

# RICARDO M. HOLDO

## Curriculum Vitae

### ACADEMIC HISTORY

#### Academic Positions

2013-present *Professor*, Odum School of Ecology, University of Georgia.

2016-2023 *Associate Professor*, Odum School of Ecology, University of Georgia.

2013-present *Honorary Researcher*, Animal, Plant and Environmental Sciences, University of the Witwatersrand, South Africa.

2010-2016 *Assistant Professor*, Division of Biological Sciences, University of Missouri.

2005-2010 *Postdoctoral Associate*, Department of Biology, University of Florida.

#### Education

2005 Ph.D. in Ecology and Evolutionary Biology. Princeton University, Princeton, NJ.

1999 M.S. in Zoology. University of Florida, Gainesville, FL.

1994 B.A. in Organismic and Evolutionary Biology. Harvard College, Cambridge, MA.

#### Postgraduate awards

2016-2019 Odum Chair, Odum School of Ecology, University of Georgia.

2008 University of Toronto EEB Postdoctoral Fellowship (declined).

### INSTRUCTION

#### Courses Taught (in reverse chronological order)

Course	Title	Term	Effort (%)	Credit hours	Enrollment
FYOS 1001	Plant Intelligence: Fact or Fiction?	Fall 2023	100	1	15
ECOL 8990	Statistical Modeling in R	Fall 2023	100	3	4
ECOL 8990	Ecological Modeling	Fall 2022	100	2	4
ECOL 3510	Study abroad: African savanna ecology	Maymester 2022	50	3	10
ECOL 3480	Savanna Ecology	Spring 2022	50	1	16
ECOL 3500	General Ecology	Spring 2022	50	3	136
ECOL 8990	Statistical Modeling in R	Fall 2021	100	3	16
ECOL 3480	Savanna Ecology	Spring 2021	100	1	6
ECOL 8020L	Research Modeling	Fall 2020	100	3	5
ECOL 3500	General Ecology	Spring 2020	50	3	113
ECOL 8910	Statistical Modeling in R	Fall 2019	100	3	15
ECOL 8000	Introduction to the practice of Ecology	Fall 2019	20	3	10
ECOL 4950	Senior Seminar	Spring 2019	50	1	28

ECOL 8020L	Research Modeling	Fall 2018	100	3	7
ECOL 8000	Introduction to the practice of Ecology	Fall 2018	20	3	14
ECOL 3500	General Ecology	Spring 2018	50	3	105
ECOL 8990	Statistical Modeling in R	Fall 2017	100	3	8
ECOL 8000	Introduction to the practice of Ecology	Fall 2017	20	3	16
ECOL 4950	Senior Seminar	Spring 2017	100	1	16

*Summary of courses taught as Assistant Professor at University of Missouri*

<b>Course</b>	<b>Title (times taught)</b>	<b>Term(s)</b>	<b>Effort (%)</b>	<b>Credit hours</b>	<b>Enrollment</b>
BioSci 8002	Dynamic Models in Ecology and Behavior (2)	Spring 2011, 2016	100	3	8-9
BioSci 3650	General Ecology (1)	Fall 2014	100	3	116
BioSci 4994	Models in Population Biology (2)	Spring 2012, 2014	100	3	12-16
BioSci 8002	Statistical Modeling in Biology (3)	Fall 2012, 2013, 2015	100	3	12-20

**Development of new courses and teaching modules**

*Study Abroad: African Savanna Ecology* (ECOL 3510), Maymester 2022. New two-week field course on the ecology of savanna ecosystems, based in South Africa. The course combined lectures, field work, field trips, and student-led research. The first week of the course focused on the development, execution, analysis and presentation of group research projects in savanna ecology. The second week (in Kruger National Park) focused on themes such as biome shifts, landscape ecology, climate change and plant-water relations, plant-animal interactions and fire ecology. Co-taught with Jason Donaldson.

*Statistical Modeling in R* (ECOL 8910/8990), Fall 2017. Modified my statistical modeling course for biologists to have specific relevance to ecologists. The course has also shifted from a heavy reliance on lectures towards hands-on in-class exercises using various datasets. The same datasets are revisited repeatedly to allow incorporation of increasingly complex analysis methods.

*Savanna Ecology* (ECOL 3480), Spring 2021 and 2022. New course. This class was developed in Spring 2021 as a pre-requisite for a Maymester field course to take place in South Africa (cancelled in May 2021 due to COVID-19, moved to May 2022). The course combines lectures and paper discussions and introduces students to key concepts in the field (e.g., tree-grass dynamics, herbivory, and fire ecology). Co-taught with Jason Donaldson in 2022.

*Introduction to the practice of Ecology* (ECOL 8000), Fall 2017. New module. A three-week module (offered three times) focused on principles of community assembly and inferring process from pattern. The course combined a small amount of lecturing with paper discussions and group exercises.

*Research Modeling* (ECOL 8020L), Fall 2020. In response to a request for online instruction by all enrolled students, the course was modified to rely on daily worksheets focusing on modeling problems (parameter estimation, model construction, model validation, etc.).

*Statistical Modeling in R* and *Dynamic Models in Ecology and Behavior* (now *Research Modeling*) were both originally developed by me as new courses at the University of Missouri in Fall 2012 and Spring 2011, respectively.

### **Other courses taught**

*Models and Data Workshop*, Sokoine University of Agriculture, Arusha, Tanzania. This workshop combined a field data module (taught by T. Michael Anderson of Wake Forest) with a data analysis and statistics module taught by me. The workshop was attended by 19 Tanzanian graduate students and administrators from a range of institutions and government agencies. The purpose of the course was to strengthen computing (using R as a platform) and data visualization and analysis skills in Tanzania. July 2012.

### **Supervision of Graduate Student Research**

Wargowsky, I. MS Ecology, Odum School. 2021-2022. Thesis topic: Implications of root anatomical differences between savanna trees and grasses.

Judge, P. MS Ecology, Odum School. 2020-2022. Thesis topic: Effects of hydraulic redistribution on plant communities in long-leaf pine savanna.

Working, C. MS Ecology (co-advised with V. Ezenwa), Odum School. 2018-2021. Transferred to Warnell School of Forestry in Spring 2021 (graduated). Current position: Army Corp of Engineers, Sacramento, CA.

Belovitch, M. PhD Candidate Ecology, Odum School. 2018-present. Thesis topic: Hydraulic constraints in C<sub>4</sub> grasses and C<sub>3</sub> trees in an African savanna.

Rowland, F. PhD Biological Sciences, University of Missouri (co-advised with R. Semlitsch). 2013-2018. Thesis: Dynamics and regulation of pond food webs. Current position: United States Geological Survey, Columbia, MO.

Ketter, B. MS Biological Sciences, University of Missouri. 2014-2016. Thesis: Morphological and physiological responses of two savanna tree species to grass competition. Current position: private health-care sector.

Godwin, D. PhD Biological Sciences, University of Missouri. 2011-2015. Thesis: Fire behavior and impacts across rainfall gradients in temperate and tropical savannas. Current position: Wildfire Analyst with the Center for Environmental Management of Military Lands, Fort Collins, CO.

Rugemalila, D. MS Biological Sciences, University of Missouri. 2013-2015. Thesis: Mechanisms of tree seed limitation across a rainfall gradient in Serengeti National Park, Tanzania. Current position: Ph.D. student, Wake Forest University, Winston-Salem, NC.

Arnold, S.G. MS Biological Sciences, University of Missouri. 2010-2012. Thesis: Structure and composition of plant communities on grazing lawns in Kruger National Park, South Africa. Current position: The Mountaineers (conservation nonprofit), Seattle, WA.

### **Graduate Student Advisory Committee Membership**

Brown, C. PhD. Odum School, ongoing. Major advisor: Jackie Mohan.

Novak, L. PhD. Plant Biology, ongoing. Major advisor: Anny Chung.

Cryan, D. PhD. Odum School, ongoing. Major advisor: Craig Osenberg.

Rack, L. PhD. Odum School, ongoing. Major advisor: Mary Freeman.

Noble, S. PhD. Division of Biology, Kansas State University, ongoing. Major advisor: Zak Ratajczak.

Taylor, M. PhD. Odum School, ongoing. Major advisor: Nina Wurzburger.

Ramirez Quintero, L. PhD. Warnell School of Forestry, completed 2023. Major advisor: Cristian Montes.

Briggs, A. PhD. Odum School, completed 2022. Major advisor: Craig Osenberg.  
Arnold, K. PhD. Odum School, completed 2022. Major advisor: Nicole Gottdenker.  
Park, R. MS. Odum School, completed 2022. Major advisor: Jackie Mohan.  
Henderson, S. MS. Warnell School of Forestry, completed 2022. Major advisor: Doug Aubrey.  
Kim, C. PhD. Department of Horticulture, completed 2022. Major advisor: Marc Iersel.  
Ottinger, S. MS. Odum School, completed 2021. Major advisor: Nina Wurzburger.  
Kenna, A. MS, completed 2020. Odum School. Major advisor: Jackie Mohan.  
Teitelbaum, C. PhD, completed 2021. Odum School. Major advisors: Sonia Altizer and Richard Hall.  
Evans. M. PhD, completed 2020. Major advisors: John Drake and Courtney Murdock.  
Michael Belovitch, MS, completed 2018. Warnell School of Forestry. Major adviser: Doug Aubrey.  
Elise Krueger, MS, 2017. Odum School. Major adviser: Ford Ballantyne.

#### *Summary of committee memberships at University of Missouri*

I was a member of 7 MS and 12 PhD committees at the University of Missouri between 2010 and 2016.

#### **Supervision of Undergraduate Research**

Slater, S. 2023-present. Odum School. Research topic: Deep transport in savanna trees and grasses.  
Wargowsky, I. 2017-2021. Odum School. Research topic: Rooting architecture and vessel architecture of savanna trees and grasses. Currently a Double Dawgs graduate student in my lab.  
Gajjar, N. 2018-2022. Odum School. Thesis topic: Ecohydrological traits in African savanna tree and grass species.  
Barr, A. 2018-2019. Odum School. Senior honors thesis topic: Herbivore habitat use in woodland-grassland transitions.  
Lenz, L. 2019. Odum School. Apprenticeship in Ecology student. Study topic: using camera-trap imagery to map the Serengeti migration.  
Eden, J. 2019. Odum School. Apprenticeship in Ecology student. Study topic: morphology of fine roots in savanna trees and grasses.  
Amerson, B. 2018. Odum School. Student research assistant. Topic: morphology of fine roots in savanna trees and grasses.  
Saracino, M. University of Missouri. Determinants of woody invasion in prairie communities.  
McHargue, W. University of Missouri. Plant thermal imaging as a tool for quantifying transpiration.  
Campbell, T. University of Missouri. Analysis of herbivore community patterns in Serengeti National Park.  
Roach, R. R. University of Missouri. Developing algorithms for extracting tree cover spatial patterns from Google Earth imagery.  
Dismukes, W. University of Missouri. Wade took independent study with me to learn modeling tools. He completed a research project on the use of imaging tools for quantifying plant growth.  
Miller, E. University of Missouri. Data extraction and analysis of game camera data.  
Osterholz, Z. University of Missouri. REU student (University of Notre Dame): Ecology of plant-fire interactions in Serengeti National Park.  
Mollman, M. University of Missouri. Discovery Fellow: Inferring rooting distributions and water use strategies in key savanna tree species.

Brocato, E. University of Missouri. Honors College intern. Inferring mechanisms of tree-grass competition using a greenhouse experiment.

### **Postdocs supervised**

Donaldson, J. 2021-present. Odum School. Research topic: The role of animal movement on disease dynamics in Serengeti.

Gaughan, A. 2011-2012. University of Missouri. Research topic: New algorithms for quantifying savanna tree cover, size structure, and composition using composite satellite imagery. Current position: Associate Professor, Department of Geography and Geosciences, University of Louisville.

Morris, T. 2014-15. University of Missouri. Research topic: Resprouting dynamics and resource allocation in savanna trees across a rainfall gradient in Kruger National Park, South Africa. Co-mentored with Michelle Mack, Northern Arizona University. Current position: data scientist, South Africa.

### **Instructional grants**

NSF STEM Fellows: "ShowMe Nature from elements to ecosystems." 2010-2015. Role: faculty participant. PI: Candace Galen.

### **Trainee recognitions and achievements**

Gajjar, N. 2021. Best poster, Graduate Student Symposium, Odum School.

Wargowsky, I. 2020. Honors International Scholars Program, UGA.

Wargowsky, I. 2019. Art of STEM competition – special merit award. 2019.

Rowland, F. 2019. Donnelley Postdoctoral Fellow, Yale University.

Rowland, F. 2016. Ethel Sue Lumb Award for Excellence in Graduate Studies, University of Missouri.

Rugemalila, D. 2016. The Peter Ashton Prize for the outstanding paper published by a student in *Biotropica*.

Arnold, S. 2014. Thesis paper selected as Editor's choice in July 2014 issue of *Biotropica*.

### **SCHOLARLY ACTIVITIES**

In the field of ecology, lead and senior authors typically appear in first and last position, respectively. Unless otherwise stated, all works are peer-reviewed. I highlight work by undergraduate and **graduate student** co-authors working under my supervision using underlining and in bold face type, respectively.

#### **Book chapters**

Holdo, R.M., and Holt, R.D. 2015. The Serengeti coupled human-natural system: socio-ecological feedbacks, dynamics, and resilience. Chapter 19 in *Serengeti IV: Sustaining biodiversity in a coupled human-natural system*. Sinclair, A.R.E., Mduma, S.A.R., and Packer, C. (eds.). Chicago University Press.

Eby, S., Holdo, R.M., Metzger, K., and Dempewolf, J. 2015. Structural, functional and biodiversity consequences of fire in the Serengeti. Chapter 4 in *Serengeti IV: Sustaining biodiversity in a coupled human-natural system*. Sinclair, A.R.E., Mduma, S.A.R., and Packer, C. (eds.). Chicago University Press.

Hopcraft, J.G.C., Holdo, R.M., Mwangomo, E., Mduma, S., Thirgood, S., Borner, M., Fryxell, J.M., Olf, H. and Sinclair, A.R.E. 2015. Why are wildebeest the most abundant herbivore in the Serengeti ecosystem? Chapter 15 in *Serengeti IV: Sustaining biodiversity in a coupled human-natural system*. Sinclair, A.R.E., Mduma, S.A.R., and Packer, C. (eds.). Chicago University Press.

Holdo, R.M., Holt, R.D., Sinclair, A.R.E., Godley, B., and Thirgood, S. 2011. Migration impacts on communities and ecosystems: empirical evidence and theoretical insights. Chapter 9 in *Animal Migration: a Synthesis*. Milner-Gulland, E.J., Fryxell, J.M., and Sinclair, A.R.E. (eds.). Oxford University Press.

Börger, L., Matthiopoulos, J., Holdo, R.M., Morales, J., Couzin, I., and McCauley, E. 2011. Migration quantified: constructing models and linking them with data. Chapter 8 in *Animal Migration: a Synthesis*. Milner-Gulland, E.J., Fryxell, J.M., and Sinclair, A.R.E. (eds.). Oxford University Press.

Holt, R.D., Holdo, R.M., and van Veen, F.J. 2010. Theoretical perspectives on trophic cascades: current trends and future directions. Pp. 301-318 in *Trophic cascades: predators, prey, and the changing dynamics of nature*. Terborgh, J., and Estes, J.A. (eds.). Island Press.

### Journal Articles (in review)

Donaldson, J.E., Anderson, T.M., Munuo, N., Holdo, R.M. Time since fire interacts with herbivore intake rates to control herbivore habitat occupancy. *Ecology*, in review.

Anderson, T.M., Hepler, S.A., Holdo, R.M., Donaldson, J.E., Erhardt, R.J., Hopcraft, J.G.C., Hutchinson, M.C., Huebner, S.E., Morrison, T.A., Muday, J., Munuo, I.N., Palmer, M.S., Pansu, J., Pringle, R.M., Sketch, R., Packer, C. Competition and facilitation drive body-size dependent succession patterns during the Serengeti migration. *Science*, in revision.

Donaldson, J.E., Ezenwa, V.O., Morrison, T.A., and Holdo, R.M. 2023. Animal migration intensity and duration influence parasite transmission. *Trends in Ecology and Evolution*, in second review.

Mochi, L., Morrison, T.A., Stevens, N.; Mazia, N, Anderson, T.M., and Holdo, R.M. Grass layer limits tree seedling survival but not tree seedling growth in African and South American savannas. *Journal of Vegetation Science*, in second review.

### Journal Articles (published or in press)

63. Donaldson, J.E., Holdo, R.M., Anderson, T.M., Morrison, T.A., Hopcraft, J.G.C., McIntyre, J., Devaney, E., Hempson, G., Senso, B., Trentinus, A., and Ezenwa, V.O. 2023. Direct and indirect effects of fire on parasites in an African savanna. *Journal of Animal Ecology*, in press. **Cover article.**

62. **Wargowsky, I.K.**, NeSmith, J.E., Gajjar, N.N., and Holdo, R.M. 2023. Root vascular anatomy predicts maximum growth rates in savanna trees and grasses. *Biotropica* 55:1159-1164. **Cover article.**

61. Davies, R., Ryan, C., Harrison, R., Dexter, K., Ahrends, A., Benitez, L., Brade, T., Carreiras, J., Druce, D., Fayolle, A., Finckh, M., Godlee, J., Gonclaves, F., Holdo, R.M., Makungwa, S., McNicol, I., Mograbi, P., Muchawona, A., Muhate, A., Muledi, J., Pritchard, R., Revermann, R., Ribeiro, N., Siampale, A., Staver, C., Syampungani, S., Williams, M., Swemmer, T., Edwards, D. 2023. Precipitation gradients drive high turnover in the world's largest savanna woodland. *Ecography* e06720.

60. Pringle, R.M., Abraham, J.O., Anderson, T.M., Coverdale, T.C., Davies, A.B., Dutton, C.L., Gaylard, A., Goheen, J.R., Holdo, R.M., Hutchinson, M.C., Kimuyu, D.M., Long, R.A., Subalusky, A.L., Veldhuis, M.P. 2023. Impacts of large herbivores on terrestrial ecosystems. *Current Biology* 33:R584-R610.

59. **Belovitch, M.W.**, NeSmith, J.E., Nippert, J.B. and Holdo, R.M. 2023. African savanna grasses outperform trees across the full spectrum of soil moisture availability. *New Phytologist* 239:66-74.

58. Holdo, R.M. and Nippert, J.B. 2023. Linking resource- and disturbance-based models to explain tree-grass coexistence in savannas. *New Phytologist* 237:1966-1979. Invited Tansley Review.

57. Donaldson, J.E., Holdo, R.M., Sarakikya, J. and Anderson, T.M. 2022. Fire, grazers and browsers interact with grass competition to determine tree establishment in an African savanna. *Ecology* 103:e3715.

56. Holdo, R.M., Donaldson, J.E., Rugemalila, D.M. and Anderson, T.M. 2022. Seedling growth gradients interact with homogeneous disturbance regimes to explain savanna tree cover discontinuities. *Ecological Monographs* 92:e1514.
55. Holdo, R.M. and Onderdonk, D.A. 2022. River networks impose a dominant signature on savanna tree abundance and spatial pattern in Serengeti national Park, Tanzania. *Landscape Ecology* 37:1113-1123.
54. Lee, C., Holdo, R. M., Muzika, R.M. 2021. Feedbacks between forest structure and an opportunistic fungal pathogen. *Journal of Ecology* 109:4092-4102.
53. Godlee, J.L., Casey, R., Bauman, D.; Bowers, S., Carreiras, J., Chisingui, A., Cromsigt, J., Druce, D., Finkch, M., Gonçalves, F., Holdo, R.M., Makungwa, S., McNicol, I., Mitchard, E., Muchawona, A., Revermann, R., Ribeiro, N., Siampale, A., Syampungani, S., Tchamba, J., Tripathi, H., Wallenfang, J., Te Beest, M., Williams, M., Dexter, K. 2021. Structural diversity and tree density drives variation in the biodiversity-ecosystem function relationship of woodlands and savannas. *New Phytologist* 232:579-594.
52. The SEOSAW partnership. 2021. A new network to understand the changing socio-ecology of the southern African woodlands (SEOSAW): challenges, benefits and methods. *Plants, People, Planet* 3:249–267.
51. NeSmith, J.E., Twine, W. and Holdo, R.M. 2021. Interspecific variation in post-disturbance growth responses of a savanna tree community and its implications for escaping the fire trap. *Biotropica* 53:896-905.
50. Wargowsky, I.K., NeSmith, J.E. and Holdo, R.M. 2021. Root vascular traits differ systematically between African savanna tree and grass species, with implications for water use. *American Journal of Botany* 108:83-90.
49. Aleman, J.C., Fayolle, A., Favier, C., Staver, A.C., Dexter, K G., Azihou, A.F., Bastin, J-F., Bauman, D., te Beest, M., Chidumayo, E.N., Comiskey, J.A., Cromsigt, J.P.G. M., Dessard, H., Doucet, J-L., Finckh, M., Gillet, J-F., Gourlet-Fleury, S., Holdo, R.M., Kirunda, B., Kouame, F.N., Mahy, G., Maiato, F., Gonçalves, P., McNicol, I., Nieto Quintano. P., Plumptre, A.J., Pritchard, R.C., Revermann, R., Ryan, C.M., Schmitt, C.B., Swemmer, A.M., Talila, H., Woollen, E., and Swaine, M.D. 2020. Floristic evidence for alternative biome states in tropical Africa. *Proceedings of the National Academy of Sciences* 117 (45), 28183-28190.
48. Case, M., Nippert, J.B., Holdo, R.M., and Staver, C. 2020. Root-niche separation between savanna trees and grasses is greater on sandier soils. *Journal of Ecology* 108 (6), 2298-2308.
47. Holdo, R.M. and McHargue, W. 2020. Foliar temperature as a tool for quantifying whole-plant transpiration in tree seedlings under laboratory and greenhouse conditions. *Plant Ecology* 221:283-293.
46. Holdo, R.M., Onderdonk, D.A., Barr, A., Mwita, M. and Anderson, T.M. 2020. Spatial transitions in tree cover are associated with soil hydrology, but not with grass biomass, fire frequency, or herbivore biomass in Serengeti savannahs. *Journal of Ecology* 108:586-597.
45. Probert, J., Parr, K., Holdo, R.M., Anderson, T.M., Archibald, S., Courtney-Mustaphi, C., Dobson, A., Donaldson, J.E., Hempson, G., Morrison, T., and Beale, C. 2019. Human activities disrupt fire regimes in the wider Serengeti-Mara ecosystem. *Global Change Biology* 25:3406-3423.
44. Fayolle, A., M.D. Swaine, J. Aleman, A.F. Azihou, D. Bauman, M. te Beest, E.N. Chidumayo, J.P.G.M. Cromsigt, H. Dessard, M. Finckh, F.M.P. Gonçalves, J.-F. Gillet, A. Gorel, A. Hick, R. Holdo, B. Kirunda, G. Mahy, I. McNicol, C.M. Ryan, R. Revermann, A. Plumptre, R. Pritchard, P. Nieto-Quintano, C.B. Schmitt, J. Seghieri, A. Swemmer, H. Talila and E. Woollen. 2019. A sharp floristic discontinuity revealed by the biogeographic regionalization of African savannas. *Journal of Biogeography* 46:454-465

43. Morrison, T., Holdo, R.M., **Rugemalila, D.**, Nzunda, M. and T.M. Anderson. 2019. Grass competition overwhelms effects of herbivores and precipitation on seedling establishment in Serengeti. *Journal of Ecology* 107:216-228.
42. **Ketter, B.M.** and Holdo, R.M. 2018. Strong competitive effects of African savanna C<sub>4</sub> grasses on tree seedlings do not support rooting differentiation. *Journal of Tropical Ecology* 34:65-73.
41. Holdo, R.M., Nippert, J.B. and Mack, M.C. 2018. Rooting depth varies differentially in trees and grasses as a function of mean annual rainfall in an African savanna. *Oecologia* 186:269-280.
40. Campbell, T.A. and Holdo, R.M. 2017. Competitive response of savanna tree seedlings to C<sub>4</sub> grasses is negatively related to photosynthesis rate. *Biotropica* 49:774–777.
39. **Rugemalila, D. M.**, Morrison, T., Anderson, T. M. and Holdo, R. M. 2017. Seed production, infestation, and viability in *Acacia tortilis* (synonym: *Vachellia tortilis*) and *Acacia robusta* (synonym: *Vachellia robusta*) across the Serengeti rainfall gradient. *Plant Ecology* 218:909-922.
38. Twine, W.C. and Holdo, R.M. 2016. Fuelwood sustainability revisited: integrating size structure and resprouting into a spatially-realistic fuelshed model. *Journal of Applied Ecology* 53:1766-1776.
37. **Rugemalila, D.M.**, Anderson, T.M. and Holdo, R.M. 2016. Precipitation and elephants, not fire, shape tree community composition in Serengeti National Park, Tanzania. *Biotropica* 48:476-482.
36. Morrison, T.A., Anderson, T.M., and Holdo, R.M. 2016. Elephant damage, not fire or rainfall, explains mortality of overstorey trees in Serengeti. *Journal of Ecology* 104:409-418.
35. Miller-Struttmann, N.E., Geib, J.C., Franklin, J.D., Kevan, P.G. Holdo, R.M., Ebert-May, D., Kettenbach, J.A., Hedrick, E. and Galen, C. 2015. The evolution of a functional mismatch in a pollination mutualism under climate change. *Science* 349:1541-1544.
34. Ogada, D.L., Shaw, P., Beyers, R.L, Buij, R., Murn, C., Thiollay, J.M., Beale, C.M., Holdo, R.M., Pomeroy, D.D., Baker, N., Allan, D.G., Kruger, S.C., Botha, A., Virani, M.Z., Monadjem, A. and Sinclair, A.R.E. 2015. Another continental vulture crisis: Africa's vultures collapsing toward extinction. *Conservation Letters* 9:89-97.
33. Holdo, R.M. and Nippert, J.M. 2015. Transpiration dynamics support resource partitioning in African savanna trees and grasses. *Ecology* 96:1466-1472.
32. Nippert, J.B. and Holdo, R.M. 2015. Challenging the maximum rooting depth paradigm in grasslands and savannas. *Functional Ecology* 29:739-745.
31. Holdo, R.M. and Brocato, E.R. 2015. Tree–grass competition varies across select savanna tree species: a potential role for rooting depth. *Plant Ecology* 216:577-588.
30. **Luhring, T.M.** and Holdo, R.M. 2015. Trade-offs between age at maturity and body size; drought survival in stochastic aquatic environments. *Oecologia* 178:723-732.
29. Anderson, T.M., Morrison, T., **Rugemalila, D.M.** and Holdo, R.M. 2014. The composition of savanna canopy trees and their recruitment pool are decoupled across a demographic bottleneck in the Serengeti ecosystem. *Journal of Vegetation Science* 26:385-394.
28. Holdo, R.M., Anderson, T.M. and Morrison, T. 2014. Precipitation, fire and shifting demographic bottlenecks in Serengeti tree populations. *Landscape Ecology* 29:1613–1623.
27. **Lee, C.A.**, Voelker, S., Holdo, R.M. and Muzika, R.M. 2014. Tree architecture predicts growth in Midwestern oaks. *Canadian Journal of Forest Research* 44: 1005–1012.
26. Holdo, R.M. and Mack, M.C. 2014. Functional attributes of savanna soils: contrasting effects of tree canopies and herbivores on bulk density, nutrients and moisture dynamics. *Journal of Ecology* 102:1171-1182.



25. **Arnold, S.G.**, Anderson, T.M., and Holdo, R.M. 2014. Edaphic, nutritive, and species assemblage differences between hotspots and matrix vegetation: two African case studies. *Biotropica* 46:387-394. Selected as Editor's choice in July 2014 issue.
24. Holdo, R.M. 2013. Revisiting the two-layer hypothesis: coexistence of alternative functional rooting strategies in savannas. *PLoS ONE* 8:e69625.
23. Gaughan, A.E., Holdo, R.M., and Anderson, T.M. 2013. Using short-term MODIS time-series to quantify tree cover in a highly heterogeneous African savanna. *International Journal of Remote Sensing* 34:6865-6882.
22. Holdo, R.M. 2013. Effects of fire history and N and P fertilization on seedling biomass, specific leaf area, and root:shoot ratios in a South African savanna. *South African Journal of Botany* 86:5-8.
21. Holdo, R.M., Holt, R.D., and Fryxell, J.E. 2013. Herbivore-vegetation feedbacks can expand the environmental range of savannas: insights from a simple theoretical model. *Oikos* 122: 441–453.
20. Holdo, R.M., and Roach, R. R. 2013. Inferring animal population distributions from individual tracking data: theoretical insights and potential pitfalls. *Journal of Animal Ecology* 82:175-181 (cover article).
19. Holdo, R.M., Mack, M.C., and **Arnold, S.G.** 2012. Tree canopies explain fire effects on soil nitrogen, phosphorus and carbon in a savanna ecosystem. *Journal of Vegetation Science* 23:352-360.
18. Holdo, R.M., Fryxell, J.M., Sinclair, A.R.E., Dobson, A.P., Holt, R.D. 2011. Predicted impact of barriers to migration on the Serengeti wildebeest population. *PLoS ONE* 6(1): e16370.
17. Dobson, A. P., Borner, M., Sinclair, A. R. E., Hudson, P. J., Anderson, T. M., Bigurube, G., Davenport, T. B. B., Deutsch, J., Durant, S. M., Estes, R. D., Estes, A. B., Fryxell, J., Foley, C., Gadd, M. E., Haydon, D., Holdo, R. M., Holt, R. D., Homewood, K., J., Hopcraft, J. G. C., Hilborn, R., Jambiya, G. L. K., Laurenson, M. K., Melamari, L., Morindat, A. O., Ogotu, J. O., Schaller, G., and Wolanski, E. 2010. Road will ruin Serengeti. *Nature* 467, 272-273.
16. Holdo, R.M., Holt, R.D., Galvin, K., Polasky, S., Knapp, E., and Hilborn, R. 2010. Responses to alternative rainfall regimes and antipoaching enforcement in a migratory system. *Ecological Applications* 20:381-397.
15. Holdo, R.M., Sinclair, A.R.E., Metzger, K.L., Bolker, B.M., Dobson, A.P., Ritchie, M.E., and Holt, R.D. 2009. A disease-mediated trophic cascade in the Serengeti: implications for ecosystem C. *PLoS Biology* 7:e1000210. Summarized in Research Highlights ("Wildebeest chain reaction"), *Nature* 461:700. Recommended on Faculty of 1000.
14. Holdo, R.M., Holt, R.D., and Fryxell, J.M. 2009. Opposing rainfall and nutrients gradients best explain the wildebeest migration in the Serengeti. *The American Naturalist* 173:431-445.
13. Holdo, R.M., Holt, R.D., and Fryxell, J.M. 2009. Grazers, browsers, and fire influence the extent and spatial pattern of tree cover in the Serengeti. *Ecological Applications* 19:95-109.
12. Holdo, R.M. and Timberlake, J. 2008. Does rooting depth explain community composition in Kalahari sand woodlands? *Journal of Tropical Ecology* 24:169-176.
11. Holdo, R.M. 2007. Elephants, fire, and frost can determine community structure and composition in Kalahari woodlands. *Ecological Applications* 17:558-568.
10. Holdo, R.M., Holt, R.D., Coughenour, M.B., and Ritchie, M.E. 2007. Plant productivity and soil nitrogen as a function of grazing, migration, and fire in an African savanna. *Journal of Ecology* 95:115-128.
9. Chamaille-Jammes, S., Fritz, H., and Holdo, R.M. 2007. Revisiting elephant-sodium relationships in Hwange National Park. *Journal of Tropical Ecology* 23:725-728.

8. Holdo, R.M. 2006. Elephant herbivory, frost damage, and topkill in Kalahari sand woodland savanna trees. *Journal of Vegetation Science* 17:509-518.
7. Holdo, R.M. 2006. Tree growth in an African woodland savanna impacted by disturbance. *Journal of Vegetation Science* 17:369-378.
6. Holdo, R.M. 2005. Stem mortality following fire in Kalahari sand vegetation: effects of frost, prior damage, and tree neighbourhoods. *Plant Ecology* 180:77-86.
5. Zavala, M.A. and Holdo, R.M. 2005. Delayed effects of fire on habitat use by large herbivores in *Acacia drepanolobium* savanna. *African Journal of Ecology* 43:155-157.
4. Holdo, R.M., and McDowell, L.R. 2004. Termite mounds as nutrient-rich food patches for elephants. *Biotropica* 36:231-239.
3. Holdo, R.M. 2003. Woody plant damage by African elephants in relation to leaf nutrients in western Zimbabwe. *Journal of Tropical Ecology* 19:189-196.
2. Holdo, R.M., Dudley, P.J., and McDowell, L.R. 2002. Geophagy in the African elephant in relation to availability of dietary sodium. *Journal of Mammalogy* 83:652-664.
1. Holdo, R.M. 2000. Altitudinal distribution of two primates in the Mount Kenya forest. *African Journal of Ecology* 38: 369-371.

### Letters to editors

Griffith, D.M., C.E.R. Lehmann, C.A.E. Strömberg, C.L. Parr, R.T. Pennington, M. S, J. Ratnam, C.J. Still, R.L. Powell, N.P. Hanan, J.B. Nippert, C.P. Osborne, S. Good, T.M. Anderson, R.M. Holdo, J.W. Veldman, G. Durigan, K.W. Tomlinson, W.A. Hoffmann, S. Archibald and W.J. Bond. 2017. Technical comment on “The extent of forest in dryland biomes.” *Science* 358:1309.

Dobson A., Hopcraft G., Mduma S., Ogotu J.O., Fryxell J., Anderson T.M., Archibald S., Lehmann C., Poole J., Caro T., Mulder M.B., Holt R.D., Berger J., Rubenstein D.I., Kahumbu P., Chidumayo E.N., Milner-Gulland E.J., Schluter D., Otto S., Balmford A., Wilcove D., Pimm S., Veldman J.W., Olf H., Noss R., Holdo R.M., Beale C., Hempson G., Kiwango Y., Lindenmayer D., Bond W., Ritchie M., Sinclair A.R.E. 2022. Savannas are vital but overlooked carbon sinks. *Science* 375(6579):392.

### Encyclopedia entries

Dobson, A.P., Holdo, R.M., and Holt, R.D. 2010. Rinderpest. *Encyclopedia of Biological Invasions*. Simberloff, D. and Rejmánek, M. (eds.). University of California Press.

### Other

Holdo, R.M. Response to “Should DDT be reconsidered?” Letter to the Editor. *The New York Times*. August 8, 2003.

### Grants received (2010-present)

UGA Global Research Collaboration Grant: Direct and indirect effects of tree canopies on seedling escape pathways in savannas. Role: co-PI (with J. Donaldson). \$10,000. 2023-2024.

USDA NIFA: “US-UK Collab: Disentangling transport and trophic effects of animal movement on infectious disease.” Role: lead PI. \$1,975,846. 2021-2025.

NSF DEB: “Collaborative Research: Rainfall variability and the axes of tree-grass niche differentiation.” Role: lead PI. \$365,991. 2019-2022.

NSF BCS: “Spatiotemporal Dynamics of Woody Cover in a Savanna Landscape.” Role: co-PI (T. M. Anderson, PI). Holdo subcontract: \$95,652 (\$305,261 total). 2015-2020.

UGA Global Research Collaboration Grant. Role: co-PI (with V. Ezenwa). \$4,000. 2017-2018.

NSF DEB: "COLLABORATIVE RESEARCH: Tree recruitment limitation in African savannas: top-down versus bottom-up effects across a soil moisture gradient." Role: PI. \$159,775. 2012-2016.

Andrew F. Mellon Foundation: "Growth and resprouting dynamics of savanna trees across resource gradients in Kruger National Park." Role: co-PI (Michelle C. Mack, PI). Holdo subcontract: \$68,611 of \$230,000 awarded. 2013-2017.

NSF EPSCoR: "The Missouri Transect: Climate, Plants, and Community." Role: co-I (John Walker, PI). Holdo lab portion: \$195,915. 2014-2016.

University of Missouri Research Council: Spatial heterogeneity in fire intensity in African savannas. Role: PI. \$6,100. 2013-15.

NSF DEB: REU supplement to COLLABORATIVE RESEARCH: Mechanisms of tree recruitment limitation across a savanna soil moisture availability gradient. Role: PI. \$7,000. 2013.

Andrew F. Mellon Foundation: "Linking disturbance and nutrient limitation in tropical savannas: tree-soil-microbial feedbacks in Kruger National Park." Role: co-PI (Michelle C. Mack, PI). Holdo subcontract: \$61,419 of \$300,000 awarded. 2010-2012.

### **Recognition for excellence in research**

Odum Chair (rotating), Odum School of Ecology, University of Georgia. 2016-2019.

College of Arts and Sciences Faculty Fellowship for Excellence, University of Missouri. 2014.

Provost Outstanding Junior Faculty Research and Creative Activity Awards, University of Missouri. 2014.

### **Invited seminars/lectures**

Holdo, R.M. Tree-grass coexistence theory: (almost) nothing new under the sun. Department of Plant Biology, University of Georgia. September 2022.

Holdo, R.M. Tree-grass coexistence in grasslands and savannas: closing the gaps among models. Semi-plenary speaker, Argentine Ecological Society, Tucuman, Argentina. July 2021.

Holdo, R.M., Donaldson, J.E. and Anderson, T.M. Sudden tree cover transitions in savannas: causes and mechanisms. Symposium on woody encroachments, Argentine Ecological Society, Tucuman, Argentina. July 2021.

Holdo, R.M. Tree cover variation in African savannas: bottlenecks, constraints, and niche partitioning. Department of Biology, Wichita State University. October 2019.

Holdo, R.M. Tree cover variation in African savannas: bottlenecks, constraints, and niche partitioning. Department of Animal, Plant and Environmental Sciences, Wits University, South Africa. June 2019.

Holdo, R.M. Tree cover variation in African savannas: bottlenecks, constraints, and niche partitioning. Department of Ecology and Evolutionary Biology, Princeton University. October 2018.

Holdo, R.M. Infectious disease prevalence and transmission in a migratory ungulate system. Center for the Ecology of Infectious Disease, March 2018.

Holdo, R.M. Precipitation variability and tree-grass dynamics in African savannas. Joseph Jones Center, November 2017.

Holdo, R.M. Tree cover dynamics in African savannas: fire, elephants and tree-grass competition. University of Florida, October 2015.

Holdo, R.M. Tree cover dynamics in African savannas. Missouri Botanical Gardens. June 2015.

Holdo, R.M. Tree cover in savannas: disturbance, competition, and the search for a general model of tree-grass dynamics. Institute of Biodiversity, Animal Health and Comparative Medicine, University of Glasgow. February 2015.

- Holdo, R.M. Tree cover dynamics in Serengeti and beyond: fire, water, and the quest for useful predictive models. Department of Forestry, University of Missouri. March 2014.
- Holdo R.M. Water, fire and herbivores as drivers of tree-grass dynamics in tropical savannas. Divisional Seminar, Division of Biology, Kansas State University, Manhattan, KS. October 2012.
- Holdo, R.M. Herbivore movement and tree dynamics in African savanna ecosystems. Proseminar given to Mathematics and Life Sciences Fellows. March 2012.
- Anderson, T.M., and Holdo, R.M. What can spatial relationships between trees and seedlings tell us about recruitment mechanisms in African savannas? Insights from the Serengeti rainfall gradient. Theory and Dynamics of Savanna Systems Symposium, ESA Annual Meeting, Austin, TX, August 2011.
- Holdo, R.M. Wildebeest: ecosystem engineers of the Serengeti. Proseminar given to Mathematics and Life Sciences Fellows. January 2011.
- Holdo, R.M. Herbivory, fire, and landscape change in the Serengeti. Tyson Research Center, Washington University in St. Louis. July 2010.
- Holdo, R.M. Shifting rainfall regimes and the dynamics of the greater Serengeti socio-ecological system. Symposium on resilience in dryland ecosystems, AAG Annual Meeting, Washington, DC. April 2010.
- Holdo, R.M. Mobile herbivores, fire, and landscape change in savannas. Department of Biology, New Mexico State University. April 2009.
- Holdo, R.M. Herbivores, fire, and landscape change in savannas. Department of Biology, Florida State University. April 2009.
- Holdo, R.M. Mobile herbivores, fire, and landscape change in savannas. Department of Biology, University of Missouri, Columbia. March 2009.
- Holdo, R.M. Direct and indirect drivers of tree cover change in the Serengeti. Department of Biology, Wake Forest University. January 2009.
- Holdo, R.M. Spatio-temporal patterns of tree cover change in the Serengeti. Department of Plant Biology, Michigan State University. January 2009.
- Holdo, R.M. Spatio-temporal patterns in savanna structure in the Serengeti: effects of climate, herbivores, and fire. Department of Wildlife Ecology and Conservation, University of Florida. October 2008.
- Holdo, R.M. Modeling ungulate migrations. Workshop for edited volume: *Migration: a modern synthesis*. Imperial College, London, Silwood Park, UK. April 2008.
- Holdo, R.M. Socio-ecological dynamics in the Serengeti ecosystem. Workshop on agent-based modeling of social and ecological systems, Institute for Society, Landscape and Ecosystem Change, Colorado State University, Fort Collins, CO. April 2008.
- Holdo, R.M. Landscape-level effects of herbivores and fire on tree cover. Department of Biology, Georgia Southern University, Statesboro, GA. February 2008.
- Holdo, R.M. Interactions among climate, vegetation, herbivores, fire, and humans in the Serengeti. Workshop for edited volume: *Serengeti IV: Sustaining biodiversity in a coupled human-natural system*. Vancouver, B.C. October 2007.
- Holdo, R.M. Elephants, fire, and frost: shaping woodland structure and composition in Kalahari sand savannas. University of British Columbia, Vancouver, Canada. April 2007.
- Holdo, R.M. Herbivores, disturbance, and vegetation in African savannas. Department of Biology, University of Missouri-St. Louis, St. Louis, MO. February 2007.

## Conference oral presentations

- Holdo, R.M. and Nippert, J.B. Tree-grass coexistence theory: (almost) nothing new under the tropical sun. Savanna Science Network Meeting, Skukuza, South Africa. March 2023.
- Donaldson, J.E., Ezenwa, V.O., Anderson, T.M., Senso, B., Trentinus, A. and Holdo, R.M. Fire and macroparasites: quantifying the benefits of seasonal fires for wild ungulates. Savanna Science Network Meeting, Skukuza, South Africa. March 2023.
- Wedel, E.R., Nippert, J.B., NeSmith, J.E. and Holdo R.M. Impacts of magnitude, timing, and depth of water availability on savanna tree growth and physiology. Savanna Science Network Meeting, Skukuza, South Africa. March 2023.
- Donaldson, J.E., Ezenwa, V.O., Morrison, T.A. and Holdo, R.M. Migratory animals and resident populations: exploring the role of intensity and duration in macroparasite transmission. ESA Annual Meeting, Montreal, Canada. August 2022.
- Holdo, R.M., Donaldson, J.E. and Anderson, T.M. Edaphic variation interacts with disturbance to generate sudden transitions in savanna tree cover across space. Savanna Science Network Meeting, Skukuza, South Africa. March 2022.
- Donaldson, J.E., Ezenwa, V.O. and Holdo, R.M. Migratory animals and resident populations: the role of intensity and duration in parasite transmission. Savanna Science Network Meeting, Skukuza, South Africa. March 2022.
- Wargowsky, I.**, NeSmith, J.E., and Holdo, R.M. Belowground water use traits of savanna trees and grasses. Savanna Science Network Meeting, Skukuza, South Africa. March 2022.
- Holdo, R.M. and Anderson, T.M. Woodland-grassland transitions are strongly associated with soil hydrology but not fuel loads or fire in Serengeti savannas. ESA Annual Meeting, Louisville, KY, August 2019.
- Case, M., Nippert, J.B., Holdo, R.M. and Staver, C. Soil texture and rainfall jointly influence tree and grass functional rooting depths in an African savanna. ESA Annual Meeting, Louisville, KY, August 2019.
- Holdo, R.M. Spatiotemporal patterns of precipitation events at continental and local scales: implications for tree cover. Savanna Science Network Meeting, Skukuza, South Africa. March 2018.
- Holdo, R.M. and Nippert, J.B. Functional rooting separation between trees and grasses varies as a function of rainfall in an African savanna. ESA Annual Meeting, Portland, OR, August 2017.
- Nippert, J.B., O'Keefe, K., Swemmer, T. and Holdo, R.M. A new paradigm for plant water uptake and use in grasslands and savannas. ESA Annual Meeting, Portland, OR, August 2017.
- Holdo, R.M., Nippert, J.B., and Mack, M.C. Tree-grass soil moisture partitioning across the Kruger rainfall gradient. Savanna Science Network Meeting, Skukuza, South Africa. March 2016.
- Holdo, R.M. and Nippert, J.E. Tree-grass niche partitioning is pervasive and supported by water-use time series data. ESA Annual Meeting, Baltimore, MD, August 2015.
- Twine, W. and Holdo, R.M. Model answer: incorporating coppice dynamics in simulations of fuelwood supply and demand. Savanna Science Network Meeting, Skukuza, South Africa. March 2015.
- Morris, T., Holdo, R.M. and Mack, M.C. Resprouting dynamics of savanna trees across resource gradients in Kruger National Park. Savanna Science Network Meeting, Skukuza, South Africa. March 2015.
- Holdo, R.M. Interspecific variation in savanna tree rooting profiles and response to competition from grasses: evidence from modeling and empirical studies. ESA Annual Meeting, Minneapolis, MN, August 2013.

Holdo, R.M. Revisiting the two-layer hypothesis: theoretical insights on the coexistence of alternative functional rooting strategies across rainfall and edaphic gradients. ESA Annual Meeting, Portland, OR, August 2012.

Gaughan, A.E. and Holdo, R.M. Using short-term MODIS time-series to reconstruct the dynamics of tree cover in the Serengeti ecosystem AAG Annual Meeting, New York, NY. February 2012.

Gaughan, A.E. and Holdo, R.M. Quantifying tree cover in an African savanna using a multi-scale remote sensing approach. ESA Annual Meeting, Austin, TX, August 2011.

**Luhring, T.M.** and Holdo, R.M. Body size as an adaptation for drought survival in stochastic aquatic environments. ESA Annual Meeting, Austin, TX, August 2011.

Holdo, R. M., Mack, M.C., **Arnold, S.G.**, and Holt, R.D. Direct and Indirect effects of fire and herbivores on plant-available N and P and soil C pools in Kruger National Park. 10<sup>th</sup> Savanna Science Network Meeting, Skukuza, South Africa. March 2011.

Holdo, R.M., Holt, R.D., and Fryxell, J.M. Fitting movement models to data: the case of the Serengeti wildebeest migration. ESA Annual Meeting in Milwaukee, WI. August 2008.

Holdo, R.M., R.D. Holt, and J.M. Fryxell. The potential for indirect mutualism between ecosystem engineers: grazers and browsers in the Serengeti. ESA Annual Meeting in Memphis, TN. August 2006.

Holdo, R.M. and R.D. Holt. The wildebeest migration, fire, and nitrogen loss in the Serengeti woodlands. ESA Annual Meeting in Montreal, Canada. August 2005.

Holdo, R.M. Interactions among fire, frost, and elephants in Kalahari sand woodlands. ESA Annual Meeting in Portland, OR. August 2004.

### **Conference sessions organized**

Co-organizer (with Jesse Nippert, KSU, principal organizer, and Troy Ocheltree, CSU, co-organizer), Organized Oral Session: "How does plasticity in root morphology and physiology buffer responses to changes in resource availability?" Ecological Society of America (ESA) Annual Meeting, Minneapolis, MN. August 2013.

Principal organizer, Organized Oral Session: "Towards a synthetic theory of tree-grass coexistence in savannas." Ecological Society of America (ESA) Annual Meeting, Milwaukee, WI. August 2008.

### **Poster presentations**

**Wargowsky, I.K.** and Holdo, R.M. Root vascular anatomy explains plant performance in savanna trees and grasses. ESA Annual Meeting, Montreal, Canada. August 2022.

**Judge, P.**, Brantley, S. and Holdo, R.M. No evidence of hydraulic lift in a longleaf pine (*Pinus palustris*) savanna during an abnormally wet year. ESA Annual Meeting, Montreal, Canada. August 2022.

Wedel, E., Holdo, R.M., Belovitch, M.W., Keen, R., Twine, W., and Nippert, J.B. Tree-grass coexistence under altered rainfall regimes. Savanna Science Network Meeting, Skukuza, South Africa. March 2022.

Gajjar, N. and Holdo, R.M. Root morphology of savanna trees and grasses. ESA Annual Meeting, virtual presentation, August 2021.

Gajjar, N. and Holdo, R.M. Root morphology of savanna trees and grasses. Graduate Student Symposium, Odum School of Ecology, UGA, January 2021.

Wargowsky, I. and Holdo, R.M. Phylogenetic signal of root histology in savanna trees and grasses. Graduate Student Symposium, Odum School of Ecology, UGA, January 2020.

Gajjar, N. and Holdo, R.M. Root traits across South African trees and grasses. Graduate Student Symposium, Odum School of Ecology, UGA, January 2020.

- NeSmith, J., Nippert, J. B. and Holdo, R. M. Contrasting ecohydrological functional trait relationships in savanna tree and grass species. ESA Annual Meeting, Louisville, KY, August 2019.
- Wargowsky, I. and Holdo, R.M. Characterizing the histology of roots in African savanna trees and grasses. CURO Summer Symposium, UGA, July 2019.
- Holdo, R.M. and Anderson, T.M. Woody cover variation is strongly associated with soil hydrology in Serengeti savannas. American Geophysical Union Annual Meeting, Washington, DC, December 2018.
- Wargowsky, I. and Holdo, R.M. Characterizing root architecture and anatomy in African savanna trees and grasses. CURO Symposium, UGA, April 2018.
- Rugemalila, D.M.**, Holdo, R.M., Anderson, T.M. and Morrison, T.A. Antagonistic variation in tree height and seed mass of *Acacia robusta* and *Acacia tortilis* trees across the Serengeti soil moisture gradients. ESA Annual Meeting, Fort Lauderdale, FL, August 2016.
- Ketter, B.L.** and Holdo, R.M. Photosynthetic and transpirational responses of two savanna tree species to grass competition. Savanna Science Network Meeting, Skukuza, South Africa. March 2016.
- McHargue, W. and Holdo, R.M. The use of thermal data for quantifying plant transpiration. Missouri EPSCoR Statewide Meeting. Columbia, MO. June 2015.
- Miller, E. and Holdo, R.M. Quantifying herbivore assemblages across Serengeti using camera trap data: temporal and spatial patterns of occurrence. Undergraduate Research Forum, University of Missouri, April 2014.
- Mollman, M., Holdo, R.M., Anderson, T.M. and Morrison, T. 2013. Using camera trap data to quantify herbivore community composition in a savanna ecosystem. Summer Undergraduate Research Forum, University of Missouri, July 2013.
- Holdo, R.M. Depth partitioning of soil moisture in savannas: Walter revisited. Presented at Savanna Science Network Meeting, Skukuza, South Africa, March 2013.
- Arnold, S. G.** and Holdo, R.M. Grazing lawns in the South African landscape: a mechanistic approach. Grasslands in a Global Context Symposium, Kansas State University, Manhattan, KS, September 2011.
- Roach, R., and Holdo, R.M. Using individual movement data to map population distributions: a simulation study. Mathematics and Life Sciences Symposium, University of Missouri, Columbia, MO, September 2011.
- Holdo, R.M. and J. Timberlake. Rooting profiles along a Kalahari sand woodland catena. ESA Annual Meeting, Savannah, GA, August 2003.
- Holdo, R.M. and J.P. Dudley. Lick use by elephants in relation to fecal sodium concentration and environmental mineral availability in a Kalahari sand habitat. ASM Annual Meeting, Seattle, WA, June 1999.
- Iudica, C.A. and R.M. Holdo. Cranial morphometrics in the genus *Sturnira* (Chiroptera: Phyllostomatidae): a comparison of two techniques. ASM Annual Meeting, Seattle, WA, June 1999.

## **PUBLIC SERVICE**

### **K-12 educational activities**

Ecology module, Rock Bridge High School, Columbia, MO. Assisted with the development and implementation of a two-day field research activity for 170 10<sup>th</sup>-grade students. As part of this module, I wrote a simulation model to teach students about drought impacts in prairie ecosystems. April and October 2015.

## **PROFESSIONAL SERVICE**

### **Service to professional societies**

Poster judge, ABRCMS National Meeting, St. Louis, MO. 2011.

Buell/Braun judge, ESA annual meeting, Memphis, TN. 2006.

### ***Ad hoc* manuscript reviewer**

African Journal of Ecology (3), African Journal of Agricultural Research, African Journal of Wildlife Research, American Botany Teacher, American Journal of Botany, American Naturalist (6), Animal Conservation, Animal Migration, AoB Plants, Biogeochemistry, Biogeosciences (2), Biological Conservation (3), Biology Letters (2), Biotropica (3), book chapters (5), Communications Biology, Conservation Biology (2), Diversity and Distributions, Ecohydrology, Ecological Applications (2), Ecological Modeling (2), Ecological Monographs (3), Ecological Research, Ecología Austral, Ecology (10), Ecology Letters (3), Ecosphere (2), Ecosystems (5), Environmental and Experimental Botany, Forest Ecology and Management, Frontiers in Ecology and Evolution, Functional Ecology, Global Change Biology, Global Ecology and Biogeography, Global Ecology and Conservation, International Journal of Wildland Fire, Journal of Animal Ecology (7), Journal of Applied Ecology (2), Journal of Biogeography (5), Journal of Ecology (14), Journal of Mammalogy (2), Journal of Plant Ecology, Journal of Tropical Ecology (10), Journal of Vegetation Science (9), Journal of Zoology (1), Landscape Ecology, Methods in Ecology and Evolution, Movement Ecology, Natural Resources Research, Nature Communications, Nature Ecology and Evolution, New Phytologist (8), Northeastern Naturalist, Oecologia (2), Oikos (3), Plant Ecology (3), Plant and Soil, Perspectives in Plant Ecology, Evolution and Systematics (2), Plant and Soil, PLoS Biology, PLoS One (7), PNAS (7), Rangeland Ecology and Management, Science (3), Science Advances, Scientific Reports (2), South African Journal of Botany, South African Journal of Wildlife Management, Southern Forests, Tropical Conservation Science, Water Resources Research, Wetlands.

### **Grant review panel member**

Population and Community Ecology panel, NSF. 2023.

Population and Community Ecology panel, NSF. 2021.

Biology Integration Institutes (BII) panel, NSF. 2020.

Pre-proposal panel, Population and Community Ecology, NSF. 2015.

Full proposal panel, Population and Community Ecology, NSF. 2015.

DDIG panel, Population and Community Ecology, NSF. Washington, DC. 2013.

### ***Ad hoc* grant reviewer**

Agence Nationale de la Recherche, France; Leverhulme Trust, UK; Lincoln Park Zoo Field Conservation Fund; NSF (12); National Geographic Society (5); National Research Foundation, South Africa; Natural Environment Research Council, UK, Royal Society (UK).

### **External evaluator**

Career evaluation for S. Archibald, NRF, South Africa, Nov 2023.

Career evaluation for E. Witkowski, NRF, South Africa, Oct 2021.

Tenure evaluation for Dr. Brandon Barton, Mississippi State University, Sep 2020.

Career evaluation for G. Hempson, NRF, South Africa, Aug 2017.

### **PhD examiner**

PhD dissertation external examiner for R. Scholtz, University of KwaZulu-Natal, May 2015.

PhD dissertation external examiner for G.S. Joseph, University of Cape Town, May 2012.



## **Service on departmental, college, or University committees**

### *Service at University of Georgia (2016-present)*

#### Campus-wide

President's Advisory Committee. 2023-present.

Meigs Professorship Selection Committee. 2023-present.

Dean search committee. 2020 & 2022.

International Research Collaborations Working Group. 2020-2022.

Council of Academic Diversity. 2020-2022.

#### Odum School

Graduate Program Committee. 2022-present.

Faculty mentor to Assistant Professor Alex Strauss. 2020-present.

Strategic Planning Committee. 2018-2020.

DEI Committee. 2017-2022. Chair 2019-2022.

Search Committee, Data Literacy Lecturer position. 2018-2019.

Steering Committee. 2017-2018.

Executive Committee. 2017-2019.

Search committee, Organismal Biology. 2017-2018.

### *Service at University of Missouri (2010-2016)*

#### Campus-wide

Provost's Outstanding Junior Faculty Research and Creative Activity Award Committee. 2015.

Faculty Responsibility Committee. 2014.

Search committee, stochastic modeler (Mizzou Advantage position). 2012-2013.

Poster judge, Life Sciences Poster Week, 2014.

Poster judge, Life Sciences Poster Week, 2013.

Poster judge, Life Sciences Poster Week, 2012.

Poster judge, Life Sciences Poster Week, 2011.

Active member, Complexity Modeling Initiative. 2011-2015.

#### Division of Biological Sciences

Chair, Tucker Prairie oversight committee. 2014-2016.

Divisional Council. 2012-2013.

Facilities and Common Equipment Subcommittee. 2012.

Search committee, Cell and Molecular Biology positions. 2011-2012.

EEB seminar series. Organizer. Fall 2011.

Search committee, Neuroscience Modeling position. 2010.