

# Melanie R. Kazenel

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## EDUCATION

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- 2018–2022 Ph.D. in Biology, with distinction, University of New Mexico, Albuquerque, NM  
Dissertation title: *The consequences of climate change for native bee assemblages*  
Advisors: Jennifer A. Rudgers and Kenneth D. Whitney
- 2016–2017 Ph.D. Student in Biology, University of Vermont, Burlington, VT  
Advisor: Alison K. Brody
- 2014–2016 M.Sc. in Biology, with distinction, University of New Mexico, Albuquerque, NM  
Thesis title: *Altitudinal gradients do not predict plant-symbiont responses to experimental warming*  
Advisor: Jennifer A. Rudgers
- 2006–2010 B.A. in Environmental Studies & Spanish, *summa cum laude*, Wellesley College, Wellesley, MA  
Senior project title: *Characterizing a meadow ecosystem: soil composition and plant communities*  
Advisors: Daniel Brabander and Kristina Jones

## RESEARCH AND TEACHING APPOINTMENTS

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- 2023–Present Visiting Assistant Professor, Department of Biology, Earlham College, Richmond, IN
- 2022–Present Adjunct Assistant Professor, Department of Biology, University of New Mexico
- 2022–2023 Postdoctoral Researcher, North Carolina State University and Rocky Mountain Biological Laboratory
- 2021–2022 Program Coordinator, Impact Leadership & Mentorship Program, Women’s Resource Center, University of New Mexico
- 2018–2022 Graduate Research & Teaching Assistant, Dept. of Biology, University of New Mexico
- 2018 Environmental Educator, Bosque Ecosystem Monitoring Program, Albuquerque, NM
- 2016–2017 Graduate Teaching Fellow, Dept. of Biology, University of Vermont
- 2014–2016 Graduate Research & Teaching Assistant, Dept. of Biology, University of New Mexico
- 2013–2014 Research Technician, Dept. of Biology, University of New Mexico (PIs: Rudgers & Whitney)
- 2013 Research Technician, Dept. of Forest Resources, University of Minnesota (PI: Reich)
- 2013 Field Ecology Research & Course Program, Rocky Mountain Biological Laboratory, Gothic, CO
- 2009–2010 Undergraduate Research Assistant, Biological Sciences and Geosciences, Wellesley College

## PUBLICATIONS

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### *Peer-Reviewed Publications*

- Pardee, G.L., S.R. Griffin, M. Stenkovski, T. Harrison, Z.M. Portman, **M.R. Kazenel**, J.S. Lynn, D.W. Inouye, and R.E. Irwin (2022) Life history traits predict responses of wild bees to climate variation. *Proceedings of the Royal Society B: Biological Sciences* 289: 20212697 (doi: 10.1098/rspb.2021.2697).

- Kivlin, S.N., M.A. Mann, J.S. Lynn, **M.R. Kazenel**, D.L. Taylor, and J.A. Rudgers (2022) Grass species identity shapes communities of root and leaf fungi more than elevation. *ISME Communications* 2:25 (doi: 10.1038/s43705-022-00107-6).
- Kazenel, M.R.\***, K.W. Wright\*, J. Bettinelli, T.L. Griswold, K.D. Whitney, and J.A. Rudgers (2020) Predicting changes in bee assemblages following state transitions at North American dryland ecotones. *Scientific Reports* 10:708 (doi: 10.1038/s41598-020-57553-2). \*co-first authors
- Lynn, J.S., **M.R. Kazenel**, S.N. Kivlin, and J.A. Rudgers (2019) Context-dependent biotic interactions control plant abundance across steep environmental gradients. *Ecography* 00:1–13 (doi: 10.1111/ecog.04421).
- Kazenel, M.R.**, S.N. Kivlin, D.L. Taylor, J.S. Lynn, and J.A. Rudgers (2019) Altitudinal gradients fail to predict fungal symbiont responses to warming. *Ecology* 0:e02740 (doi: 10.1002/ecy.2740).
- Kivlin, S.N., **M.R. Kazenel**, J.S. Lynn, D.L. Taylor, and J.A. Rudgers (2019) Plant identity influences foliar fungal symbionts more than elevation in the Colorado Rocky Mountains. *Microbial Ecology* (doi: 10.1007/s00248-019-01336-4).
- Kivlin, S.N., J.S. Lynn, **M.R. Kazenel**, K.K. Beals, and J.A. Rudgers (2017) Biogeography of plant-associated fungal symbionts in mountain ecosystems: a meta-analysis. *Diversity and Distributions* 23:1067–1077 (doi: 10.1111/ddi.12595).
- Adams, A.E., **M.R. Kazenel**, and J.A. Rudgers (2017) Does a foliar endophyte improve plant fitness under flooding? *Plant Ecology* 218(6):711–723 (doi: 10.1007/s11258-017-0723-0).
- Kazenel, M.R.**, C.L. Debban, L. Ranelli, W.Q. Hendricks, Y.A. Chung, T.H. Pendergast, N.D. Charlton, C.A. Young, and J.A. Rudgers (2015) A mutualistic endophyte alters the niche dimensions of its host plant. *AoB PLANTS* 7:plv005 (doi: 10.1093/aobpla/plv005).

#### ***Manuscripts in Review or Preparation (available upon request)***

- Kazenel, M.R.**, K.W. Wright, T.L. Griswold, K.D. Whitney, and J.A. Rudgers (*in third round of review*, Nature) Heat and drought sensitivity predict desert bee population dynamics under escalating aridity.
- Kazenel, M.R.**, K.W. Wright, T.L. Griswold, K.D. Whitney, and J.A. Rudgers (*in prep*) Behavioral thermoregulation buffers heat-sensitive native bees against abundance declines under climate change.
- Kazenel, M.R.**, I.K. Breckheimer, S.R. Griffin, B.D. Inouye, David W. Inouye, W. Lovecky, J.E. McLaughlin, J.E. Ogilvie, G.L. Pardee, M. Stenkovski, N. Underwood, and R.E. Irwin (*in prep*) Climate and floral availability drive solitary bee sex ratios in a montane ecosystem.
- Hall, E.S., **M.R. Kazenel**, J.E. McLaughlin, K.W. Wright, T.L. Griswold, J.A. Rudgers, and N.E. Rafferty (*in prep*) Plant-bee phenological synchrony is maintained over time in an arid ecosystem.

#### **PROFESSIONAL PRESENTATIONS**

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- 2023 **Kazenel, M.R.**, B.D. Inouye, D.W. Inouye, N. Underwood, and R.E. Irwin. Climate and floral availability drive solitary bee sex ratios in a montane ecosystem. Ecological Society of America Annual Meeting, Portland, OR. *Contributed talk*.
- Kazenel, M.R.**, and R.E. Irwin. The impact of climate change on pollinators. Annual Meeting of the North Carolina Chapter of The Wildlife Society, Sherrills Ford, NC. *Invited talk*.
- 2022 **Kazenel, M.R.**, K.W. Wright, T.L. Griswold, K.D. Whitney, and J.A. Rudgers. Daily activity timing and physiological tolerances jointly predict native bee population trends under climate change.
1. 19th Congress of the International Union for the Study of Social Insects, San Diego, CA. *Invited talk*.
  2. Ecological Society of America Annual Meeting, Montreal, QC, Canada. *Contributed talk*.

- 2021 **Kazenel, M.R.**, P.A. Cárdenas, K.W. Wright, K.D. Whitney, D.C. Lightfoot, T.L. Griswold, E. Christensen, S.K.M. Ernest, R.L. Schooley, P. Stapp and J.A. Rudgers. Desert bee and rodent assemblages track climate variability. Ecological Society of America Annual Meeting, held virtually. *Contributed talk.*
- 2020 **Kazenel, M.R.**, K.W. Wright, T.L. Griswold, K.D. Whitney, and J.A. Rudgers. Body size-mediated responses to climate change in a desert bee assemblage.
1. Ecological Society of America Annual Meeting, held virtually. *Contributed talk.*
  2. Sevilleta LTER Brown Bag Seminar Series, University of New Mexico, Albuquerque, NM. *Contributed talk.*
  3. Brown Bag Seminar Series, Dept. of Biology, University of New Mexico, Albuquerque, NM. *Contributed talk.*
- Kazenel, M.R.**, K.W. Wright, T.L. Griswold, K.D. Whitney, and J.A. Rudgers. Assemblage-level increases in bee body size in concert with increasing aridity over 13 years in the southwestern US. Sevilleta LTER All Scientists Meeting, University of New Mexico, Albuquerque, NM. *Contributed poster.*
- 2019 **Kazenel, M.R.**, K.W. Wright, T.L. Griswold, J. Bettinelli, J.A. Rudgers, and K.D. Whitney. Native bees exhibit species- and ecosystem-specific changes in abundance with aridity.
1. Annual Meeting of the Guild of Rocky Mountain Ecologists and Evolutional Biologists, Gothic, CO. *Contributed talk.*
  2. International Pollinator Conference, University of California, Davis, CA. *Contributed poster.*
  3. Dept. of Biology Research Day, University of New Mexico, Albuquerque, NM. *Contributed poster.*
  4. Desert Ecology Short Course, Jornada LTER, New Mexico State University, Las Cruces, NM. *Invited poster.*
  5. Central Arizona-Phoenix LTER All Scientists Meeting, Arizona State University, Tempe, AZ. *Invited poster.*
  6. Sevilleta LTER All Scientists Meeting, University of New Mexico, Albuquerque, NM. *Contributed poster.*
- Kazenel, M.R.**, K.W. Wright, T.L. Griswold, J. Bettinelli, K.D. Whitney, and J.A. Rudgers. Predicting changes in bee communities following state transitions in dryland ecosystems. Sevilleta LTER Brown Bag Seminar Series, University of New Mexico, Albuquerque, NM. *Contributed talk.*
- 2018 **Kazenel, M.R.**, K.W. Wright, K.D. Whitney, and J.A. Rudgers (2018) Climate sensitivity functions for native bees. Sevilleta LTER Science Symposium, Sevilleta Field Station, University of New Mexico, San Acacia, NM. *Contributed talk.*
- 2017 **Kazenel, M.R.**, and A.K. Brody. Assessing the consequences of bumblebee declines for native plants and pollinators. Ecology, Evolution, and Environmental Biology Seminar, University of Vermont, Burlington, VT. *Contributed talk.*
- 2016 **Kazenel, M.R.**, S.N. Kivlin, D.L. Taylor, and J.A. Rudgers. Altitudinal gradients do not predict plant-symbiont responses to experimental warming. Graduate Seminar Series, Dept. of Biology, University of Vermont, Burlington, VT. *Contributed talk.*
- Kazenel, M.R.**, S.N. Kivlin, D.L. Taylor, and J.A. Rudgers. Assessing the potential for climate-induced disruption of plant-microbe symbioses in the Rocky Mountains.
1. Ecological Society of America Annual Meeting, Ft. Lauderdale, FL. *Contributed poster.*
  2. Brown Bag Seminar Series, Dept. of Biology, University of New Mexico, Albuquerque, NM. *Contributed talk.*
- 2013 **Kazenel, M.R.** Can fungal symbionts shift host niche dimensions to alter species coexistence? Summer Research Symposium, Rocky Mountain Biological Laboratory, Gothic, CO. *Contributed talk.*
- 2010 **Kazenel, M.R.**, L. Fink, S. Kho, K. McFadden, C. McGlynn, S. Meyer, A. Nelson, L. Reed, T.D. Shafer, K. Wingate, and J. Zhou. Making the grade: an analysis of sustainability rankings in higher education. Ruhlman Conference, Wellesley College, Wellesley, MA. *Contributed talk.*
- Kazenel, M.R.**, L. Chilson, C. Ferris, C. Gayle, A. French, H. Mok, H. Rainey, B. Schindler, and C. Whitlock. Designing an edible ecosystem garden at Wellesley College. Ruhlman Conference, Wellesley College, Wellesley, MA. *Contributed talk.*

- 2009 **Kazenel, M.R.**, K. Jones, and D. Brabander. Characterizing a meadow ecosystem: soil composition and plant communities. Research Symposium, Summer Research in the Sciences, Wellesley College, Wellesley, MA. *Contributed poster.*
- 2008 **Kazenel, M.R.**, T.D. Shafer, E.R. Estes, and D. Haffner. The climate monster and the fate of environmentalism: analyzing trends in national environmental discourse. Ruhlman Conference, Wellesley College, Wellesley, MA. *Contributed poster.*
- Bisno, A., E.R. Estes, T. Harvey, S. Hurley, **M.R. Kazenel**, T.D. Shafer, H. Sholder, and S. Xi. Analyzing industrial contamination as recorded in sediments from Memorial Pond, Walpole, MA. Ruhlman Conference, Wellesley College, Wellesley, MA. *Contributed poster.*

## AWARDS, HONORS, AND GRANTS

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- 2023 Postdoctoral Research Fellowship in Biology, National Science Foundation (\$207,000; *declined*)
- 2022 Annual Meeting Registration Award, Early Career Ecologists Section of the Ecological Society of America (\$298)
- 2021 Caughran Scholarship, Department of Biology, University of New Mexico (\$1,000)
- 2015, 2019, 2021 Grove Scholarship, Department of Biology, University of New Mexico (\$4,000 total)
- 2020, 2021 Student Research Grant, Graduate and Professional Student Association, University of New Mexico (\$1,000 total)
- 2020 Springfield Fellowship for excellence in research and academic record, Department of Biology, University of New Mexico (5-month research assistantship totaling \$13,500)
- 2019 Doctoral Conference Presentation Award, University of New Mexico (\$726)
- 2019 Howard McCarley Student Research Award, Southwestern Association of Naturalists (\$1,000)
- 2018, 2019 Sevilleta LTER Summer Graduate Student Fellowship (\$8,000 total)
- 2017 Botanical Society of America Graduate Student Research Award (\$500)
- 2016 Plant Population Ecology Travel Award, Ecological Society of America (\$250)
- 2015, 2016 Honorable Mention, NSF Graduate Research Fellowship Program
- 2015 Springfield Scholarship, Department of Biology, University of New Mexico (\$2,000)
- 2015 Rocky Mountain Biological Laboratory Graduate Fellowship (\$150)
- 2010 Justina Ruiz-de-Conde Prize in Spanish, Wellesley College
- 2010 Community Service Travel Grant, Wellesley College, for environmental education work in Peru (\$750)
- 2009 Phi Beta Kappa (Junior Year), Wellesley College
- 2008 Lumpkin Family Internships for the Environment Stipend, Wellesley College (\$3,500)

## TEACHING AND MENTORING

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### *Teaching*

- 2023 Instructor of Record, Department of Biology, Earlham College  
Ecological Biology (BIOL 111), Fall 2023  
Population and Community Ecology (BIOL 455), Fall 2023
- 2023 Guest Instructor, Department of Applied Ecology, North Carolina State University  
Foundations of Ecology (AEC 503), Spring 2023. Topics: herbivory; island biogeography.  
Ecology (AEC 360), Spring 2023. Topics: competition; predation; mutualism.
- 2019, 2022 Guest Lecturer, Department of Biology, University of New Mexico  
Principles of Ecology (BIOL 310), Spring 2019 & 2020. Topic: mutualism and facilitation.

- 2020 Graduate Teaching Assistant, Department of Biology, University of New Mexico  
Biology of Infectious Organisms (BIOL 490), Spring 2020  
Virology (BIOL 450), Fall 2020
- 2019 Primary Laboratory Instructor/Graduate Teaching Assistant, Department of Biology,  
University of New Mexico  
Plant and Animal Form and Function Laboratory (BIOL 304L), Spring 2019
- 2016–2017 Primary Laboratory Instructor/Graduate Teaching Fellow, Department of Biology,  
University of Vermont  
Ecology and Evolution (BCOR 102), Fall 2016 & Fall 2017  
Principles of Biology (BIOL 002), Spring 2017
- 2016 Primary Laboratory Instructor/Graduate Teaching Assistant, Department of Biology,  
University of New Mexico  
Principles of Ecology (BIOL 310), Spring 2016. Guest lecture topic: conservation biology.

### ***Mentoring and Research Supervision***

- 2023 Mentor, Rocky Mountain Biological Laboratory Research Experience for Undergraduates Program  
Isabelle Larson, Bates College, *Effects of microclimate variation on diversity of plants and pollinators*  
Ellen Warmerdam, Oberlin College, *Does pollinator and plant diversity vary with microclimate?*
- 2014–2016 & 2018–2022 Mentor and supervisor to undergraduate and postbaccalaureate research assistants (n=18),  
Department of Biology, University of New Mexico
- 2018–2021 Mentor, Sevilleta Research Experience for Undergraduates Program, San Acacia, NM  
2021: Eduardo Barragan, California State Polytechnic Institute at Pomona, *Variation in diet breadth within and among bee species, and its consequences for bee population persistence.*  
2020: Ianellie Munguia, University of Texas at El Paso, *Bee foraging and pollination activity in relation to body size.*  
2019: Benjamin Turnley, Central College, *Bee body size and climate change.*  
2018: Jennifer Schlauch, University of Texas at Austin, *Bee community variation among ecosystem types and sampling dates over the pre-monsoon summer growing season at the Sevilleta National Wildlife Refuge.*
- 2016, 2021 Co-mentor to University of New Mexico Biology Honors Thesis and Independent Study students  
2021: Shelby Showalter, *Nutritional content of key pollen resources for dryland bee communities*  
2016: Amy Adams, *Does a foliar endophyte improve plant fitness under flooding?*
- 2021 Mentor to two high school students completing senior capstone research on native bee communities of the Valle de Oro National Wildlife Refuge, Albuquerque, NM
- 2017 Field research supervisor to two South Burlington, VT high school student field research volunteers
- 2014–2015 Co-mentor to undergraduate student researchers, Rocky Mountain Biological Laboratory  
2015: KariAnna Clausen (Western Washington University), Nisreen Abo-Sido (Wellesley College), Liana Edwards (University of Vermont), Lea Milando (Oberlin College)  
2014: Ian Spellman (Bridgewater State University), Chiara Forrester (Hampshire College), Samuel Canfield (Glennville State College)
- 2007–2008 Peer Tutor, Spanish and Astronomy Departments, Wellesley College

## **LEADERSHIP, SERVICE, AND TRAINING**

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### ***Science Outreach and Communication***

- 2021–Present Skype a Scientist presenter for K-12 classrooms, held virtually (n=7)
- 2020–2023 Contributions to public media on native bees and pollination
1. March 2020: Interviewed by *New Mexico Magazine* for “Hive Mind: All across New Mexico, beekeepers and scientists are working together to help bees survive climate change, pesticides, a vicious mite, and habitat loss.” Article available at <https://www.newmexico.org/nmmagazine/articles/post/bees/>

2. March 2021: Interviewed by *New Scientist* for “Nearly 500 bee species are thriving in a small patch of US desert.” Article available at <https://www.newscientist.com/article/2272581-nearly-500-bee-species-are-thriving-in-a-small-patch-of-us-desert/>
  3. Fall 2022: Interviewed by *Wellesley Magazine* for “Plan bee: As problems assail the world’s bee population, Wellesley scientists step in.” Article available at <https://magazine.wellesley.edu/fall-2022/plan-bee>
  4. Summer 2023: Interviewed by *The Colorado Sun* for “Tiniest ‘little gals’ of the bee world seem to be holding their own in a warming world, Colorado research shows.” Article available at <https://coloradosun.com/2023/08/04/tiny-bees-climate-change-research-gothic-rmbl/>
- 2022 Native bee activity table coordinator and volunteer, Fall Family Day, North Carolina Botanical Garden, Chapel Hill, NC
- 2022 Invited virtual guest lecturer on Chihuahuan Desert ecology for University of Richmond undergraduate course on Desert Ecology
- 2021 Curated a display highlighting New Mexico’s native bee diversity for the New Mexico Museum of Natural History and Science’s “What’s the buzz?” bee exhibit. Public talk given on 26 October 2021 (recording: <https://www.youtube.com/watch?v=n5YfNBB1ULo>).
- 2019, 2020 Volunteer, Museum of Southwestern Biology Open Collections Events, Albuquerque, NM
- 2019, 2020 Science Fair Judge, Jefferson Middle School, Albuquerque, NM
- 2019 Public workshops and presentations on bee ecology, identification, and conservation
1. Sevilleta National Wildlife Refuge, in partnership with New Mexico State University
  2. Environment New Mexico
- 2016–2017 Working Group Contributing Member, Pollinator-Friendly Solar Initiative of Vermont
- 2015 Science Fair Mentor, Amy Biehl High School, Albuquerque, NM
- 2015 Presenter, Science in the Community Day, Wilson Middle School, Albuquerque, NM
- 2014 Guest Scientist, Kids Nature Camp, Rocky Mountain Biological Laboratory
- 2010 Co-organizer, Communicating Science Symposium, Wellesley College
- 2009–2010 Treasurer, Publicity Chair, and Lecture Organizer, Wellesley Energy and Environmental Defense, Wellesley College

### **Professional Service**

- 2023–Present Manager, Earlham College Herbarium
- 2023–Present Contributing Member, Community Diversity, Equity, & Inclusion Committee, Rocky Mountain Biological Laboratory
- 2022 *Ad hoc* proposal review, Division of Environmental Biology, National Science Foundation
- 2020–2022 Contributing Member, Diversity, Equity, & Inclusion Committees of the University of New Mexico Biology Department, Biology Graduate Student Association, & Sevilleta Long-Term Ecological Research Program
- 2018–2022 University of New Mexico Biology Graduate Student Association Co-president (2018–20), Secretary (2020–21), and Treasurer (2021–22)
- 2018 Research Day Committee, Department of Biology, University of New Mexico
- 2014–2016 & 2018–2022 Travel and Research Grant Reviewer, Graduate Research Allocations Committee, Department of Biology, University of New Mexico
- 2015, 2016 Session Moderator and Poster Judge, Department of Biology Research Day, University of New Mexico

### **Manuscript Review**

*AoB PLANTS, Diversity and Distributions, Ecological Monographs, Ecology, Ecology and Evolution, Global Change Biology, Insect Conservation and Diversity, Journal of Animal Ecology, Journal of Vegetation Science, Landscape Ecology, Microbial Ecology, Plant and Soil, Scientific Reports, and Southwestern Naturalist*

### **Professional Memberships**

Ecological Society of America

***Professional Courses and Trainings***

- 2022–2023 Inclusive Teaching Certification, Office of Faculty Excellence, North Carolina State University
- 2021 Story Collider science communication training, held virtually
- 2018 Science Writing Workshop, University of New Mexico
- 2017 The Bee Course (competitive-admissions training in bee identification and natural history), Southwestern Research Station of the American Museum of Natural History, Portal, AZ

**OTHER PROFESSIONAL EXPERIENCE**

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- 2010–2012 Immigration Law Paralegal and Senior Paralegal, Chin & Curtis, LLP, Boston, MA
- 2010 Sustainable Agriculture Intern, Nanoose Edibles Organic Farm, Nanoose Bay, BC, Canada
- 2009–2010 Intern, Immigration & Asylum Services, International Institute of New England, Boston, MA
- 2008 Outreach and Programming Intern, Boston Natural Areas Network, Boston, MA
- 2007 Environmental Educator, Massachusetts Audubon Society, Milton, MA