


Carnegie Museum of Natural History
4400 Forbes Ave
Pittsburgh, PA 15213 USA
Tel 412 353 4828
E heberlingm@carnegiemnh.org
Web masonheberling.com
Blog collectedonthistday.com
 orcid.org/0000-0003-0756-5090

J. MASON HEBERLING

EDUCATION

- 2015 **Ph.D.** in Biology, Syracuse University, Syracuse, NY
Functional traits and resource-use strategies of native and invasive plants in Eastern North American forests
Advisor: Jason Fridley
- 2010 **B.S.** in Biology (Statistics minor), Penn State University, University Park, PA
Mentor: Katriona Shea

APPOINTMENTS

- 2019-present **Associate Curator of Botany** (since 2023), Assistant Curator (2019-2023)
Carnegie Museum of Natural History, Pittsburgh, PA, USA
- 2020-present Adjunct Associate Professor (graduate faculty since 2022; Adjunct Assistant
Professor 2020-2024), Department of Biological Sciences, University of
Pittsburgh, Pittsburgh, PA, USA
- 2019-present Adjunct Research Scientist, Hunt Institute for Botanical Documentation,
Carnegie Mellon University, Pittsburgh, PA, USA
- 2017-2021 Research Assistant Professor, Ecology and Evolutionary Biology
University of Tennessee Knoxville
- 2017-2018 NSF Postdoctoral Fellow in Biology, Carnegie Museum of Natural History
Mentor: Stephen J. Tonsor
- 2016-2019 Research Associate, Botany, Carnegie Museum of Natural History
- 2015-2016 Postdoctoral Research Associate, Ecology and Evolutionary Biology
University of Tennessee Knoxville
Mentor: Susan Kalisz
- 2014-2016 Visiting Scholar, Dept. of Biological Sciences, University of Pittsburgh
- 2008-2010 Undergraduate Research Assistant, Department of Biology, Penn State
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RESEARCH GRANTS & FELLOWSHIPS

- 2023-2025 Richard King Mellon Foundation: *Confronting Plant Invasions through Awareness*. Lead PI, with internal and external community partners. \$225,000
- 2020-2024 NSF Division of Environmental Biology, Population and Community Ecology *Collaborative Research: Phenological mismatch between trees and wildflowers mediated by climate change and plant invasions*. (DEB-1936971) Lead PI [with co-PIs Sara Kuebbing (University of Pittsburgh/Yale University), Richard Primack (Boston University)]. (including travel supplement co-supported by European Research Council with Dr. Pieter De Frenne/Ghent University; and supplement for Research Experience for Post-Baccalaureate Students). \$244,739 for CMNH portion
- 2020 Global Biodiversity Information Facility (GBIF) Secretariat, Copenhagen, Denmark. Sole PI (fixed-term contract). *Systematic Review of the GBIF-mediated Scientific Literature*. €20,000
- 2018-2021 NSF Division of Biological Infrastructure, Advancing Digitization of Biodiversity Collections (ADBC) Program *Digitization PEN: Connecting Rust Belt dynamics to the Mid-Atlantic Megalopolis Project utilizing the Carnegie Museum herbarium* (DBI-1612079) PI with co-PI B.L. Isaac. \$173,614
- 2019-2020 Pennsylvania Department of Conservation and Natural Resources (DCNR) Wild Resource Conservation Program. *Measuring Long-Term Ecological Change in Rare Plants of Pennsylvania*. Co-PI with PI B.L. Isaac. \$27,081.
- 2017-2018 NSF Postdoctoral Research Fellowship in Biology (DBI-1801022) Sole PI. *Leveraging centuries of herbarium data to track invasion processes: functional trait shifts, local adaptation, and rapid evolution* \$138,000
- 2012-2015 NSF Graduate Research Fellowship
- 2010-2012 Syracuse University Graduate Fellowship
- 2009-2010 Morrow Family Endowed Prize, Penn State Eberly College of Science

AWARDS

- 2022 Coulter Prize, *International Journal of Plant Sciences*
- 2020 George Mercer Award, Ecological Society of America
- 2016 Alexander Gourevitch Memorial Award, Syracuse University
- 2015 All University Doctoral Prize, Syracuse University

PUBLICATIONS (peer-reviewed; published, in press, or in review only)

- In review Reeb, R.A. & **Heberling, J.M.** (in review) Lost in translation: The need for updated messaging strategies in invasion biology communication. Submitted to *Plants, People, Planet*
- Accepted 45. Reeb, R.A., **Heberling, J.M.**, & Kuebbing, S.E. Phenological responses to temperature diverge across species ranges. *AoB PLANTS*
- 2024 44. Hardy, M., & **Heberling, J.M.** (2024) Hope in the herbarium: A record of what is lost and found. *Arnoldia: The Nature of Trees* 81:26-37.
- 2024 43. Lee, B.R., Alecrim, E.F., Miller, T.K., Forrest, J.R.K., **Heberling, J.M.**, Primack, R.B., & Sargent, R.D. Phenological mismatch between trees and wildflowers: Reconciling divergent findings in two recent analyses. *Journal of Ecology* 112:1184-1199. <https://doi.org/10.1111/1365-2745.14317>
- 2024 42. Yancy, A.J., Lee, B.R., Kuebbing, S.E., Neufeld, H.S., Spicer, M.E., & **Heberling, J.M.** Evaluating the definition and distribution of spring ephemeral wildflowers in eastern North America. *American Journal of Botany* 111:e16323. <https://doi.org/10.1002/ajb2.16323>
- 2024 41. Lee, B.R., Yancy, A.J., & **Heberling, J.M.** Phenological escape and its importance for understory plant species in temperate forests. *International Journal of Plant Sciences*, in press <https://doi.org/10.1086/729439>
- 2024 40. Fortier, R.P., **Heberling, J.M.**, & Feeley, K.J. What is an herbarium and how does it help us protect biodiversity? *Frontiers for Young Minds* 11:1170456. <https://doi.org/10.3389/frym.2023.1170456>
- 2023 39. Liu, Y., **Heberling, J.M.**, Wang, Z., Soltis, D.E., Soltis, P.S. Niche unfilling dominates the naturalization of species from intercontinentally disjunct genera. *Global Ecology and Biogeography* 32:1977-1990 <http://doi.org/10.1111/geb.13750>
- 2023 38. Ng, M., McCormick, A., Utz, R.M. & **Heberling, J.M.** Herbarium specimens reveal century-long trait shifts in poison ivy due to anthropogenic CO₂ emissions. *American Journal of Botany* 110:e16225 <https://doi.org/10.1002/ajb2.16225> [article featured on cover: <https://doi.org/10.1002/ajb2.16011>]
- 2023 37. **Heberling, J.M.** & Isaac, B.L. The Extended Specimen. In: *The Herbarium Handbook, Fourth Edition* (Edited by Nina Davies, Clare Drinkell, Timothy Utteridge). Published by Royal Botanic Gardens, Kew: London, UK. ISBN 9781842467695 <https://shop.kew.org/kew-herbarium-handbook>
- 2023 36. **Heberling, J.M.** & Muzika, R. Not all temperate deciduous trees are leafless in winter: The curious case of marcescence. *Ecosphere*:e4410.

<http://doi.org/10.1002/ecs2.4410> [article featured on cover:
<https://doi.org/10.1002/ecs2.4121>]

- 2023 35. Miller, T.K., **Heberling, J.M.**, Kuebbing, S.E., & Primack, R.B. Warmer temperatures are linked to widespread phenological mismatch among native and non-native forest plants. *Journal of Ecology* 111:356-371. <https://doi.org/10.1111/1365-2745.14021> [Special Feature: Leveraging Natural History Collections to Understand the Impacts of Global Change] [article featured on cover: <https://doi.org/10.1111/1365-2745.13913>]
- 2023 34. Teixeira-Costa, L., **Heberling, J.M.**, Wilson, C.A., & Davis, C.C. Parasitic plant specimens embody the extended specimen. *Methods in Ecology and Evolution* 14:319-331. <https://doi.org/10.1111/2041-210X.13866> [Special Feature: Leveraging Natural History Collections to Understand the Impacts of Global Change]
- 2022 33. Lee, B.L., Miller, T.K., Rosche, C., Yang, Y., **Heberling, J.M.**, Kuebbing, S.E., & Primack, R.B. Wildflower phenological escape differs by continent and spring temperature. *Nature Communications* 13:7157. <https://doi.org/10.1038/s41467-022-34936-9>
- 2022 32. Yang, Y., **Heberling, J.M.**, Primack, R.B., & Lee, B.R. Herbarium specimens may provide biased flowering phenology estimates for dioecious species. *International Journal of Plant Sciences* 183:777-783. <https://doi.org/10.1086/722294>
- 2022 31. Fridley, J.D., Bauerle, T.L., Craddock, A., Ebert, A.R., Frank, D.A., **Heberling, J.M.**, Hinman, E.D., Jo, I., Martinez, K.A., Smith, M.S., Woolhiser, L.J., & Yin, J. Fast but steady: woody invader syndrome in North America evades leaf economic tradeoffs. *Ecology Letters* 25:900-912. <https://doi.org/10.1111/ele.13967>
- 2022 30. **Heberling, J.M.** Herbaria as big data sources of plant traits. *International Journal of Plant Sciences* 183:87-118. <https://doi.org/10.1086/717623> [*featured on cover of Feb 2022 issue] [2022 Coulter Review]
- 2022 29. Reeb, R.A., N. Aziz, Lapp, S.M., Kitzes, J., **Heberling, J.M.**, & Kuebbing, S.E. Using convolutional neural networks to efficiently extract immense phenological data from community science images. *Frontiers in Plant Science* 12:787407. <https://doi.org/10.3389/fpls.2021.787407>
- 2021 28. Gallinat, A.S., Ellwood, E.R., **Heberling, J.M.**, Miller-Rushing, A.J., Pearse, W.D., Primack, R.B. Macrophenology: insights into the broad-scale patterns, drivers, and consequences of phenology. *American Journal of Botany*, 108:2112–2126.
- 2021 27. Gorchoy, D.L., Blossey, B., Averill, K.M., Dávalos, A., **Heberling, J.M.**, Jenkins, M.A., Kalisz, S., McShea, W.J., Morrison, J., Nuzzo, V., Webster, C.R., & Waller, D.M. Differential and interacting impacts of invasive plants

and white-tailed deer in eastern U.S. forests. *Biological Invasions* 23:1711-2727.

- 2021 26. **Heberling, J.M.**, Miller, J., Noesgaard, D., Weingart, S. & Schigel, D.S. Data integration enables global biodiversity synthesis. *Proceedings of the National Academy of Sciences USA*, 118(6): e2018093118. [recommended article on *Faculty Opinions*]
- 2020 25. **Heberling, J.M.** Museum specimens are more than meet the eye. *Current Biology* 30:R1368-R1370.
- 2020 24. Perez, T.M., Rodriguez, J. & **Heberling, J.M.** Herbarium specimens reliably estimate three functional traits. *American Journal of Botany* 107:1457-1464.
- 2020 23. Reeb, R.A., Acevedo, I., **Heberling, J.M.**, Isaac, B.L. & Kuebbing, S. Nonnative old-field species inhabit early-season phenological niches and exhibit unique sensitivity to climate. *Ecosphere* 11(18):e03217.
- 2020 22. Pearson, K.D., Nelson, G., Aronson, M., Bonnet, P., Brenskelle, L., Davis, C.C., Denny, E.G., Ellwood, E.R., Goëau, H., **Heberling, J.M.**, Joly, A., Lorieul, T., Mazer, S.J., Meineke, E.K., Stucky, B., Sweeney, P., White, A., Soltis, P.S. Machine learning using digital herbarium specimens to accelerate phenological research. *BioScience* 70:610-620.
- 2020 21. Shouman, S., Mason, N.W.H., **Heberling, J.M.**, Kichey, T., Closset-Kopp, D., Kobeissi, A. & Decocq, G. Leaf functional traits at home and abroad: a community perspective of sycamore maple invasion. *Forest Ecology & Management* 464:118061.
- 2020 20. Hedrick, B. P., **Heberling, J. M.***, Meineke, E.* , Turner, K. G.* , Grassa, C. J., Park, D., Kennedy, J., Clarke, J., Cook, J., Edwards, S. V., Davis, C. The future of natural history collection digitization. *BioScience* 70:243-251. *denotes equal contributors (see *PeerJ Preprints* 7:e27859v1)
- 2020 19. Kattge, J., Bönisch, G., Díaz, S., Lavorel, S., Prentice, I.C., Leadley, P., Tautenhahn, S., Werner, G., ...[data paper with 715 additional co-authors including **Heberling, J.M.**]... and Wirth, C. TRY plant trait database - enhanced coverage and open access. *Global Change Biology* 26:119-188.
- 2019 18. **Heberling, J.M.**, Prather L.A. & Tonsor, S.J. The changing uses of herbarium data in an era of global change: An overview using automated content analysis. *BioScience* 69:812-822. [*featured on cover of Oct 2019 issue]
- 2019 17. **Heberling, J.M.**, Burke, D.J. Utilizing herbarium specimen roots to quantify historical mycorrhizal communities. *Applications in Plant Sciences* 7(4):e1223. [*Special Issue on Methods in Belowground Botany]
- 2019 16. **Heberling, J.M.**, McDonough Mackenzie, C., Fridley, J.D., Kalisz, S. & Primack, R.B. Phenological mismatch with trees reduces wildflower carbon

budgets. *Ecology Letters* 22:616-623. [***winner of 2020 George Mercer Award from the Ecological Society of America**]

- 2019 15. **Heberling, J.M.**, Cassidy, S., Fridley, J.D. & Kalisz, S. Carbon gain phenologies of spring-flowering perennials in a deciduous forest indicate a novel niche for a widespread invader. *New Phytologist* 221:778-788.
- 2018 14. **Heberling, J.M.** & Isaac, B.L. iNaturalist as a tool to expand the research value of museum specimens. *Applications in Plant Sciences* 6(11):e1193.
- 2018 13. **Heberling, J.M.** & Mason, N.W.H. Are endemics functionally distinct?: Leaf traits of native and invasive woody species in a New Zealand forest. *PLOS ONE* 13(5):e0196746
- 2017 12. Shouman, S., Mason, N.W.H., Kichey, T., **Heberling, J.M.**, Closset-Kopp, D. & Decocq, G. Functional shift of sycamore (*Acer pseudoplatanus* L.) towards greater plasticity and shade tolerance in its invasive range. *Perspectives in Plant Ecology, Evolution, & Systematics* 29:30-40.
- 2017 11. **Heberling, J.M.** & Isaac, B.L. Herbarium specimens as exaptations: new uses for old collections. *American Journal of Botany* 104(7):963-965.
- 2017 10. Wavrek, M., **Heberling, J.M.**, Fei S. & Kalisz, S. Herbaceous invaders in temperate forests: a systematic review of their ecology and proposed mechanisms. *Biological Invasions* 19(11):3079-3097.
- 2017 9. **Heberling, J.M.**, Brouwer, N.L. & Kalisz, S. Effects of deer on the photosynthetic performance of invasive and native forest herbs. *AoB PLANTS* 9:plx011. [**Special Issue on Interactions between white-tailed deer and invasive plants in North American forests*]
- 2017 8. **Heberling, J.M.**, Jo, I., Kozhevnikov, A., Lee, H. & Fridley, J.D. Biotic interchange in the Anthropocene: strong asymmetry in East Asian and eastern North American plant invasions. *Global Ecology and Biogeography* 26:447-458.
- 2016 7. **Heberling, J.M.** & Fridley, J.D. Invaders do not require high resource levels to maintain physiological advantages in a temperate deciduous forest. *Ecology* 97:874-884
- 2016 6. **Heberling, J.M.**, Kichey, T., Decocq, G. & Fridley, J.D. Plant functional shifts in the invaded range: a test with reciprocal forest invaders of Europe and North America. *Functional Ecology* 30:875-884
- 2013 5. **Heberling, J.M.** & Fridley, J.D. Resource-use strategies of native and invasive plants in Eastern North American forests. *New Phytologist* 200:523-533.
- 2012 4. **Heberling, J.M.** & Fridley, J.D. Biogeographic constraints on the worldwide leaf economics spectrum. *Global Ecology and Biogeography* 21:1137-1146.

- 2012 3. Siefert, A., Ravenscroft, C., Althoff, D., Alvarez-Yapiz, J., Carter, E., Glennon, K., **Heberling, J.M.**, Jo, I., Pontes, A., Sauer, A., Willis, A. & Fridley, J.D. Scale dependence of vegetation-environment relationships: a meta-analysis of multivariate data. *Journal of Vegetation Science* 23:942-951.
- 2011 2. Russo, L., Stehouwer, R., **Heberling, J.M.** & Shea, K. The composite insect trap: an innovative combination trap for biologically diverse sampling. *PLoS ONE* 6(6):e21079.
- 2011 1. Zhang R., **Heberling, J.M.**, Haner, E. & Shea, K. Tolerance of two invasive thistles to repeated disturbance. *Ecological Research* 26:575-581.

NON-PEER REVIEWED PUBLICATIONS (society newsletters, etc.)

- 2023 Bierker, S., Landa, A., Isaac, B.L. & **Heberling, J.M.** "Archiving population variation: A new collection method for herbaria." *Vasculum* 18(1):10-13. <https://www.herbariumcurators.org/newsletter>

INVITED RESEARCH PRESENTATIONS (scientific & public audiences)

- 2024 Kellogg Biological Station, Michigan State University, Hickory Corners, MI
Mary Elizabeth Dickason King M.D. Annual Lecture in the Life Sciences in Memory of Professor Howard Parshley, Department of Biological Sciences, Smith College, Northampton, MA (one of a three part botany talk series in honor of John Burk)
School of Integrative Biology, Program in Ecology, Evolution, and Conservation Biology, University of Illinois Urbana-Champaign
"Nature out of place?: Brainstorming best practices for communicating about invasive plants" Natural Areas Association (webinar)
- 2023 Department of Botany and Rocky Mountain Herbarium, University of Wyoming
"All about timing: changing seasons in our changing forests" Natural Areas Association (webinar)
- 2022 Department of Biological Sciences, University of Cincinnati, OH
Forest & Nature Lab, Department of Environment, Ghent University, Belgium
"Native, invasive, and everything in between: How did we get here?", Phipps Conservatory & Botanical Gardens, Pittsburgh, PA
"Stories from the Dead: What herbarium specimens tell us about the living world" Pennsylvania Botany Symposium webinar, virtual
"Winter leaves and spring blooms," *Science & Nature Lectures*, Powdermill Nature Reserve, Rector, PA

- 2021 Department of Biodiversity, Earth & Environmental Science, Drexel University, Philadelphia, PA
Academy of Natural Sciences of Drexel University, Philadelphia, PA
Niagara Frontier Botanical Society, Buffalo, NY
Department of Biology, West Virginia University, Morgantown, WV
New England Botanical Club, Cambridge, MA
- 2020 Royal Botanic Gardens, Kew, London, United Kingdom
Carnegie Discoverers, Carnegie Museum of Natural History, Pittsburgh, PA
- 2020 Department of Botany, Smithsonian National Museum of Natural History, Washington, DC
GBIF Governing Board Meeting 27, Global Biodiversity Information Facility (GBIF) Secretariat, Copenhagen, Denmark
Convolvulaceae Network Research Group (virtual)
Department of Biological Sciences, University of Pittsburgh, Pittsburgh, PA
Mount Lebanon Nature Conservancy, Mt. Lebanon, PA
- 2019 “Rethinking the herbarium specimen in the digital age,” 45th Annual Southern California Botanists Symposium, *New Frontiers in Botany: Discoveries and Emerging Tools*, Pomona College, Claremont, CA
“Rethinking the museum specimen in the digital age” *R.W. Moriarty Science Seminar Series*, Carnegie Museum of Natural History, Pittsburgh, PA
“Stories from the dead: What museums specimens tell us about the living world” *Scientist Lecture Series*, Holden Arboretum, Kirkland, OH
“All about timing: Plant phenology and mismatch in our changing forests” Pymatuning Laboratory of Ecology, University of Pittsburgh
“Measuring change through a century of invasion” [keynote speaker] *Plants in the City: Mid-Atlantic Megalopolis Project symposium*, Rutgers University, New Brunswick, NJ
“Of wildflowers and weeds: Our changing Pittsburgh forests” Mt. Lebanon Nature Conservancy, Mt. Lebanon, PA
- 2018 *Biophilia public seminar series*, Phipps Conservatory and Botanical Gardens, Pittsburgh, PA
- 2017 *NSF Postdoc Research Symposium*, Harvard University, MA
- 2016,2018 Botanical Society of Western Pennsylvania, Pittsburgh, PA
- 2016 *Biological Invasions in Forests Workshop*, International Union of Forest Research Organizations, Shepherdstown, WV
- 2015 R.W. Moriarty Seminar Series, Carnegie Museum of Natural History
- 2014 Department of Biological Sciences, University of Pittsburgh, Pittsburgh, PA

2013 Ecology and Dynamics of Human Influenced Systems (EDYSAN), Université de Picardie Jules Verne, Amiens, France

CONFERENCE PRESENTATIONS (presenting author only)

- 2024 **Heberling, J.M.**, Turetsky, M., & Ceriaco, L.M.P. "Plant monstrosities and the value of the unusual" Botanical Society of America Annual Meeting, Grand Rapids, Michigan. June 2024. [special session co-sponsored by Society of Herbarium Curators and BSA Historical Section]
- 2024 **Heberling, J.M.**, Moore, C., Primack, R.B., & Kuebbing, S. "Effects of shrub leaf phenology on understory forest herbs" Botanical Soc of America Annual Meeting, Grand Rapids, Michigan. June 2024.
- 2024 **Heberling, J.M.**, Weaver, W., & Guralnick, R. "Trait data from herbarium specimens: What is needed?" 8th Annual Digital Data in Biodiversity Research Conference, University of Kansas, Lawrence, Kansas. May 29, 2024.
- 2023 **Heberling, J.M.** "Getting the timing right: Measuring and understanding plant phenology in a changing world" Keynote Speaker for workshop entitled "Designing with the more-than-human: Temporalities of thinking with care" Association of Computing Machinery Designing Interactive Systems (ACM DIS '23), Carnegie Mellon University. July 11, 2023.
- 2022 **Heberling, J.M.**, Hughes, N.M., George, C.O., Lee, B.R., Neufeld, H.S., Webb, C., & Lee, D.W. "Comparative analysis of autumn leaf coloration across North America" Botany Meeting 2022, Anchorage, AK.
- 2021 **Heberling, J.M.** & Isaac, B.L. "Monstrosities and archiving variation" Society of Herbarium Curators annual symposium entitled "NOT your average specimen!" Botany Meeting 2021 (Lightning talk; virtual).
- 2021 **Heberling, J.M.** & Muzika, R. "Why do some deciduous plants retain dead leaves through winter?: Exploring marcescence" Botanical Society of America Annual Meeting 2021 (Contributed talk; virtual).
- 2021 **Heberling, J.M.**, Miller, J., Noesgaard, D., Weingart, S. & Schigel, D.S. "Data integration enables global biodiversity synthesis" Ecological Society of America Annual Meeting 2021. (Poster; virtual)
- 2020 **Heberling, J.M.**, McDonough MacKenzie, C., Fridley, J.D., Kalisz, S., Kuebbing, S., Miller, T. & Primack, R.B. "Phenological mismatch between trees and wildflowers under climate change and plant invasions" Ecological Society of America Annual Meeting (poster; virtual)
- 2019 **Heberling, J.M.** "Emerging roles for herbaria in functional trait ecology" *Special symposium: Early career innovators in herbarium-enabled research*, Society of Herbarium Curators, Tucson, AZ (invited talk)

- 2018 **Heberling, J.M.**, Tonsor, S.J. & Prather, L.A. "The changing roles of herbaria in an era of global change: A systematic review" Ecological Society of America Annual Meeting, New Orleans, LA, USA. *Organized Oral Session: "New Uses For Old Collections: Herbarium Data in an Era of Ecological Change" [*Heberling organized oral session with S. Tonsor and A. Prather]
- 2017 **Heberling, J.M.** "The changing roles of herbaria in an era of global change" International Council of Museums Committee for Museums and Collections of Natural History (ICOM NAT HIST) Annual Meeting, Pittsburgh, PA, USA.
- 2017 **Heberling, J.M.** "Old collections with new uses: the roles of herbaria in the Anthropocene" Northeast Natural History Conference, Cromwell, CT, USA.
- 2016 **Heberling, J.M.** & Kalisz, S. "Physiological mechanisms behind *Alliaria petiolata* success and native decline: deer increase invader photosynthetic rates" 101th Ecological Society of America Annual Meeting, Ft. Lauderdale, FL, USA.
- 2016 **Heberling, J.M.**, Brouwer, N.L. & Kalisz, S. "Plant invasion mediated by deer overabundance: linking demographic patterns and ecophysiological mechanisms" Botany 2016 Meeting (Botanical Society of America), Savannah, GA, USA.
- 2015 **Heberling, J.M.** & Fridley, J.D. "Physiological ecology of forest invaders along experimental light and nutrient gradients: does invader advantage depend on disturbance?" 100th Ecological Society of America Annual Meeting, Baltimore, MD, USA.
- 2014 **Heberling, J.M.**, Kichey, T., Decocq, G., Fridley, J.D. "Pre-adapted to invade? Resource-use strategies of reciprocal woody invaders in Northeastern US and France." Northeast Natural History Conference, Springfield, MA, USA.
- 2013 **Heberling, J.M.** & Fridley, J.D. "Functional comparisons of native and invasive plants in Eastern North American forests: do they differ in resource-use strategies?" 56th International Association of Vegetation Science Annual Symposium, Tartu, Estonia.
- 2012 **Heberling, J.M.** & Fridley, J.D. "East Asian plants in Eastern US forests: Are invaders pre-adapted for more efficient resource use?" International symposium on the East Asian flora and its role in the formation of the world's vegetation. Botanical-Garden Institute, Russian Academy of Sciences, Vladivostok, Russia.
- 2011 **Heberling, J.M.** & Fridley, J.D. "Biogeographic constraints on the worldwide leaf economic spectrum." 96th Ecological Society of America Annual Meeting, Austin, TX, USA.

2010 **Heberling, J.M.**, Russo, L., Yang, S. & Shea, K. “Complex plant community responses to invasion by the thistle *Carduus acanthoides*.” 95th Ecological Society of America Annual Meeting, Pittsburgh, PA, USA.

SCIENTIFIC SERVICE

2011-present Reviewer for >50 manuscripts, >30 journals: *PNAS*, *Nature* (x2), *American Journal of Botany* (x6), *Current Biology* (x3), *Trends in Ecology & Evolution*, *Biological Conservation*, *Brittonia* (x2), *Journal of Applied Ecology*, *Nature Communications* (x2), *New Phytologist* (x5), *Rhodora*, *Journal of Ecology*, *Taxon*, *Nature Plants*, *PhytoKeys*, *Castanea* (x2), *Systematics & Biodiversity*, *BioScience* (x2), *Functional Ecology* (x2), *Annals of Carnegie Museum*, *Ecological Applications*, *Global Change Biology*, *Applications in Plant Sciences* (x3), *Scientific Reports* (x2), *Oecologia* (x4), *Botany Letters*, *Plant Ecology*, *Photosynthesis Research*, *PLoS ONE* (x2), *Forest Ecology and Management*, *Journal of the Torrey Botanical Society*, *Biological Invasions* (x5), *Ecology Letters*, *Global Ecology and Biogeography* (x2), *Journal of Ecology*, *Journal of Plant Ecology* (x2), *Diversity and Distributions*, *Journal of Vegetation Science* (x3), *Botanica Pacifica*, *International Journal of Plant Biology*, *Northeastern Naturalist* (x3), *Journal & Proceedings of the Royal Society of New South Wales*

*Verified review record here:
<https://www.webofscience.com/wos/author/record/922882>
And here: <https://orcid.org/0000-0003-0756-5090>

2024 External expert reviewer, Deutsche Forschungsgemeinschaft (German Research Foundation)

2024 External expert reviewer, Swiss National Science Foundation

2024-present Grant reviewer, Frederick Honors College Undergraduate Research Fellowship Programs, University of Pittsburgh

2023 Book manuscript reviewer, MIT Press

2023 Proposal review panelist, National Science Foundation Directorate for Biological Sciences, Division of Biological Infrastructure

2022-24 Judge, Annual International Cherry Blossom Prediction Competition

2022-present Proposal review committee chair, Undergraduate Research Awards, Botanical Society of Western PA

2022,2024 Botany-In-Action Science Advisory Committee member, Phipps Conservatory and Botanical Gardens

2022 Ad hoc reviewer, National Science Foundation, Directorate for Social, Behavioral and Economic Sciences, Division of Social and Economic Sciences

2021 Book manuscript reviewer, Yale University Press

2020 External expert reviewer, Dutch Research Council (NWO)

- 2020 Ad hoc reviewer, National Science Foundation National Science Foundation
Directorate for Biological Sciences, Division of Environmental Biology
- 2018 Organized Oral Session: “New Uses For Old Collections: Herbarium Data in
an Era of Ecological Change” (Heberling organized oral session with S.
Tonsor and L.A. Prather)
<https://eco.confex.com/eco/2018/meetingapp.cgi/Session/14000>

OTHER ACADEMIC SERVICE

- 2023-present Advisory Committee member, Pennsylvania Plant Conservation Alliance (PA
Department of Conservation and Natural Resources)
- 2023 Chair, Research Visioning Working Group, Carnegie Museum of Natural
History
- 2019-present Biodiversity Open Data Ambassador, GBIF
- 2019-2022 Co-Chair of Collections, Carnegie Museum of Natural History
- 2021-22 Human Remains Museum Policy Working Group, CMMH
- 2020-2021 Member, Human Remains Policy Working Group, CMNH
- 2013,2014 Graduate Representative, Undergraduate Curriculum Committee, Department
of Biology, Syracuse University
- 2012 Vice President, Biology Graduate Student Organization, Syracuse University

ADVISING AND THESIS COMMITTEES

Postdoctoral advisees

- 2023-present Rachel Reeb (R.K. Mellon Foundation funded)
- 2021-2023 Molly Ng (CMNH Rea Postdoctoral Fellow)
- 2021-2023 Benjamin R. Lee (NSF Postdoctoral Research Fellow in Biology)

Graduate advisees and committees

- 2024-present Olivia Leek (MS committee), University of Cincinnati
- 2023-present Louis Freeland-Haynes (PhD committee), University of Pittsburgh
- 2019-2023 Rachel Reeb (PhD committee), University of Pittsburgh
- 2021-present Amber Stanley (PhD committee), University of Pittsburgh
- 2021-present Hannah Assour (PhD committee), University of Pittsburgh
- 2022-present Taylor Zallek (PhD committee), University of Pittsburgh
- 2022-present Patrick Lyon (PhD committee), University of Pittsburgh
- 2020-2021 Cheyenne Moore (PhD committee), University of Pittsburgh

Other graduate committee service

- 2021 Saara M Hartikainen (External PhD dissertation pre-examiner), University
of Helsinki, Finland

Undergraduate mentorship

“**”= received independent student research funding

“+”= authored peer-reviewed publication

2024-present	Kayleigh Phillips*, Univ of Pittsburgh (co-mentored with Prof. Josep Werne/Dept. of Geology) <i>2024 Brackenridge Summer Fellowship (U Pittsburgh)</i>
2022-present	Megan Gauger* (research intern, field technician), Univ of Pittsburgh <i>2023 Botanical Society of Western PA Undergraduate Research Award</i> <i>2023 Earl Core Student Research Award (S Appalachian Botanical Society)</i> <i>2023 Brackenridge Summer Fellowship (U Pittsburgh)</i> <i>2023 Torrey Botanical Society Undergraduate Research Award</i>
2023-present	Chris Perrone* (research student), Univ of Pittsburgh <i>2023 Botanical Society of Western PA Undergraduate Research Award</i> <i>2023 Brackenridge Summer Fellowship (U Pittsburgh)</i>
2022-2023	Rodrigo Monteagudo (research student), University of Pittsburgh Frederich Honors College Research Hub Program
2022-2023	J. Mamas (research intern), Chatham University
2022-2024	Searrah Bierker*+ (research student), Chatham University <i>2022 Society of Herbarium Curator's Undergraduate Research Award</i>
2021-2022	Abby Yancy*+ (field technician & NSF REPS participant), CMNH <i>2021-22 NSF REPS (Research Experience for Postbaccalaureate Students)</i>
2021-2022	Alyssa McCormick+ (research internship), Chatham University
2021-2022	Koa Reitz (research technician), Univ of Pittsburgh
2021-2023	Jack Hatajik*, Univ of Pittsburgh (co-mentored w postdoc Ben Lee) <i>2022 Botanical Society of Western PA Undergraduate Research Award</i> <i>2022 Brackenridge Summer Fellowship (U Pittsburgh)</i> <i>2022 Torrey Botanical Society Undergraduate Research Award</i>
2021-2022	Meri Raughley (research technician), Univ of Pittsburgh

TEACHING EXPERIENCE (academic)

2015	Instructor (sole), Function and Structure of Organisms, Penn State New Kensington
2013-present	Occasional guest lecturer for: <i>Inside Natural History Museums</i> (Museum Studies, University of Pittsburgh), <i>Plant Taxonomy</i> (Texas A&M University-Corpus Christi), <i>Plant Biology</i> (University of Pittsburgh), <i>Population Biology</i> (University of Pittsburgh), <i>Ecology</i> (Onondaga Community College, Syracuse, NY); I host regular visits for classes to herbarium
2011-12	Teaching assistant, <i>Physiology Lab</i> (advanced undergraduate), Syracuse University
2011	Teaching assistant, <i>Introductory Biology</i> , Syracuse University
2011-2014	Teaching fellow, Future Professoriate Program, Syracuse University

OUTREACH

- 2022-present Local Phenology Participatory Science Program, Powdermill Nature Reserve
Co-designed, co-organized and co-led public and staff workshops with REPS student Abby Yancy, in collaboration with departments across museum (Marketing, Education, Exhibitions) to empower visitors to observe and contribute to phenological monitoring through the National Phenology Network.
<https://naturesnotebook.usanpn.org/npnapps/programs/1144>
- 2024 Co-organized “Invasive Species Roundtable” regular events (led by postdoc R. Reeb), bringing together environmental educators and land practitioners from more than 20 different regional environmental non-profit and governmental organizations in the Pittsburgh region.
- 2017-present Regularly participate in numerous outreach events at CMNH or in community across western PA, including collaborations with Carnegie Museum of Art, Allegheny Land Trust, Botanical Society of Western PA, and others.
- 2017-present *Collected On This Day* (www.collectedonthistoday.com) herbarium blog
- 2012 Volunteer, Early College High School Summer Science Institute, Syracuse University.
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EXHIBITIONS

I regularly serve as content advisor for CMNH Exhibitions projects relevant to plants or ecology. Exhibitions highlighted below were very much team effort with exhibitions and other museum staff, and community partners.

- 2024-present *Uprooted: Plants Out of Place* (temporary exhibition), Carnegie Museum of Natural History; A unique interdisciplinary science communication project culminating in an exhibition on the topic of introduced plants, including scientific, historical, and artistic perspectives and multiple cultural points of view. Hosted artist Koichi Watanabe as part of exhibition and engaged numerous community partners. Opens spring 2025.
- Updated 2021 *Hall of Botany* (permanent gallery), Carnegie Museum of Natural History; scientific advisor for complete renovation of entryway and updated labels in the hall (NSF grant funded through broader impacts associated with our research)
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LABORATORY/TEACHING PROTOCOLS (not peer-reviewed)

- 2013 Heberling, J.M. A practical guide to measuring leaf-level photosynthesis.
[online resource: <https://sites.google.com/site/fridleylab/home/protocols>].
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PROFESSIONAL SOCIETY MEMBERSHIPS

Botanical Society of America (BSA), Ecological Society of America (ESA), Society of Herbarium Curators (SHC), Botanical Society of Western Pennsylvania, Southern Appalachian Botanical Society (SABS), International Association for Vegetation Science (IAVS), Society for the Preservation of Natural History Collections (SPNHC), International Council of Museums (ICOM), American Alliance of Museums (AAM)
