

Rachael Winfree

Rutgers University
Department of Ecology, Evolution and Natural Resources
14 College Farm Rd | New Brunswick, NJ 08901 USA
orcid.org/0000-0002-1271-2676
rwinfree.rutgers@gmail.com
winfreelab.com

POSITIONS

Rutgers University

Professor, Ecology, Evolution and Natural Resources (2017-present)
Associate Professor, Ecology, Evolution and Natural Resources (2013-2017)
Assistant Professor, Entomology (2008-2012)

University of California, Berkeley

Postdoctoral Associate, Environmental Science, Policy & Management (2006-2008)
Advisor: Claire Kremen

Princeton University

Postdoctoral Associate, Ecology and Evolutionary Biology, Princeton University (2004-2005)
Advisor: Claire Kremen
Postdoctoral Fellow, Ecology and Evolutionary Biology, Princeton University (2001-2004)

EDUCATION

Princeton University

PhD, Ecology and Evolutionary Biology, 2001
Advisor: Andrew P. Dobson

Dartmouth College

BA, Government, 1990

PUBLICATIONS

Publication impact [Google Scholar](https://scholar.google.com/citations?user=...) (citations 10,000, h index 35)
Highly Cited Scientist (top 1% worldwide) in ecology/environment (clarivate.com/hcr/)
* indicates work done while author was a lab undergraduate, graduate student, or postdoc

55 *T Harrison, J Gibbs, and **R Winfree**. In press 2018. Phylogenetic homogenization of bee communities across ecoregions. *Global Ecology and Biogeography*

54 **R Winfree**, *J R Reilly, *I Bartomeus, N M Williams, *D Cariveau, and J Gibbs. 2018. Species turnover promotes the importance of bee diversity for crop pollination at regional scales.

Science 359: 791-793 doi: 10.1126/science.aao2117 Featured in a *Science Perspective*,
Science 359: 741-742

- 53 *T Harrison, J Gibbs, and **R Winfree**. 2017. Anthropogenic landscapes support fewer rare bee species. *Landscape Ecology* 24: 287-296
- 52 *T Harrison, J Gibbs, and **R Winfree**. 2017. Forest bees are replaced in agricultural and urban landscapes by native species with different phenologies and life history traits. *Global Change Biology* 24: 287-296 doi: 10.1111/gcb.13921
- 51 Bartomeus, I, *D Cariveau, *T Harrison, **R Winfree**. 2017. On the inconsistency of pollinator species traits for predicting either response to land-use change or functional contribution. *Oikos* 127: 306-315 doi 10.1111/oik.04507
- 50 *Genung, M, J Fox, N Williams, C Kremen, J Ascher, J Gibbs, and **R Winfree**. 2017. Pollinator abundance, rather than species richness, drives the temporal variability of pollination services. *Ecology* 98:1807-1816
- 49 Lichtenberg, E M and 63 others including **R Winfree** and *F Benjamin. 2017. A global synthesis of the effects of diversified farming systems on arthropod diversity within fields and across agricultural landscapes. *Global Change Biology* 23: 4946-4957 doi: 10.1111/gcb.13714
- 48 *Griffin, S R, *B Bruninga-Socolar, M A Kerr, J Gibbs, and **R Winfree**. 2017. Wild bee community change over a 26-year chronosequence of restored tallgrass prairie. *Restoration Ecology* 25:650-660
- 47 *MacLeod, M, *Genung, M (co-first author), and **R Winfree**. 2016. Measuring partner choice in plant-pollinator networks: Using null models to separate rewiring and fidelity from chance. *Ecology* 97:2925-2931
- 46 *Cariveau, D *G Nayak, *I Bartomeus, *J Zientek, J Ascher, J Gibbs, and **R Winfree**. 2016. The allometry of bee proboscis length and its uses in ecology. *PLoS ONE* 11:3 e0151482
- 45 *Bruninga-Socolar, B, E Crone, and **R Winfree**. 2016. The role of floral density in determining bee foraging behavior: a natural experiment. *Natural Areas Journal* 36: 392-399
- 44 Rader, R, I Bartomeus, L Garibaldi, M Garratt, B Howlett, **R Winfree**, and 46 other authors including *S Griffin. 2016. Non-bee insects are important contributors to global crop pollination. *PNAS* 113:146-151 Featured in *Nature* as a Research Highlight, *ISI Highly Cited Paper*

- 43 Kleijn, D, **Winfree, R**, and 56 other authors including *F Benjamin, *D Cariveau, *I Bartomeus. 2015. Delivery of crop pollination services is an insufficient argument for wild pollinator conservation. *Nature Communications* 6:7414 DOI: 10.1038/ncomms8414 *F1000 recommendation* Featured in *The Guardian* (UK), *The Independent* (UK), *Wired*, *LA Times*, *Washington Post*, *Conservation* magazine; *ISI Highly Cited Paper*
- 42 *Cariveau, D, and **R Winfree**. 2015. Causes of variation in wild bee responses to anthropogenic drivers. *Current Opinion in Insect Science* 10: 104-109.
- 41 *Harrison, T, and **R Winfree**. 2015. Urban drivers of plant-pollinator interactions. *Functional Ecology* 29: 879-888.
- 40 **Winfree, R**, J Fox, N Williams, *J Reilly, and *D Cariveau. 2015. Abundance of common species, not species richness, drives delivery of a real-world ecosystem service. *Ecology Letters* 18: 626-635. *Featured in Nature as a Research Highlight, ISI Highly Cited Paper*
- 39 *Benjamin, F and **R Winfree**. 2014. Lack of pollinators limits fruit production in commercial blueberry (*Vaccinium corymbosum*). *Environmental Entomology* 43: 1574-1583
- 38 Garibaldi, L A, L G Carvalheiro, S D Leonhardt, M A Aizen, B R Blaauw, R Isaacs, M Kuhlmann, D Kleijn, A M Klein, C Kremen, L Morandin, J Scheper, and **R Winfree**. 2014. From research to action: practices to enhance crop yield through wild pollinators. *Frontiers in Ecology and the Environment* 12: 439-447 *Cover article, ISI Highly Cited Paper*
- 37 **Winfree, R**, J Dushoff, N Williams, and C Kremen. 2014. Species abundance, not diet breadth, drives the persistence of the most linked pollinators as plant-pollinator networks disassemble. *American Naturalist* 183: 600-611
- 36 *Cariveau, D P, J E Powell, H Koche, **R Winfree**, and N A Moran. 2014. Variation in gut microbial communities and its association with pathogen infection in wild bumble bees (*Bombus*). *ISME Journal* 8: 2369-2379
- 35 *Benjamin, F, *J Reilly and **R Winfree**. 2014. Pollinator body size mediates the scale at which land use drives crop pollination services. *Journal of Applied Ecology* 51: 440-449
- 34 Garibaldi, L, I Steffan-Dewenter, **R Winfree**, and 44 other authors including *I Bartomeus, *D Cariveau, and *F Benjamin. 2013. Wild pollinators enhance fruit set of crops regardless of honey bee abundance. *Science* 339: 1608-1611 *Covered by National Public Radio (NPR) program 'The Salt'* *ISI Highly Cited Paper*
- 33 *Bartomeus, I, J Ascher, J Gibbs, B Danforth, D Wagner, S Hedtke, and **R Winfree**. 2013. Lack of a general decline among northeastern US bee pollinators over a century of global change.

PNAS 110(12): 4656-4660 *Cover article* Covered by National Public Radio (NPR) program 'Science Friday' ISI Highly Cited Paper

- 32 *Cariveau, D, NM Williams, *F Benjamin, and **R Winfree**. 2013. Response diversity to land use occurs but does not consistently stabilize ecosystem services provided by native pollinators. *Ecology Letters* 16: 903-911 *Cover article* Interview with National Public Radio (NPR) station WHYY Philadelphia
- 31 *Bartomeus, I, M Park, J Gibbs, B Danforth, A Lasko, and **R Winfree**. 2013. Biodiversity ensures plant-pollinator phenological asynchrony against climate change. *Ecology Letters* 16:1331-1338 *Cover article*
- 30 **Winfree, R**. 2013. Invited View: Global environmental change, biodiversity, and ecosystem services: what can we learn from studies of pollination? *Basic and Applied Ecology* 14: 453-460
- 29 *Rader, R, *J Reilly, *I Bartomeus and **R Winfree**. 2013. Native bees buffer the negative impact of climate warming on honey bee pollination of watermelon crops. *Global Change Biology* 19: 3103-3110
- 28 Kennedy, C., E Lonsdorf, M C Neel, N M Williams, T H Ricketts, **R Winfree**, and 22 other authors including *D Cariveau. 2013. A global quantitative synthesis of local and landscape effects on native bee pollinators in heterogeneous agricultural systems. *Ecology Letters* 16: 584-599 *ISI Highly Cited Paper*
- 27 Williams, N M and **R Winfree**. 2013. Local habitat characteristics but not landscape urbanization drive pollinator visitation and native plant pollination in forest remnants. *Biological Conservation* 160: 10-18
- 26 Mandelik, Y, **R Winfree**, T Neeson and C Kremen. 2012. Complementary habitat use by wild bees in agro-natural landscapes. *Ecological Applications* 22: 1535-1546
- 25 *Bartomeus, I, J Ascher, S Colla, D Wagner, B Danforth, S Kornbluth, and **R Winfree**. 2011. Climate-associated phenological advances in bee pollinators and bee-pollinated plants. *PNAS* 108: 20645-20649
- 24 **Winfree, R**, *I Bartomeus, and *D Cariveau. 2011. Native pollinators in anthropogenic habitats. *Annual Review of Ecology, Evolution and Systematics* 42: 1-22
- 23 **Winfree, R**, B Gross (co-first author) and C Kremen. 2011. Valuing pollination services to agriculture. *Ecological Economics* 71: 80-88
- 22 Garibaldi, L, I Steffan-Dewenter, C Kremen, J Morales, R Bommarco, S Cunningham, L Carvalheiro, N Chacoff, J Dudenhöffer, S Greenleaf, A Holzschuh, R Isaacs, K Krewenka, Y

- Mandelik, M Mayfield, L Morandin, S Potts, T Ricketts, H Szentgyörgyi, C Westphal, **R Winfree**, A Klein. 2011. Stability of pollination services decreases with isolation from natural areas despite frequent honey bee visits. *Ecology Letters* 14: 1062-1072 *ISI Highly Cited Paper*
- 21 *Bartomeus, I and **R Winfree**. 2011. The Circe principle: Are pollinators waylaid by attractive habitats? *Current Biology* 21: R652-R654
- 20 Ollerton, J, **R Winfree**, and S Tarrant. 2011. How many flowering plants are pollinated by animals? *Oikos* 120: 321-326 *ISI Highly Cited Paper*
- 19 Williams, NM, *D Cariveau, **R Winfree**, and C Kremen. 2011. Bees in disturbed habitats use, but do not prefer, alien plants. *Basic and Applied Ecology* 12: 332-341
- 18 Menz, M, RD Phillips, **R Winfree**, C Kremen, MA Aizen, SD Johnson, and KW Dixon. 2011. Reconnecting plants and pollinators: challenges in the ecological restoration of pollination mutualisms. *Trends in Plant Science* 16: 4-12 *Cover article F1000 recommendation ISI Highly Cited Paper*
- 17 *Fiorella, KA, A Cameron, W Sechrest, **R Winfree**, and C Kremen. 2010. Methodological considerations in reserve system selection: a case study of Malagasy lemurs. *Biological Conservation* 143: 963-973
- 16 **Winfree, R**. The conservation and restoration of wild bees. 2010. Pages 169-197 in R Ostfeld and W Schlesinger, eds, *The Year in Ecology and Conservation Biology*. The New York Academy of Sciences: New York
- 15 **Winfree, R**, R Aguilar, DP Vázquez, G LeBuhn, and MA Aizen. 2009. A meta-analysis of bees' responses to anthropogenic disturbance. *Ecology* 90: 2068-2076 *Cover article ISI Highly Cited Paper*
- 14 **Winfree, R** and C Kremen. 2009. Are ecosystem services stabilized by differences among species? A test using crop pollination. *Proceedings of the Royal Society of London* 276: 229-237 *F1000 recommendation*
- 13 Lonsdorf, E, C Kremen, TH Ricketts, **R Winfree**, S Greenleaf, and NM Williams. 2009. Modeling pollination services across agricultural landscapes. *Annals of Botany* 103: 1589-1600
- 12 **Winfree, R**. 2008. Pollinator-dependent crops: An increasingly risky business. *Current Biology* 18: R968-R969

- 11 **Winfree, R**, NM Williams, H Gaines, J Ascher, and C Kremen. 2008. Wild bee pollinators provide majority of crop visitation across land use gradients in New Jersey and Pennsylvania, USA. *Journal of Applied Ecology* 45: 793-802
- 10 **Winfree, R**, NM Williams, J Dushoff, and C Kremen. 2007. Native bees provide insurance against ongoing honey bee losses. *Ecology Letters* 10: 1105-1113
- 9 Greenleaf, S, NM Williams, **R Winfree** and C Kremen. 2007. Bee foraging ranges and their relationship to body size. *Oecologia* 153: 589-596 *ISI Highly Cited Paper*
- 8 **Winfree, R**, T Griswold and C Kremen. 2007. Effect of human disturbance on bee communities in a forested ecosystem. *Conservation Biology* 21: 213-223
- 7 Kremen, C, NM Williams, MA Aizen, B Gemmill-Herren, G LeBuhn, R Minckley, L Packer, SG Potts, T Roulston, I Steffan-Dewenter, D Vazquez, **R Winfree**, L Adams, E E Crone, S Greenleaf, TH Keitt, AM Klein, J Regetz, TH Ricketts. 2007. Pollination and other ecosystem services produced by mobile organisms: a conceptual framework for the effects of land-use change. *Ecology Letters* 10: 299-314 *Cover article ISI Highly Cited Paper*
- 6 **Winfree, R**, SK Robinson, D Bengali and J Dushoff. 2006. A Monte Carlo model for estimating the reproduction of a generalist brood parasite across multiple host species. *Evolutionary Ecology Research* 8: 213-236
- 5 Dobson, AP, D Lodge, J Alder, G Cumming, J Keymer, J McGlade, H Mooney, JA Rusak, O Sala, V Wolters, D Wall, **R Winfree**, and M Xenopoulos. 2006. Habitat loss, trophic collapse, and the decline of ecosystem services. *Ecology* 87: 1915-1924
- 4 **Winfree, R**, J Dushoff, EE Crone, C Schultz, R Budny, NM Williams and C Kremen. 2005. Testing simple indices of habitat proximity. *American Naturalist* 165: 707-717
- 3 Chace, J, C Farmer, **R Winfree**, D Curson, W Jensen, C Goguen, and SK Robinson. 2005. Cowbird (*Molothrus*) ecology: a review of factors influencing distribution and abundance of cowbirds across spatial scales. *Ornithological Monographs* 57: 45-70
- 2 **Winfree, R**. 2004. High offspring survival of the brown-headed cowbird in an invaded habitat. *Animal Conservation* 7: 445-453
- 1 **Winfree, R**. 1999. Cuckoos, cowbirds and the persistence of brood parasitism. *Trends in Ecology and Evolution* 14: 338-343 *Cover article*

Book chapters and reviews

Winfree, R. 2018. To be a bee. *Science* 361: 137. Review of *Buzz* by Thor Hanson. [10.1126/science.aat9250](https://doi.org/10.1126/science.aat9250)

Winfree, R. In press 2018. How does biodiversity relate to ecosystem functioning in real-world systems? R Holt, D Tilman and A Dobson, eds, *What Are The Unsolved Problems in Ecology?* Princeton University Press

Winfree, R, *M MacLeod, *T Harrison, and *D Cariveau. 2015. Conserving and restoring mutualisms. Pages 265-286 in Bronstein, J, ed, *Mutualism*. Oxford University Press

Lonsdorf, E, TH Ricketts, C Kremen, **R Winfree**, S Greenleaf, and NM Williams. 2011. Crop pollination services. Pages 168-187 in P Kareiva et al., eds, *Natural Capital: Theory & Practice of Mapping Ecosystem Services*. Oxford University Press

EDITORSHIPS, FELLOWSHIPS, AWARDS

Highly Cited Scientist in ecology/environment (clarivate.com/hcr/), 2015-present

Associate editor, *Global Ecology and Biogeography* (2016-present)

Advisory Board, Bee Better pollinator-friendly product certification (2016-present)

Board of Directors, Xerces Society for Invertebrate Conservation (2015-present)

Rutgers University Board of Governors Research Award for Scholarly Excellence (2013)

Subject editor, *Ecological Applications* (2012-2015)

Board of scientific advisors, The Xerces Society for Invertebrate Conservation (2012-2015)

Faculty member, Faculty of 1000 (2011-2015)

Postdoctoral Fellowship, Princeton University Council on Science and Technology (2001-2004)

National Science Foundation Graduate Research Fellowship (1995-1998)

GRANTS

National Science Foundation, Population and Community Ecology (DEB #). SG: Synthetic analysis of the importance of species richness to ecosystem services in natural systems. PI: *M Genung, Co-PI: R Winfree. Rutgers amount \$150,000, 2018-2020

National Park Service. Forest bee-plant network assessment in Great Lakes National Parks. PI: R Winfree. Rutgers amount \$98,992, 2017-2020

National Science Foundation, Population and Community Ecology (DEB 1556629). The role of species dominance in mediating biodiversity-ecosystem function relationships across spatial scales. PI: R Winfree, Co-PI: N Williams. Rutgers amount \$445,386 including two REU and one CLB supplements, 2016-2019

United States Fish and Wildlife Service. Comprehensively evaluating New Jersey's bee pollinators for the State Wildlife Action Plan. PIs: D Jenkins, T Harrison, R Winfree. Rutgers amount \$75,000, 2015-2017

United States Department of Agriculture NIFA SCRI. Developing sustainable pollination strategies for US specialty crops. PI: R Isaacs, Lead senior investigator: R Winfree. Rutgers amount \$187,186, 2012-2017

United States Department of Agriculture, Federal Conservation Innovation Grant. Next steps in pollinator conservation: operations and maintenance, organic habitat restoration, seed mix choices, and assessing conservation effectiveness. PI: M Vaughn, Co-PI: R Winfree and multiple others. Rutgers amount \$175,402, 2012-2016

National Science Foundation, Dimensions of Biodiversity (DEB 1046153). Dimensions: Genomics, functional roles, and diversity of the symbiotic gut microbiotae of honey bees and bumble bees. PI: N Moran, Lead senior investigator: R Winfree. Rutgers amount \$97,528, 2011-2013

United States Department of Agriculture, Federal Conservation Innovation Grant. Development and validation of protocols for assessing functioning of pollinator plantings for agricultural settings. PI: NM Williams, Co-PIs R Winfree, R Isaacs. Rutgers amount \$87,468, 2010-2013

United States Department of Agriculture, NIFA AFRI. Strategies for promoting reliable crop pollination by native bees. PI: R Winfree, Co-PI: NM Williams. Rutgers amount \$400,000, 2009-2013

National Science Foundation, Population and Community Ecology (DEB 0554790). Community disassembly and ecosystem function: pollination services across agro-natural landscapes. \$427,810, PIs: C Kremen and NM Williams, Co-PI: R Winfree 2005-2008

INVITED TALKS AND WORKSHOPS

Fields Institute, Canada, Emerging challenges in mathematical biology workshop (Feb 2018)
Freiburg Institute for Advanced Studies, Germany, Workshop on temporal networks (Nov 2017)
Ecological Society of America, Symposium on dominant species and function (Aug 2017)
University of Zurich, Müller seminar (May 2017)
Connecticut College, Frederick Henry Sykes Memorial Lecture (Feb 2017)
University of Georgia, Institute for Ecology (Nov 2016)
Princeton University, Department of Ecology & Evolutionary Biology (Oct 2016)
Columbia University, Department of Ecology, Evolution and Environmental Biology (Oct 2016)
Keynote speaker, International Conference on Pollinator Biology, Health, and Policy (Jul 2016)
University of Idaho / Washington State University joint seminar (May 2014)
University of Pittsburgh, Department of Biology (Apr 2014)
Harvard Forest, Harvard University (Oct 2013)
Dartmouth College, Department of Biology (Sep 2013)
University of Michigan, Department of Ecology & Evolutionary Biology (Dec 2012)
Ecological Society of America, Pollination in a changing world, session organizer (Aug 2012)
Status and Trends in European Pollinators, Netherlands, working group member (Feb 2012)

Entomological Society of America, Biodiversity and ecosystem services, session organizer (2011)
International Union for the Conservation of Nature, Bumble bee conservation workshop (2010)
Cornell University, Department of Entomology, Jugatae Seminar (2009)
Princeton University, Woodrow Wilson School of Public Policy (2008)
University of California Davis, Department of Entomology (2008)
University of Wisconsin, Department of Geography (2007)
NCEAS working group, Restoring an ecosystem service to degraded landscapes (2008-2011)

TEACHING AND ADVISING

Courses

Instructor for Conservation Ecology (undergraduate, Rutgers), 2018-present
Co-Instructor for Advanced Statistics (graduate, Rutgers), 2017-present
Instructor for Foundations of Ecology (graduate, Rutgers), 2013-present
Co-Instructor for Principles of Ecology (undergraduate, Rutgers), 2014-2017
Instructor for Conserving and Restoring Mutualisms (graduate, Rutgers), 2012
Instructor for Insect Ecology (graduate, Rutgers), 2012-2013
Instructor for Pollination Ecology (graduate, Rutgers), 2010-2011
Instructor for Conservation Biology (undergraduate, Princeton), 2005
Instructor for Biostatistics tutorial (undergraduate, Princeton), 2001

Postdoc Advisor

Dr. Tina Harrison (2016-2017), *Postdoctoral Associate, University of California, Davis*
Dr. Mark Genung (2014-present), *Assistant Professor, University of Louisiana*
Dr. James Reilly (2011-present)
Dr. Geetha Nayak, Fulbright Postdoctoral Fellow (2011-2012)
Dr. Romina Rader (2011), *Lecturer, University of New England, Australia*
Dr. Ignasi Bartomeus (2010-2012), *Ramón y Cajal Fellow, Doñana Biological Station, Spain*
Dr. Daniel P. Cariveau (2009-2015), *Assistant Professor, University of Minnesota*

Ph.D Primary Advisor

Dylan Simpson (2018-present), MS William & Mary, Rutgers Excellence and EOAS Fellowships
Lucia Weinman (2017-present), BS Columbia, Rutgers Presidential and EOAS Fellowships
Michael Roswell (2014-present), BS Swarthmore, NSF GRFP Fellowship
Colleen Smith (2014-present), BS University of Michigan, Rutgers Presidential Fellowship
Bethanne Bruninga-Socular (2012-2018), BS Swarthmore, *Postdoc, University of Minnesota*
Tina Harrison (2011-2016), BS Dartmouth, *Postdoc, University of California, Davis*
Molly MacLeod (2010-2015), BS Marlboro, EPA-STAR Fellowship, *Director of Science Content, Pfizer Pharmaceuticals*
Faye Benjamin (2009-2015), BS Brown, *Adjunct Professor, Hofstra University*

Undergraduate Independent Research Advisor

R Tucker (2014-2017) *Research Technician, University of Minnesota*

J Zientek (2013-2016) *Lab manager, Oakland University*

A Cohen (2014) *Ph.D student, University of Washington*

S Hauser (2012) *Ph.D student, University of Louisiana*

SERVICE

Grant panelist, National Science Foundation DEB, Washington DC (2013, 2016)

Grant panelist, United States Department of Agriculture, Washington DC (2010, 2011, 2012)

Grant reviewer for National Science Foundation, MacArthur Fellowship 'genius award'

Reviewer for *Nature, Science, PNAS, Ecology Letters, Ecology* and many other journals