

A. CARLA STAVER

Associate Professor

Ecology and Evolution Biology

Yale University

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PROFESSIONAL APPOINTMENTS

2021- Associate Professor (tenure), Ecology & Evolutionary Biology, Yale University
2021-2024 Associate Director, Yale Institute for Biospheric Studies, Yale University
2019-2021 Associate Professor (term), Ecology & Evolutionary Biology, Yale University
2014-2019 Assistant Professor, Ecology & Evolutionary Biology, Yale University
2015-pres Secondary Appointment, Forestry & Environmental Studies, Yale University
2012-2014 Prize Postdoctoral Fellow, E3B, Columbia University
2012 Postdoctoral Researcher, EEB, Princeton University

EDUCATION AND TRAINING

2008-2012 Ph.D. in Ecology and Environmental Biology, Princeton University
2006-2008 M.Sc. in Botany, University of Cape Town (Distinction)
2001-2005 B.A. in Ecology, Evolution, & Environmental Biology, Columbia University

NOTABLE HONORS AND AWARDS

2017 Tansley Medal shortlist from the New Phytologist Trust
2015-2020 Early Career Fellow, Ecological Society of America
2013 Jasper Loftus-Hills Young Investigator Award, American Society of Naturalists
2012 George Mercer Award, Ecological Society of America
2005-2006 Fulbright US Student Fellowship

GRANTS AND FUNDING

2020-2023 Consequences of environmental stochasticity for the spatial dynamics of savanna-forest transitions (Co-PI) \$101,109
NSF Mathematical Biology (PI Simon Levin, Princeton, Total: ~\$600k)
2018-2023 Scaling Fire Size from Local Process to Continental Pattern (PI) \$1,035,000
NSF Macrosystems Biology (Total: \$1,035,000)
2016-2019 Spatial Dynamics of Savanna-Forest Boundaries (PI) \$250,000
NSF Mathematical Biology (Total: \$400,000)
2016-2019 NSF Graduate Research Fellowship to Madelon Case \$132,000
2015 Reading the Historical Record of the Mara Using Sediment Cores from the Mara Wetland (Co-PI; PI David Post, Yale) \$65,641
World Wildlife Fund for Nature
2012-2015 Fire, land use, and the savannization of seasonally dry Amazon forests (Co-PI) Gordon and Betty Moore Foundation \$112,838
Sub-award from Woods Hole Research Center (PI: M. Coe, Total \$1,344,453)

SERVICE AND SYNERGISTIC ACTIVITIES

- 2021-2024 Associate Director, Yale Institute for Biospheric Studies
- 2021- USGS Powell Center Working Group “Using a multi-scale approach to synthesize measurements and models of C4 photosynthesis”
- 2020 Expert Testimony to the U.S. House of Representatives Natural Resources Committee on H.R. 5435 “American Public Lands and Water Climate Solutions Act of 2019” and H.R. 5859 “Trillion Trees Act” (February 26, 2020) [[watch](#)]
- 2019 Expert Guest on *Al Jazeera, The Stream* “Why is the world on fire?” (November 4, 2019) [[watch](#)]
- 2020-2022 Mercer Prize selection committee, Ecological Society of America
- Associate Editor: *Journal of Ecology* (2018-2022)
- External PhD Examiner: Oxford University, University of Cape Town
- Reviewer: *American Naturalist, Ecology, Ecology Letters, Ecological Applications, Journal of Applied Ecology, Journal of Ecology, Journal of Theoretical Biology, Journal of Mathematical Biology, National Science Foundation (USA), National Research Foundation (South Africa), Natural Environmental Research Council (UK), Nature, Nature Climate Change, Nature Communications, Nature Geosciences, PLoS One, PNAS, Philosophical Transactions of the Royal Society B, The Royal Society Interface, Science, Theoretical Ecology*, and others
- Member: Ecological Society of America (ESA), Association for Tropical Biology and Conservation (ATBC), American Geophysical Union (AGU)

TEACHING EXPERIENCE

Directed or co-directed at Yale University:

- | | | |
|-----------|-----------------------------------------|-------------------|
| 2014-pres | General Ecology (EEB 220/520, EVST 223) | Enrollment: 35-55 |
| 2017-pres | Scientific Writing (EEB 725) | Enrollment: 10-20 |
| 2018-pres | Plant Ecology (EEB 305/705) | Enrollment: ~10 |
| 2014-pres | Rotating Graduate Seminar (EEB 8xx) | Enrollment: ~10 |
- Ecosystem Dynamics of NBS, Ecology of Global Change, ...*

PUBLICATIONS (Staver lab-affiliated [postdocs](#)†, [grad students](#)†, and [undergrads](#)°, indicated for work done in some part while in the Staver lab)

For copies, see [my Google Scholar page](#)

- Beckett, H., A.C. **Staver**, T. Charles-Dominique, and W.J. Bond. *Accepted*. Pathways of savannization in a mesic African savanna-forest mosaic after an extreme fire. *J Ecology*.
- [Abraham](#)°, J.E., G. Hempson, J.T. Faith, and A.C. **Staver**. *Accepted*. Seasonal strategies differ between tropical and extratropical herbivores. *J Animal Ecology*.
- [Zhou](#)†, Y., J. Singh, J.R. Butnor, C. Wigley-Coetsee, P.B. Boucher, M.F. [Case](#)†, E. Hockridge, A.B. Davies, and A.C. **Staver**. *Accepted*. Limited increases in savanna whole-ecosystem carbon storage over six decades of fire suppression. *Nature*.
- [Karp](#)†, A.T., J.T. Faith, J.R. Marlon, and A.C. **Staver**. 2021. Global response of fire activity to late Quaternary grazer extinctions. *Science* 374: 1145-1148.

- Xu, L., D. [Patterson†](#), A.C. [Staver](#), S.A. Levin, and J. Wang. 2021. Unifying deterministic and stochastic ecological dynamics via a landscape-flux approach. *PNAS* 118: e2103779118.
- [Zhou†](#), Y., M. Tingley, M. [Case†](#), C. Coetsee, G.A. Kiker, R. Scholtz, and A.C. [Staver](#). 2021. Woody encroachment happens via intensification, not extensification, of species ranges in an African savanna. *Ecological Applications* 31: e02437.
- [Staver](#), A.C., J.O. Abraham, G.H. Hempson, A.T. [Karp†](#), and J.T. Faith. 2021. The past, present, and future of herbivore impacts on savanna vegetation. *Journal of Ecology* 109: 2804-2822.
- [Abraham](#)^o, J.O., [Goldberg](#)^o, E., J. Botha, and A.C. [Staver](#). 2021. Determinants of elephant landscape use are scale dependent. *Ecology and Evolution* 11: 5624-5634.
- [Wu†](#), C., S. Venevsky, S. Sitch, L.M. Mercado, C. Huntingford, and A.C. [Staver](#). 2021. Historical and future global burned area with changing climate and human demography. *One Earth* 4: 517-530.
- Pellegrini, A., A. Hein, J. Cavender-Bares, R.A. Montgomery, A.C. [Staver](#), F.S. Silla, S.E. Hobbie, and P.B. Reich. 2021. Disease and fire interact to influence transitions between savanna-forest ecosystems over a multi-decadal experiment. *Ecology Letters* 24: 1007-1017.
- Pellegrini, A., T. Refsland, C. Averill, C. Terrer, A.C. [Staver](#), *et al.* 2021. Decadal changes in fire frequencies shift tree communities and functional traits globally. *Nature Ecology and Evolution* 5: 504-512.
- The SEOSAW partnership [including A.C. [Staver](#)]. 2021. A Socio-Ecological Observatory for the Southern African Woodlands: challenges, benefits and methods. *Plants, People, Planet* 3: 249-267.
- Wigley, B.J., *et al* [including Y [Zhou†](#), A.C. [Staver](#)]. 2021. Turner Review: A handbook for the standardised sampling of plant functional traits in disturbance-prone ecosystems with a focus on open ecosystems. *Australian Journal of Botany* 68: 473-531.
- Voysey, M., S. Archibald, W.J. Bond, J.E. Donaldson, A.C. [Staver](#), and M. Greve. 2021. The role of browsers in maintaining the openness of savanna grazing lawns. *Journal of Ecology* 109: 913-926.
- [Patterson†](#), D., S.A. Levin, A.C. [Staver](#), J. Touboul. 2020. Probabilistic foundations of the Staver-Levin model from stochastic tree growth to large-scale dynamics of vegetation. *SIAM Dynamical Systems* 19: 2682-2719.
- Aleman, J.C., A. Fayolle, C. Favier, A.C. [Staver](#), *et al.* 2020. Floristic evidence for alternative biome states in tropical Africa. *PNAS* 117: 28183-28190.
- [Staver](#), A.C. and G. Hempson. 2020. Seasonal strategies determine population sizes of savanna ungulates. *Science Advances* 6: eabd2848.
- [Goel†](#), N., E. van Vleck, J. [Aleman†](#), and A.C. [Staver](#). 2020. Dispersal limitation and fire feedbacks explain savanna distributions in Madagascar. *Ecology* 101: e03177.
- ◇ Winner of the Robert McIntosh Award from the ESA Vegetation Section
- [Case†](#), M.F., J. Nippert, R. Holdo, and A.C. [Staver](#). 2020. Root-niche separation between trees and grasses is greater on sandier soils. *Journal of Ecology* 108: 2298-2308.
- ◇ Shortlisted for the Harper Prize from the British Ecological Society

- [Zhou†](#), Y., Wigley, B.J., [Case†](#), M.F., Coetsee, C., and A.C. [Staver](#). 2020. Rooting depth as a key woody functional trait in savannas. *New Phytologist* 227: 1350-1361.
- [Goel†](#), N., V. Guttal, S.A. Levin, and A.C. [Staver](#). 2020. The spatial dynamics of savanna-forest distribution change. *The American Naturalist* 195: 833-850.
- Coetsee-Wigley, C. and [Staver](#), A.C. 2020. Grass community responses to drought in an African savanna. *African Journal of Range and Forage Science* (Special Issue) 37: 43-52.
- Kulmatiski, A., *et al* [including A.C. [Staver](#)]. 2020. Forecasting semi-arid biome shifts in the Anthropocene. *New Phytologist* 226: 351-361.
- [Case†](#), M.F., Wigley, B.J., Coetsee-Wigley, C., and [Staver](#), A.C. 2020. Could drought disfavor woody encroachers in savanna? *African Journal of Range and Forage Science* (Special Issue) 37: 19-29.
- [Staver](#), A.C., P. Brando, J. Barlow, D. Morton, T. Paine, Y. Malhi, A. Murakami, J. de A. Pasquel. 2020. Thinner bark increases sensitivity of wetter Amazonian tropical forests to fire. *Ecology Letters* 23: 99-106.
- [Daskin†](#), J.H., Aires, F., and A.C. [Staver](#). 2019. Determinants of tree cover in tropical floodplains. *Proceedings of the Royal Society B* 286: 20191755.
- Veldman, J.W., *et al*. [alphabetical; including A.C. [Staver](#)] 2019. Comment on “The global tree restoration potential”. *Science* 366: eaay7976.
- [Aleman†](#), J., O. Blarquez, H. Elenga, J. Paillard, V. Kimpuni, G. Itoua, G. Issele, and A.C. [Staver](#). 2019. Paleo-trajectories of forest savannization in the southern Congo. *Biology Letters* (Special Issue) 15: 20190284.
- [Zhou†](#), Y., and A.C. [Staver](#). 2019. Enhanced activity of soil nutrient-releasing enzymes after plant invasion: a meta-analysis. *Ecology* 100: e02830.
- [Case†](#), M.F., Wigley-Coetsee, C., Nzima, N., Scogings, P., and [Staver](#), A.C. 2019. Severe drought limits trees in a semi-arid savanna. *Ecology* 100: e02842.
- Wigley, B.J., A.C. [Staver](#), R. Zytkowski, A. Jagodzinski, and C. Wigley-Coetsee. 2019. Root trait variation in African savannas. *Plant + Soil* 441: 555-565.
- Hempson, G., S. Archibald, and A.C. [Staver](#). 2019. Chapter 10: Fire-browser interactions. In Scogings, P., C Skarpe, and M. Sankaran (eds). *Herbivores and woody plants in savannas*. Wiley and Sons: Chichester.
- Archibald, S., W.J. Bond, W. Hoffmann, C. Lehmann, A.C. [Staver](#), N. Stevens. 2019. Chapter 4: Distribution and Determinants Savannas. In Scogings, P., C Skarpe, and M. Sankaran (eds). *Herbivores and woody plants in savannas*. Wiley and Sons: Chichester.
- [Abraham°](#), J., G.P. Hempson, and A.C. [Staver](#). 2019. Drought-response strategies of savanna herbivores. *Ecology and Evolution* 9: 7047–7056.
- Li, Q., A.C. [Staver](#), S.A. Levin, and W. E. 2019. Spatial feedbacks and the dynamics of savanna and forest. *Theoretical Ecology* 12: 237–262.
- [Staver](#), A.C., G. Asner, I. Rodriguez-Iturbe, S.A. Levin, I. Smit. 2019. Spatial patterning among savanna trees in high-resolution, large-scale data. *PNAS* 116: 10681-10685.
- Rodriguez-Iturbe, I., Z. Chen, A.C. [Staver](#), and S.A. Levin. 2019. Tree clusters in savannas result from islands of soil moisture. *PNAS* 116: 6679-6683.
- C.L. Dutton, A.L. Subalusky, T.D. Hill, J.C. [Aleman†](#), E.J. Rosi, K.B. Onyango, K. Kanuni, J.A. Cousins, A.C. [Staver](#) and D.M. Post. 2019. A 2000-year sediment record reveals rapidly changing sedimentation and land use since the 1960s in the Upper Mara-Serengeti Ecosystem. *Science of the Total Environment* 115: E1336-E1345.

- Staver**, A.C., C. Wigley-Coetsee, J. Botha. 2019. Grazer movements exacerbate grass declines during drought in an African savanna. *Journal of Ecology* 107: 1482-1491.
- Staver**, A.C. and E. Schertzer. 2018. Fire spread and the issue of community-level selection in the evolution of flammability. *Journal of the Royal Society Interface* 15: 20180444.
- Case†**, M.F. and A.C. **Staver**. 2018. Soil texture mediates tree responses to rainfall intensity in African savannas. *The New Phytologist* 219: 1363-1372.
 ◇ Winner of the Robert McIntosh Award from the ESA Vegetation Section
- Aleman†**, J.C. and A.C. **Staver**. 2018. Spatial patterns in the global distributions of savanna and forest. *Global Ecology and Biogeography* 27, 792-803.
- Touboul, J.D., A.C. **Staver**, and S.A. Levin. 2018. On the complex dynamics of savanna landscapes. *PNAS* 115, E1336-E1345.
- Aleman†**, J.C., M. Jarzyna, and A.C. **Staver**. 2018. Forest extent and deforestation in sub-Saharan Africa since 1900. *Nature Ecology and Evolution* 2, 26-28.
- Pellegrini, A.F.A., A. Ahlström, S.E. Hobbie, P.B. Reich, L.P. Nieradzik, A.C. **Staver**, B.C. Scharenbroch, A. Jumponnen, W.R.L. Anderegg, J.R. Randerson, and R.B. Jackson. 2018. Fire frequency drives decadal changes in soil carbon and nitrogen and ecosystem productivity. *Nature* 553, 194-198.
- Staver**, A.C. 2018. Tansley Insight: Prediction and scale in savanna ecosystems. *New Phytologist* 219: 52-57.
 ◇ Runner up for the Tansley Medal from the New Phytologist Trust
- Staver**, A.C., J. Botha, and L. Hedin. 2017. Soils and fire jointly determine vegetation structure in an African savanna. *New Phytologist* 216: 1151-1160.
- Case†**, M.F. and A.C. **Staver**. 2017. Fire prevents woody encroachment only at higher-than-historical frequencies in a South African savanna. *Journal of Applied Ecology* 54, 955–962.
 ◇ Runner up for the Southwood Prize from the British Ecological Society
- Staver**, A.C., H. Beckett, and J. Graf. 2017. Chapter 3: Long-term vegetation dynamics. In Cromsigt, J., S. Archibald, and N. Owen-Smith (eds). *Savanna Ecology and Management: Conserving Africa's Mega-Diversity in the Hluhluwe-iMfolozi Park*. Cambridge UP: Cambridge.
- Bond, W.J., A.C. **Staver**, M. Cramer, J. Wakeling, J.J. Midgley, and D. Balfour. 2017. Chapter 9: Demographic bottlenecks and savanna trees. In Cromsigt, J., S. Archibald, and N. Owen-Smith (eds). *Savanna Ecology and Management: Conserving Africa's Mega-Diversity in the Hluhluwe-iMfolozi Park*. Cambridge UP: Cambridge.
- Archibald, S., H. Beckett, W.J. Bond, D. Druce, A.C. **Staver**, and C. Coetsee. 2017. Chapter 10: Interactions between fire and ecosystem processes: implications for fire management. In Cromsigt, J., S. Archibald, and N. Owen-Smith (eds). *Savanna Ecology and Management: Conserving Africa's Mega-Diversity in the Hluhluwe-iMfolozi Park*. Cambridge UP: Cambridge.
- Pellegrini, A.F.A., A.C. **Staver**, L.O. Hedin, T. Charles-Dominique and A. Tourgee. 2016. Aridity, not fire, favors nitrogen-fixing plants across tropical savanna and forest biomes. *Ecology* 97 (9), 2177-2183.

- [Aleman†](#), J.C., O. Blarquez, and A.C. [Staver](#). 2016. Land use change outweighs projected effects of changing rainfall on tree cover in sub-Saharan Africa. *Global Change Biology* 22 (9), 3013-3025.
- Charles-Dominique, T., A.C. [Staver](#), G.F. Midgley, and W.J. Bond. 2015. Functional differentiation of biomes in an African savanna/forest mosaics. *South African Journal of Botany* 101: 82-90.
- Pellegrini, A.F.A., L. Hedin, A.C. [Staver](#), and N. Govender. 2015. Fire alters ecosystem carbon and nutrients but not plant nutrient stoichiometry or composition in tropical savanna. *Ecology* 96: 1275–1285.
- [Staver](#), A.C., and M. Hansen. 2015. Analysis of stable states in global savannas: is the CART pulling the horse? – a comment. *Global Ecology and Biogeography* 24: 985–987.
- Schertzer, E, AC [Staver](#), & S Levin. 2015. Implications of the spatial dynamics of fire spread for the bistability of savanna and forest. *Journal of Mathematical Biology* 70:329-341.
- [Staver](#), A.C. and S. Koerner. 2015. Chapter 5: Top-Down and Bottom-Up Interactions Determine Tree and Herbaceous Layer Dynamics in Savanna Grasslands. In LaPierre, K. and T. Hanley (eds). *Trophic Ecology: Bottom-Up and Top-Down Interactions across Aquatic and Terrestrial Systems*. Cambridge UP: Cambridge.
- [Staver](#), A.C., and W.J. Bond. 2014. Is there a ‘browse trap’? Dynamics of herbivore impacts on trees and grasses in an African savanna. *Journal of Ecology* 102: 595-602.
 ◇ Runner up for the Harper Prize from the British Ecological Society
- Pérez-Harguindeguy, N. *et al* [including A.C. [Staver](#)]. 2013. New handbook for standardised measurement of plant functional traits worldwide. *Australian Journal of Botany* 61:167–234.
- [Staver](#), A.C., and S.A. Levin. 2012. Integrating theoretical climate and fire effects on savanna and forest systems. *The American Naturalist* 180: 211-224.
- [Staver](#), A.C., W.J. Bond, M. J. Cramer, and J. L. Wakeling. 2012. Top-down determinants of niche structure and adaptation among African Acacias. *Ecology Letters* 15: 673–679.
- Archibald, S., A.C. [Staver](#), and S.A. Levin. 2012. The evolution of human-driven fire regimes in Africa. *Proceedings of the National Academy of Sciences, USA* 109: 847–852.
- [Staver](#), A.C., S. Archibald, and S.A. Levin. 2011. The global extent and determinants of savanna and forest as alternative biome states. *Science* 334: 230-232.
- Wakeling, J.L., A.C. [Staver](#), and W.J. Bond. 2011. Simply the best: the transition of savanna saplings to trees. *Oikos* 120: 1448-1451.
- [Staver](#), A.C., S. Archibald, and S.A. Levin. 2011. Tree cover in sub-Saharan Africa: rainfall and fire constrain forest and savanna as alternative stable states. *Ecology* 92: 1063-1072.
 ◇ Winner of the George Mercer Prize from the Ecological Society of America
- [Staver](#), A.C., E.C. February, and W.J. Bond. 2011. History matters: tree establishment variability and species turnover in an African savanna. *Ecosphere* 2: art49.
- [Staver](#), A.C., W.J. Bond, W.D. Stock, S.J. van Rensburg, and M.S. Waldram. 2009. Browsing and fire interact to suppress tree density in an African savanna. *Ecological Applications* 19: 1909-1919.
- Debroux, L., T. Hart, D. Kaimowitz, A. Karsenty and G. Topa (eds). 2007. Forests in post-conflict Democratic Republic of Congo: analysis of a priority agenda. A joint report by

teams of the World Bank, CIFOR, CIRAD, AWF, CNONGD, CI, GTF, LINAPYCO, SNV, REPEC, WCS, Woods Hole Research Center, ICRAF, and WWF. xxii, 82p.

Staver, A.C., W. de Jong, and D. Kaimowitz. 2007. Nicaragua's Frontier: the Bosawas Biosphere Reserve. In De Jong, W., D. Donovan, and A.K. Ichi (eds). *Extreme conflicts and tropical forests*. Springer: Berlin.

SEMINARS

Oxford University, Center for the Environment, Invited Seminar (September 2021)
Rutgers University, School of Environment & Biological Sciences, Invited Seminar (September 2020)
Harvard University, Harvard Forest, Invited Seminar (February 2020)
University of Florida, Center for African Studies, Student Invited Speaker (September 2019)
University of Victoria, Plenary Speaker at 'LevinFest' for Simon Levin Honorary Doctorate (June 2019)
University of Texas, Austin, Invited Seminar (February 2019)
Cornell University, Ecology and Evolutionary Biology, Invited Seminar (January 2019)
Columbia University, Lamont Doherty Earth Observatory, Invited Seminar (January 2019)
ETH Zurich, Institute of Integrative Biology, Invited Seminar (January 2019)
Brown University, EEB, Departmental Seminar (December 2018)
Duke University, Mathematics, Probability Seminar Series (September 2018)
Smithsonian Tropical Research Institute, Invited Seminar (August 2018)
Utrecht Uni., Copernicus Institute of Sustainable Development, Invited Seminar (June 2018)
Goethe Uni., Senckenberg Biodiversity & Climate Research Center, Invited Sem. (June 2018)
Oxford University, Center for the Environment, Invited Seminar (June 2018)
Cary Institute for Ecosystem Studies, Invited Seminar (February 2018)
Indian Institute for Science, Bangalore, Invited Seminar & Workshop (January 2018)
Instituto de Ecología (INECOL), Xalapa, Invited Seminar (in Spanish) (December 2017)
Texas A&M University, Departments of Ecosystem Science & Management and Ecology & Evolutionary Biology, Student Invited Speaker (October 2017)
University of Notre Dame, Biology, Departmental Seminar (September 2017)
University of the Witwatersrand, School of Animal, Plant and Environmental Sciences, Departmental Seminar (April 2017)
University of Edinburgh, School of Geosciences, Departmental Seminar (October 2016)
Utah State University, Ecology Center, Student Invited Speaker (September 2016)
Brown University, EEB, Departmental Seminar (September 2016)
College de France, Invited Seminar, Symposium: Modelling & Predicting Ecological Transitions (June 2016)
Yale University, School of Forestry & Environmental Studies Seminar (March 2016)
Harvard University, Arnold Arboretum Seminar (December 2015)
Stanford University, Biology, Departmental Seminar (December 2014)
Columbia University, Schools of Arts and Sciences, Invited Colloquium (April 2014)
Duke University, Mathematics, Departmental Seminar (April 2014)
College de France, Center for Interdisciplinary Research in Biology, Invited Seminar (December 2013)

Lehigh University, Earth & Environmental Sciences, Donnell Foster-Hewett Lecture
(February 2013)

University of California Berkeley, ESPM, Departmental Seminar (March 2013)

University of Maryland, Biology, Departmental Seminar (January 2013)

University of California Davis, Ecology & Evolution, Departmental Seminar (January 2013)

Yale University, Ecology & Evolutionary Biology, Departmental Seminar (November 2012)

Columbia University, E3B, Departmental Seminar (February 2012)

NIMBioS, 'Disturbance Regimes & Climate-Carbon Feedbacks' Invited Colloquium
(February 2012)