

REBECCA E. HEWITT

Center for Ecosystem Science and Society • Northern Arizona University
Flagstaff • Arizona • 86011

Phone: 907-978-0024 • E-mail: Rebecca.hewitt@nau.edu

Education

2008-2014, Ph.D. in Biological Sciences, University of Alaska Fairbanks

2001-2005, B.A. in Environmental Studies and Biology, Middlebury College, Vermont

Research interests and expertise

Arctic plant ecology; ectomycorrhizal fungi, plant-microbe interactions; fungal metagenomics; nutrient constraints on ecosystem carbon cycling; stable isotopes; landscape modeling of vegetation change; permafrost

Research appointments

- Postdoctoral Researcher, Center for Ecosystem Science and Society, Northern Arizona University, 2015-present
- USGS Climate Science Center Fellow, International Arctic Research Center, University of Alaska Fairbanks, 2014

Doctoral appointments

- UAF Graduate School Fellow, University of Alaska Fairbanks, 2014
- Visiting Researcher, Centro Austral de Investigaciones Científicas, Argentina, 2012
- NSF Graduate Research Fellow, Department of Biology and Wildlife, University of Alaska Fairbanks, 2010-2013
- Alaska EPSCoR Graduate Research Fellow, University of Alaska Fairbanks, 2009-2010

Pre-doctoral appointments

- Research Technician, Boreal Ecology Cooperative Research Unit, 2008
- Research Technician, N. M. Holbrook Lab, Harvard University, 2007-2008
- Research Technician, D. Inouye and K. N. Jones Labs, Rocky Mountain Biological Laboratory, summers 2004, 2005, 2007
- Research Intern, E. S. Menges Lab, Archbold Biological Station, 2006-2007

Teaching appointments

- Winter Term Instructor, Conservation Biology, Middlebury College, 2015
- Online program developer, University of the Arctic and North (Arctic) Federal University, Arkhangelsk, Russia, 2014
- Instructor, Ecological background for resilience and adaptation (BIOL 692), University of Alaska Fairbanks, 2012
- Field Instructor, Arctic in a changing climate: Physical and biological linkages to permafrost, International Arctic Research Center Summer School, 2010
- Teaching Assistant, Microbiology (BIOL 342), University of Alaska Fairbanks, 2009
- Teaching Assistant, Principles of Ecology (BIOL 271), University of Alaska Fairbanks, 2008
- Field Teaching Assistant, Field course on the environmental and cultural impacts of the Hydro-Québec dam projects, Sterling College James Bay Territory, Québec, Canada, 2006

Peer-reviewed publications in review, in press, or published

7. **Hewitt, R. E.**, D. L. Taylor, T. N. Hollingsworth, G. J. M. Pastur, and C. B. Anderson. The influence of variable retention timber management on ectomycorrhizal fungi, plant-fungal interactions, and *Nothofagus pumilio* forest recovery. *In review*
6. Djukic, I., S. Kepfer-Rojas, I. K. Schmidt, K. S. Larsen, C. Beier, B. Berg, and K. Verheyen et al. (300 co-authors). Litter decomposition across the biomes: early stage mass loss. *In review*.
5. **Hewitt, R. E.**, F. S. Chapin, T. N. Hollingsworth, and D. L. Taylor. 2017. The potential for mycobiont sharing between shrubs and seedlings to facilitate tree establishment after wildfire at Alaska arctic treeline. *Molecular Ecology*: DOI: 10.1111/mec.14143.
4. **Hewitt, R. E.**, T. N. Hollingsworth, F. S. Chapin III, and D. L. Taylor. 2016. Fire-severity effects on plant-fungal interactions after a novel tundra wildfire disturbance: implications for arctic shrub and tree migration. *BMC Ecology* DOI: 10.1186/s12898-016-0075-y
3. **Hewitt, R. E.**, A. P. Bennett, A. L. Breen, T. N. Hollingsworth, D. L. Taylor, F. S. Chapin, III, and T. S. Rupp. 2015. Getting to the root of the matter: landscape implications of plant-fungal interactions for tree migration in Alaska. *Landscape Ecology* DOI 10.1007/s10980-015-0306-1
2. **Hewitt, R. E.**, E. Bent, T. N. Hollingsworth, F. S. Chapin III, and D. L. Taylor. 2013. Resilience of arctic mycorrhizal fungal communities after wildfire facilitated by resprouting shrubs. *Ecoscience* **20**:296-310.
1. **Hewitt, R. E.**, and E. S. Menges. 2008. Allelopathic effects of *Ceratiola ericoides* (Empetraceae) on germination and survival of six Florida scrub species. *Plant Ecology* **198**:47-59.

Peer-reviewed book chapter

Hollingsworth, T. N., **R. E. Hewitt**, and J. F. Johnstone. Vegetation composition change as a driver of landscape change in the northwest boreal region. *in* A. Robertson, D. Reid, and E. Schroff, editors. *The Changing Boreal Landscape: Drivers of change in the northwest boreal region of North America and their impacts on sustainable resource management and conservation*. US Fish and Wildlife Service. *In press*.

Non peer-reviewed publications

Shibata, H., P. M. Groffman, W. H. McDowell, P. Pinho, K. Fukuzawa, M. Kobayashi, Y. Uchida, K. Koba, T. Yoshida, Y. Ohishi, Y. Lin, C. Chen, I.-L. Lai, C.-P. Wang, W.-C. Chao, C.-T. Chang, J. Tang, P. H. Templer, I. Djukic, K. Isobe, H. Doi, A. Kohzu, Y. Fujita, T. Hiura, N. Ohte, A. C. Flores-Díaz, A. Csolti, E. T. Bol, I.-J. Hsiao, I. Mukumbuta, I. Bourgeois, J. Zheng, J. C. Morina, J.-W. Lu, L. A. Rose, N. Hosokawa, R. Sharif, **R. E. Hewitt**, S. R. M. Lins, T. Inoue, U.-O. Baatar, W. Zhou, W.-y. Shi, Y. N. Palma, and M.-C. Su. 2016. Changing nitrogen cycles in ecosystems across the globe: Training the next generation of ILTER scientists. *LTER Network News*.

Hewitt, R. E. 2014. Fire-severity effects on plant-fungal interactions: implications for Alaskan treeline dynamics in a warming climate. PhD thesis. University of Alaska Fairbanks, Fairbanks, Alaska.

Chapin III, F. S., T. N. Hollingsworth, and **R. E. Hewitt**. 2014. Fire effects on seedling establishment success across Treeline: Implications for future tree migration and flammability in a changing climate. Joint Fire Science Program Graduate Research Innovation Award final report.

Current research support

NSF, Arctic System Science, Collaborative Research: The roles of plant roots, mycorrhizal fungi and uptake of deep nitrogen in the permafrost carbon feedback to warming climate. 2015-2019 (PI: M. C. Mack, Northern Arizona University; Co-PIs D. L. Taylor, University of New Mexico; H. Genet and A. D. McGuire, University of Alaska Fairbanks; Contributor Hewitt, R. E., NAU) Total: \$1,610,000, NAU: \$754,433

National Geographic Society, Plant acquisition of deep nitrogen and the permafrost carbon feedback to climate. 2017-2018 (R. E. Hewitt and M. C. Mack, Northern Arizona University, \$20,00)

NSF, Arctic System Science, Collaborative Research: Fire Influences on forest recovery and associated climate feedbacks in the Siberian Arctic 2017-2021 (PI: H. Alexander, University of Mississippi; Co-PIs M.C. Mack and R. E. Hewitt, Northern Arizona University; M. Loranty, Colgate University, R. W. McEwan, University of Dayton; J. M. DeMarco and J. W. Lichstein, University of Florida) Total: \$1,604,678, NAU: \$255,681

Awards and honors

2014	UAF Lowell Thomas Jr. Scholarship
2013	Ecological Society of America Microbial Ecology Section Student Travel Award
2013-2014	Dissertation Completion Fellowship, University of Alaska
2012	Joint Fire Science Program Graduate Research Innovation Award
2012	Alaska EPSCoR Graduate Research Grant
2012	Alaska INBRE Graduate Research Grant
2012	NSF IRES grant to work in Tierra del Fuego, Argentina
2011	Alaska EPSCoR Graduate Research Grant
2010	Arctic Institute of North America Grant-in-Aide
2010-2013	NSF Graduate Research Fellowship
2010	Alaska EPSCoR Landscape Genetics Student Research Award
2009-2010	Alaska EPSCoR Graduate Research Fellowship
2009-2010	University of Alaska Foundation John B. Henderson Scholarship
2009-2010	University of Alaska Howenstein Field Research scholarship
2009-2011	Center for Global Change and Arctic System Research Grant
2009	EPSCoR All Hands Meeting, first place poster session
2009	LTER ALL Scientist Meeting, first place poster session
2005	Lake Champlain Research Consortium Student Research Grant
2005	Janet C. Curry '49 Award in the Biological Sciences, Middlebury College
2004	Vermont Genetics Network Student Research Grant

Presentations

- Hewitt, R. E.**, The roles of plant roots, mycorrhizal fungi, and uptake of deep nitrogen in the permafrost carbon feedback to warming climate. Invited seminar speaker, Department of Biology, University of New Mexico, 2017 (Albuquerque, New Mexico).
- Hewitt, R. E.**, D. L. Taylor, H. Genet, A. D. McGuire, and M. C. Mack. Deep nitrogen acquisition in warming permafrost soils: Contributions of belowground plant traits and fungal symbioses in the permafrost carbon feedback to climate. Annual meeting of the Arctic LTER, 2017 (Woods Hole, Massachusetts).
- Hewitt, R. E.**, D. L. Taylor, H. Genet, A. D. McGuire, and M. C. Mack. Deep nitrogen acquisition in warming permafrost soils: Contributions of belowground plant traits and fungal symbioses in the permafrost carbon feedback to climate. American Geophysical Union, 2016 (San Francisco, California).
- Hewitt, R. E.** and M.C. Mack. Deep nitrogen acquisition in warming permafrost soils: Contributions of belowground plant traits and fungal symbioses in the permafrost carbon feedback to climate. ILTER Nitrogen Initiative Meeting, 2016 (Sapporo, Japan).
- Hewitt, R. E.**, A. P. Bennett, A. L. Breen, T. N. Hollingsworth, D. L. Taylor, F. S. Chapin III, and T. S. Rupp. Getting to the root of the matter: landscape implications of

- plant-fungal interactions for tree migration in Alaska. American Geophysical Union, 2015 (San Francisco, California).
- Hewitt, R. E.** and M.C. Mack. Deep nitrogen acquisition in warming permafrost soils: Contributions of belowground plant traits and fungal symbioses in the permafrost carbon feedback to climate. Theo Murphy Elements, genomes, and ecosystems: cascading nitrogen and phosphorus impacts across levels of biological organization, 2015 (Buckinghamshire, UK).
- Hewitt, R. E.**, A. P. Bennett, A. L. Breen, T. N. Hollingsworth, D. L. Taylor, F. S. Chapin III, and T. S. Rupp. Getting to the root of the matter: landscape implications of plant-fungal interactions for tree migration in Alaska. Climate, Conservation, and Community in Alaska and Northwest Canada, 2014 (Anchorage, Alaska).
- Hewitt, R. E.**, M.C. Mack, T. N. Hollingsworth, D. L. Taylor, and F. S. Chapin III. Getting to the root of the matter: the role of mycorrhizal fungi in post-fire seedling establishment at treeline. Ecological Society of America, 2014 (Sacramento, California).
- Breen, A. L., A. Bennett, **R.H. Hewitt**, T. N. Hollingsworth, H. Genet, E. S. Euskirchen, A. D. McGuire, and T. S. Rupp. Tundra fire and vegetation dynamics: Simulating the effects of climate change on fire regimes in Arctic ecosystems. American Geophysical Union, 2013 (San Francisco, California).
- Hewitt, R. E.**, T. N. Hollingsworth, D. L. Taylor, and F. S. Chapin III. Do post-fire plant-fungal interactions shape biome shifts? Ecological Society of America, 2013.
- Breen, A. L., A. Bennett, **R. E. Hewitt**, A. Springsteen, M. Lindgren, T. N. Hollingsworth, and T. S. Rupp. Tundra fire and vegetation dynamics: Simulating the effects of climate change on fire regimes in Arctic ecosystems. Arctic Science Summit Week, 2013 (Krakow, Poland).
- Hewitt, R. E.**, T. N. Hollingsworth, D. L. Taylor, and F. S. Chapin III. Getting to the root of the matter: Fire effects on mycorrhizal seedling establishment and tree migration in Alaska. LTER All Scientist Meeting, 2012 (Estes Park, Colorado).
- Hewitt, R. E.**, T. N. Hollingsworth, D. L. Taylor, and F. S. Chapin III. The role of fire in facilitating treeline expansion: Getting to the root of the matter. American Geophysical Union, 2011 (San Francisco, California).
- Hewitt, R. E.**, T. N. Hollingsworth, D. L. Taylor, and F. S. Chapin III. Resprouting tundra shrubs may act as ectomycorrhizal refugia during wildfire facilitating boreal tree seedling establishment. Mycological Society of America, 2011 (Fairbanks, Alaska).
- Hewitt, R. E.**, T. N. Hollingsworth, D. L. Taylor, and F. S. Chapin III. 2011. Resprouting tundra shrubs may act as ectomycorrhizal refugia during wildfire facilitating boreal tree seedling establishment. International Boreal Forest Research Association (Krasnoyarsk, Russia).
- Hewitt, R. E.**, T. N. Hollingsworth, D. L. Taylor, and F. S. Chapin III. The role of mycorrhizal fungi in promoting or inhibiting post-fire seedling establishment across treeline. Alaska EPSCoR Meeting, 2009 (Fairbanks, Alaska).
- Hewitt, R. E.**, T. N. Hollingsworth, D. L. Taylor, and F. S. Chapin III. Going Underground: The role of mycorrhizal fungi in promoting or inhibiting post-fire

seedling establishment across treeline. LTER All Scientist Meeting, 2009 (Estes Park, Colorado).

Interdisciplinary research activities and collaborations

- Future of Fire Working Group, NSF DEB sponsored (2017)
- Permafrost Carbon Network (2016-present)
- TeaComposition: Global network experimental field study of controls over decomposition rates (2016-present)
- Carbon in Arctic Tussock Tundra (CATT): Global network experimental field study of how tussocks sedges influence ecosystem structure and function (2016-present)
- Global Treeline Range Expansion Experiment (GTREE): Global network experimental field study of constraints of tree migration (2013-present)
- University of the Arctic, Natural Hazards Working Group (2014)
- Integrated Ecosystem Model for Alaska, Vegetation Dynamics Working Group (2012-2014)

Research and teaching integration

- PolarTREC (Teachers and Researchers Exploring and Collaborating): teachers from the United States spend 3-6 weeks participating in hands-on field research experiences in the polar regions (2016)

Collaborative training participant

- Microbiome Bioinformatics with QIIME 2 (2017)
- International Long Term Research Nitrogen Initiative Workshop, Hokkaido, Japan (2016)
- University of Utah stable isotopes in ecology, Salt Lake City, Utah (2009)
- School for International Training: Ecology and Conservation, Botswana (2004)

Reviewer

Ecology, Ecology Letters, Ecosystems, Environmental Research Letters, FEMS Microbiology Ecology, Global Change Biology, Journal of Ecology, Journal of Geophysical Research – Biogeosciences, Journal of Vegetation Science, Molecular Ecology, Polar Biology

Outreach activities

- PolarTREC <https://www.polartrec.com/expeditions/deep-roots> (2016-2017)
- Early Career Climate Forum <https://www.eccforum.org> (2016)
- Bonanza Creek LTER In a Time of Change Arts, Humanities, Science Collaboration <https://itoc.alaska.edu> (2009-2016)