

ROSE MARIE MUZIKA

CURATOR OF ECOLOGY, CARNEGIE MUSEUM OF NATURAL HISTORY;
POWDERMILL NATURE RESERVE, RECTOR, PA 15677
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EDUCATION

Ph.D. Forestry, Graduate certificate in Ecology and Evolutionary Biology

Michigan State University, East Lansing, MI

M.Sc. Biology, emphasis in Environmental Science

Clarion University of Pennsylvania, Clarion, PA

B.A. Biology Seton Hill University (formerly Seton Hill College), Greensburg, PA

SELECT HONORS, AWARDS, AND PROFESSIONAL DEVELOPMENT

- Fulbright Fellowship, University of Iceland
- Harvard Forest Fellowship, Harvard University
- Huron Mt Wildlife Foundation Manierre Research Award
- Outstanding Undergraduate Advisor Award, University of Missouri
- Outstanding Faculty award, University of Missouri
- Golden Apple Teaching Award, College of Agriculture, University of Missouri
- Tribute to Mizzou Women Award, University of Missouri
- Excellence in Education Award, Division of Student Affairs, University of Missouri
- European Union Center Fellowship, University of Missouri
- Golden Chalk Award for Excellence in Graduate Education, University of Missouri
- Honors Convocation Faculty Mentor, University of Missouri
- LEAD 21 Leadership for the 21st century Leadership Development Program
- University of Missouri System Leadership Development Program

PROFESSIONAL EXPERIENCE

ACADEMIC APPOINTMENTS

ASSOCIATE DIRECTOR OF ACADEMIC PROGRAMS AND RESEARCH

School of Natural Resources, University of Missouri, Columbia, MO

CHAIR, DEPARTMENT OF FORESTRY

University of Missouri, Columbia, MO

PROFESSOR OF FOREST ECOLOGY AND FOREST HEALTH, Department of Forestry, School of Natural Resources,
University of Missouri, Columbia, MO

ADJUNCT PROFESSOR, University of Notre Dame

PROFESSIONAL EXPERIENCE AND APPOINTMENTS

CARNEGIE MUSEUM OF NATURAL HISTORY 2018 - PRESENT

CURATOR of Ecology, Science and Research: Powdermill Nature Reserve

UNIVERSITY OF MISSOURI 1998 - 2017

PROFESSOR (2009), Associate Professor (2004), Assistant Professor (1998)

ASSOCIATE DIRECTOR, School of Natural Resources (2012-2017)

CHAIR, Dept. of Forestry (2008-2011)

DIRECTOR OF GRADUATE STUDIES, Department of Forestry (2003-2008)

DIRECTOR OF CONSERVATION BIOLOGY GRADUATE PROGRAM, (2004-2012)

USDA FOREST SERVICE

RESEARCH ECOLOGIST, NE Research Station, Morgantown, WV (1992-1998)

ECOLOGIST, Monongahela National Forest, Elkins, WV (1991-1992)

RESEARCH ENTOMOLOGIST, PNW Research Station, La Grande, OR (1989-1991)

LEGISLATIVE SERVICE BUREAU, STATE OF MICHIGAN, 1989

SCIENCE POLICY ANALYST

MICHIGAN STATE UNIVERSITY 1985-1989

GRADUATE RESEARCH AND TEACHING ASSISTANT, Department of Forestry and Department of Botany and Plant Pathology

CURRENT RESEARCH, POLICY, AND MANAGEMENT EMPHASES

- Forest health monitoring, detection, management
- Fire Ecology; wildland fire predictions
- Management approaches for invasive species
- Nonnative organisms and ecological dynamics
- Forest disturbance history reconstruction

COURSES TAUGHT AT THE UNIVERSITY OF MISSOURI

Forest Ecology – upper division undergraduate course for natural resources students

Ecology Field studies – field course for 2nd - 3rd year natural resources students

Forest Health and Protection – forest entomology, pathology, management course

Field Botany and Ecological classification – upper division undergraduate course

Honors Discussion Session in Natural Resources – non-major undergraduate Honors topics course

Advanced Forest Ecology – Graduate course

Practice of Silviculture (as co-instructor) – upper division undergraduate course for forestry majors

Covering Nature and Society in the Developing World – co-taught with Journalism faculty in Costa Rica

Other instruction:

The University of Notre Dame: Insect Ecology (undergraduate course).

Taught annually at the Notre Dame Environmental Research Center in northern Wisconsin

West Virginia University: Insect Ecology (graduate course) taught while a research scientist for the USDA Forest Service research, Morgantown, WV

SELECT PUBLICATIONS

IN REVIEW AND IN PRESS

Muzika, RM and RS Morin. *In press* Oak Mortality Patterns in the Midwestern US, North America.

International Oaks

Lee, CA and RM Muzika. *In review*. Facultative parasitism and opportunism in a forest fungus: spatial and temporal pre-positioning as part of forest succession. Fungal Ecology

Maginel, C, BO Knapp, JM Kabrick, and RM Muzika. *In press*. Landscape and site level responses of woody structure and ground flora to repeated prescribed fire in the Missouri Ozarks. Canadian Journal of Forest Research

PUBLISHED

Reed, SE, JE English and RM Muzika. 2019. *Phytophthora* species detected in two Ozark forests with unusual patterns of white oak mortality. Plant Disease 103:102-109. DOI: 10.1094/PDIS-02-18-0253-RE

- Wood, JD, BO Knapp, RM Muzika, MC Stambaugh and L Gu. 2018. The importance of drought-pathogen interactions in driving oak mortality events in the Ozark Border Region. Environmental Research Letters <https://doi.org/10.1088/1748-9326/aa94fa>
- Muzika, RM. 2017. Silviculture for management and restoration of forests affected by biological invasions. Biological Invasions doi: 10.1007/s10530-017-1549-3
- Guyette, RP, MC Stambaugh, DE Dey, RM Muzika. 2017. The theory, direction, and magnitude of ecosystem fire probability as constrained by precipitation and temperature. PLoS ONE, 12(7) doi:10.1371/journal.pone.0180956
- Lee, CA, J Bruhn, RM Muzika. 2017. Distribution of *Heterobasidion irregulare* in Missouri pine-oak forests. North American Fungi, [S.l.], v. 12, p. 1-20, feb. 2017. ISSN 1937-786X. doi:http://dx.doi.org/10.2509/10.2509/naf2017.012.001.
- Lee, CA, D Dey, RM Muzika. 2016. Oak stump-sprout vigor and Armillaria infection after clearcutting. Forest Ecology and Management. 374:211-219.
- Hubbart, JA, RP Guyette, RM Muzika. 2016. More than drought: precipitation variance, excessive wetness, pathogens and future of the western edge of the eastern deciduous forest. Science of the Total Environment 567: 463-467.
- Maginel, CJ, BO Knapp, J Kabrick, E Olson, RM Muzika. 2016. Quality Index for woodland restoration: utility and effectiveness in a fire-managed landscape. Ecological Indicators 67:58-67
- Yanoviak, SP, E Gora, J Fredlye, PM Bitzer, RM Muzika, WP Carson. 2015. Direct effects of lightning in temperate forests: a review and preliminary survey in a hemlock-hardwood forest of the northern United States. Canadian Journal of Forest Research. 45: 1258-1268
- Muzika, RM, RP Guyette, MC Stambaugh, JM Marschall. 2015. Fire, drought and humans in a heterogeneous Lake Superior landscape. Journal of Sustainable Forestry 34:49-70
- Lee, CA and RM Muzika. 2014. Plant senescence for ecologists: precision in scale, concept, and terminology. Plant Ecology 215 (12): 1417-1422
- King, CB and RM Muzika. 2014. Historic fire and canopy disturbance in an oak-pine forest of the Missouri Ozarks (1624-2010). Castanea 79 (2): 78-87
- Lee, CA, SL Voelker, RM Holdo, RM Muzika. 2014. Tree architecture as a predictor of growth and mortality after an episode of red oak decline in the Ozark Highlands of Missouri, USA. Canadian Journal of Forest Research 44:1005-1012.
- Schultz, AN and RM Muzika. 2013. The effect of fire on insect diversity in the Missouri Ozark Highlands. McNair Journal 21:8-12.
- Muzika, RM and LS Heath. 2012. Fire Effects. In: A synthesis of evaluation monitoring projects sponsored by the Forest Health Monitoring Program (1998-2007). Gen. Tech. Rep. SRS-159. Asheville, NC: U.S. Department of Agriculture Forest Service, Southern Res Station. 140 p.
- Guyette, RG, MC Stambaugh, D Dey, RM Muzika. 2012. Predicting ecosystem fire using chemistry and climate. Ecosystems 15: 322-335.
- Muzika, RM and SJ Farrington. 2012. Effects of silvicultural practices on invasive plant species abundance in the Missouri Ozark forests of the central United States, in: Invasive Plant Ecology CRC Press. pp 111-118.
- Hubbart, JA, RM Muzika, D Huang, A Robinson. 2011. Bottomland Hardwood Forest Influence on Soil Water Consumption in an Urban Floodplain: potential to improve flood storage capacity and reduce stormwater runoff. The Watershed Science Bulletin Fall 2011: 34-43.
- Unger, IM, RM Muzika, PP Motavalli. 2010. The effect of flooding and residue incorporation on soil chemistry, germination and seedling growth. Environ. and Experimental Botany 69:113-120.
- Reed, SE and RM Muzika. 2010. The Influence of Forest Stand and Site Characteristics on the Composition of Exotic Dominated Ambrosia Beetle Communities (Coleoptera: Curculionidae: Scolytinae) Environmental Entomology 39: 1482-1491.

- Farrington, SJ, RM Muzika, D Drees, TM Knight. 2009. Harvesting and herbivory affect the population dynamics of American ginseng (*Panax quinquefolius*). Conservation Biology 23: 719-728.
- Unger, IM, RM Muzika, A Kennedy. 2009. Flooding Effects on Soil Microbial Communities. Applied Soil Ecology 42:1-8.
- Unger, IM, PP Motavalli, RM Muzika. 2009. Changes in Soil Chemical Properties with Flooding: A Field Laboratory Approach. Agriculture, Ecosystems and Environment 131: 105-110.
- Unger, IM, RM Muzika, PP Motavalli, J Kabrick. 2008. Evaluation of Continuous In Situ Monitoring of Soil Changes with Varying Flooding Regimes. Communications in Soil Science and Plant Analysis 39:1600-1619
- Voelker, SL, RM Muzika, RP Guyette. 2008. An investigation of individual tree and stand level factors that influence growth, vigor and decline of red oaks in the Ozarks. Forest Science 54: 8-20.
- Yates, MD and RM Muzika. 2006. Effect of forest structure and fragmentation on site occupancy of bat species in Missouri Ozark forests. Journal of Wildlife Management 70:1238- 1248.
- Voelker, SL, RM Muzika, RP Guyette and MC Stambaugh. 2006. Historic CO₂ Enhancement declines with age in *Quercus* and *Pinus*. Ecological Monographs 76: 549-564.
- Guyette, RP, MC Stambaugh, RM Muzika and ER McMurry. 2006. Fire history at the southwestern great plains margin, Capulin Volcano National Monument. Great Plains Research 16:161-172.
- Guyette, RP, MC Stambaugh, A Lupo, RM Muzika and DC Dey. 2006. Oak growth in Midwestern North America linked with post glacial climate epochs in the North Atlantic. PAGES news 14:21-22.
- Duchamp, JE, MD Yates, RM. Muzika and RK. Swihart. 2006. Estimating probabilities of detection for bat echolocation calls: an application of the double observer method. Wildlife Soc Bulletin 34:408-412.
- Elkinton, J.S., A.M. Liebhold, and R.M. Muzika. 2004. Effects of Alternative Prey on Predation by Small Mammals on Gypsy Moth Pupae. Population Ecology 46: 171-178
- Muzika, RM, ST Grushecky, AM Liebhold, and RL Smith. 2004. Using thinning as a management tool for gypsy moth: the influence on small mammal abundance. Forest Ecology and Management 192:349-359
- Muzika, RM, RP Guyette, T Zielonka, and AM Liebhold. 2004. The influence of O₃, NO₂ and SO₂ on growth of *Picea abies* and *Fagus sylvatica* in the Carpathian Mountains. Environmental Pollution 130:65-71.
- Muzika, RM, RP Guyette, T Zielonka, and AM Liebhold. 2002. The influence of air pollution on tree growth in the Carpathian Mountains. Pages 185-193 from: Effects of Air Pollution on Forest Health and Biodiversity in Forests of the Carpathian Mountains. NATO Scientific Affairs Division; IOS Press, Amsterdam.
- Guyette, RP, RM Muzika and DC Dey. 2002. Dynamics of an anthropogenic fire regime. Ecosystems 5: 472-486.
- Guyette, RP, WG Cole, DC Dey and RM Muzika. 2002. Age distributions of large woody debris in riparian carbon pools. Canadian Journal of Fisheries and Aquatic Sciences 59(3): 578-585
- Bytnerowicz, A. R. Szaro, D. Karnosky, W. Manning, M. Mcmanus, R. Musselman, and R.M. Muzika. 2002. Importance of International Research Cooperative Programs for Better Understanding of Air Pollution Effects on Forest Ecosystems in Central Europe. Pages 13-20 in: Effects of Air pollution on Forest Health and Biodiversity in forests of the Carpathian Mountains. NATO Scientific Affairs Division; IOS Press, Amsterdam.
- Stambaugh, MC, RM Muzika and RP Guyette. 2002. Disturbance and vegetation dynamics in an old-growth shortleaf pine (*Pinus echinata* Mill.) forest within the Ozark Highlands, Missouri. Natural Areas Journal 28:108-119.
- Liebhold, AM, JS Elkinton, DW Williams, and RM Muzika. 2000. What causes outbreaks of gypsy moth in North America? Population Ecology 42:257-266.
- Muzika, R.M., A.M. Liebhold, and M.J. Twery. 2000. Dynamics of twolined chestnut borer as influenced by gypsy moth defoliation and selection thinning. Agricultural and Forest Entomology 2: 283-289.
- Muzika, R.M. and A. M. Liebhold. 2000. A critique of silvicultural approaches to managing defoliating insects in North America. Agricultural and Forest Entomology 2: 97-105

- Muzika, R.M. and A.M. Liebhold. 1999. Changes in radial increment in host and non-host tree species with gypsy moth defoliation. Canadian Journal of Forest Research 29: 1365-1373.
- Liebhold, A.M., R.M. Muzika, A. Sharov, and D. Williams. 1998. Landscape level approaches to understanding gypsy moth population ecology. Recent Research Developments in Entomology 2: 87-102.
- Liebhold, A.M., R.M. Muzika, and K.W. Gottschalk. 1998. Does forest thinning affect gypsy moth dynamics? Forest Science 44: 239-245.
- Muzika, R.M. and A.M. Liebhold. 1997. Ecological effects of introduced species in North America. Acta Phytopathologica et Entomologica Hungarica 32: 161-170.
- Muzika, R.M. and M.J. Twery. 1997. Early-Season activity and habitat characteristics of terricolous spider families (Araneae) in an Appalachian Oak-Mixed Hardwood Forest. Environmental Entomology 26: 497-506.
- Muzika, R.M. 1993. Terpenes and phenolics in response to nitrogen fertilization: a test of the carbon/nutrient balance hypothesis. Chemoecology 4: 3-7.
- Lewinsohn, E, M Gijzen, RM Muzika, K Barton, and R Croteau. 1993. Oleoresinosis in grand fir saplings and mature trees: modulation of this wound response by light and water stress. Plant Physiology 101: 1021-1028.
- Muzika, RM and KS Pregitzer. 1992. Effect of nitrogen fertilization on leaf phenolic production of grand fir seedlings. Trees - Structure and Function 6: 241-244.
- Muzika, RM, CL Campbell, AL Smith, and JW Hanover. 1990. Comparison of techniques for extracting volatile chemicals from conifer needles. Journal of Chemical Ecology 16: 2713-2722.
- Muzika, RM, KS Pregitzer, and JW Hanover. 1989. Changes in terpene production with fertilization of grand fir (*Abies grandis*) seedlings. Oecologia 80: 485-489.
- Muzika, RM, JB Gladden, and JD Haddock. 1987. Structural and functional aspects of succession in Southeastern floodplain forests following a major disturbance. American Midland Naturalist 117: 1-9.

RECENT REFEREED TECHNICAL PUBLICATIONS OR PROCEEDINGS

- Olson, E.K., R.M Muzika, and S. Farrington, in press. Twenty Years of Ground Flora Community Response to Forest Management in the Missouri Ozarks. Missouri Department of Conservation Technical Bulletin
- Reed, S.E. J. T. English, R M. Muzika, J.M Kabrick, S. Wright. 2016. Characteristics of sites and trees affected by rapid white oak mortality as reported by forestry professionals in Missouri. Pages 240-247 in: Proceedings of the 20th Central Hardwood Forest Conference.
- King, C. B. and R. M. Muzika. 2013. A multi-century analysis of disturbance dynamics in pine-oak forests of the Missouri Ozark Highlands. Pages 50-62 in: Proceedings of the 18th Central Hardwood Forest Conference, GRT NRS – P – 117.
- Guyette, R.P., M.C. Stambaugh, and R. Muzika. 2010. Fire history at the Nickel Preserve, Cherokee County, Oklahoma. Report to Oklahoma Dept. of Wildlife Conservation. 22 pp.
- Unger, I.M., R.M. Muzika. 2008. Influence of Microtopography on Soil Chemistry and Understory Riparian Vegetation. Pages 565-579. In: Jacobs, Douglass F.; Michler, Charles H., eds. Proceedings, 16th Central Hardwood Forest Conference; 2008 Gen. Tech. Rep. NRS-P-24. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northern Research Station.
- Stevenson, A.P., R.M. Muzika and R.P. Guyette. 2008. Fire scars and tree vigor following prescribed fires in Missouri Ozark upland forests. Pages 525-534 In: Jacobs, Douglass F.; Michler, Charles H., eds. Proceedings, 16th Central Hardwood Forest Conference; 2008 Gen. Tech. Rep. NRS-P-24. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northern Research Station.
- Stambaugh, M.C. and R. M. Muzika. 2007. Successional trends of six mature shortleaf pine forests in Missouri. Proceedings: Shortleaf pine Restoration and Ecology in the Ozarks. Northern Research Station GTR NRS-P-15, Pages 59-67.

- Guyette, R.P., R.M. Muzika and S.L. Voelker. 2007. The historical ecology of fire, climate, and the decline of shortleaf pine in the Missouri Ozarks. Proceedings: Shortleaf pine Restoration and Ecology in the Ozarks. Northern Research Station GTR NRS-P-15, Pages 8-18.
- Guyette, R.P., R.M. Muzika, M.C. Stambaugh. 2007. Tree rings: Natural Area Historians. Missouri Natural Areas Newsletter 8: 10-11
- Guyette, R.P., R.M. Muzika and A. P. Stevenson 2007. Rotation length based on a time series analysis of timber degrade caused by oak borers. Proceedings 15th Central Hardwood Forest Conference. Northeastern Research Station GTR SRS-101, pages 176-180.
- Unger, I.M., R. M. Muzika. 2007. Plant Communities Associated with Multi-Aged Clearcuts in the Missouri Ozarks. Proceedings 15th Central Hardwood Forest Conference. Northeastern Research Station GTR SRS-101, pages 709-718.
- McMurry, E.R. and R. M. Muzika. 2007. Initial Effects of Prescribed Burning and Thinning on Plant Communities in the Southeast Missouri Ozarks. Proceedings 15th central Hardwood Forest Conference. Northeastern Research Station GTR SRS-101, pages 241-249
- Guyette, R.P., M.C. Stambaugh, R.M. Muzika, and D.C. Dey. 2006. Fire scars reveal variability and dynamics of eastern fire regimes. In: (P. Brose eds.) Proceedings of the Conference on Fire in Eastern Oak Forests: Delivering Science to Land Managers GTR-NRS-P-1, pp 20-39.
- Voelker, S.L. and R.M. Muzika. 2005. An update on forest health in Missouri: Oak decline, live fast, die young. Notes for Forest Managers, Missouri Department of Conservation.
- Stambaugh, M.C. and R.M. Muzika. 2004. Promoting shortleaf pine: canopy openness and pine regeneration in closed canopy forests. Notes for Forest Managers, Missouri Department of Conservation.
- Liebhold, A.M., K.W. Gottschalk, J.M. Guildin, and R.M. Muzika. 2004. Defoliation potential in the Ouachita / Ozark Highlands. pp 267-272. IN: Ouachita and Ozark Mountains symposium: ecosystem management research. Gen. Tech. Report SRS-74, Asheville, NC.
- Muzika, R.M., and R.P. Guyette. 2004. A dendrochronological analysis of red oak borer. Pp. 102-105. Upland Oak Ecology Symposium: history, current conditions, and sustainability. USDA Forest Service General Technical report SRS-73.
- Guyette, R.P., R.M. Muzika, J. Kabrick, and M.C. Stambaugh. 2004. A perspective on *Quercus* life history characteristics and forest disturbance. Pp. 138-142. Upland Oak Ecology Symposium: history, current conditions, and sustainability. USDA Forest Service Gen Tech report SRS-73.
- Sasseen, A.N. and R.M. Muzika. 2004. Timber harvesting, prescribed fire, and vegetation dynamics in the Missouri Ozarks. Pages 179-192, from: Proceedings 14th central Hardwood Forest Conference. Northeastern Research Station GTR NE-316.

RECENT INVITED PRESENTATIONS

- “Loss of oak in the Midwestern US: causes and consequences” West Virginia University, Morgantown, WV March 2019
- “What can we learn from tree rings?” Powdermill Nature Center. March 2019
- “Humans, Climate, and Fire: Deciphering the past to understand the present and to predict the future” Moriarity Series Lecture, Carnegie Museum of Natural History. January 2019
- “The Ecology of Fire - A pervasive, powerful & complex environmental influence” University of Pittsburgh, Pittsburgh, PA November 2018
- “Unraveling the enduring mystery of dying oak trees in the Ozarks” Biology Dept Seminar, University of Arkansas, Fayetteville, AR October 2018
- “Oak Mortality Patterns and Causes in the Midwestern US, North America” International Oak Society Conference, Davis, CA October 2018
- “Diagnosing urban forest insect and disease problems” City of Columbia, MO March 2018

“Drought pathogen interactions and implications for tree mortality” USDA APHIS Climate Change Working Group. February 2018

“Understanding climate change and wildfire using dendroecology” University of Pittsburgh Graduate seminar series. October 2017

“Oak decline: a brief history and a complex etiology: North Central Forest pest Workshop. Rolla, MO September 2017.

“Nature, nurture and neglect in Ozark forests.” Ozark Area Bioregional Congress. October 2016 Hammonds’ Mill, MO.

“Silviculture for management and restoration of forests affected by invasive species”. July 2016. IUFRO Task Force conference, Shepards town, WV

“White oak mortality: CSI” June 2016. Presentation to REU students, Harvard Forest, Petersham, MA.

“Climate Change and Forest Disturbance.” April 2016. Earth Day Presentation, Petersham, MA

“Disturbance regimes of the western edge of the Eastern Deciduous Forest” August 2015. Ecological Society of America. In: Dynamics, Conservation Status, and Future of the Eastern Deciduous Forest Biome: A Session in Honor of E. Lucy Braun

“Effect of fire on ground foraging ants” July 2015. Presentation at the University of Notre Dame Environmental Research Center.

“The ecological and silvicultural consequences of disturbance and salvaging on the sustainability and biodiversity of Forest Ecosystems” May 2015 Carnegie Museum of Natural History Powdermill Nature Reserve, Ligonier, PA

“What’s ailing my tree? A Few ideas to consider for diagnosis and remedy” February 2015 City of Columbia Tree Keepers short course. Columbia, MO.

“Ecosystem management for urban areas” March 2015. Missouri community forestry council annual conference. St. Louis, MO.

“Understanding the causes of white oak mortality in Missouri” March 2015. Missouri Forest Resource Advisory Council. Jefferson City, MO.

“Looking at Tree Rings, the inside story of forest health” March 2015. The 53rd Annual Minnesota Shade Tree Course. St. Paul, MN.

“Climate and human effects on fire regimes of the Great Lakes” February 2014. Fire in the Northeast Conference, Yale University, New Haven, CT

“Using dendrochronology to interpret forest health concerns” September 2014. North Central Forest Pest Workshop, Chariton, IA

RECENT RESEARCH GRANTS

Missouri Department of Conservation, 2017-2018. (\$229,832, with one Co-PI) Effects of even-aged and uneven-aged forest management on ground flora and soft mast production in Missouri’s Ozark forests and woodlands.

USDA Forest Service, Forest Health Monitoring. 2016-2017. (\$55,556, with 3 PI’s). Investigating causes of bishop pine (*Pinus muricata* D. Don) mortality on California’s north coast.

Missouri Department of Conservation. 2014-2016. (\$15,000). Investigation of rapid white oak decline.

USDA Forest Service, Forest Health Monitoring. 2013-2015. (\$74,800 , with one Co-PI) White Oak decline evaluation monitoring in the Midwest.

Missouri Department of Conservation. 2012-2014. (\$30,895) Examining the effect of landscape fire on woody vegetation.

Huron Mt. Wildlife Foundation: 2010-2016 (~\$23,000). Boulders as refugia from overbrowsing by moose and deer: evaluating the potential of recolonization.

USDA NIFA International Science and Education. 2011-2014. (\$148,904, with one Co-PI). Internationalization of Forestry Education, Research and Extension: U.S.-Costa Rica Cooperation.

Missouri Department of Conservation. 2009-2016, (\$301,784). Effects of even-aged and uneven-aged forest management on ground flora and soft mast production in Missouri's Ozark forest and woodlands.

National Science Foundation GK12 2011-2014. (\$1,006,355 with three Co-PI). STEM Fellows: ShowMe Nature from elements to ecosystems.

USDA Forest Service. 2010-2013, (\$60,000). Disturbance dynamics and pre 18th century forest structure in pine oak communities of the Ozark Highlands, Missouri.

USDA National Needs Fellowship. 2009-2014, (\$245,000, with one Co-PI). Integrating disciplinary diversity in graduate student education to support forest resource management decisions.

USDA Forest Service, Northeastern Area State and Private Forestry: 2008-2009, (\$16,500). Detection trapping for emerald ash borer on federal lands in Missouri.

USDA Forest Service, Northeastern Area State and Private Forestry: 2008-2009, (\$25,000). Early Detection of Exotic Bark Beetles in Missouri.

National Science Foundation – Division of Environmental Biology: 2006-2010, (\$600,000, with two PI's). Establish Interdisciplinary Undergraduate Mentoring in Environmental Biology.

Oklahoma Department of Fish and Game: 2006-2009, (\$43,489 with one Co-PI). Using Tree Ring Analysis to Determine Fire History In the Oklahoma Ozarks

US Department of Interior – National Park Service: 2006-2008, (\$238,000 with one Co-PI). Fire History of the Great Plains.

USDA Forest Service, Southern Research Station: 2006-2008, (\$21,779). Regional variation in historic red oak borer population

USDA Forest Service, Northeast Area Forest Health Monitoring: 2005-2007, (\$38,621). Effects of prescribed fire on oak pests and invasive plant species.

USDA Agricultural Research Service: 2000-2005, (\$214,307 among 5 Co-PI's). Developing a knowledge base for increasing the number of small farm agroforestry adopters and their financial gain.

USDA Forest Service, Southern Research Station: 2003-2004, (\$12,819). Risk assessment for oak decline in the Ozarks.

USDA Forest Service. Joint Fire Sciences Project: 2001-2005, (\$53,000). Effects of fuel reduction treatments on ground flora, understory and overstory treatments.

University of Missouri European Union Center: 2007 (\$3,500). Developing goals for restoration by quantifying natural communities and land use change in the Czech Republic.

University of Missouri Research Council Grant: 2007 (\$7,474). Identifying competitive interactions and fungal symbionts of native and non-native ambrosia beetles.

Huron Mt. Wildlife Foundation: 2006-2007 (\$8,400). Fire History of the Huron Mountains, Upper Peninsula, MI

RECENT INTERNATIONAL ACTIVITIES

Co-facilitator of a science journalism course in Costa Rica

Lecturer University of Banja Luka, Bosnia

Coordinator of Natural Resources Study abroad program, Czech University of Life Sciences

Invited Guest Lecture, University of Tasmania, Australia

Invited Guest Lecture, Deakin University, Melbourne, Australia

EARTH University, Monteverde Institute, Costa Rica, collaboration on student internships and research

Participation in the International Conference of Dendrochronology, Melbourne, Australia

Brazil (University of Missouri Global Scholars Program) (selected but did not attend)

INVITED PROFESSIONAL ACTIVITIES

Member: International Union of Forest Research Organizations (IUFRO) task force on biological invasions
Board Member: Forest History Society
Science advisor: The Forest Stewards Guild
Member: Society of American Foresters, Educational Policy Review Committee

Service on Editorial Boards

Associate Editor: *Frontiers in Forests and Global Change*
Associate Editor: *Ecological Monographs*
Associate Editor: *Ecology*
Associate Editor: *Northern Journal of Forestry*
Special Issues Associate Editor: *Forest Ecology & Management*

Professional and Trade memberships:

American Association for the Advancement of Science	Phi Kappa Phi
Society of American Foresters	Ecological Society of America
Blacksmiths Association of Missouri	

RECENT SERVICE (REVIEWER)

Grant reviewing: (recent)

National Science Foundation
Environmental Protection Agency
USDA National Institute of Food and Agriculture
USDA NRI Arthropod and Nematode Biology Panel
USDA NRI Invasive Biology of Weedy and Invasive Species in Agroecosystems Panel
NSF Graduate research fellowship panel

Journals (recent):

<i>Canadian Journal of Forest Research</i>	<i>Journal of Ecology</i>
<i>Forest Science</i>	<i>Ecology</i>
<i>Ecological Applications</i>	<i>Northern Journal of Applied Forestry</i>
<i>Bulletin of the Torrey Botanical Society</i>	<i>Environmental Entomology</i>
<i>Journal of Economic Entomology</i>	<i>Biological Invasions</i>
<i>Conservation Biology</i>	<i>Ecological Monographs</i>

UNIVERSITY SERVICE:

Campus Writing Board Executive Committee
Environmental Studies Executive Committee
Search committees, College of Law, Depts of Geography, Biological Sciences, Fisheries and Wildlife, School of Natural Resources
Promotion and Tenure Probationary Extension Committee
University Lectures Committee
MU Sustainability Committee
International Studies Committee
Policy Committee
University of Missouri Campus wide Fellowship advisory Board
University of Missouri Committee on Undergraduate Education

UNDERGRADUATE RESEARCH MENTORING:

A total of 18 undergraduate students have worked in the forest ecology lab through employment in research projects with graduate students, special projects through UMEB Grants or GK12 programs and 4 students were McNair Scholars.

GRADUATE STUDENTS MENTORED (AS MAJOR ADVISOR) AT THE UNIVERSITY OF MISSOURI

Michael C. Stambaugh	M.S.- Forestry	2001
Taisia M. Gordon	M.S.- Forestry	2002
Alicia Sasseen	M.S.- Forestry	2002
Heather O'Connor	M.S.- Forestry	2002
Steven L. Voelker	M.S.- Forestry	2004
Susan J. Farrington	M.S.- Forestry	2005
Mark D. Yates	Ph.D. -Forestry	2006
Aaron P. Stevenson	M.S.- Forestry	2007
Irene M. Unger	Ph.D.- Forestry	2008
Nancy Mungai	PhD- Soil Science	2008
Sharon Reed	Ph.D.- Forestry	2010
Ronald Colatski	M.S.- Forestry	2011
Chad King	Ph.D.- Forestry	2013
Elizabeth Wright	M.S. – Forestry	2013
Christine Steinwand	M.S. – Forestry	2014
Christopher Lee	Ph.D.- Forestry	2016
Calvin Maginel	M.S. – Natural Resources	2015
Muhammed Nugraha	M.S. – Natural Resources	2018

Graduate students mentored as a member of graduate committee:

Kathryn Womack	PhD	F&W	Carla Kruse	MSc	Parks &Rec
Freya Womack	PhD	Biological Sciences	Nicholas Bezzerides	PhD	F&W
Denise Vaughn	MA	Journalism	Dean Grey	PhD	Forestry
John Nichols	MSc	Forestry	Cynthia Becker	MSc	Forestry
Robert Rives	MSc	Forestry	Dulce Figueroa-	PhD	Biol. Sci
Sara Bellchamber	MSc	Forestry	Olga Pinzon	PhD	Entomology
Jonathan White	MSc	Entomology	Joshua Swanson	MA	Geography
Kyle Steele	MSc	Forestry	Mundy Hackett	PhD	F&W
Mark Mackey	MA	Biological Sciences	Tom Demeo	PhD	Forestry
Jennifer Hamilton	MA	Geography	Teri Tamboia	PhD	Biol. Sci
Matthew McCloud	PhD	F&W	Tom Faust	PhD	Forestry
Shannon Pittman	PhD	Biological Sciences	Frank Nelson	MSc	F&W
Jennifer Grabner	MSc	Forestry	Mevin Hooten	MSc	Forestry
Gorden Shaw	MSc	Forestry	Joseph Riley	PhD	Forestry
Francis Lloyd	PhD	Entomology	James Mudd	PhD	Forestry

Outside Reader: Michelle Bassett, Ph. Deakin University, Melbourne, Australia