and reproductive isolation in sympatry: genetic and phenotypic evidence for multiple native host races in *Rhagoletis pomonella*. ***Molecular Ecology*** 23:688-704*.*

***2013***

(12) Powell THQ, **Hood GR**, Murphy M\*, Heilveil JS, Berlocher SH, Nosil P, Feder JL. (2013) Genetic divergence along a speciation continuum: the transition from host race to species in *Rhagoletis* (Diptera: Tephritidae). ***Evolution*** 67:2561-2576*.*

(11) Egan SP, **Hood GR**, DeVela G\*, Ott JR. (2013) Parallel ecological divergence of two specialist gall wasp species. ***PLoS One*** e54690*.*

(10) **Hood GR**, Yee WL, Goughnour RB, Sim SB, Egan SP, Arcella T, St. Jean G, Powell THQ, Xu C\*, Feder JL. (2013) The geographic distribution of *Rhagoletis pomonella* (Diptera: Tephritidae) in the western United Stated: introduced species or native population? ***Annals of the Entomological Society of America*** 106:59-65*.*

***2012***

(9) **Hood GR**, Egan SP, Feder JL. (2012) Evidence for sexual isolation as a prezygotic barrier to gene flow between morphologically divergent species of *Rhagoletis* fruit flies. ***Ecological Entomology*** 37:521-528.

(8) **Hood GR**, Egan SP, Feder JL. (2012) Interspecific competition and speciation in endoparasitoids. ***Evolutionary Biology*** 39:219-230.

(7) Egan SP, **Hood GR**, Ott JR. (2012) Testing the role of habitat isolation among ecologically divergent gall wasp populations.  ***International Journal of Ecology***, vol. 2012 Article ID 809897, 8 pgs. \*\*Special issue on *Ecological Speciation*\*\*

(6) Egan SP, **Hood GR**, Feder JL, Ott JR. (2012) Divergent host plant use promotes reproductive isolation among cynipid gall wasp populations. ***Biology Letters*** 8:605-608.

\*\***Featured in *The Earth Times* science blog.**

***2011***

(5) **Hood GR**,Ott JR. (2011) Generational shape shifting: changes in egg shape and egg size between asexual and sexual generations of a cyclically parthenogenic gall former. ***Entomologia Experimentalis et Applicata*** 141:88-96.

(4) Egan SP, **Hood GR**, Ott JR. (2011) Natural selection on gall size: Natural selection in the wild: variable contributions of individual host plants to landscape wide patterns. ***Evolution*** 65:3543-3557.

***2009-2010***

(3) Forbes, AA**‡**, **Hood GR‡**, Powell THQ, Feder JL. (2010) Geographic ranges and host breadths of parasitoid wasps associated with *Rhagoletis pomonella* (Diptera: Tephritidae) species complex. ***Annals of the Entomological Society of America*** 103:908-15.**‡**Equal author contribution

(2) **Hood GR**, Ott JR. (2009) Developmental plasticity and reduced susceptibility to natural enemies following host plant defoliation in a specialized herbivore. ***Oecologia*** 162:673-83.

(1) Farallo VR, Swanson RL, **Hood GR,** Troy JR, Forstner MJ. (2009) New county records for the Mediterranean house gecko (*Hemidactylus turcicus*) in Central Texas with comments on human mediated dispersal. Applied Herpetology 6:196-198.

***In Preparation*** (draft of manuscript available upon request)

Milnes JM, Yee WL, Rose A, Bush MR, **Hood GR**, Goughnour RB, James TS, Schwarz JJ, LaBelle J, Feder JL. *Rhagoletis pomonella* (Diptera: Tephritidae) infesting rose hip (*Rosa nutkana*): a new host record in the Pacific Northwest USA.

**Hood GR,** Powell THQ, Sim SB, Linn Jr. C, Doellman MM, Glover M, Yee WL, Schwarz D, Goughnour RB, Smith JJ, Feder JL. Genetic and behavioral evidence for multiple introductions of *Rhagoletis pomonella* (Diptera: Tephritidae) in the western United States.

Egan SP, Boschert C, Comerford M, Burns M, Drummond J, Elshahat E, Fordyce J, Forister M, Graham A, **Hood GR**, Howe-Kerr L, Pinto P, Shzu S, Wice E, Zhang L. Niche width and range size predict host shifts across North American leaf beetles.

Egan SP, **Hood GR**, Zhang L, Comerford C, Weinersmith C. A review of the eco-evolutionary impacts of border barriers on natural populations*.*

Egan SP, **Hood GR**, Feder JL. Ecological divergence promotes reproductive isolation across the genus *Rhagoletis*.

***Natural History Notes***

Swanson R, Farallo VR, Troy JR, **Hood GR**, Forstner MRJ (2009) Geographic distribution. *Hemidactylus turcicus*. ***Herpetological Review*** 40:443.

Farallo VR, Swanson R, Troy JR, **Hood GR**, Forstner MRJ (2008) Geographic distribution. *Coluber constrictor*. ***Herpetological Review*** 39:484.

Swanson RL, Farallo VR, Troy JR, **Hood GR**, Forstner MRJ (2008) Geographic distribution. *Anolis carolinensis*. Herpetological Review. 39: 482.

Swanson RL, Farallo VR, Troy JR, **Hood GR**, Forstner MRJ (2008) Geographic distribution. *Syrrhophus cystignathoides campi*. ***Herpetological Review*** 39:478.

Farallo VR, Swanson RL, Troy JR, **Hood GR**, Forstner MRJ (2008) Geographic distribution. *Lithobates sphenocephalus*. ***Herpetological Review*** 39:363.

Swanson RL, Farallo VR, Troy JR, **Hood GR**, Forstner MRJ (2008) Geographic distribution. *Hemidactylus turcicus*. ***Herpetological Review***. 39: 367.

Farallo VR, Swanson RL, Troy JR, **Hood GR**, Forstner MRJ (2008) Geographic distribution. *Hemidactylus turcicus*. ***Herpetological Review*** 39:368.

**Non-reviewed publications**

**Hood GR** (2016) Sequential divergence and the multiplicative origin of community diversity. Ph.D. Dissertation. University of Notre Dame, Notre Dame, IN.

**Hood GR** (2015) Hawthorns to Apples, Flies to Parasitoids–How New Species Create More Species. Pieris Project Blog Post [www.pierisproject.org/cool-stuff].

**Hood GR** (2015) Sequential Divergence Across Trophic Levels. Eco-Evolutionary Dynamics Blog Post [www.ecoevoevoeco.blogspot.com/2015/11/].

**Hood GR** (2009) Effects of Prior Defoliation on the Timing of Life Cycle Events and Susceptibility to Natural Enemies of a Host Specific Gall-former. M.Sc. Thesis. Texas State University, San Marcos, TX.

**presentations** (\*undergraduate co-author; ^graduate student co-author)

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| 18 invited seminars, 90 conference presentations, and 7 posters presented from 2007–2024 (32 presenting/first author).Society for the Study of Evolution (27), Entomological Society of America (25), Ecological Society of America (13), Southwestern Association of Naturalists (5), University of Notre Dame Seminar Series (4), Midwestern Ecology and Evolution Conference (3), Genomes to Biomes Conference (2), Texas Academy of Science (2), Texas State University Colloquium (2), NIEHS Superfund Program (2), Texas A&M University Ecological Integration Symposium (1); Ecological Genetics Symposium (1), Western Evolutionary Biology Meeting (1). ***Invited Seminars*****Hood GR.** The ecology and evolutionary biology of gall-forming insects: spatial and temporal variation at multiple scales. University of Dayton, Dayton, OH. April 2024. *\*Invited by graduate students***Hood GR.** The biodiversity crisis: implications for pollination and food security. Wayne State University Office of Sustainability’s ‘Green Street Event’. Wayne State University, Detroit, MI. Oct. 2023. **Hood GR.** The origin of species in your own backyard: the story of the apple maggot fly and its parasitoid wasps. Wayne State University’s “Under the Dome” Seminar Series. Wayne State University, Detroit, MI. Oct. 2023. **Hood GR.** The ecology and evolutionary biology of gall-forming insects. University of New Mexico, Albuquerque, NM. Dec. 2023. **Hood GR.** The ecology and evolutionary biology of gall-forming insects. Bowling Green State University, Bowling Green, OH. April 2023. **Hood GR**. Sequential divergence and the multiplicative origin of community diversity. University of Illinois, Urbana, IL. June 2022. **Hood GR.** (Urban) Ecology: What is its role in urban sustainability? Invited lecture in Urban Sustainability, Wayne State University, Detroit, MI. Oct. 2022. **Hood GR.** (Urban) Ecology: What is its role in urban sustainability? Invited lecture in Urban Sustainability, Wayne State University, Detroit, MI. Nov. 2021. **Hood GR.** The ecology and evolutionary biology of insect induced plant galls. Michigan State University, East Lansing, MI. March 2021. **Hood GR**, Papuga SA. Insect Induced Plant Galls as Bioindicators to Detect Contamination in Urban Environments. Invited lecture in Volatile Solvents in the Environment, Wayne State University, Detroit, MI. Feb. 2020. **Hood GR.** The ecology and evolutionary biology of insect induced plant galls. Oakland University, Rochester, MI. April 2019. **Hood GR.** “Natural” ecological and evolutionary experiments in an urban setting. Department of Biological Sciences Annual Retreat, Wayne State University, Detroit, MI. Oct. 2018. **Hood GR.** Sequential divergence and the multiplicative origin of community diversity. Rice University, Houston, TX. May 2017. **Hood GR.** The origin of insect biodiversity. Rice University’s Smalley-Curl Institute, Houston, TX. May 2017.**Hood GR.** Sequential divergence and the multiplicative origin of community diversity. University of Florida, Gainesville, FL. July 2016.**Hood GR.** Sequential speciation multiplicatively amplifies biodiversity across trophic levels. Western Washington University, Bellingham, WA. Oct. 2014. **Hood GR.** Forbes AA, Egan SP, Powell THQ, Smith JJ, Feder JL. Sequential speciation multiplicatively amplifies biodiversity across trophic levels. Midwestern Ecology and Evolution Conference. Dayton, OH. March 2014.**Hood GR.** The ecology and evolution of life history characteristics in a gall-forming insect. University of Iowa, Iowa City, IA. Nov. 2010.***Conference Presentations (only last 10 years listed)******2024*****Hood GR**, Sergeant M. Artificial selection of plants promotes temporal reproductive isolation in insect populations: a test case using the blueberry stem gall wasp. International Congress of Entomology Kyoto, Japan. Aug. 2024. O'Leary BF, **Hood GR**, Lu M, Bunting E, Zhang Q, Hossain M, Sperone GS, Miller CJ, Hussain, Y, Wu T, Melkonian C. Using Natural Language Processing to Exploring Legacy Brownfield. American 13th Annual Institute of Professional Geologists Environmental Risk Management. Roscommon, MI. June 2024. O'Leary BF, **Hood GR**, MacDonald Gibson J, Long HC, Miller CJ, Wager Y. Sampling strategies and numerical models to understand subsurface vapor intrusion exposure pathways and risk. Battelle Chlorinated Conference. Denver, CO.  June 2024.O'Leary BF, **Hood GR**, Miller CJ, Black SM. Investigating Groundwater Contamination through Phytoscreening in Neighborhoods of the Great Lakes Region. Shared Lakes: One Water, One Health*.* 67th Annual Conference on Great Lakes Research. Windsor, Ontario. May 2024. O'Leary BF, **Hood GR**, Lu M, Bunting E, Zhang Q, Hossain M, Sperone GS, Miller CJ, Hussain Y, Wu T, Melkonian C. Integrating Fieldwork Approaches to Uncover the Environmental Health Impact of Brownfields on Urban Communities. Climate Change and Environmental Justice: Engaging Diverse Teams. NIEHS Partnerships for Environmental Public Health. Durham, NC.Feb. 2024.  ***2023***Black SM,  **Hood GR**. Developing novel ento-phyto-screening methods: detecting carcinogenic environmental contaminants using insect-induced plant galls. National Institute of Environmental Health Science Superfund Research Program Annual Meeting. Albuquerque, NM. Dec. 2023. O'Leary BF, **Hood GR**, Lu M, Bunting E, Zhang Q, Hossain M, Sperone GS, Miller CJ, Hussain Y, Wu T, Melkonian C. Use of Innovative Methods to Uncover Hidden Stories of Legacy Brownfield Sites. National Institute of Environmental Health Science Superfund Research Program Annual Meeting. Albuquerque, NM. Dec. 2023.  (Poster)**Hood GR**, Hwang K, Black S, Socrates C, Papuga SA. Developing novel tools to screen for belowground chemical contaminants: insect-induced plant galls and their application in phytoscreening organic and inorganic pollutants. Entomological Society of American’s Annual Meeting. National Harbor, WA. Nov. 2023. Sergeant M, **Hood GR**. Fitness tradeoffs among cultivar-associated populations of the blueberry stem gall wasp, *Hemadas nubilipennis*, an agricultural pest of blueberries.Entomological Society of American’s Annual Meeting. National Harbor, WA. Nov. 2023. (Poster)Shaible T, **Hood GR**. Variation in biodiversity of soil dwelling arthropods in an urban environment. Entomological Society of American’s Annual Meeting. National Harbor, WA. Nov. 2023. (Poster)Black S, Socrates C, Sergeant M, Papuga SA, **Hood GR**. Ento-phyto-screening for organic contaminants: the use of insect-induced plant galls as a novel tool for tracking belowground belowground chemical contaminants. Entomological Society of American’s Annual Meeting. National Harbor, WA. Nov. 2023.O'Leary BF, **Hood GR,** Miller CJ, Wager Y. Neighborhood-scale sampling strategies and numerical models to understand subsurface environmental exposure pathways. 7th Annual Sustainable Detroit Forum. Detroit, MI. Nov. 2023.  **Hood GR,** Lecic S, Wolfe T, Gosh A, Satar S, Souza Beraldo C, Smith E, Dambroskie J, Jernigan E, Schuler H, Stauffer C.Spatial variation in *Wolbachia* frequencies predict the invasion origins of an insect pest recently introduced to North America from Europe. Ecological Society of American’s Annual Meeting. Portland, Oregon. Aug. 2023. (Poster)Black SM, Socrates C, Sergeant M, Papuga S, **Hood GR**. Developing novel ento-phyto-screening methods: detecting contaminants with insect-induced plant galls. National Brownfields Training Conference. Detroit, MI. Aug. 2023. (Poster).O'Leary BF, **Hood GR**, Miller, CJ *Phytoscreening and Modeling VI in Urban Centers*. National Brownfields Training Conference. Detroit, MI. Aug. 2023. **Hood GR,** Black S, Socrates C, Hwang K, Sergeant M, Papuga SA.Ento-phyto-screening: developing insect-induced plant galls as a novel tool for tracking organic chemical contaminants in the subsurface. 8th International Plant Gall Symposium. Chico, CA. July 2023. **Hood GR**. Building aboveground strategies to identify and address belowground hot spots for VOC vapor intrusion in complex urban settings. Center for Leadership in Environmental Awareness and Research (CLEAR) Community Advisory Board presentation. Wayne State University. Detroit, MI Apr. 2023. Runge-Morris M, Miller CJ, **Hood GR**, Wager Y, Baker T, Straughen J, Mor G. An Introduction to the National Institute of Health Sciences Superfund Research Program at Wayne State University. The Center for Leadership in Environmental Awareness and Research (CLEAR) Seminar Series. Wayne State University. Detroit, MI. Feb. 2023. ***2022***Black SM^, Socrates C\*, Sergeant M^, Papuga S, **Hood GR**. Developing novel ento-phyto-screening methods: detecting carcinogenic environmental chemical contaminants using insect-induced plants galls. National Institute of Environmental Health Sciences 35th Annual Superfund Research Program Meeting. Raleigh, North Carolina. Dec. 2022. (Poster)O’Leary BF^, Miller CJ, Selegean K\*, **Hood GR**. Variation in pollutant concentration across multiple media at abandoned urban brownfields. National Institute of Environmental Health Sciences 35th Annual Superfund Research Program Meeting. Raleigh, North Carolina. Dec. 2022. (Poster)Martinson EO, Sergeant M, **Hood GR**. Host gene expression manipulation by the blueberry stem gall wasp, *Hemadas nubilipennis*. Annual Meeting of the Entomological Society of America. Vancouver, British Columbia, Canada. Nov. 2022. **Hood GR,** Black S, Sergeant M, Egan SP, Comerford MS. Temporal variation in the form and magnitude of natural selection on an extended phenotype: contributions of parasitism and predation to gall size. Annual Meeting of the Society for the Study of Evolution. Cleveland, OH. June 2022. Bruzzese D, Wolfe T, Schuler H, Yee WL, Rull J, Aluja M, Goughnour R, **Hood GR**, Stauffer C, Feder JL. Hidden structural diversity within a *Wolbachia* strain infecting cherry-infesting Rhagoletis (Diptera: Tephritidae) flies across North America. Annual Meeting of the Society for the Study of Evolution. Virtual. June 2022. Comerford MS^, **Hood GR**, Egan SP. Hidden trade-off in a food-for-protection mutualism: higher fungal infection and lower survival of nectar-producing galls when ants do not tend. Ecological Society of American’s Annual Meeting. Virtual. August 2022. O’Leary BF^, Miller CJ, Selegean K\*, **Hood GR**. Urban groundwater pollution: Using vegetation to evaluate impacts. Joint Aquatic Sciences Meeting. Grand Rapids, MI. May 2022. ***2021***Black SM^, Socrates C\*, Sergeant M^, Papuga S, **Hood GR**. Developing novel phytoscreening methods: detecting carcinogenic environmental contaminants using insect-induced plant galls. Wayne State University’s One Health Symposium. Dec. 2021. (Poster)O’Leary BF^, Miller CJ, Dittrich T, **Hood GR**, Papuga SA, Schuster W. Evaluating volatile organic compound exposure pathways and risk in a variably-saturated, urban landscape. American Geological Union Fall Meeting, New Orleans, Dec. 2021. *\*\*Awarded 2nd Place for the ‘Outstanding Student Presenter’ from the Unsaturated Zone Technical Committee\*\****Hood GR**, Mattsson M, Yee WL, Bruzzese DJ, Doellman MM, Goughnour RB, Driscoe AL, Van Dexter S, Tait C, Glover MM, Meyers P, Ruedas LA, Feder JL. Recursive adaptation in action: allochronic isolation and the divergence of host-associated populations of the apple maggot fly, *Rhagoletis pomonella* (Diptera: Tephritidae) following its recent introduction into the western United States. Annual Meeting of the Entomological Society of America. Virtual. Nov. 2021.Feder JL, Glover MM, Doellman MM, **Hood GR**. Adaptive radiation and its relationship to ecological and non-ecological speciation in a group of walnut infesting Tephritid flies. Annual Meeting of the Entomological Society of America. Virtual. Nov. 2021. Feder JL, Glover MM, Doellman MM, **Hood GR**. Ecology and geography iteract to fuel the adaptive radiation of walnut-infesting *Rhagoletis* flies. Annual Meeting of the Society for the Study of Evolution. Virtual. June 2021.Bruzzese DJ, Schuler H, Wolfe TM, Glover MM, Mastroni JV, Doellman MM, Tait C, Yee WL, Rull J, Aluja M, **Hood GR**, Goughnour RB, Stauffer C, Nosil P, Feder JL. *Wolbachia*-induced cytoplasmic incompatibility and its coupling with non-endosymbiont based reproductive isolation during speciation. Annual Meeting of the Society for the Study of Evolution. Virtual. June 2021.Zhang L***^***, **Hood GR**, Carroo IJ\*, Ott JR, Egan SP. Context-dependent reproductive isolation: host plant variability drives fitness of hybrid herbivores. Annual Meeting of the Society of American Naturalist. Virtual. Jan. 2021.***2020***Papuga SA, **Hood GR**, Socrates C\*, Rankin K\*, Hwang K, Whitfield M\*. Toward improved use of aboveground plant material to monitor belowground contaminants and their movement in urban environments. Annual Meeting of the American Geophysical Union. Virtual. Dec. 2020. Papuga SA, **Hood GR**, Socrates C\*, Rankin K\*, Hwang K, Whitfield M\*. Toward improved use of aboveground plant material to monitor belowground contaminants and their movement in urban environments. National Institute of Environmental Health and Safety Superfund Research Program’s Annual Meeting. Virtual. Dec. 2020. Martinson M, Sergeant M, **Hood GR**. Compositional changes in the venom repertoire of the blueberry stem gall wasp, *Hemadas nubilipennis*. Annual Meeting of the Entomological Society of America. Virtual. Nov. 2020. **Hood GR,** Papuga SA, Socrates C\*, Rankin K\*, Huang K. Insect-induced plant galls expose hard-to-detect belowground contaminants. Annual Meeting of the Entomological Society of America. Virtual. Nov. 2020. Sergeant M^, **Hood GR**. Artificial selection of plants promotes temporal reproductive isolation in insect populations: a test case using highbush blueberry and blueberry stem gall wasp. Annual Meeting of the Entomological Society of America. Virtual. Nov. 2020. (Poster).***2019***Sergeant M^, Fanning PD, Isaacs R, **Hood GR**. Artificial selection of plants promotes temporal reproductive isolation in insect populations: a test case using highbush blueberry and blueberry stem gall wasp. Annual Meeting of the Entomological Society of America. St. Louis, MO. Nov. 2019. (Poster)Doellman MM, Powell THQ, Berlocher SB, Inskeep K\*, Tait CC, Meyers P, **Hood GR**, McCall BC, Egan SP, Ragland G, Feder JL. Characterizing the genomic architecture of divergence along the speciation continuum in the *Rhagoletis pomonella* species complex. Annual Meeting of the Entomological Society of America. St. Louis, MO. Nov. 2019. Feder JL, Meyers P, Doellman MM, **Hood GR**, Ragland G. How predictable is the genomics of diapause life history adaptation in allochronically isolating host races and species of *Rhagoletis* flies? Annual Meeting of the Entomological Society of America. St. Louis, MO. Nov. 2019. Santagelo J,…**Hood GR**…Global Urban Evolution Project (1 of almost 100 co-authors). The global urban evolution project: parallel adaption to the world’s urban jungles. Annual Meeting of the Society for the Study of Evolution. Providence, RI. June 2019.**Hood GR,** Zhang L, Hu EG\*, Ott JR, Egan SP. Cascading reproductive isolation: plant phenology drives temporal isolation among populations of a host-specific herbivore. Annual Meeting of the Society for the Study of Evolution. Providence, RI. June 2019.Egan SP, Boschert C\*, Comerford MS, Burns MP, Drummond J, Elshahat E, Fordyce J, Forister M, Graham AM, **Hood GR**, Howe-Kerr LP, Pinto PDBF, Shzu SA\*, Wice E, Zhang L. Niche width and range size predict host shifts across North American leaf beetles. Annual Meeting of the Society for the Study of Evolution. Providence, RI. June 2019.Driscoe AL, Nice C, Busbee R, **Hood GR**, Egan SP, Ott JR. Interactions between host associations and geography drive diversification in a specialist herbivore. Annual Meeting of the Society for the Study of Evolution. Providence, RI. June 2019.Etges WJ, **Hood GR**, Jennings JH, Beehler M\*, Yew J, Feder JR. Cuticular hydrocarbon variation in the *Rhagoletis pomonella* sibling species complex. Annual Meeting of the Society for the Study of Evolution. Providence, RI. June 2019.Feder JL, Meyers P, Doellman MM, **Hood GR**, Egan SP, Ragland GJ. How predictable is the genomics of diapause life history adaptation in allochronically isolating host races and species of *Rhagoletis* flies? Annual Meeting of the Society for the Study of Evolution. Providence, RI. June 2019.McCall C, Doellman MM, **Hood GR**, Egan SP, Powell THQ, Hahn D, Feder JL, Ragland GJ. The genomics of multivariate trait combinations and their influence on the predictability of evolution. Annual Meeting of the Society for the Study of Evolution. Providence, RI. June 2019.Zhang L, **Hood GR**, Carroo I, Ott JR, Egan SP. Asymmetry in reinforcement between ecologically divergent host-associated populations of the gall-forming wasp, *Belonocnema treatae*. Annual Meeting of the Society for the Study of Evolution. Providence, RI. June 2019.***2018*****Hood GR,** Blankinship D\*, Doellman M, Feder JL. Temporal resource partitioning facilitates species co-existence and promotes the formation of biodiversity. Annual Meeting of the Ecological Society of America. New Orleans, LA. Aug. 2018.Zhang L, **Hood GR**, Comerford MS, Ott JR, Egan SP. Testing immigrant inviability as a reproductive barrier among different host-associated populations of the gall wasp *Belonocnema treatae*. Annual Meeting of the Ecological Society of America. New Orleans, LA. Aug. 2018.Seifert NR\*, Doellman MM, **Hood GR**, Feder JL. Identifying the source of parasitoids infesting western *Rhagoletis pomonella* using cytochrome oxidase-I sequence analysis. University of Notre Dame’s College of Science Joint Annual Meeting. April 2018. **Hood GR,** Blankinship D\*, Doellman M, Feder JL. Temporal resource partitioning facilitates species co-existence and promotes parasitoid biodiversity. Annual Meeting of the Southwestern Association of Naturalists. San Marcos, TX. April 2018. Busbee R, Driscoe A, Nice C, Forbes AA, Egan SP, **Hood GR**, Zhang L, Ott J. Distance based redundancy analysis captures the natural enemy community structure of a regionally host specific insect herbivore. Annual Meeting of the Southwestern Association of Naturalists. San Marcos, TX. April 2018.Driscoe A, Nice C, Busbee R, **Hood GR**, Egan SP, Ott J. Disentangling the roles of host plant affiliation and spatial autocorrelation as drivers of genetic differentiation among populations of a host-specific insect herbivore. Annual Meeting of the Southwestern Association of Naturalists. San Marcos, TX. April 2018.Doellman MM, Inskeep K, Powell THQ, Egan SP, Ragland GJ, Meyers P, **Hood GR**, Smith JJ, Berlocher SH, Feder JL. Genomic differentiation during speciation-with-gene-flow: comparing life history and geographic variation within and across species in the *Rhagoletis pomonella* complex. Annual Meeting of the Entomological Society of America. Vancouver, BC. Nov. 2018.Feder JL, Doellman MM, St. Jean G, Egan SP, **Hood GR**, Powell TQH, Yee W, Rull J, Smith JJ, Aluja M. Partial ring species, clines, and disjunct geographic patterns of genetic differentiation reveal complex history of divergence for North American cherry-infesting *Rhagoletis* flies. Annual Meeting of the Entomological Society of America. Vancouver, BC. Nov. 2018.***2017*****Hood GR,** Powell THQ, Forbes AA, Egan SP, Harada A\*, Feder JL. Interspecific competition and temporal resource partitioning facilitate speciation. Annual Meeting of the Entomological Society of America. Denver, CO. Nov. 2017.Ragland G, **Hood GR**, Egan SP, Doellman D, Hahn D. Introduction to the symposium: Genomics of adaptation: linking the next generation of genome-wide analysis to understand and manage complex traits”. Annual Meeting of the Entomological Society of America. Denver, CO. Nov. 2017.Zhang L, **Hood GR**, Comerford M, Busbee R, Driscoe A, Ott JR, Egan SP. Immigrant inviability promotes reproductive isolation among host-associated populations of the gall wasp *Belonocnema treatae*. Annual Meeting of the Entomological Society of America. Denver, CO. Nov. 2017.Doellman M, Powell THQ, Inskeep C\*, Egan SP, Ragland G, Meyers P, **Hood GR**, Smith JJ, Berlocher SH, Feder JL. From host races to species: genome-wide divergence parallels ecological variation within and across species in the *Rhagoletis pomonella* complex (Diptera: Tephritidae). Annual Meeting of the Entomological Society of America. Denver, CO. Nov. 2017.Feder JL, Doellman M, **Hood GR**, Ragland G, Egan S, Meyers P, Powell THQ, Hahn D. Experimental evidence natural selection affects genome-wide geographic and host-related differentiation during sympatric speciation in *Rhagoletis* fruit flies (Diptera: Tephritidae). Annual Meeting of the Entomological Society of America. Denver, CO. Nov. 2017.**Hood GR,** Powell THQ, Forbes AA, Egan SP, Harada A\*, Feder JL. Interspecific competition and temporal resource partitioning facilitate speciation and the formation of community biodiversity. Annual Meeting of the Society for the Study of Evolution. Portland, OR. June 2017. Doellman M, Powell T, Berlocher SH, Ragland G, Egan SP, Meyers P, **Hood GR**, Feder JL. Across the tipping point? The transition from host race to species in *Rhagoletis pomonella* species complex. Annual Meeting of the Society for the Study of Evolution. Portland, OR. June 2017.Feder JL, Doellman M, **Hood GR**, Ragland G, Meyers P, Powell THQ, Egan SP, Glover M, Tait C, Hahn D, Berlocher S, Nosil P. Experimental evidence natural selection affects genome-wide geographic and host-related differentiation during sympatric divergence. Annual Meeting of the Society for the Study of Evolution. Portland, OR. June 2017.***2016*****Hood GR**, Forbes AA, Powell THQ, Egan SP, Hamerlinck G, Smith JJ, Feder JL. Sequential divergence and the multiplicative origin of community diversity. Annual Meeting of the Society for the Study of Evolution. Austin, TX. June 2016. Feder JL, Doellman MM, Powell THQ, **Hood GR**, Egan SP, Ragland G, Meyers PJ, Berlocher SH, Nosil P. Darwinian punctuated disequilibrium during speciation in *Rhagoletis*. Annual Meeting of the Society for the Study of Evolution. Austin, TX. June 2016.***2015*****Hood GR**, Forbes AA, Powell THQ, Egan SP, Hamerlinck G, Smith JJ, Feder JL. Sequential speciation and the multiplicative origin of community diversity. Annual Meeting of the Entomological Society of America. Minneapolis, MN. Nov. 2015. Schuler H, Doellman MM, **Hood GR**, Glover M, Yee WL, Rull J, Aluja M, Egan SP, Feder JL. The potential role of *Wolbachia* as an incompatibility factor between cherry infesting *Rhagoletis* fruit fly species. Annual Meeting of the Entomological Society of America. Minneapolis, MN. Nov. 2015.Doellman MM, Egan SP, **Hood GR**, Powell THQ, Ragland G, Smith JJ, Feder JL. Characterizing the genomic architecture of divergence along the speciation continuum in the *Rhagoletis pomonella* species complex. Annual Meeting of the Entomological Society of America. Minneapolis, MN. Nov. 2015. Schuler H, Doellman MM, Lopez JA, **Hood GR**, Egan SP, Feder JL. Target enriched double digest RADseq: a novel approach for the high-resolution characterization of the endosymbiont *Wolbachia*. Ecological Genomics Symposium. Manhattan, KS. Nov. 2015.  |
| Egan SP, **Hood GR**, Feder JL. Ecological divergence promotes reproductive isolation across the genus *Rhagoletis*. Annual Meeting of the Society for the Study of Evolution. Sao Paulo, Brazil. June 2015.  |

Dickson, M\*, **Hood GR,** Doellman MM, Egan SP, Liu W\*, Dymek R\*, Messina F, Feder JL. The Evolution of Sexual Isolation in the Seed Beetle *Callosobruchus maculatus* (Coleoptera: Chrysomelidae). Midwestern Ecology and Evolution Conference. Bloomington, IN. March 2015.

Doellman MM, Meyers PJ, Egan SP, Ragland G, **Hood GR**, Feder JL. Genomic interplay of eclosion timing and latitudinal variation on host race differences in *Rhagoletis pomonella*. Midwestern Ecology and Evolution Conference. Bloomington, IN. March 2015.

**GRANTS, FELLOWSHIPS AND AWARDS**

***In Review***

**Hood GR**, Black S, O’Leary BF, Shaible, TM. (2023) Food equity in Detroit, Michigan: exposure of crops grown at urban gardens to anthropogenic volatile compounds (VOCs). **United Health Care’s Health Equity Challenge.** ($50,000)

**National Science Foundation (NSF) DEB (Evolutionary Processes), Submitted 01/30/2024.** Forbes AA, Prior **KM**, Hood GR. (2022) Collaborative Research: How do gall-forming insects escape diverse and evolving clades of parasitic wasps–and how do parasites catch up? 4-year collaborative proposal with University of Iowa and Wayne State University. Total requested budget: ~$1.6M, Wayne State University budget: $310,874.

**National Science Foundation (NSF) DEB (Evolutionary Processes), Submitted 12/10/2023**. Lackey ACR, **Hood GR**, Powell THQ. Collaborative Research: Sexual isolation in the wake of ecological adaptation and speciation: how multifaceted reproductive isolation evolves early in divergence. 4-year collaborative proposal with University of Louisville and Wayne State University. Total requested budget: ~$1.93M, Wayne State University budget: $563,532.

**National Science Foundation (NSF) NRT Research Traineeship Program (NRT), Submitted 08/28/2023.** Kashian DR, Seeger MW, Shuster W, Huang YM, Tangari AH, **Hood GR**, Huang Y, Lu Zhijiang, Watkins RR. Climate hazards and resilience management (CHARM). 5-year graduate student training grant. Total requested budget: $3.0M.

***Funded***

**Hood GR**, Black S, O’Leary BF, Shaible, TM. (2023) Food equity in Detroit, Michigan: exposure of crops grown at urban gardens to anthropogenic volatile compounds (VOCs). **United Health Care’s Health Equity Challenge.** ($5,000)

*\*Invited to submit a full proposal with a budget of $50,000*

**Hood GR,** Shuster W. (2023) Determining the suitability of vacant lots for urban agriculture to decrease food scarcity in blighted areas. **Barber Interdisciplinary Research Program, Wayne State University**. ($19,262)

**National Institute of Health (NIH) | National Institute of Environmental Health and Safety (NIEHS) SRP, Funded 04/10/2022**: Center for Leadership in Environmental Awareness & Research | Core Project E1: Building Aboveground Strategies to Identify and Address Belowground Hot Spots for VOC Vapor Intrusion in Complex Urban Settings. $13,175,442 ($1,798,130 to Project E1/BIO) 2022 – 2027.  PI **Hood GR** Core Project E1 with Co-PI Sperone and overall SRP PIs C Miller and M Runge-Morris. National Institute of Health–NIEHS Superfund Research Program

**Hood GR**, Burdick S. (2022) Modeling the origin of species: how does climate change facilitate the evolution of new agricultural pests? **Barber Interdisciplinary Research Program, Wayne State University.** ($27,500)

**Hood GR**. (2022) Enhancing mitigation of European Cherry Fruit Fly through endosymbionts. **United States Department of Agriculture Plant Protection Act**. ($76,156)

**Hood GR,** Barr N.(2020)Identification resources for the European Cherry Fruit Fly-Year 2, *Rhagoletis cerasi*. **United States Department of Agriculture Plant Protection Act**. ($108,908)

Kelly M, O’Grady P, **Hood GR**, Dambroskie J. (2020) Development of management tactics in support of regulatory efforts to limit the establishment and spread of ECFF in New York. **United States Department of Agriculture Plant Protection Act**. ($192,310) *\*Due to the effects of the Covid-19 pandemic, I was dropped as a participant from the project.*

**Hood GR.** (2020) Integrating DNA diagnostics and population genomics to benefit human health: a test case using the causative agent of Chagas Disease (Trypanosoma cruzi) and its insect vectors (Triatominae). **Collaborative Institutional Training Initiative (CITI) in Indiana**. ($9,980)

*\*\*Credit to use University of Notre Dame’s Genomic Core Facility at in-house faculty pricing*

Papuga S, **Hood GR**. (2020) Assessing viability of detecting spread of a belowground contaminant plume using aboveground plant material. **Pilot Funding from Wayne State University’s Center for Leadership in Environmental Awareness and Research (CLEAR)**. ($50,000)

**Hood GR,** Barr N.(2019)Identification resources for the European Cherry Fruit Fly-Year 1, *Rhagoletis cerasi*. **United States Department of Agriculture Plant Protection Act**. ($71,312)

**Hood GR,** Papuga S. Insect galls as bioindicators to detect carcinogens and their movement in the environment. (2019) **Barber Interdisciplinary Research Program, Wayne State University**. ($25,000).

***Resubmitting***

**Hood GR**, Egan SP, Ott JR, Forbes AA. Collaborative Research: Testing co-diversification in a hyperdiverse tri-trophic community across the speciation continuum: do population level processes predict continental-scale patterns? National Science Foundation (NSF) DEB Evolutionary Processes.

***Previously Funded***

**Hood, GR.** Academy of Fellows Postdoctoral Fellowship, Rice University. Integrating DNA Diagnostics and Population Genomics to Benefit Human Health. 2016. ($190,000).

**Hood, GR.** National Science Foundation Post-doctoral Research Fellowship in Biology. Testing for sequential speciation in species-rich tri-trophic communities. 2015. ***Not funded but received* *high meritorious status***.

Condon M, Ottens K, **Hood GR.** How can prey kill predators. 2014. Successful crowd sourced funding project through www.experiment.com. ($3,991).

Feder JL (PI), **Hood GR (co-PI).** Catching sequential speciation in the act. 2013. National Science Foundation Doctoral Dissertation Improvement Grant (NSF DDIG). ($19,760).

Feder JL (PI), Egan SP (co-PI), McLachlan J (co-PI), Linn Jr C (co-PI). Forbes AA (co-PI). Does sequential speciation amplify biodiversity across trophic levels? 2012-2014. Collaborative Research-National Science Foundation-Evolutionary Processes. ($1.1 million) ***Not allowed to co-author but contributed substantially****.*

Feder JL. Notre Dame Faculty Research Support Program Grant. 2010. Does diversity beget diversity? Sequential speciation in a tritropic community. ($10,000) ***Not allowed to co-author but wrote the majority of the grant.***

**Hood GR.** Indiana Academy of Science. 2010. Does sequential speciation amplify biodiversity?: Testing for cascading host race formation across a guild of sympatric insect parasites. ($2950).

**Hood GR.** Sigma Xi Grant in Aid of Research. 2010. Cascading host race formation across a guild of sympatric parasitoid wasps.($1290).

**Hood GR.** Entomological Society of America Systematics and Evolutionary Biology Grant. 2010. Investigating sequential speciation in *Rhagoletis-*attacking parasitoids at the local, regional and continental scale. ($1700).

**Hood GR.** American Museum of Natural History Theodore Roosevelt Memorial Grant. 2007. 2008. The brood with an attitude: Is allochrony occurring in a specialized insect herbivore*?* ($1500).

**Hood GR.** Freeman Ranch Advisory Board Grant. 2007. Variation in oviposition timing, susceptibility to natural enemies, and population divergence in a specialized insect herbivore. ($250).

**Hood GR.** Francis Rose Undergraduate Award for Excellence in Biological Research Grant, Texas State University. 2006. Ecological genetic evidence of allochronic speciation in a specialized insect herbivore. ($600).

***Fellowships***

Notre Dame Center for Environmental Science and Technology (CEST)/Bayer Fellowship. Spring 2016. Assessing the spread of insect pests: the roles of hybridization, desiccation resistance and cuticular hydrocarbons in the apple maggot fly. ($11,500).

Notre Dame Center for Environmental Science and Technology (CEST)/Bayer Fellowship. Fall 2013. The evolution of reproductive isolation and speciation in *Rhagoletis*: determining the role of cuticular hydrocarbon divergence. ($11,200).

National Science Foundation Graduate Education and Research Traineeship (NSF-IGERT) Fellow in the GLOBES program. Fall 2011. ($11,200).

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| **Awards/Honors** |  |
| Notre Dame Graduate Student Union Scholarship ($250) | 2014 |
| Notre Dame Graduate College Professional Development Award ($1200) | 2013 |
| Summer Institute in Statistical Genetics Scholarship ($1,275)  | 2013 |
| University of Notre Dame Graduate Student Organization Travel Grant ($250) | 2010 |
| Southwestern Association of Naturalists Travel Grant ($350) | 2009 |
| Tri Beta Biological Honors Society | 2009 |
| Texas State University Biology Department Travel Grant. ($100) | 2009 |
| Texas State University Biology Department Travel Grant. ($400) | 2009 |
| Texas State University Biology Department Travel Grant. ($175) | 2009 |
| Texas State University Biology Department Travel Grant. ($375) | 2008 |
| Texas State University Biology Department Travel Grant. ($375) | 2008 |
| Texas State University Biology Department Travel Grant. ($125) | 2008 |
| Phi Eta Sigma National Honor Society | 2001–2009 |
| Outstanding Academic Achievement | 2008 |
| Texas State Associated Student Government Scholarship ($2000) | 2008–2009 |
| Dean’s List | 2001–2003 |

**TEACHING EXPERIENCE AND MENTORSHIP**

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| **Wayne State University**Technical Communication in Molecular Biotechnology (BIO 6994)Ecology (BIO 4130)Biogeography (BIO 4420)Basic Life Diversity (BIO 1500) General Entomology (BIO 5740/7740)Graduate Seminar in Biology**Teaching Assistant** | Winter 2019Winter 2020–2024Fall 2020Fall 2021Fall 2022Fall 2023 |
| *University of Notre Dame*  |  |
| Biological Statistics | 2010–2011 |
| Ecology | 2009 |
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| **Teaching Assistant** | 2006–2009 |
| *Texas State University* |  |
| Population Biology I (emphasis in molecular techniques) | 2008 |
| Population Biology II (emphasis in ecological techniques) | 2008 |
| Earth Science | 2007–2009 |
| Organismal Biology | 2007–2009 |
| Modern Biology | 2006–2009 |
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| **Teaching Areas of Interest**: Organismal Biology, Evolution, Ecology, Population Biology, Behavioral Ecology, Genetics, Insect Physiology, Entomology, Plant–Insect Interactions |
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| **Undergraduate Students Mentored** |  |
| Brett Hauser (Fall 2009–Spring 2010) | Cong Xu (Fall 2011–Spring 2014) |
| Cailee Smith (Summer 2010) | Wenxin Liu (Fall 2011–Spring 2015) |
| Mason Murphy (Fall 2010–Spring 2013) | Lauren Schmitt (Fall 2011–Spring 2014) |
| Alice Harada (Fall 2010–Spring 2012) | Meg Dickson (Spring 2011–Spring 2015) |
| Devin Blankenship (Spring 2011–Summer 2012) | Ryan Davila (Fall 2012–Spring 2014) |
| Gabe DeVela (Spring 2011–Spring 2013) | Ryanne Dymek (Fall 2014–Summer 2016) |
| Rebecca Bullis (Summer 2012) | Amanda Weaver (Fall 2016­–Spring 2018) |
| Elaine Hu (Fall 2016-Spring 2018) | Shih An Shzu (Spring 2017-Spring 2018) |
| Ali Husseini (Winter 2019-Winter 2021) | Suman Raghavan (Winter 2019-Winter 2020) |
| Peter Tavalieri (Summer 2019) | Audrey Cook (Summer 2019-Winter 2020) |
| Catherine Vandenbrink (Summer 2019) | Todd Honeycut (Summer 2019) |
| Kevin Selegean (Summer 2019-Present) | Connor Socrates (Summer 2019-Winter 2021) |
| Kennadi Rankin (Summer 2019-Fall 2019) | Emily Smith (Fall 2019-Winter 2021) |
| Olivia Decker (Fall 2019-Summer 2021) | Elsa Fuerst (Fall 2020-Fall 2021) |
| Loveleen Banga (Winter 2020-Summer 2021) | Sebina Ali (Fall 2021-Fall 2022) |
| Katherine Millican (Fall 2021-Winter 2022) | Madeline Sigler (Winter 2022-Winter 2023) |
| Hajir Alobaidi (Winter 2022-Winter 2023) | Brendan Horner (Winter 2023-Present) |
| Ian McNulty (Summer 2022-Fall 2022) | Julie Nitz (Winter 2023-Present) |
| Olivia Muench (Winter 2023) | Gwendolyn Drake (Winter 2023-Present) |
| Ryan Pauli (Winter 2023-Present) | Grace Szewc (Winter 2023-Fall 2023) |
| Matthew Terryn (Winter 2023-Present) | Kyla Keyes (Winter 2023-Fall 2023) |
| Gwendolyn Schmidt (Winter 2023-Present) | Mariah Smith (Winter 2023-Present) |
| Brianna Quallich (Winter 2023-Present) | Nicole Bailie (Winer 2023-Present) |
| Abigail O’Connor (Winter 2023-Present) | Sage Percival (Fall 2023-Present) |
| Jonathon Meyer (Fall 2023-Present) | Luisa Saito (Fall 2023-Present) |
| Joline Che (Fall 2023-Present) | Ryan Pauli (Winter 2023-Present) |
| Shea Lucus (Fall 2-23-Present) |  |
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| **Graduate Students Mentored** | **Graduate Committee Member** |
| Michael Sergeant (PhD; Fall 2018–Present) | Zoha Siddiqua (Fall 2019-Winter 2022) |
| Sarah Black (PhD; Fall 2021–Present) | Hector Esparra-Escalara (Fall 2018-Present) |
| Tierney Shaible (PhD; Fall 2022-Present) | Brenna Friday (Fall 2019-Present) |
| Bailey Gorden (MSc ESG; Fall 2023-Present) | Hilary Emenheiser (Fall 2021-Present) |
| Elizabeth Wiese (MA ESG; Fall 2023-Present) | Jedidiah Jacobson (Fall 2021-Present) |
|  | Brendan O’Leary (Fall 2022-Present) |
| **Post-doctoral Fellows** | Rayann Mirza (Fall 2022-Present) |
| Dr. Brendan O’Leary (Winter 2023-Present) | Akinbami Oladokun (Winter 2022-Present) |
| Dr. Lekshmy (Winter 2024-Present) | Booker Ruud (Winter 2022-Present) |
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| **Research Technician** |  |
| Grace Szewc (Winter 2024-Present) |  |
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**PROFESSIONAL SERVICE AND MEMBERSHIP**

**Professional Affiliations**

* Ecological Society of America (2007–Present)
* Entomological Society of America (2008–Present)
* Society for the Study of Evolution (2009–Present)
* Sigma Xi (2010–Present)
* American Association of the Advancement of Science (2015–Present)

**External Scholarly Activities**

* Judge for poster presentations, 9th Annual Graduate and Postdoctoral Research Symposium, Wayne State University. Detroit, MI, 2019-Present.
* Co-organizer of Symposium at Entomological Society’s Annual Meeting. Genomics of Adaptation: Linking the Next Generation of Genome-Wide Analysis to Understand and Manage Complex Traits. Boulder, CO, 2017.
* Undergraduate Diversity Mentor at the Society of the Study of Evolution’s annual meeting in Portland, OR, 2017.
* Chair session at annual Biosciences at Rice Gulf Coast Undergraduate Research Symposium. Houston, TX, 2016.
* Contributor to the Reviews in Cell Biology and Molecular Medicine (2016).
* Recurring invited seminar (multiple sections each semester) to speak to students at Evergreen High school in Vancouver, WA about graduate school, research and being a career scientist.
* Co-organizer of the Midwestern Ecology and Evolution Society (MEEC). Notre Dame, IN, 2013.
* Co-organizer of Symposium at Entomological Society’s Annual Meeting. Guy Bush and Santa Rosalia: Speciation with gene flow and the extraordinary diversity of insects. Austin, TX, 2013.
* Contributor to the Encyclopedia of Evolutionary Biology (Co-evolution and Speciation sections).

**Reviewer for the Following Journals:** BMC Evolutionary Biology (1),Biological Journal of the Linnean Society (1), Ecological Entomology (3), Ecology and Evolution (1), Ecology Letters (3), Economic Entomology (5), Evolutionary Applications (1), Evolution Letters (1), Flora (1), The Great Lakes Entomologist (1), Journal of Animal Ecology (1), Journal of Pest Science (1), Molecular Ecology (6), Oecologia (2), Pan-Pacific Entomologist (2), PLoS One (1), Proceedings of the Entomological Society of Washington (1), Proceedings of the Royal Society B (1), Trends in Ecology and Evolution (1), U.S. Department of Agriculture Internal Review (9).

**WORK EXPERIENCE**

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| **Development of Field-based DNA Detection Technology**  | 2012–Present |
| *Collaboration with Engineers at the University of Notre Dame* |  |
| Project: Integrating farm-based DNA diagnostics and population genomics to thwart pest invasion |
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| **Tropical Research Experience**  | February–March 2015 |
| *Brownsberg National Park, Paramaribo* | *Suriname, South America* |
| Project: Niche diversity in tropical insect communities |
| Advisor: Martha Condon |  |
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| **Workshop** | July 2013 |
| *Summer Institute in Statistical Genetics* | *University of Washington, Seattle, WA* |
| Modules: MCMC for Genetics, Elements of *R* for Genetics and Bioinformatics, Animal Genetic Data Analysis |
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| **Internship** | Summer 2005 |
| *Herman Park Conservancy/Exxon-Mobile* | *Houston, TX* |
| Project: Using GIS to map citywide diversity of trees for use in conservation, planning, and management decisions. |