WILLIAM KOLBY SMITH

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EDUCATION

2009–2013 Ph.D., Department of Ecosystem and Conservation Sciences, University of Montana

2006–2008 M.S., Graduate Degree Program in Ecology, Colorado State University

2000–2005 B.S. (Distinction and Honors), Applied Mathematics and Biology, Western Carolina University

PROFESSIONAL

2016-Present Assistant Professor, School of Natural Resources and the Environment, University of Arizona, Tucson, AZ

2014–2016 Luc Hoffmann Postdoctoral Fellow, University of Minnesota, St. Paul, MN

2013–2014 Postdoctoral Research Associate, University of Montana, Missoula, MT

PUBLICATONS ($^{\Delta}$Postdoc; $^{\delta}$PhD Student; $^{\sigma}$MS Student, *Senior Author)

2019

47. **Wang, X.$^{\delta}$, Dannenberg, M.P.$^{\Delta}$**, **Yan, D.$^{\Delta}$,** Jones, M.O., Kimball, J.S., Moore, D.J.P., van Leeuwen, W.J.D., Didan, K., **Smith, W.K.*** Globally consistent patterns of asynchrony in the phenology of optical, microwave, and fluorescence satellite data. *Remote Sensing of Environment* (*in review*).

46. Chen, M., Parton, W.J., Hartman, M.D., Del Grosso, S.J., **Smith, W.K.**, Knapp, A.K., Lutz, S., Derner, J.D., Tucker, C.J., Ojima, D.S., Volesky, J.D., Stephenson, M.B., Gao, W. Assessing Precipitation, AET, and NDVI as Controls of Great Plains Plant Production. *Ecosphere* (*in review*).

45. O'Sullivan, M., Spracklen, D.V., **Smith, W.K.**, Sitch, S., Friedlingstein, P., Arora, V., Haverd, V., Jain, A., Kato, E., Kautz, M., Lombardozzi, D., Nabel, J., Tian, H., Vuichard, N., Wiltshire, A., Zhu, D., Buermann W. Climate driven trends and variability in terrestrial productivity over 1982-2011. *Global Change Biology* (*in review*).

44. Yuan, W., Zheng, Y., Piao, S., Ciais, P., Lombardozzi, D., Wang, Y., Ryu, Y., Chen, G., Cox, P., Dong, W., Hu, Z., Jain, A.K., Jiang, C., Kato, E., Li, S., Lienert, S., Liu, S., Nabel, J., Qin, Z., Quine, T., Sitch, S., **Smith, W.K.**, Wang, F., Wu, C., Xiao, Z., Yang, S. Increased atmospheric vapor pressure deficit reduces global vegetation growth. *Science Advances* (*in review*).

43. **Smith, W.K.**[*], **Dannenberg, M.P.**[Δ] , **Yan, D.**[Δ] , Herrmann, S., Barnes, M.L., Barron-Gafford, G.A., Biederman, J.A., Ferrenberg, S., Fox, A.M., Hudson, Knowles, J.F., MacBean, N., Moore, D.J.P., Nagler, P.L., Reed, S.C., Rutherford, W.A., Scott, R.L., **Wang, X.**[δ] , Yang, J. Remote sensing of dryland ecosystem structure and function: Progress, challenges, and opportunities. *Remote Sensing of Environment* (*in review*).

42. Yu, K., **Smith, W.K.**, Trugman, A.T., Condit, R., Hubbell, S.P., Sardans, J., Peng, C., Penuelas, J., Anderegg, W.R.L. Pervasive decreases in vegetation carbon turnover time across forest biomes. *Proceedings of the National Academy of Sciences of the USA* (*in revision*).

41. **Smith, W.K.**[*]**,** Fox, A.M., MacBean, N.L., Moore, D.J.P., Parazoo, N.C. [Invited] Tansley Insight: On the role of satellite remote sensing in constraining the vegetation CO_2 fertilization effect. *New Phytologist* (*in revision*).

41. **Dannenberg, M.P.**[Δ], Wise, E.K., **Smith, W.K.**[*] Reduced forest growth due to asymmetric responses to intensifying precipitation extremes. *Science Advances* (*in revision*).

40. Renwick, K.M., Fellows, A., Flerchinger, G.N., Lohse, K.A., Clark, P.E., **Smith, W.K.**, Poulter, B. The importance of phenology in modeling sagebrush ecosystem dynamics. *Agriculture & Forest Meteorology (accepted*).

39. Bastos, A., Ciais, P., Chevallier, F., Rödenbeck, C., Ballantyne, A.P., Maignan, F., Yin, Y., Fernandez-Martinez, M., Friedlinstein, P., Peñuelas, J., Piao, S.L., Sitch, S., **Smith W.K.**, Wang, X., Zhu, Z. *et al.* **2019**. Contrasting effects of CO_2 fertilisation, land-use change and warming on seasonal amplitude of northern hemisphere CO_2 exchange. *Atmospheric Chemistry and Physics* DOI: 10.5194/acp-2019-252.

38. Shiklomanov, A.N., Bradley, B.A., Dahlin, K., Fox, A., Gough, C., Hoffman, F.M., Middleton, E., Serbin, S., Smallman, L., **Smith, W.K. 2019**. Enhancing global change experiments through integration of remote sensing techniques. *Frontiers in Ecology and the Environment* DOI: 10.1002/fee.2031.

37. Levesque, M., Andreu-Hayles, L., **Smith, W.K.**, Williams, A.P., Hobi, M.L., Pederson, N. **2019**. Tree-ring isotopes capture interannual vegetation productivity dynamics at the biome scale. *Nature Communications* 10, 742.

36. **Smith, W.K.**[*], Pennington, D.N., Johnson, J.A., Nelson, E., Polasky, S., Milder, J.C., Gerber, J.S., West, P.C., Siebert, S., Brauman, K.A., Carlson, K.M., Arbuthnot, M. **2019**. Voluntary sustainability standards could significantly reduce detrimental impacts of global agriculture. *Proceedings of the National Academy of Sciences of the USA* DOI: 10.1073/pnas.1707812116.

35. **Yan, D.$^{\Delta}$**, Scott, R.L., Moore, D.J.P., Biederman, J.A., **Smith, W.K.* 2019**. Understanding the relationship between vegetation greenness and productivity across dryland ecosystems through the integration of PhenoCam, satellite, and eddy covariance data. *Remote Sensing of Environment* DOI: 10.1016/j.rse.2018.12.029.

2018

34. Fox, A.M., Hoar, T.J., Anderson, J.L., Arellano, A.F., **Smith, W.K.**, Litvak, M.E., MacBean, N., Schimel, D.S., Moore, D.J.P. **2018**. Evaluation of a Data Assimilation System for Land Surface Models using CLM4.5. *Journal of Advances in Modeling Earth Systems* DOI: 10.1029/2018MS001362.

33. Buermann, W., Forkel, M., O'Sullivan, M., Sitch, S.S., Friedlingstein, P., Haverd, V., Jain, A.K., Kato, E., Kautz, M., Lienert, S., Lombardozzi, D., Nabel, J.E.M.S, Tian, H., Wiltshire, A.J., Zhu, D., **Smith, W.K.**, Richardson, A.D. **2018**. Widespread seasonal compensation effects of spring warming on northern plant productivity. *Nature 562*, 110-114.

32. Tucker, C., **Yan, D.$^{\Delta}$**, **Dannenberg, M.P.$^{\Delta}$**, Reed, S.C., **Smith, W.K.* 2018**. Science at the Frontier: Multi-method research to evaluate ecosystem change across multiple scales. *New Phytologist* DOI: 10.1111/nph.15195.

31. Robinson, N.P., Allred, B.W., **Smith, W.K.**, Jones, M.O., Moreno, A., Erickson, T.A., Naugle, D.E., Running, S.W. Landsat 30 m and MODIS 250 m derived terrestrial primary production for the conterminous United States. **2018**. *Remote Sensing in Ecology and Conservation* DOI: 10.1002/rse2.74.

30. Sloat, L.L., Gerber, J.S., Samberg, L.H., **Smith, W.K.**, Herrero, M., Ferreira, L.G., Godde, C.M., Power, B., Waha, K., West, P.C. **2018**. Increasing importance of precipitation variability on global livestock grazing lands. *Nature Climate Change* 8, 214-218.

29. **Dannenberg, M.P.$^{\Delta}$**, Wise, E.K., Janko, M., Hwang, T., **Smith. W.K.*** Atmospheric influence on North American land surface phenology and productivity. **2018**. *Environmental Research Letters* DOI: 10.1088/1748-9326/aaa85a.

28. **Smith, W.K.***, Biederman, J.A., Scott, R.L., Moore, D.J.P., He, M., Kimball, J.S., **Yan, D.$^{\Delta}$**, Hudson, A., Barnes, M.L., MacBean, N., Fox, A., Litvak, M.E. Chlorophyll Fluorescence Better Captures Seasonal and Interannual Gross Primary Productivity Dynamics Across Dryland Ecosystems of Southwestern North America. **2018**. *Geophysical Research Letters* DOI: 10.1002/2017GL075922.

27. Wood, S.L., Jones, S.K., Johnson J.A, Brauman, K., Chaplin-Kramer, B., **Smith, W.K.**, Fremier, A., Mulligan, M., Naeem, S., O'Farrel, P., Willemen, L., Zheng, W., DeClerck F.A. **2018**. Distilling the role of ecosystem services in the Sustainable Development Goals. *Ecological Services* 29, 70-82.

2017

26. Chen, M., Parton, W.J., Del Grosso S.J., Hartman, M.D., Day, K., Tucker, C.J., Derner, J.D., Knapp, A.K., **Smith, W.K.**, Ojima, D.S., Gao, W. **2017**. The signature of sea surface temperature anomalies on the dynamics of semiarid

grassland productivity. *Ecosphere* DOI: 10.1002/ecs2.2069.

25. Liu, Y., Piao, S., Xu, L., Ciais, P., **Smith, W.K.** Seasonal responses of terrestrial carbon cycle to climate variation in the CMIP5 models: evaluation and projection. **2017**. *Journal of Climate* DOI: 10.1175/JCLI-D-16-0555.1.

24. Biederman, J.A., Scott, R.L., Bell, T.W., Bowling, D.R., Dore, S., Garatuza-Payan, J., Kolb, T.E., Krishnan, P., Krofcheck, D.J., Litvak, M.E., Maurer, G.E., Meyers, T.P., Oechel, W.C., Papuga, S.A., Ponce-Campos, G.E., Rodriguez, J.C., **Smith, W.K.**, Vargas, R., Watts, C.J., Yepez, E.A., Goulden, M.L. Carbon and water exchange across dryland ecosystems of southwestern North America. **2017**. *Global Change Biology* DOI: 10.1111/gcb.13686.

23. Wang, J., Dong, J., Yu, G., Wang, S., Li, G., Yi, Y., Lu, G., Li, Y., Zhang, F., Oyler, J., **Smith, W.K.**, Zhao, M., Liu, J., Running, S.W. **2017.** Decreasing net primary production due to drought and slight decreases in solar radiation in China from 2000 to 2012. *Journal of Geophysical Research – Biogeosciences* DOI: 10.1002/2016JG003417.

22. Ballantyne, A.P., **Smith, W.K.**, Anderegg, W.R.L., Kauppi, P., Sarmiento, J., Tans, P., Shevliakova, E., Pan, Y., Poulter, B., Anav, A., Friedlingstein, P., Houghton, R., Running, S.W. **2017**. Accelerating net terrestrial carbon uptake during the warming hiatus due to reduced respiration. *Nature Climate Change* 7, 148-52.

2016

21. Ahrestani, F.S., **Smith, W.K.**, Hebblewhite, M., Running, S.W., Post, E. **2016**. Variation in stability of elk and red deer populations with abiotic and biotic factors at the species-distribution scale. *Ecology* 97, 3184-94.

20. **Smith, W.K.***, Reed, S.C., Ballantyne A.P., Cleveland, C.C., Anderegg, W.R.L., Wieder W.R., Running, S.W. **2016**. Large divergence of satellite and Earth system model estimates of global terrestrial CO_2 fertilization. *Nature Climate Change* 6, 306–310 (**Faculty of 1000 Ecology**).

2015

19. Anderegg, W.R.L., Ballantyne, A.P., **Smith, W.K.**, Majkut, J., Rabin, S., Kauppi, P., Beauleau, C., Birdsey, R., Dunne, J, Houghton, R, Myneni, R., Pan, Y., Sarmiento, J., Serota, N., Shevliakova, E., Tans, P., Pacala, S. **2015**. Sensitivity of respiration to tropical nighttime warming drives increasing variability in the terrestrial carbon sink. *Proceedings of the National Academy of Sciences of the USA* 112, 15591–6.

18. Wieder, W.R., Cleveland, C.C., **Smith, W.K.**, Todd-Brown, K. **2015**. Land unlikely to become large carbon source-Response. *Nature Geoscience* 8, 893–894.

17. Cleveland, C.C., Taylor, P., Chadwick, D.K., Dahlin, K., Doughty, C.E., Malhi, Y., **Smith, W.K.**, Sullivan, B.W., Wieder, W.R., Townsend, A.R. **2015**. An inter-comparison of plot-scale, satellite and earth system model estimates of tropical net primary production. *Global Biogeochemical Cycles* 29, 626-644.

16. Allred, B.W., **Smith, W.K.**, Twidwell, D., Haggerty, J.H., Running, S.W., Naugle,

D.E., Fuhlenforf, S.D. **2015**. Ecosystem services lost to oil and gas in North America. *Science*, 328, 401-403.

15. Wieder, W.R., Cleveland, C.C., **Smith, W.K.**, Todd-Brown, K. **2015**. Nutrient availability strongly constrains future terrestrial productivity and carbon storage. *Nature Geoscience* 8, 441-444.

14. Cavaleri, M.A., Reed, S.C., **Smith, W.K.**, Wood, T.E. **2015**. Urgent need for warming experiments in tropical forests. *Global Change Biology*, DOI: 10.1111/gcb.12860.

2014

13. Small, E.E., Larson K.M, **Smith, W.K. 2014**. Normalized Microwave Reflectance Index: Validation of Water Content Estimates from Montana Grasslands. *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing* DOI: 10.1109/JSTARS.2014.2320597.

12. Sullivan, B.W., **Smith, W.K.**, Nasto, M.K., Reed, S.C., Townsend, A.R., Chazdon, R., Cleveland, C.C. **2014**. Spatially robust estimates of biological nitrogen (N) fixation imply substantial human alteration of the tropical N cycle. *Proceedings of the National Academy of Sciences of the USA* 111, 8101-8106.

11. Hurley, M.A., Hebblewhite, M., Gaillard, J., Dray, S., Taylor, K.A., **Smith, W.K.**, Zager, P., Bonenfant, C. **2014**. Functional analysis of NDVI curves reveals overwinter mule deer survival is driven by both spring and fall phenology. *Philosophical Transactions of the Royal Society B* 369, 20130196.

10. Wang, J., Dong, J., Liu, J., Huang, M., Li, G., Running, S.W., **Smith, W.K.**, Harris, W., Fujinuma, Y., Kondo, H., Lui, Y., Hirano, T., Gamo, M., Xiao, X. **2014**. Comparison of Gross Primary Productivity Estimates derived from GIMMS NDVI3g, GIMMS, and MODIS in Southeast Asia. *Remote Sensing* 6, 2108-2133.

9. **Smith, W.K.**, Cleveland, C.C., Reed, S.C., Running, S.W. **2014**. Agricultural conversion without external water and nutrient inputs reduces terrestrial vegetation productivity. *Geophysical Research Letters* 41, 449-455.

2013

8. Haberl, H., Erb, K.H., Krausmann, F., Running, S.W., Searchinger, T.D., **Smith, W.K. 2013**. Bioenergy: how much can we expect for 2050? *Environmental Research Letters* 8, 031004.

7. Cleveland, C.C., Houlton, B.Z., **Smith, W.K.**, Marklein, A.R., Reed, S.C., Parton, W.J., Del Grosso, S.J., Running, S.W. **2013**. Patterns of new versus recycled primary production in the terrestrial biosphere. *Proceedings of the National Academy of Sciences of the USA* 110, 12733-12737.

2012

6. Running, S.W., **Smith, W.K. 2012**. Pushing the Planetary Boundaries-Response. *Science* 338, 1420-1420.

5. **Smith**, **W.K.**, Zhao, M., Running, S.W. **2012**. Global bioenergy capacity as constrained by observed biospheric productivity rates. *BioScience* 62, 911-922.

4. **Smith**, **W.K.**, Cleveland, C.C., Reed, S.C., Miller, N.L., Running, S.W. **2012**. Bioenergy potential of the United States constrained by satellite observations of existing productivity. *Environmental Science & Technology* 46, 3536-3544.

3. Rout, M.E., Chrzanowski, T.H., **Smith**, **W.K.**, Gough L. **2012.** Ecological impacts of the invasive grass Sorghum halepense on native tallgrass prairie. *Biological Invasions* 15, 327-339.

2009-2011

2. **Smith**, **W.K.**, Gao, W., Steltzer, H., Wallenstein, M.D., Tree, R. **2010**. Moisture availability influences the effect of ultraviolet-B radiation on leaf litter decomposition. *Global Change Biology* 16, 484-495.

1. **Smith**, **W.K.**, Gao, W., Steltzer, H. **2009**. Current and future impacts of ultraviolet radiation on the terrestrial carbon balance. *Frontiers of Earth Science* 3, 34-41.

PRESENTATIONS (* Invited)

2019* **Smith, W.K.**, et al. Monitoring photosynthesis from leaf to canopy using high frequency measurements of chlorophyll fluorescence and photochemical reflectivity from near-surface remote sensing platforms. Accepted Session: Cutting-Edge Remote Sensing Applications in Ecology: Spanning Scales, Sensors, and Systems. Ecological Society of America annual meeting, Louisville, KY.

2019* **Smith, W.K.** Understanding dryland vegetation dynamics through integration of novel remote sensing techniques. USDA-ARS.

2018* **Smith, W.K.** Understanding dryland vegetation dynamics through integration of novel remote sensing techniques. New Mexico State University.

2018* **Smith, W.K.** Understanding dryland vegetation dynamics through integration of novel remote sensing techniques. RISE Symposium.

2018* **Smith, W.K.**, et al. Satellite-based constraints on terrestrial CO2 fertilization: Challenges and opportunities. OOS 19: Integrating Diverse Evidence Streams on the Effects of Rising CO2 on Terrestrial Ecosystems. Ecological Society of America annual meeting, New Orleans, LA.

2018* **Smith, W.K.**, et al. Understanding dryland vegetation dynamics through integration of novel remote sensing techniques. Accepted Session: Research gaps in the US Southwest and Mexico. Ecological Society of America annual meeting, New Orleans, LA.

2018* **Smith, W.K.**, et al. Advances in remote sensing-based monitoring of vegetation growth dynamics across North American ecosystems. Soil, Water, and Environmental Science Departmental Seminar Series, University of Arizona, Tucson, AZ.

2017* **Smith, W.K.**, et al. Advances in remote sensing-based monitoring of vegetation growth dynamics across North American ecosystems. Hydrology and Atmospheric Science Departmental Seminar Series, University of Arizona, Tucson, AZ.

2017 **Smith, W.K**, et al. Evidence of a robust relationship between solar-induced chlorophyll fluorescence and gross primary productivity across dryland ecosystems of southwestern North America. B44C: Sun-Induced Chlorophyll Fluorescence as a Proxy of Photosynthesis: Measurements, Modeling, and Applications from Field, Airborne, and Satellite Platforms. American Geophysical Union annual meeting, New Orleans, LA.

2017* **Smith, W.K**, et al. Advances in satellite-based monitoring of seasonal to interannual vegetation growth dynamics across the Southwest U.S. Special Session: Ecological drought and climate change in the southwestern U.S. 14th Biennial Conference of Science & Management on the Colorado Plateau & Southwest Region, Flagstaff, AZ.

2017* **Smith, W.K.** Global trends in terrestrial carbon cycling. Ball Aerospace, Boulder, Colorado.

2017* **Smith, W.K.**, Gerber, J. Global trends in crop productivity. Phenome Conference, Tucson, Arizona.

2016* **Smith, W.K.** Current trends in terrestrial carbon cycling: Insights from satellite, field, and model data. SNRE Seminar Series, University of Arizona, Tucson, Arizona.

2016* **Smith, W.K.** Satellite observed trends in terrestrial vegetation dynamics. Carlton College, Northfield, Minnesota.

2016* **Smith, W.K.** Using remote sensing to assess vegetation dynamics and climate feedbacks in a warming and increasingly managed world. University of Arizona, Tucson, Arizona.

2016* **Smith, W.K.** Using remote sensing to assess vegetation dynamics and climate feedbacks in a warming and increasingly managed world. University of Nevada-Reno, Reno, Nevada.

2016* **Smith, W.K.** Integrating remote sensing, experiments, and models, to explore climate feedbacks. INTERFACE workshop - Frontiers in terrestrial climate feedbacks: Integrating models and experiments to explore climate feedbacks in a managed and warming world. St. Bert's Beach, Florida.

AWARDED GRANTS

Year	Role	CO-Is	Source	Title	Total Award	UA Award
2019	Co-I	Andrew Fox (PI, UA) Dave Moore (UA)	NASA TE	Improving Mechanistic Representation of Arctic Carbon Dynamics Using Data Assimilation	**$815K**	**$815K**
2018	PI	Joel Biederman (ARS)	USDA ARS	Defining the relationship of productivity with water availability across the semiarid western U.S.	**$190K**	**$190K**
2018	PI	Willem Van Leeuwen (UA), Greg Barron-Gafford (UA), Richard Bennett (UA), Isabel Barton (UA), William Pauli (UA)	WEES	LiDAR and hyperspectral fusion for wide ranging applications across the water-environment-energy nexus	**$113K**	**$113K**
2018	CO-I	Sasha Reed (USGS), Scott Ferrenberg (NMSU), Osvaldo Sala (ASU), Peter Adler (USU)	DOD SERDP	Forecasting dryland ecosystem vulnerability to change: a cross-system assessment of vegetation and process	**$2.27M**	**$266K**

				responses to climate change on Department of Defense lands		
2018	PI	NA	USDA / NDMC	Drought Information Services and Research for Agriculture across the United States	**$25K**	**$25K**
2017	CO-I	Laura Meredith (UA), Scott Saleska (UA), Greg Barron-Gafford (UA)	WEES	Constraining carbon cycling at the Landscape Evolution Observatory using a novel tracer for plant and microbial activity	**$141K**	**$141K**
Total					**$3.5M**	**$1.6M**

National/International Outreach		
2018	AGU Session Organizer	B040: Integrated Understanding of Climate, Carbon, Nutrient Cycles, Human Activities, and their Interactions in Terrestrial Ecosystems
2018	ICOFEST	Workshop: Integrating CO2 Fertilization Evidence Streams and Theory: Global Terrestrial Carbon Sink, Oak Ridge National Laboratory
2018	ESA Session Organizer	Accepted Oral Session: Vegetation Dynamics and Ecosystem Resilience Under Global Climate Change
2018	NASA Invited Panel Member	NASA Earth and Space Science Fellowship (NESSF) Program Carbon Cycle & Ecosystem (CC&E)
2018	Co-Leader and Co-Organizer, EDO Workshop	Earth Dynamics Observatory (EDO): Opportunities for interdisciplinary collaboration and external funding, University of Arizona
2017	NASA JPL Workshop	Collaboration: Initializing predictions of terrestrial hydrology in an Earth System Model using data assimilation
2017	Primary AGU Session Convener	GC24G: Science at the Frontier: Using Multimethod Research to Create New Knowledge and Assess Tools Across Spatial and Temporal Scales I
2017	Invited Instructor, Remote sensing techniques	NSF-funded Flux Measurement and Advanced Modeling Course, Mountain Research Station, University of Colorado
2017	NASA Invited Panel Member	NASA Interdisciplinary Sciences-Carbon proposal review panelist

2016	AGU Session Organizer	GC045. Livestock, Land Use, and the Environment, American Geophysical Union, San Francisco, CA.
2016	DroughtNet	Workshop: Utilizing ongoing experiments to understand terrestrial ecosystem sensitivity to precipitation change and drought. Sevilleta National Wildlife Refuge, Socorro, NM.
2016	INTERFACE	Workshop: Frontiers in terrestrial climate feedbacks: Integrating models and experiments to explore climate feedbacks in a managed and warming world. St. Bert's Beach, FL.

JOURNAL REFEREE

Ecological Applications; Ecological Modeling; Global Change Biology; Geophysical Research Letters; Plant, Cell & Environment; Remote Sensing; Landscape Ecology; Land; Ecological Indicators; Frontiers in Ecology and the Environment; Scientific Reports; Regional Environmental Change; Nature Ecology & Evolution; Nature Geoscience; Global Ecology and Biogeography; Science; PLOS ONE; Proceedings of the National Academy of Sciences of the USA; Nature Climate Change; New Phytologist; Journal of Photogrammetry and Remote Sensing; Remote Sensing of Environment; Journal of Geophysical Research; Proceedings of the Royal Society B; Agricultural and Forest Meteorology

PROFESSIONAL MEMBERSHIPS

American Geophysical Union, Ecological Society of America, American Association for the Advancement of Science