Miriam R. Johnston

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Professional Appointments

Assistant Professor 2025 - present
University of Maryland Center for Environmental Science, Appalachian Lab

Postdoctoral Associate 2024 - 2025
Cary Institute of Ecosystem Studies

Adjunct Assistant Professor 2023 - 2024
University of Iowa Dept. of Geographical and Sustainability Sciences

Postdoctoral Research Scholar 2021 - 2024
University of Iowa Dept. of Geographical and Sustainability Sciences
Visiting University of California, L.A. Dept. of Geography, June-Nov 2023

Life Sciences Outreach Fellow 2019
Harvard University Bok Center for Teaching and Learning

Learning Lab Graduate Fellow 2018 - 2019
Harvard University Bok Center for Teaching and Learning

Education

Ph.D., Harvard University, Organismic and Evolutionary Biology 2014 - 2021
Thesis: *Plant temperature in a Mediterranean woodland savanna: Measurements and models*

M.S., University of Maryland College Park, Ecology 2012 - 2014
Thesis: *Field-measured vs. derived: What are the most effective predictor variables in stream biodiversity models?*

B.A., Middlebury College, Conservation Biology 2006 - 2010
Thesis: *Changes in ectomycorrhizal colonization of* Quercus rubra *roots across an experimental nutrient gradient*

Awards and Honors

The Appalachian Lab Investors Network (TALIN, **$99,808**) 2025 - 2026
USDA-NIFA Postdoctoral Fellowship (recommended & declined, **$164,946**) 2021 - 2023
Outstanding Student Presentation Award, American Geophysical Union (AGU) Conference 2020
NASA Earth and Space Science Fellowship (**$120,000** and tuition remission, etc.) 2016 - 2019
Certificates of Distinction in Teaching (Harvard, all eligible classes) 2016, 2018
Skaff Family Environmental Graduate Fellowship (**$5,000**) 2014 - 2015
Maryland Sea Grant Research Fellowship (**$40,000** and tuition remission, etc.) 2012 - 2014
High Honors in Biology and Environmental Studies, *summa cum laude*, Phi Beta Kappa 2010
Scott A. Margolin '99 Award in Environmental Studies 2010
Senior Research Fellowship (**$700**) 2010

Publications

Dannenberg, M.P., M.L. Barnes, J.A. Biederman, **M.R. Johnston**, S.K. Meerdink, S. Ruehr, R.L. Scott, W.K. Smith, A.P. Williams. 2026. DrylANNd: Twenty years of monthly, 0.05°gross primary production and evapotranspiration estimates for global drylands. *Environmental Research: Ecology.* doi:10.1088/2752-664X/ae8f4f.

He, Q., A.P. Williams, **M.R. Johnston**, C.S. Juang, and B. Wang. 2025. Influence of time-averaging of climate data on estimates of atmospheric vapor pressure deficit and inferred relationships with wildfire area in the western United States. *Geophysical Research Letters.* doi:10.1029/2024GL113708.

Johnston, M.R., M.L. Barnes, Y. Priesler, W.K. Smith, J.A. Biederman, R.L. Scott, A.P. Williams, and M.P. Dannenberg. 2025. Effects of hot vs. dry vapor pressure deficit on ecosystem carbon and water fluxes. *Journal of Geophysical Research - Biogeosciences.* doi:10.1029/2024JG008146.

Dannenberg, M.P., G.J. McCabe, E.K. Wise, **M.R. Johnston**, D.N. Huntzinger, and A.P. Williams. 2025. Recent increases in Missouri River streamflow driven by combined effects of climate variability, land-use change, and elevated CO2. *AGU Advances.* doi:10.1029/2024AV001432.

Kannenberg, S., F. Babst, M.L. Barnes, A. Cabon, M.P. Dannenberg, **M.R. Johnston**, and W. Anderegg. 2025. Stand density and local climate drive allocation of GPP to aboveground woody biomass. *New Phytologist.* doi:10.1111/nph.20414.

Pierrat, Z., T. Magney, W. Richardson, B. Runkle, J. Diehl, X. Yang, W. Woodgate, W. Smith, **M. Johnston**, Y. Ginting, G. Koren, L. Albert, C. Kibler, B. Morgan, M. Barnes, A. Uscanga, C. Devine, M. Javadian, K. Meza, T. Julitta, G. Tagliabue, M. Dannenberg, M. Antala, C. Wong, A. Santos, K. Hufkens, J. Marrs, A. Stovall, Y. Liu, J. Fisher, J. Gamon, and K. Cawse-Nicholson. 2025. Proximal remote sensing: An essential tool for bridging the gap between high resolution ecosystem monitoring and global ecology. *New Phytologist.* doi:10.1111/nph.20405.

Ho, J.Y.*[1], **M.R. Johnston**[1], M.P. Dannenberg, A. Cabon, and P.R. Moorcroft. 2024. Sensitivity of sub-annual grey pine (*Pinus sabiniana*) stem growth to water supply and demand in central California. *Dendrochronologia.* doi:10.1016/j.dendro.2024.126253.
***undergraduate advisee [1]co-lead authors**

Novick, K.A., D. Ficklin, C. Grossiord, A.G. Konings, J. Martínez-Vilalta, W. Sadok, A.T. Trugman, A.P. Williams, A.J. Wright, J.T. Abatzoglou, M.P. Dannenberg, P. Gentine, K. Guan, **M.R. Johnston**, L.E.L. Lowman, D.J.P. Moore, and N.G. McDowell. 2024. The impacts of rising vapor pressure deficit in natural and managed ecosystems. *Plant, Cell, & Environment.* doi:10.1111/pce.14846.

Scott, R., **M.R Johnston**, J.F. Knowles, N. MacBean, K. Mahmud, M.C. Roby, and M.P. Dannenberg. 2023. Interannual variability of spring and summer monsoon growing season carbon exchange at a semiarid savanna over nearly two decades. *Agricultural and Forest Meteorology.* doi:10.1016/j.agrformet.2023.109584.

Dannenberg, M.P., and **M.R. Johnston**. 2023. Effects of eastern vs. central Pacific El Niño on Northern Hemisphere photosynthetic seasonality. *Environmental Research: Climate.* doi:10.1088/2752-5295/accb02.

Dannenberg, M.P., M.L. Barnes, W.K. Smith, **M.R. Johnston**, S.K. Meerdink, X. Wang, R.L. Scott, and J.A. Biederman. 2023. Upscaling dryland carbon and water fluxes with artificial neural networks of optical, thermal, and microwave satellite remote sensing. *Biogeosciences.* doi:10.5194/bg-20-383-2023.

Dannenberg, M.P., D. Yan, M.L. Barnes, W.K. Smith, **M.R. Johnston**, R. Scott, J.A. Biederman, J.F. Knowles, X. Wang, T. Durman, M.E. Litvak, J.S. Kimball, A.P. Williams, and Y. Zhang. 2022. Exceptional heat and atmospheric dryness amplified losses of primary production during the 2020 U.S. Southwest hot drought. *Global Change Biology.* doi:10.1111/gcb.16214.

Johnston, M.R., A. Andreu, J. Verfaillie, D. Baldocchi, and P. Moorcroft. 2022. What lies beneath: Vertical heterogeneity in blue oak canopy temperatures. *Remote Sensing of Environment.* doi:10.1016/j.rse.2022.112950.

Johnston, M.R., A. Andreu, J. Verfaillie, D. Baldocchi, M.P. Gonzalez-Dugo, and P. Moorcroft. 2021. Measuring surface temperatures in a woodland savanna: Opportunities and challenges of thermal imaging in an open-canopy system. *Agricultural and Forest Meteorology.* doi: 10.1016/j.agrformet.2021.108484.

Fer, I., A. K. Gardella, A.N. Shiklomanov, S.P. Serbin, M.G. De Kauwe, A. Raiho, **M.R. Johnston**, A. Desai, T. Viskari, T. Quaife, D.S. LeBauer, E.M. Cowdery, R. Kooper, J.B. Fisher, B. Poulter, M.J. Duveneck, F.M. Hoffman, W. Parton, J. Mantooth, E.E. Campbell, K.D. Haynes, K. Schaefer, K.R. Wilcox, M.C. Dietze. 2020. Beyond modeling: A roadmap to community cyberinfrastructure for ecological data-model integration. *Global Change Biology.* doi: 10.1111/gcb.15409.

Ettinger, A.K., I. Chuine, B.I. Cook, J.S. Dukes, A.M. Ellison, **M.R. Johnston**, A.M. Panetta, C.R. Rollinson, Y. Vitasse, and E.M. Wolkovich. 2019. How do climate change experiments alter plot-scale climate? *Ecology Letters.* doi: 10.1111/ele.13223.

Richardson, A.D., K. Hufkens, T. Milliman, D.M. Aubrecht, M. Chen, J.M. Gray, **M.R. Johnston**, T.F. Keenan, S.T. Klosterman, M. Kosmala, E.K. Melaas, M.A. Friedl, and S. Frolking. 2018. Tracking vegetation phenology across diverse North American biomes using PhenoCam imagery. *Scientific Data.* doi: 10.1038/sdata.2018.28.

Johnston, M.R., A.J. Elmore, K. Mokany, M. Lisk, and M.C. Fitzpatrick. 2017. Field-measured variables outperform derived alternatives in Maryland stream biodiversity models. *Diversity and Distributions.* doi: 10.1111/ddi.12598.

Bret-Harte, M.S., M.C. Mack, G.R. Shaver, D.C. Huebner, **M. Johnston**, C.A. Mojica, M.C. Pizano, and J.A. Reiskind. 2013. The response of arctic vegetation and soils following an unusually severe tundra fire. *Philosophical Transactions of the Royal Society B.* doi: 10.1098/rstb.2012.0490.

Datasets

Harris, V.M., M.P. Dannenberg, K. Long, **M.R. Johnston**, and E. Kraus. 2026. NOAA/WDS Paleoclimatology - Harris - Saylorville Dam Update - QUAL - ITRDB IA046. NOAA National Centers for Environmental Information. doi:10.25921/fzt7-5x12.

Ho, J.Y.* and **M.R. Johnston**. 2024. NOAA/WDS Paleoclimatology - Ho - Tonzi Ranch - PISA - ITRDB CA736. NOAA National Centers for Environmental Information. doi: 10.25921/hf7p-gy65.
*undergraduate advisee

Milliman, T., K. Hufkens, A.D. Richardson, D.M. Aubrecht, M. Chen, J.M. Gray, **M.R. Johnston**, T. Keenan, S.T. Klosterman, M. Kosmala, E.K. Melaas, M.A. Friedl, S. Frolking, M. Abraha, M. Alber, M. Apple, B.E. Law, T.A. Black, P. Blanken, D. Browning, S. Bret-Harte, N. Brunsell, S.P. Burns, E. Cremonese, A.R. Desai, A.L. Dunn, D.M. Eissenstat, S.E. Euskirchen, L.B. Flanagan, B. Forsythe, J. Gallagher, L. Gu, D.Y. Hollinger, J.W. Jones, J. King, O. Langvall, J.H. McCaughey, P.J. McHale, G.A. Meyer, M.J. Mitchell, M. Migliavacca, Z. Nesic, A. Noormets, K. Novick, J. O'Connell, A.C. Oishi, W.W. Oswald, T.D. Perkins, R.P. Phillips, M.D. Schwartz, R.L. Scott, O. Sonnentag, and J.E. Thom. 2017. PhenoCam Dataset v1.0: Digital Camera Imagery from the PhenoCam Network, 2000-2015. ORNL DAAC, Oak Ridge, Tennessee, USA. doi: 10.3334/ORNLDAAC/1560.

Presentations and Posters

(first author only)

Johnston, M.R. 2026. A forest simulation model for the Central Appalachian region. **Presentation**. Developing Synergies for Maryland's Environment: A Retreat for Strategic Environmental Thinking and Problem-Focused Collaboration. Solomons, MD.

Johnston, M.R., M.P. Dannenberg, J.H. Ho, A. Cabon, and P.R. Moorcroft. 2024. Sensitivity of sub-annual grey pine (*Pinus sabiniana*) stem growth to water supply and demand in central California. **Poster**. American Geophysical Union Fall Conference. Washington, D.C.

Johnston, M.R. 2024. Terrestrial ecosystem structure and function in a changing world. **Invited Presentation**. University of Maryland Center for Environmental Science, Appalachian Lab. Frostburg, MD.

Johnston, M.R., M.L. Barnes, and M.P. Dannenberg. 2023. Does elevated CO_2 increase risk of exceeding detrimental leaf temperatures? **Presentation**. American Geophysical Union Fall Conference. San Francisco, CA.

Johnston, M.R. 2023. Ecosystem carbon, water, and energy fluxes in a changing world. **Invited Presentation.** E. Ordway group meeting, University of California, Los Angeles. Los Angeles, CA.

Johnston, M.R., Y. Priesler, M.L. Barnes, W.K. Smith, J.A. Biederman, R.L. Scott, A.P. Williams, and M.P. Dannenberg. 2023. Effects of hot vs. dry vapor pressure deficit on ecosystem carbon and water fluxes. **Presentation.** Ecological Society of America Conference. Portland, OR.

Johnston, M.R. 2023. Terrestrial biosphere model evaluation with thermal remote sensing **Presentation.** Linking Optical and Energy Fluxes Workshop. Nederland, CO.

Johnston, M.R. 2023. Ecosystem carbon, water, and energy fluxes in a changing world: Multi-scale

synthesis of measurements and models. **Invited Presentation.** University of Iowa Department of Geographical and Sustainability Sciences. Iowa City, IA.

Johnston, M.R., Y. Priesler, M.L. Barnes, W.K. Smith, J.A. Biederman, R.L. Scott, and M.P. Dannenberg. 2022. Effects of hot vs. dry vapor pressure deficit on ecosystem carbon and water fluxes. **Presentation.** American Geophysical Union Fall Conference. Chicago, IL.

Johnston, M.R., and P.R. Moorcroft. 2022. Evaluation of ED2 surface temperature with thermal remote sensing. **Invited Presentation.** ED2 User and Developer Meeting. Virtual and Ithaca, NY.

Johnston, M.R., and P.R. Moorcroft. 2021. Evaluation of a cohort-based terrestrial biosphere model with thermal remote sensing. **Presentation.** American Geophysical Union Fall Conference. Virtual.

Johnston, M.R. 2021. Proximal thermal sensing: Scaling from ground to satellite, linking with fluxes and models. **Invited Presentation.** SpecNet Community Meeting. Virtual.

Johnston, M.R., and P.R. Moorcroft. 2021. Evaluation of a terrestrial biosphere model with ECOSTRESS land surface temperature. **Invited Presentation.** ECOSTRESS Science and Applications Team Meeting. Virtual.

Johnston, M.R., and P.R. Moorcroft. 2021. Evaluation of a cohort-based terrestrial biosphere model with thermal remote sensing. **Invited Presentation.** Surface Biology and Geology (SBG) Modeling Working Group. Virtual.

Johnston, M.R., A. Andreu, J. Verfaillie, D. Baldocchi, and P.R. Moorcroft. 2020. What lies beneath: Vertical heterogeneity in vegetation canopy temperatures. **Presentation.** American Geophysical Union Fall Conference. Virtual.
- *Outstanding Student Presentation Award (OPSA)*

Johnston, M.R. 2020. How do you get a temperature out of a thermal camera? **Invited Presentation.** Harvard University, A. Davies group meeting. Virtual.

Johnston, M.R. 2020. Measuring radiative plant temperature: The role of emissivity. **Invited Presentation.** Harvard University, N.M. Holbrook group meeting. Cambridge, MA.

Johnston, M.R., G.C. Hulley, and P.R. Moorcroft. 2019. Seeing plant stress from the sky: Integration of a terrestrial biosphere model with thermal remote sensing. **Poster.** American Geophysical Union Fall Conference. San Francisco, CA.
- *Scored 45/45 and 44/45 by two anonymous judges*

Johnston, M.R. and A.M. Andreu. 2019. Diagnosing fluxes, plant structure, and surface temperature at Tonzi Ranch. **Invited Presentation.** D. Baldocchi group meeting. Berkeley, CA.

Johnston, M.R., G.C. Hulley, and P.R. Moorcroft. 2018. Seeing plant stress from the sky: Integration of a terrestrial biosphere model with thermal remote sensing. **Poster.** HyspIRI Science and Applications Workshop. Washington, D.C.

Johnston, M.R., G.C. Hulley, and P.R. Moorcroft. 2018. Seeing plant stress from the sky: Integration of a terrestrial biosphere model with thermal remote sensing. **Poster.** Harvard Plant Biology Initiative Symposium. Boston, MA.

Johnston, M.R., G.C. Hulley, and P.R. Moorcroft. 2018. Seeing plant stress from the sky: Integration of a terrestrial biosphere model with thermal remote sensing. **Presentation.** Harvard Organismic and Evolutionary Biology G4 Symposium. Cambridge, MA.

Johnston, M.R., G.C. Hulley, and P.R. Moorcroft. 2017. How well do terrestrial biosphere models predict surface energy balance? Confronting an individual-level model with thermal remote sensing data. **Poster.** HyspIRI Science and Applications Workshop. Pasadena, CA.

Johnston, M.R., D.M. Aubrecht, and A.D. Richardson. 2015. Improving models to predict phenological response to global change. **Poster.** Department of Energy Environmental Earth System Science PI Meeting. Potomac, MD.

Johnston, M.R., M.C. Fitzpatrick, A.J. Elmore, K. Mokany, S.M. Guinn, and M.D. Lisk. 2014. Locally-measured vs. remotely derived: The most effective predictor variables in stream biodiversity models. **Presentation.** Chesapeake Modeling Symposium. Annapolis, MD.

Johnston, M.R., M.C. Fitzpatrick, A.J. Elmore, K. Mokany, S.M. Guinn, and M.D. Lisk. 2014. Locally-measured vs. remotely derived: The most effective predictor variables in stream biodiversity models. **Presentation.** U.S. Regional Association of the International Association for Landscape Ecology Annual Meeting. Anchorage, AK.

Johnston, M.R., M.C. Fitzpatrick, A.J. Elmore, K. Mokany, S.M. Guinn, and M.D. Lisk. 2014. Locally-measured vs. remotely derived: The most effective predictor variables in stream biodiversity models. **Presentation.** Mapping Maryland Streams Workshop. Annapolis, MD.

Johnston, M.R., M.C. Fitzpatrick, A.J. Elmore, and S. Guinn. 2013. Using community-level models to predict patterns of biodiversity in Maryland streams. **Poster.** Marine and Estuarine Environmental Sciences Program Colloquium. Cambridge, MD.
- *Awarded an honorable mention (2nd or 3rd / 40)*

Johnston, M.R., M.C. Fitzpatrick, A.J. Elmore, and S. Guinn. 2013. Using community-level models to predict patterns of biodiversity in Maryland streams. **Poster.** Maryland Water Monitoring Council Annual Conference. Linthicum, MD.

Teaching

Instructor of Record

The Global Environment (GEOG1020), University of Iowa	Spring 2023

Guest Lecturer

Global Environmental Remote Sensing (MEES698X), UMCES	Fall 2025
Advanced Topics in Plant Physiology (OEB212R), Harvard University	Spring 2025
Terrestrial Systems Modeling (GR6030), Columbia University	Spring 2025
Climate Change (GEOG4310), University of Iowa	Spring 2023

Ecology (BIOL2673/ENVS2673), University of Iowa — Spring 2022

Teaching Fellow

Organismic and Evol. Biology Graduate Seminar (OEB399), Harvard University — Spring 2019
Plants and Climate (OEB120), Harvard University — Fall 2018
Global Change Biology (OEB157), Harvard University — Spring 2018
Biology of Plants (OEB52), Harvard University — Spring 2016

In the Community

Colloquium Discussion Leader, Harvard University Center for the Environment — Fall 2017, 2018
Life Sciences Outreach Instructor, Harvard U. Bok Center for Teaching and Learning — Fall 2017

Undergraduate Mentoring

UMCES summer internship — 2026

Quercus alba *in a plant demographic model*

University of Iowa independent study — 2022

Deep dive into VPD and water flux during the day and night

Harvard College senior thesis — 2018 - 2019

Influence of drought legacy effects on Mediterranean ecosystem structure and composition

Harvard College summer research — 2018

Using remote sensing data to analyze plant drought stress

Additional Skills and Experience

Technical Skills

Scripting: R *(fluent)*; bash, Python *(conversant)*; Matlab, Fortran90, IDL *(basic)*; history of efficient learning and application of new languages as required.

Data types: Satellite and airborne remote sensing data (active and passive), large tabular datasets, climate data, images, monitoring and experimental data (long- and short-term), isolated data from extensive literature review.

Methods and tools: Statistical and mechanistic modeling, high performance computing (HPC), Git and GitHub, ArcGIS, ENVI, LaTeX, web scraping.

Service

Member, UMCES Graduate Faculty Committee. 2026 - present.

Member, UMCES Programs, Curricula, and Courses Committee. 2026 - present.

Co-convener, American Geophysical Union (AGU) Fall Conference session *Intersections of Ecology, Hydrology, and Climatology in Earth's Drylands*. 2024. Washington, D.C.

Co-convener, AGU Fall Conference session *Dryland carbon, water, and energy cycling in a changing world*. 2023. San Francisco, CA.

Co-convener, AGU Fall Conference session *Dryland carbon, water, and energy cycling in a changing world*. 2022. Chicago, IL.

Outstanding Student Presentation Award (OSPA) volunteer judge at the AGU Fall Conference. 2022-2024.

Co-organizer, Harvard Dept. of Organismic and Evolutionary Biology G4 Student Symposium. 2019. Cambridge, MA.

Member, Steering Committee for Harvard's E3 REU program (Evolution, Ecology, and Environment Research Experience for Undergraduates). 2019. Cambridge, MA.

Organizer, Plants and Climate Journal Club. 2017 – 2018. Cambridge, MA.

Leader and Organizer, Bayesian Statistics Reading Group. 2015. Cambridge, MA.

Reviewer: *ACS ES&T Air*, *Agricultural and Forest Meteorology*, *Biogeosciences*, *Diversity and Distributions*, *Environmental Research: Climate*, *Geophysical Research Letters*, *Global Change Biology*, *Global Ecology and Biogeography*, *Methods in Ecology and Evolution*, *Nature Communications*, *New Phytologist*, *PNAS*, *Weather and Climate Extremes*, *Science of the Total Environment*

Courses and Workshops

Participant, Seeing the forest and the trees: Harnessing signals from dendrometers and tree rings in flux science. 2026. Tucson, AZ.

Participant (invited, funded), Eastern Fire Network (EFNet) Inaugural Wildfire Science Workshop. 2026. Tallahassee, FL.

Participant, Western Fire and Forest Resilience Collaborative Town Hall. 2023. Los Angeles, CA.

Participant, Linking Optical and Energy Fluxes Workshop. 2023. Nederland, CO.

Participant, Flux Course. 2017. Nederland, CO.

Participant, Predictive Ecosystem Analyzer (PEcAn) Workshop. 2016. Boston, MA.

Participant (invited), Radcliffe Institute workshop Predicting Future Springs: Reconciling Experimental and Observational Approaches for Climate Change Impacts. 2016. Cambridge, MA.

Participant (funded), International Society of Arborioculture Womens' Tree Climbing Workshop. 2015. Petersham, MA.

Participant (funded), NIMBioS workshop Current Issues in Statistical Ecology. 2015. Knoxville, TN.

Previous Employment

Research Assistant, Woods Hole Marine Biological Laboratory Ecosystems Center. 2011 - 2012. Woods Hole, MA, and Toolik Lake, AK.

Intern, Woods Hole Marine Biological Laboratory Marine Resources Center. 2011. Woods Hole, MA.

Conservation and Land Management Intern, Bureau of Land Management. 2010. Buffalo, WY.

Plant Ecology Lab REU Intern, Smithsonian Environmental Research Center. 2009. Edgewater, MD.