

Dr. Amber C. Churchill, Ph.D.

Department of Environmental Studies

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Professional Preparation

- Ph.D. Ecology and Evolutionary Biology, *University of Colorado, Department of Ecology and Evolutionary Biology, Boulder, CO*. 2017. Adviser: Dr. William Bowman
- M.S. Biology, *University of Alaska Fairbanks, Institute of Arctic Biology, Fairbanks AK*. 2011. Adviser: Dr. A. David McGuire
- B.S. & B.A. Biology, Environmental Studies. *Stonehill College, North Easton MA*. 2008

Research Appointments

- 2023- present Assistant Professor of Ecosystem Science, *Environmental Studies Program, Binghamton University, State University of New York, Binghamton, NY, USA*.
- 2022- 2023 Postdoctoral Research Associate, *Department of Ecology, Evolution and Behavior, University of Minnesota, St. Paul, Minnesota, USA*. Dr. Forest Isbell, Plant Biodiversity Lab
- 2020- 2022 Visiting Fellow, *Hawkesbury Institute for the Environment, Western Sydney University, Richmond, NSW, Australia*. Dr. Sally Power, Pastures and Climate Extremes Project
- 2020- 2022 USDA AFRI NIFA Post-Doctoral Fellow, *Cedar Creek Ecosystem Science Reserve, Department of Ecology, Evolution and Behavior, University of Minnesota, St. Paul, Minnesota, USA*. Dr. Forest Isbell, Plant Biodiversity Lab
- 2017- 2020 Post-Doctoral Research Fellow, *Hawkesbury Institute for the Environment, Western Sydney University, Richmond, NSW, Australia*. Dr. Sally Power, Pastures and Climate Extremes Project

Publications

Peer Reviewed

26. Shi, B., Delgado-Baquerizo, M., Knapp, A.K., Smith, M.D., Reed, S., Osborne, B., Maestre, F.T., Zhu, Y., Chen, A., Wilkins, K., Holdrege, M.C., Kulmatiski, A., Picon-Cochard, C., Roscher, C., Power, S.A., Byrne, K.M., **Churchill, A.C.**, Jentsch, A., Henry, H.A.L., Beard, K.H., Schuchardt, M.A., Eisenhauer, N., Ohtinowski, R., Hautier, Y., Shen, H., Wang, Y., Wang, Z., Wang, C., Francis Cusack, D., Petraglia, A., Carbognani, M., Forte, T.G.W., Flory, S.L., Hou, P., Zhang, T., Gao, W., Sun, W. 2024. Aridity drives the response of soil particulate and mineral-associated carbon to drought worldwide. *Science Advances*. 10(40): eadq2654. DOI: 10.1126/sciadv.adq2654
25. **Churchill, A.C.**, Zhang, H., Catunda, K.L.M., Kim, G.W., Anderson, I.C., Isbell, F.I., Moore, B.D., Pendall, E., Plett, J.M., Powell, J.R., Power, S.A. 2024. Nutrient resource partitioning between tropical legume-grass mixed swards conditionally weakens under elevated CO₂. *Functional Ecology*. 38(8): 1708-1725. DOI: 10.1111/1365-2435.14595; Data DOI: 10.5061/dryad.nk98sf7ww
24. Zhang, H., Plett J.M., Catunda, K.L.M., Moore, B.D., **Churchill, A.C.**, Powell, J.F., Power, S.A., Yang, J., Pendall, E., Carrillo, Y., Anderson, I.C. 2024. *Journal of Experimental Botany*. A new method for the rapid quantification of biological nitrogen fixation using near-infrared reflectance spectroscopy. 3(2): 760-771. DOI: 10.1093/jxb/erad426
23. Potter, T.S., Bowman, W.D., **Churchill, A.C.**, Anacker, B.L. 2023. Plants species' influence on and rhizosphere microbial communities depends on N availability. *Plant and Soil*. 491:681-696. DOI: 10.1007/s11104-023-06148-7

22. Chandregowda, M.H., Tjoelker, M.G., Pendall, E., Zhang, H., **Churchill, A.C.**, Power, S.A. 2023. Belowground allocation, root trait plasticity and productivity under drought and warming in a widespread pasture grass. *Journal of Experimental Botany*. 74(6):2127-2145. DOI: 10.1093/jxb/erad021
21. Zhang, H. **Churchill, A.C.**, Anderson, I.C., Igwenagu, C., Power, S.A., Plett, J.M., Macdonald, C.A., Pendall, E., Carrillo, Y., Powell, J.R. 2023. Ecological stoichiometry reveals variation among mycorrhizal partners in phosphorus and nitrogen responses to warming and drought. *Molecular Ecology*. 32(1): 229-243. DOI: 10.1111/mec.16278.
20. Yang, J., Medlyn, B.E., Barton, C.V.M., **Churchill, A.C.**, De Kauwe, M.G., Jiang, M., Krishnanantheselvan, A., Tissue, D.T., Pendall, E., Power, S.A. 2023. Green-up and brown-down: modelling grassland foliage phenology responses to soil moisture availability. *Agricultural and Forest Meteorology*. 328:109252. DOI: 10.1016/j.agrformet.2022.109252.
19. Catunda, K.L.M., **Churchill, A.C.**, Zhang, H., Power, S.A., Moore, B.D. 2022. Short-term drought is a stronger driver of plant morphology and nutritional composition than warming for two common pasture species. *Journal of Agronomy and Crop Science*. 208(6): 841-852 DOI: 10.1111/jac.12531.
18. Chandregowda, M.H., Tjoelker, M.G., Pendall, E., Zhang, H., **Churchill, A.C.**, Power, S.A. 2022. Root trait shifts towards an avoidance strategy promote productivity and recovery in C₃ and C₄ pasture grass species under drought. *Functional Ecology*. 36(7): 1754-1771. DOI: 10.1111/1365-2435.14085.
17. Jacob, V., Choat, B., Medlyn, B.E., Power, S.A., **Churchill, A.C.**, Zhang, H., Barton, C.V.M. Krishnanantheselvan, A., Post, A.K., Tissue, D.T. 2022. Pasture grasses exhibit high safety margins to drought-induced hydraulic failure. *Plant, Cell & Environment*. 45(6): 1631-1646. DOI: 10.1111/pce.14318
16. Catunda, K.L.M., **Churchill, A.C.**, Power, S.A., Moore, B.D. 2022. Rapid prediction of the nutritional composition of pasture species by near-infrared reflectance spectroscopy. *Journal of Near Infrared Spectroscopy*. 30(5): 254-263. DOI: 10.1177/09670335221114746
15. **Churchill A.C.**, Zhang, H., Fuller, K.J., Anderson, I.C, Barton, C.V.M., Carrillo, Y., Catunda, K.L.M., Chandregowda, M., Igwenagu, C., Jacob, V., Kim, G., Macdonald, C.A., Medlyn, B.E., Moore, B.D., Pendall, E., Plett, J.M., Post, A.K., Powell, J.R., Tissue, D.T., Tjoelker, M.G., Power, S.A. 2022. Pastures and Climate Extremes: Impacts of warming and drought on the productivity and resilience of key pasture species in a field experiment. *Frontiers in Plant Science*. 13:836968. DOI: 10.3389/fpls.2022.836968.
14. **Churchill, A.C.**, Faist, A.M. 2021. Consequences of aboveground invasion by non-native plants into restored vernal pools do not prompt same changes in belowground processes. *Annals of Botany Plants*. 13(6): 1-12. DOI: 10.1093/aobpla/plab042.
13. Zhang, H., Powell, J.R., Power, S.A., **Churchill, A.C.**, Plett, J.M., MacDonald, C.A., Jacob, V., Kim, G.W., Pendall, E., Tissue, D., Catunda, K.M., Igwenagu, C., Carrillo, Y., Moore, B.D., Anderson, I.C. 2021. Arbuscular mycorrhizal fungal-mediated reductions in N₂O emissions are impacted by climate warming. *Pedobiologia*. 87-88:150744. DOI:10.1016/j.pedobi.2021.150744
12. Zhang, H., Powell, J.R., Plett, J.M., **Churchill, A.C.**, Power, S.A., MacDonald, C.A., Jacob, V., Kim, G., Pendall, E., Tissue, D., Catunda, K.M., Igwenagu, C., Carrillo, Y., Moore, B.D., Anderson, I.C. 2021. Arbuscular mycorrhizal fungal mediation of nutrient leaching may be compromised by climate warming. *Soil Biology & Biochemistry*. 152: 108075. DOI: 10.1016/j.soilbio.2020.108075.
11. Porfirio, L.L., Antille, D.L., Watson, L., Abbott, B.N., Bowman, D.M.J., Briggs, P.R., Canadell, J. G., **Churchill, A.C.**, Donohue R.J., Guerschman, J.P., Haverd, V., Hill, M.J., Knauer, J., Murphy, B.P., Paget, M., Prior, L.D., Roxburgh, S.H., Williamson, G.J. 2020. Productivity and biomass of Australia's rangelands: towards a national database. *Proceedings of the Royal Society of Queensland*. 128: 75-98. ISSN: 00804696X. <http://ecite.utas.edu.au/141785>.
10. Nielson, U.N., Stafford-Smith, M., Metternicht, G., Ash, A., Baumber, A., Boer, M., Booth, S.,

- Burnside, D., **Churchill, A.C.**, El Hassan, M., Friedel, M., Godde, C., Kelly, D., Kelly, M., Leys, J., McDonald, S., Maru, Y. T., Phelps, D., Ridges, M., Simpson, G., Traill, B., Walker, B., Waters, C., Whyte, A. W. 2020. Challenges, solutions and research priorities for sustainable rangelands and their communities. *The Rangeland Journal*. 42(5): 359-373. DOI: 10.1071/RJ20059.
9. Taylor, J.A., Erkelenz, P.A., **Churchill, A.C.** 2020. Building human capacity, capability and future leaders for Australia's Rangelands. *The Rangeland Journal*. 42(5): 277-292. DOI: 10.1071/RJ20052.
8. Jacob, V., Zhang, H., **Churchill, A.C.**, Yang, J. Choat, B., Medlyn, B.E., Power, S.A., Tissue, D.T. 2020. Warming reduced net carbon gain and productivity in *Medicago sativa* and *Festuca arundinacea*. *Agronomy*. 10(10):1601. DOI: 10.3390/agronomy10101601.
7. Tyrrell, M. Peabody, D., Peabody, R., Pederson, M., Hirst, R., Allan-Perkins, E., Bickford, H., Shafirir, A., Doriron, R., **Churchill, A.C.**, Ramirez-Tapia, J.C., Seidel, B., Torres, L., Fallavollita, K., Hernon, T., Wiswell, L., Wilson, S., Mondo, E., Salisbury, K., Peabody, C., Cabral, P., Presti, L., McKenna-Hoffman, K., Flannery, M., Daly, K., Haghighat, D., Lukason, D. 2020. Mosaic fungal individuals have the potential to evolve within a single generation. *Scientific Reports*. 10 (17625). DOI: 10.1038/s41598-020-74679-5.
6. Ratajczak, Z., **Churchill, A.C.**, Ladwig, L., Taylor, J., Collins, S.L. 2019. Combined extreme climate event and wildfire shift tallgrass prairie to a non-grassland state. *Journal of Vegetation Science*. 30(4):687-697. DOI: 10.1111/jvs.12750.
5. Hund, A.K., **Churchill, A.C.**, Faist, A.M., Havrilla, C.A., Love Stowell, S.M., McCreery, H.F., Ng, J., Pinzone, C.A., Scordato, E.S.C. 2018. Transforming Mentorship in STEM by Training Scientists to be Better Leaders. *Ecology and Evolution*. 8(20): 9962-9974. DOI: 10.1002/ece3.4527.
4. Watkins, J.E., **Churchill, A.C.**, Holbrook, N.M. 2016. Ecophysiology of fertile-sterile leaf dimorphism in ferns. *Amer.J. Bot.* 103(5): 845-855. DOI: 10.3732/ajb.1500505.
3. Ladwig, L.M., Ratajczak, Z.R., Ocheltree, T.W., Hafich, K.A., **Churchill, A.C.**, Fery, S.J.K., Fuss, C.B., Kazanski, C.E., Munoz, J.D., Petrie, M.D., Reinmann, A.B., Smith, J.G. 2016. Beyond arctic and alpine: the influence of winter climate on temperate ecosystems. *Ecology*. 97(2), 372-382. DOI: 10.1890/15-0153.1.
2. **Churchill, A.C.**, McGuire, A.D., Hollingsworth, T.N., & Turetsky, M.R. 2015. Response of vegetation structure and primary productivity to experimental drought and flooding in an Alaskan fen. *Can. J. For. Res.* 45(2), 183-191. DOI: 10.1139/cjfr-2014-0100.
1. Waldrop, M.P., Harden, J.W., Turetsky, M.R., Petersen, D.G., McGuire, A.D., Briones, M.J.I., **Churchill, A.C.**, Doctor, D.H. & Pruett, L.E. 2012. Bacterial and enchytraeid abundance accelerate soil carbon turnover along a lowland vegetation gradient in interior Alaska. *Soil Biology and Biochemistry*, 50: 188-198. DOI: 10.1016/j.soilbio.2012.02.032.

Papers in review and in preparation (full manuscripts available)

33. **Churchill, A.C.**, Yang, J., Herrmann, G., Cass, J., Tyler, T., Medlyn, B.E., Power, S.A., Gilpin, A.M. *In prep.* Reduced precipitation frequency increases pollinator floral resources in an Australian old-field grassland.
32. Catunda, K.L.M., Zhang, H., Fuller, K.J., Power, S.A., Moore, B.D, **Churchill, A.C.** *In revision.* Plant structural allocations and nutritional composition respond to drought differently among common pasture species. BioRxiv preprint: <https://doi.org/10.1101/2021.10.24.465597>
31. Bondaruk, V.F., Xu, C., Wilfahrt, P., Yahdjian, L., Yu, Q., Alberti, J., An, H., Auge, H., Biancari, L., Borer, E.T., Carbognani, M., Chandrewgowda, M., **Churchill, A.C.**, Daleo, P., Diao, H., Dieguez, H., Eisenhauer, N., Forte, T., Greenville, A., Gutknecht, J., Isbell, F., Jentsch, A., Ke, Y., Koerner, S.E., Kubert, A., Maziko, Y., Ohlert, T., Onatibia, G., Peri, P., Petraglia, A., Power, S.A., Salesa, D., Seabloom, E., Smith, M., Tedder, M., Tian, D., Tissue, D., Valdecantos, A., Verhoeven, E., Wanke, S., Wardle, G., Wei, C., Werner, C., Wheeler, G., Wilkins, K., Young, A.,

- Zhang, F., Zhu, J., Zong, N., Zuo, X., Hautier, Y. *In review at Nature Ecology and Evolution*. Nutrient addition and drought have independent effects on biomass in co-limited grasslands, but interactions arise depending on aridity conditions.
30. Worthy, S.J., Luong, J.C., Wainwright, B.E., Barcu, A.C., Elwood, E.C., Gujral, A.K., **International Drought Experiment Consortium**, Philips, R.P., Funk, J.L. *In review at Nature Ecology and Evolution*. Growth form and phenology mediate the role of traits in short-term drought response: A global study on herbaceous species.
 29. Ohlert, T. Smith, M., Collins, S., Knapp, A., Dukes, J.S., Munson, S., Anderson M., Avolio, M., Chen, A., Hayden, M., Holdrege, M.C., Sala, O., Slette, I., Wilfahrt, P., Wilkins, K., Beier, C., Fraser, L., Jentsch, A., Loik, M., Luo, Y., Maestre, F., Philips, R., Power, S.A., Yahdjian, L., Yu, Q., Chen, A., Felton, A., Gherardi, L., Lyon, N., Abdoli, H., Abedi, M., Alberti, J., Arroyo, A., Asbjornsen, H., Auge, H., Bachle, S., Bahn, M., Bartholomew, D., Bathaatar, A., Bauerle, T., Beard, K., Behn, K., Beil, I., Biancari, L., Blindow, I., Bondaruk, V., Borer, E., Bork, E., Bruschetti, C., Byrne, K.M., Cahill, J., Calvo, D., Carbognani, M., Carlyle, C., Castillioni, K., Castillo-Garcia, M., Chandregowda, M., Chang, S., Chieppa, **Churchill, A.C.**, Cianciaruso, M., Cordeiro, A., Cousins, S., Cusack, D., Dahlke, S., Dietterich, L., Dubbert, M., Eisenhauer, N., Forte, T., Funk, F., Cabrera Darcy, G., Greenville, A., Haugum, S., Hautier, Y., Hector, A., Henry, H., Hoss, D., Isbell, F., Jordan, S., Ke, Y., Kelly, E., Koerner, S., Kreyling, J., Kropfl, A., Kubert, A., Kulmatiski, A., Lamb, E., Larsen, K., Lee, S., Limbu, S., Linstadter, A., Liu, S., Longo, G., Loydi, A., Luan, J., Lubbe, F.C., Maylshev, A., McIntire, C., Metcalfe, D., Mokoka, M., Mori, A., Mudongo, E., Newman, G., Nielsen, U. Ochoa-Hueso, R., O'Connor, R., Ogaya, R., Onatibia, G., Osborne, B., Ohtnowski, R., Partel, M. Pascual, J., Penuelas, J., Peri, P., Pescador, D., Peter, G., Petraglia, A., Picon-Cochard, C., illar, V., Pineiro-Guerra, J., Ploughe, L., Plowes, R., Portales-Reyes, C., Prober, S., Pueyo, Y., Rahmati, G., Reed, S., Rodriguez, D., Rogers, W., Roscher, C., Rowley, D., Sanchez, A., Santos, B., Schellenberg, M., Scherer-Lorenzen, M., Seabloom, E., Shen, R., Shi, B., Souza, L., Stampfli, A., Standish, R., Sternberg, M., Sun, W., Snnemann, M., Tedder, M. Terry, M., Thorvaldsen, P., Tielborger, K., Tissink, M., Vadeboncoeur, M., Valdecantos, A., ca den Brink, L., Vandvik, V., Velle, L., Wanke, S., Wardle, G., Wei, C., Werner, C., Wiehl, G., Williams, J., Wolf, A., Xu, C., Yang, X., Yost, J., Young, A., Yue, P., Zeberio, J., Zeiter, M., Zhu, J., Zuo, X. *In review at Science*. Drought severity interacts with duration to erode ecosystem resistance.
 28. **Churchill A.C.**, Potter, T.S., Bowman, W.D. *In revision*. Alpine community dependent responses and ecological thresholds to elevated nitrogen deposition in the Rocky Mountains.
 27. **Churchill, A.C.**, Simkin, S.M., Ribarich, M.J., Bowman, W.D. *In revision*. Changes in ecosystem structure and function of alpine moist meadows along a gradient of nitrogen deposition in the Rocky Mountains.

Selected reports, and contributions

10. Power, S.A., **Churchill, A.C.**, Zhang, H. 2020. Sustainable pasture under climate extremes: Final Report. Meat and Livestock Australia Limited, North Sydney, NSW Australia
9. Power, S.A., **Churchill, A.C.**, Zhang, H. 2019. Sustainable pasture under climate extremes: Milestone 7 Report. Meat and Livestock Australia Limited, North Sydney, NSW Australia
8. Power, S.A., **Churchill, A.C.**, Zhang, H. 2019. Sustainable pasture under climate extremes: Milestone 5 & 6 Report. Meat and Livestock Australia Limited, North Sydney, NSW Australia
7. Power, S.A., **Churchill, A.C.**, Zhang, H. 2018. Sustainable pasture under climate extremes: Milestone 4 (Part 2) Report. Meat and Livestock Australia Limited, North Sydney, NSW Australia
6. Power, S.A., **Churchill, A.C.**, Zhang, H. 2018. Sustainable pasture under climate extremes: Milestone 4 (partial) Report. Meat and Livestock Australia Limited, North Sydney, NSW Australia
5. Power, S.A., **Churchill, A.C.**, Zhang, H. 2018. Pastures and Climate Extremes: Milestone 3 Report. Meat and Livestock Australia Limited, North Sydney, NSW Australia
4. **Churchill, A.C.**, Bowman, W.D. 2017 Alpine moist meadow response to nitrogen deposition in the

- Greater Yellowstone Ecosystem. University of Wyoming National Park Service Research Center Annual Report. 36 (15): 128- 133
3. Love Stowell, S., **Churchill, A.C.**, Hund, A.K, Kelsey, K.C., Redmond, M.D., Seiter S.A., Barger, N.N. 2015. Transforming graduate training in STEM education. *Bulletin of ESA*, 96(2):317-323.
 2. Beers, A.T., Potter, T.S., **Churchill, A.C.**, Faist, A.M., Filkins, H.R., Golden, E.M., Hicks, J.J., Barger, N.N. 2013. Advocating for science writing cooperatives in graduate programs. *Bulletin of ESA*, 94(3): 245-246.
 1. **Churchill A. C.**, Bowman W. D., Visty J., Bobowski B. (2012) Review of research conducted in Rocky Mountain National Park of CO, USA and the Tatra National Parks of Poland and Slovakia.

Research Grants Pending

- 2024 **USDA AFRI NIFA New Investigator Seed Grant: (\$298,480)** Enhanced biodiversity impacts on lawn stability and sustainability of ecosystem services under fertilization and short-term extreme drought

Research Grants Received (Total ~\$284,000 USD)

- 2024 **Upper Susquehanna Coalition Grant: (\$7,400)** Urban nutrient management planning support at Binghamton University
- 2020-2022 **USDA AFRI NIFA Postdoctoral Fellowship Grant: (\$165,000)** Exploring shifts in successional community interactions as a control on grassland ecosystem responses to climate extremes, with Dr. Forest Isbell
- 2018-2020 **Summer Scholarship Research Program, WSU: (\$10,500 AUD)**
- ❖ Effects of drought on plants and pollinators, with Dr. Amy-Marie Gilpin and Dr. Jinyan Yang
 - ❖ What is the future cooking up for hungry cattle? Pasture nutrition under climate extremes, with Dr. Ben Moore and Karen Catunda
 - ❖ Understanding the PACE of Climate Change, with Dr. Sally Power
- 2017 **Boulder County Nature Association: (\$2,592)** Drivers of spatial heterogeneity in nitrogen processing among three alpine plant communities in the Rocky Mountains.
- 2012-2016 **Undergraduate Research Opportunities Program, CU: Individual Grants (\$9,600)**
- ❖ Abiotic drivers of spatial heterogeneity in nitrogen processing among three alpine plant communities in the Rocky Mountains, with Tyler Justice and Dr. William Bowman
 - ❖ Threats to the alpine: potential losses of plant diversity in response to changes in nitrogen deposition, with Benjamin Crawford and Dr. William Bowman
 - ❖ The effect of nitrogen deposition on krummholz recruitment and establishment at alpine treeline, with Colin Luben and Dr. William Bowman
 - ❖ Differences in herbivore presence between alpine meadow communities in the CO Rocky Mountains, with George Libby and Dr. William Bowman
- 2012-2016 **EBIO Department, CU: EBIO Research Grant (\$3,600); EBIO Maxy Pope Alles Botany Endowment Research Grant (\$4,824)**
- ❖ Plant and soil feedbacks at intermediate time scales among three alpine communities responding to anthropogenic nitrogen deposition.
 - ❖ Understanding the long-term quantitative influence of alpine plants on ecosystem nutrient cycling through plant-soil feedbacks.
 - ❖ Understanding the quantitative influence of alpine plants on ecosystem nutrient cycling through plant-soil feedbacks.

- ❖ Plant community mediated responses of alpine ecosystems to nitrogen deposition.
- 2014-2015 **Indian Peaks Wilderness Alliance:** David Paddon Grant (\$1,600)
- ❖ Plant mediated susceptibility of alpine meadow ecosystems to nitrogen deposition.
 - ❖ Alpine moist meadow response to regional gradients of nitrogen deposition in the Rocky Mountains.
- 2012-2015 **Undergraduate Research Opportunities Program, CU:** Team Grant (\$21,600)
- ❖ How do nitrogen pollution and freezing tolerance contribute to plant-microorganism relationships and plant invasions? with Teal Potter and Dr. William Bowman
 - ❖ Direct and indirect plant and microbial responses to N deposition and controls on N storage, with Teal Potter and Dr. William Bowman
 - ❖ Plant mediated responses of alpine ecosystems to anthropogenic nitrogen deposition: where does nitrogen deposition go, and how long does it stay, in alpine ecosystems? with Dr. William Bowman
 - ❖ Alpine moist meadow soil responses to nitrogen deposition along a deposition gradient in the Rocky Mountains, with Dr. William Bowman
 - ❖ Anthropogenic nitrogen inputs on alpine plant communities: mechanisms of resilience and change, with Teal Potter and Dr. William Bowman
 - ❖ Alpine moist meadow response to gradients of nitrogen deposition in the Rocky Mountains, with Teal Potter and Dr. William Bowman
 - ❖ Plant community effects on alpine ecosystem response to nitrogen deposition, with Dr. William Bowman
- 2012- 2015 **John Marr Memorial Ecology Fund:** (\$3,091)
- ❖ Plant mediated susceptibility of alpine meadow ecosystems to nitrogen deposition.
 - ❖ Plant community effects on alpine ecosystem response to nitrogen deposition.
- 2012-2015 **Graduate School, CU:** Beverly Sears Grant (\$3,000), Bigelow Named Grant (\$2,000)
- ❖ Where does nitrogen deposition go, and how long does it stay, in alpine ecosystems.
 - ❖ Plant mediated susceptibility of alpine meadow communities to nitrogen deposition.
 - ❖ Regional gradients of nitrogen deposition in the central and southern Rocky Mountains, USA and coupled vegetation-soil interactions in alpine moist meadows.
 - ❖ Examining the interactions between plant communities and ecosystem functions in systems perturbed through anthropogenic deposition of nitrogen.
- 2013 **National Park Service:** (\$19,993) George M. Wright Climate Change Youth Initiative Fellowship. Alpine moist meadow response to regional gradients of nitrogen deposition and inter-annual variation in winter precipitation.
- 2013 **University of Wyoming:** (\$4,290) UW NPS Small Grant. Alpine moist meadow response to nitrogen deposition in the Greater Yellowstone Ecosystem., CO PI Dr. William Bowman
- 2012-2013 **Biological Sciences Initiative, CU:** (\$5,000)
- ❖ Alpine moist meadow response to gradients of nitrogen deposition in the Rocky Mountains. with Dr. William Bowman and Drew Meyers
 - ❖ Plant community effects on alpine ecosystem response to nitrogen deposition. with Dr. William Bowman and Matthew Ribarich
- 2012 **National Park Service:** (\$19,425) Cooperative Ecosystem Studies Unit- Rocky Mountains Grant.

Plant community effects on alpine ecosystem response to nitrogen deposition, with Dr. William Bowman

- 2010 **Center for Global Change at UAF: (\$3,728)** Nitrogen availability in boreal peatlands responding to climate change and its effect on vegetation community structure and primary productivity.

Travel and Outreach Grants Received

- Graduate Travel Grant (\$300); UGGS (2016)
- Niwot Ridge LTER Student Travel Grant (\$500); INSTAAR (2016)
- Student Section Travel Grant (\$300); ESA Annual Meeting (2016)
- Biogeosciences Section Student Travel Grant (\$250); ESA Annual Meeting (2016)
- Graduate School Travel Grant (\$300); CU Graduate School (2016)
- Student Section Travel Grant (\$300); ESA 100th Anniversary Meeting (2015)
- Graduate School Travel Grant (\$300); CU Graduate School (2015)
- Boulder Valley Inner City Outings Non-Profit trip to the Mountain Research Station. Outreach Grant (\$750) UGGS at CU Boulder (received 2014-2015)
- Graduate School Travel Grant (\$300); CU Graduate School (2014)
- Director Grant for Student Travel (\$1,000); Institute of Arctic Biology, UAF (2010)
- Travel Grant (\$1,800); PeatNet travel aid for presenters: 2nd Intern. Symp. on Carbon in Peatlands (2009)

Awards

- Department of Ecology and Evolutionary Biology Graduate Teaching Award. 2017.
- Outstanding Student Paper Award. 2016. Biogeosciences Section, *American Geophysical Union Annual Meeting*, San Francisco, CA
- GK-12 Fellowship, Project EXTREMES at University of Colorado Boulder. 2012-2013. NSF.
- Stonehill College Outstanding Senior Award, 2008.

Invited Professional Presentations (Presenting Author Only; *Oral, ** Poster)

- 2024 “Benefits of enhanced biodiversity on ecosystem function and services under global change”* *Sustainable Communities TAE Program*, Binghamton University
- 2023 “Dissecting the interview”* *Earth Lab’s EDS Seminar Series*, University of Colorado Boulder; <https://earthlab.colorado.edu/blog/dissecting-interview>
- 2023 “Plant community mediated changes in ecosystem function and services under global change”* *Department of Biological Sciences*, Binghamton University
- 2023 “Plant community mediated changes in ecosystem function under global change”* *Environmental Studies Program*, Binghamton University
- 2023 “Plant community mediated changes in ecosystem function under global change”* *Department of Biology*, University of Akron
- 2023 “Plant community mediated changes in ecosystem function under global change”* *Department of Plant Biology, Ecology and Evolution*, Oklahoma State University
- 2023 “Plant community mediated changes in ecosystem function under global change”* *Department of Biology*, San Francisco State University
- 2023 “Plant community mediated changes in ecosystem function under global change”* *School of Biological Sciences*, Illinois State University
- 2023 “Variation in canopy greenness under growing season drought among old-field successional grasslands”* *ASCEND Winter Symposium* Madison, WI

- 2022 “Impacts of summer drought in mesic savanna grasslands and old-fields at Cedar Creek”* *All Scientist Meeting: Long Term Ecological Research*, Pacific Grove, CA
- 2022 “Plant community impacts on ecosystem responses to global change”* *Forest and Rangeland Ecosystem Science Center*, USGS, Boise, ID
- 2022 “Plant community impacts on ecosystem responses to global change”* *Department of Animal and Range Sciences*, Montana State University, Bozeman, MT
- 2022 “Plant community impacts on ecosystem responses to global change”* *School of Natural Resource Sciences*, North Dakota State University, Fargo, ND
- 2019 “Working at the extremes: plant community and ecosystem responses to global change”* *Invited Talk Seminar Series*, Hawkesbury Institute for the Environment, Richmond, NSW, Australia
- 2017 “Plant community mediation of ecosystem responses to global change factors”** *Invited enlightening session. American Geophysical Union Annual Meeting*, New Orleans, LA

Contributed Professional Presentations (Presenting Author Only; *Oral, ** Poster)

- 2023 “Conditional drought resistance in mesic oak savanna under experimental nutrient resource availability”* *Ecological Society of America Conference*, Portland, OR
- 2022 “Drivers of ecosystem response to extreme drought in successional old-fields”** *All Scientist Meeting: Long Term Ecological Research*, Pacific Grove, CA
- 2022 “Plant community drivers of ecosystem response to extreme summer drought in successional old-fields”* *Ecological Society of America Conference*, Montreal, Quebec, Canada
- 2022 “Extreme summer drought impacts on old-field forage production and nutritional quality”* *American Forage and Grasslands Council Conference*, Wichita, KS
- 2021 “Reduced precipitation frequency increases pollinator floral resources in an Australian old-field grassland”* *Ecological Society of America Conference*, Long Beach, CA
- 2020 “Pasture plant-plant competition and nutrient facilitation under extreme drought and warming”* *Ecological Society of America Conference*, Salt Lake City, UT
- 2019 “Detecting shifts in pasture ecosystem health and function under extreme climate conditions using canopy greenness”** *American Geophysical Union Annual Meeting*, San Francisco, CA
- 2019 “Nutrient facilitation between tropical legumes and grasses under elevated CO₂”* *Ecological Society of Australia Conference*, Launceston, Tasmania
- 2019 “Consequences of extreme climate conditions on plant productivity and recovery among diverse pastures”* *Australian Rangelands Society Conference*, Canberra, ACT
- 2019 “Canopy greenness highlights pasture susceptibility to extreme climate conditions and phenological shifts in recovery”* *Ecological Society of America Annual Meeting*, Louisville, KY
- 2018 “Detecting phenological shifts in pasture grasses and legumes under extreme climate conditions using Phenocams” Ignite talk* *Ecological Society of Australia Annual Meeting*, Brisbane, QLD
- 2017 “Drivers of spatial heterogeneity in nitrogen processing among three alpine plant communities in the Rocky Mountains”** *American Geophysical Union Annual Meeting*, New Orleans, LA
- 2017 “Drivers of spatial heterogeneity in nitrogen processing among three alpine plant communities in the Rocky Mountains”* *Ecological Society of America Annual Meeting*, Portland, OR
- 2016 “Alpine plant community controls on ecosystem N pools under the influence of N deposition using an enriched ¹⁵N tracer experiment”** *American Geophysical Union Annual Meeting*, San Francisco, CA
- 2016 “Differences in the response of ecological indicators to nitrogen deposition among three alpine meadow communities of the Rocky Mountains”* *Ecological Society of America Annual Meeting*, Fort Lauderdale, FL
- 2016 “Plant diversity as a control on non-linear ecosystem responses to anomalous climate events”** *CLIMMANI/INTERFACE Workshop- After the extreme: Measuring and modeling impacts on terrestrial ecosystems when thresholds are exceeded*; Florence, Italy

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- 2015 “Differences in ecological thresholds to nitrogen deposition among Rocky Mountain alpine meadow ecosystems”* *Guild of Rocky Mountain Ecologists and Evolutionary Biologists Annual Meeting*; Nederland, CO
- 2015 “Differences in ecological thresholds to nitrogen deposition among Rocky Mountain alpine meadow ecosystems”** *Ecological Society of America Annual Meeting*; Baltimore, MD
- 2015 “Alpine moist meadow response to regional gradients of nitrogen deposition in the Rocky Mountains”** *George Wright Society Annual Meeting*; Oakland, CA
- 2015 “Alpine moist meadow response to regional gradients of nitrogen deposition in the Rocky Mountains”* *Rocky Mountain National Park Research Symposium*; Estes Park, CO
- 2014 “Alpine moist meadow response to regional gradients of nitrogen deposition in the Rocky Mountains”* *Guild of Rocky Mountain Ecologists and Evolutionary Biologists Annual Meeting*; Pingree Park, CO
- 2014 “Alpine moist meadow response to regional gradients of nitrogen deposition in the Rocky Mountains”* *Ecological Society of America Annual Meeting*; Sacramento, CA
- 2012 “Ambient nitrogen deposition gradients in the Rocky Mountains and the effect on alpine moist meadow ecosystems”** *American Geophysical Union Fall Meeting*; San Francisco, CA
- 2011 “The influence of thermokarst on plant community structure and ecosystem function in Alaskan boreal peatlands”* *Guild of Rocky Mountain Ecologists and Evolutionary Biologists Annual Meeting*; Mountain Research Station, CO
- 2010 “Response of vegetation structure and function to experimental drought and flooding in an Alaskan fen” ** *American Geophysical Union Fall Meeting*; San Francisco, CA
- 2010 “Responses of primary productivity and annual biomass in Alaskan boreal peatlands to changing hydrology and permafrost”** *Ecological Society of America Annual Meeting*; Pittsburgh, PA
- 2009 “Plant physiological and environmental controls on primary production in Alaskan peatlands”** *Second International Symposium on Carbon in Peatlands*; Prague, Czech Republic
- 2008 “A site for sori: consequences of fertile/sterile leaf dimorphism in ferns”* *Botanical Society of America Botany Conference*; Vancouver, Canada

Contributed Professional Presentations (Co-Author Only; *Oral, ** Poster)

- 2023 “Predicting temporal stability from its resistance and resilience components”* *Ecological Society of America Conference*, Portland, OR
- 2023 “Plant dispersal traits as predictors of grassland species composition along an old field chronosequence”**, *Ecological Society of America Conference*, Portland, OR

Courses Taught as Primary Instructor

- ENVI 413-91 Environmental Studies Capstone (22 students, 4 credits), *Binghamton University Fall 2024*
- ENVI 443/543 Global Change & Ecosystems (21 students, 4 credits), *Binghamton University Fall 2024*
- ENVI 498: Undergraduate Honors Thesis I (2 students, 4 credits), *Binghamton University Fall 2024*
- ENVI 497: Independent Study (1 student, 2 credits), *Binghamton University Fall 2024*
- BIOL 497: Independent Study (1 student, 4 credits), *Binghamton University Fall 2024*
- ENVI 382A: Biodiversity as an Ecosystem Service (12 students, 4 credits), *Binghamton University Spring 2024*
- ENVI 382B: Measuring the Natural World (21 students, 1 TA, 4 credits), *Binghamton University Spring 2024*
- ENVI 413-91: Environmental Studies Capstone (13 students, 4 credits), *Binghamton University Fall 2023*
- ENVI 481-V/581-W: Global Change & Ecosystems (27 Students, 1 TA, 4 credits), *Binghamton University, Fall 2023*
- ENVI 497: Independent Study (1 student, 1 credit), *Binghamton University Fall 2023*

BIO 4994: Directed Research (1 student, 4 credits), *UMN Spring 2023*
EBIO 4040: Plant Ecology (36 students, 3 credits), *CU Fall 2015*
EBIO 6100: Science Writing (15 students, 1 credit; co-taught by Akasha Faist and Dr. Nichole Barger),
CU Spring 2014

Teaching Assistantships and Course Lectures

2023 Instructor for ASCEND Summer Workshop: Preparing for academic interviews (20 students), *UMN*
2023 Focus scientist: Biology Saves the World (10 students), *UMN*
2023 Guest Lecture for Biodiversity (30 students), *Hamline University*
2021 Guest Lecture for Principles of Ecology (30 students), *UMN*
2020 Research co-supervisor for undergraduate project in Science Research Project Unit (1 student; co-supervised by Dr. Amy-Marie Gilpin and Dr. Jinyan Yang), *WSU*
2019 Guest Lecture for Ecosystems in a Changing World course (8 students), *WSU*
2019 Guest Instructor for Climate Change and the Environment course (20 students), *WSU*
2018 Invited instructor, HIE Professional Development Series 'A presentation on presentations', (20 students), *WSU*
2018 Invited instructor, HIE Writing Camp (30 students), *WSU*
2017 Lab Coordinator, Principles of Ecology: EBIO 2040 (~120 students), *CU*
2014- 2016 Teaching Assistant, Principles of Ecology: EBIO 2040 (~26 students/ semester), *CU*
2015 Guest Lecture for Principles of Ecology EBIO 2040 (~120 students), *CU*
2013 Teaching Assistant, Plant Ecology, Evolution & Develop.: EBIO 4800 (27 students), *CU*
2012- 2013 GK-12 Fellow, Project EXTREMES (90 students): Grade 5 Science, Louisville Elementary School, *CIRES, CU*
2010 Teaching Assistant, Fundamentals of Biology: BI 115 (19 students), *UAF*
2008 Teaching Assistant, Biological Principles II: BI 102 (5 students), *Stonehill College*
2007-2008 Assistant Laboratory Instructor, Biological Principles I & II: BI 101 and BI 102 (30 students), *Stonehill College*
2005-2006 Teaching Assistant, General Chemistry I and Organic Chemistry I: CH 113, CH 221 (15 students), *Stonehill College*

Pedagogy and DEIJ training

2023 Eco-grief and climate anxiety workshop, Ecological Society of America (conference event, 2 contact hours)
2023 Making together better: Guiding effective group work for all students, Ecological Society of America (conference event, 2 contact hours)
2023 Building Community and Maintaining Motivation, University of Minnesota (Virtual course, 2 hours)
2022 Addressing Implicit Bias in Search and Selection Processes, University of Minnesota (virtual event, 2 contact hours)
2022 Leadership Development Certificate, Office of Postdoc Initiatives, University of Minnesota (mixed in-person and virtual; 8 contact hours)
2021 First-Gen Institute: Unpacking inequities through an intersectional lens, Center for First-Generation student success, University of Minnesota (virtual event, 3.5 contact hours)
2021 Mentoring and advising summit, University of Pittsburgh (virtual event, 7.5 contact hours)
2016 Leadership and mentorship, Department of Ecology and Evolutionary Biology, University of Colorado Boulder (Semester seminar, 12 contact hours)
2015 Applying best practices in science education courses, Department of Ecology and Evolutionary Biology, University of Colorado Boulder (Semester seminar, 15 contact hours)
2015 Continuing best practices in science education, Department of Ecology and Evolutionary Biology, University of Colorado Boulder (Semester seminar, 12 contact hours)

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- 2014 Best practices in science education, Department of Ecology and Evolutionary Biology, University of Colorado Boulder (Semester seminar, 12 contact hours per semester)
- 2013 Science education reading group, Department of Ecology and Evolutionary Biology (10 contact hours)
- 2013 Presentation Bootcamp (Dr. Richard Tankersley, Project EXTREMES, CU Boulder, 12 contact hours)
- 2013 Experiential science learning collaborative (Dr. Brad McLain, Project EXTREMES, CU Boulder, 3 contact hours).
- 2012 Engaged teaching in the classroom (Wendy Ward Hoffer, Project EXTREMES, CU Boulder, 3 contact hours)
- 2012 Sheltered instruction training: ESL students (Rafael Salgado, Project EXTREMES, CU Boulder, 3 contact hours)
- 2010 Backwards course design, University of Alaska Fairbanks (workshop, 14 contact hours)

Graduate student advising

Binghamton University

Katayoun Khosravi: Ph.D. Student in Department of Biological Sciences at Binghamton University; Adviser (2025- present)

Catherine Farrell: M.S. Student in Department of Biological Sciences at Binghamton University; committee member (2023- present)

Julianna Yager: Ph.D. Student in Department of Biological Sciences at Binghamton University; committee member (2024- present)

Western Sydney University

Karen M. L. Catunda: Ph.D. Student at Hawkesbury Institute for the Environment; committee member (2018- 2022); “Growth and nutritive value of pastures under climate extremes”

Undergraduate student advising

Undergraduate Honors Theses

Binghamton University

- Jenna Meyer: B.S. Environmental Studies; Adviser Fall 2024-Sp 2025: “Lawn establishment under enhanced biodiversity”
- Masami Kanyuk: B.S. Environmental Studies; Adviser Fall 2024-Sp 2015: “Lawn nutrient run-off during establishment under enhanced biodiversity”
- Louis Glickman: B.S. Anthropology; Second Reader Fall 2023- Sp2024: “Fertilization of crops by 16th century Indigenous laborers”

* BURST- Biological Science Research Skills and Training at CU, UROP- Undergraduate Research Opportunities Program at CU or UMN, REU- Research Experience for Undergraduates by NSF, WSU Scholars- Summer undergraduate scholars program at WSU, CCEsr Interns- Cedar Creek Ecosystem Science Reserve Summer Intern Program, CBS Dean Scholars- UMN College of Biological Science Dean Research Scholar Program, BUPNUR- Binghamton University Projects for New Undergraduate Researchers *

Field and laboratory technicians

- Plant-Ecosystem Lab Undergraduate Research Assistants- 5 students, Summer 2024 (BU)
- BUPNUR- 2 students, Spring 2024 (BU)
- CBS Dean Scholars- 6 students, Spring 2022, Fall 2022, Spring 2023 (UMN)
- WSU Scholars: 5 students, Summer 2018-2019, Summer 2019-2020, Summer 2020-2021 (WSU)

- UROP team grants: 23 students, Summer 2012, Fall 2012, Summer 2013, Spring 2014, Summer 2014, Fall 2014, Spring 2015, Summer 2015, Spring 2016 (CU)
- Research grants: 1 student, Fall 2010 (UAF); 3 students, Summer 2012-2014 (CU); 2 students, Spring 2023 (UMN)
- BURST grants: 2 students, Summer 2012, Summer 2013 (CU)
- Volunteer: 13 students, Summer 2012, Fall 2012, Spring 2013, Fall 2013, Spring 2014, Summer 2014, Spring 2014, Fall 2014, Spring 2016 (CU); 2 students, Spring 2019, Autumn-Spring 2019 (WSU); 1 student, Spring 2024 (BU)
- Work Study: 1 student, Fall 2015, Spring 2016 (CU)

Field and laboratory independent research projects

- CCSR Interns: 18 students, Summer 2021 (UMN, Boston University, Michigan Technological University, Georgetown University, Macalester College, UCLA State University, University of Texas El Paso, Gustavus Adolphus College), Summer 2022 (UMN, Gustavus Adolphus College, University of Wisconsin Madison, Carlton College, Friends University), Summer 2023 (Macalester College, Emory University, UWEC)
- UROP individual grants: 4 students, Summer 2013, Summer 2015, Summer 2016 (CU); 1 student, Spring 2023 (UMN)
- REU projects: 4 students, Summer 2009, Summer 2010, Summer 2011 (Illinois Institute of Technology, University of New Hampshire, University of Chicago, UAF)

Professional Service

Environmental Studies, Binghamton University

Nuthatch Hollow Steering Committee: member 2023-present

Department of Biological Studies, Binghamton University

Greenhouse Committee: member 2023-present

EEB, University of Minnesota

Ecosystems Journal Club: organizer 2020- 2023

MnDRIVE Environment, University of Minnesota

Seed Grant Reviewer: 2023

HIE, Western Sydney University

WSU Ally Network: member 2018- 2020

HIE Writing Pods: co- organizer 2019

HIE Early Career Researcher committee: member 2017-2018

EBIO, University of Colorado

Graduate Writing Cooperative in EBIO: organizer 2013-2017

Graduate Student liaison to EBIO Undergraduate Club 2014-2016

Travel coordinator, EBIO Colloquium Committee: 2012- 2016

Climate Change Outreach Committee: member 2013-2017, Co-chair 2014- 2015

Peer Reviewer: Agricultural and Forest Meteorology; Australian Geographer; American J. Botany; Annals of Botany; Crop and Pasture Science; Ecological Applications; Ecology; Ecology and Evolution; Ecosphere; Ecosystems; Frontiers in Ecology & Evolution; Frontiers in Plant Science; Functional Ecology; Journal of Applied Ecology; Journal of Arid Environments; Journal of Ecology; Journal of Environmental Management; Journal of Soil Science and Plant Nutrition; New Phytologist; Oecologia; Pedobiologia; Physiologia Plantarum; Plant and Soil; PlosOne; Rangelands

Editorial board for Frontiers in Plant Science as Functional Plant Ecology Review Editor: 2019-2023

Professional Organizations

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| Ecological Society of America | American Geophysical Union |
| Ecological Society of Australia | Australian Rangeland Society |
| American Grass and Forage Association | Society for Range Management |
- *Australian Rangeland Society 2019 Conference planning board: Early Career Practitioner committee co-chair 2018- 2019*
 - *Ecological Society of America 2022 Lead Organizer and Moderator for Organized Oral Session: "Understanding drivers of grassland phenology under a changing climate"*

Outreach Activities

- 2024 Invited Speaker: On being a plant-ecosystem scientist, 37 students, Stuyvesant Environmental Club, Stuyvesant High School, NYC, NY, Remote Talk
- 2023 Skype a Scientist: Guest speaker for 5th grade class, 40 students, Highland Renaissance Academy, Frisco, TX, USA, Remote Talk
- 2022 Lunch with a Scientist: Invited presenter for seminar series, 79 attendees, Cedar Creek Ecosystem Science Reserve, MN, USA, remote talk and Q/A
- 2022 Eco-Extravaganza: Guest instructor for 11th grade ecological field science day, Totino-Grace High School, 38 students, Cedar Creek Ecosystem Science Reserve, East Bethel, MN, USA
- 2021 Skype a Scientist: Guest speaker for 5th grade class, 20 students, Struble Elementary, Cincinnati, OH, USA, Remote Talk
- 2021 Skype a Scientist: Guest speaker for 5th grade class, 55 students, Highland Renaissance Academy, Charlotte, NC, USA, Remote Talk
- 2021 Skype a Scientist: Guest speaker for 5th grade class, 20 students, Denver Remote Elementary, Denver, CO, USA, Remote Talk
- 2021 Skype a Scientist: Guest speaker for 11th/12th grade AP Environmental Science class, 38 students, Andrew High School, IL, USA, Remote Talk
- 2021 Lunch with a Scientist: Invited presenter for seminar series, 47 attendees, Cedar Creek Ecosystem Science Reserve, MN, USA, Hybrid in-person/remote talk and field trip
- 2021 Skype a Scientist: Guest speaker for 5th grade class, 26 students, *Central Elementary School*, MO, USA, Remote talk
- 2021 Skype a Scientist: Guest speaker for 5th grade class, 25 students, *James Madison Intermediate School*, NJ, USA, Remote talk
- 2021 Skype a Scientist: Guest speaker for 2nd grade class, 20 students, *Franklin Elementary School*, CA, USA, Remote talk
- 2019 Department of Primary Industries and Local Land Services Pasture Field Day: Speaker, 20 attendees, *Tamworth, NSW, Australia*, WSU
- 2019 Site Tour Guide for Australian Seed Federation, 14 attendees, *Pastures and Climate Extremes Facility*, WSU
- 2019 Site Tour Guide for Advanced Science Field Day class, 40 attendees, *Pastures and Climate Extremes Facility*, WSU
- 2019 Site Tour Guide and Guest Instructor for Year 10 Agricultural students, Barker College Field Day, 130 students, *Pastures and Climate Extremes Facility*, WSU
- 2019 Site Tour Guide and Guest Instructor for Year 11 Agricultural students, St. Joseph College Field Day, 8 students, *Pastures and Climate Extremes Facility*, WSU
- 2018 Site Tour Guide for Resource Sustainability class, 20 attendees, *Pastures and Climate Extremes Facility*, WSU
- 2018 Pastures and Climate Extremes Field Day: Co-organizer, 40 participants, WSU
- 2018 Invited speaker, 25 students, *Hurlestone Agricultural High School*, Glenfield, NSW, Australia

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- 2018 Site Tour Guide for Advanced Science Field Day class, 40 attendees, *Pastures and Climate Extremes Facility*, WSU
- 2017 Teaching Controversial Topics Workshop: Panel member for Inclusivity in Science Discussion, 60 participants, *CU*, Evolution and Climate Change Outreach Committees
- 2016 Teaching Controversial Topics Workshop: Session leader on ‘The ecological consequences associated with nitrogen pollution and potential solutions’, 20 participants, *CU*, Evolution and Climate Change Outreach Committees
- 2016 Vegetation Monitoring Workshop: Instructor, Research Experience for Undergraduates Program, 12 participants, *Mountain Research Station*, Nederland, CO
- 2016 Mountain Ecology Workshop: Instructor, Research Experience for Community College Students Program, 10 participants, *Mountain Research Station*, Nederland, CO
- 2015 Nederland Summer School REACH Program, 25 students: Graduate instructor, *Mountain Research Station*, Nederland, CO
- 2015 Teaching Controversial Topics Workshop, 60 participants: Co-organizer, *CU*, Evolution and Climate Change Outreach Committees
- 2015 Alpine Ecology Field Trip, Native Plant Society of Colorado: Trip co-leader, 10 participants *Rocky Mountain National Park*
- 2014 Teaching Controversial Topics Workshop, 60 participants: Co-organizer, *CU*, Evolution and Climate Change Outreach Committees
- 2013 Mountain Ecology Workshop: Workshop coordinator, Manhattan Middle School Science Club, 20 students, *Mountain Research Station*, Nederland, CO
- 2012 Mountain Ecology Workshop: Workshop coordinator, Ryan Elementary School, 90 students, *Mountain Research Station*, Nederland, CO
- 2012 National Geographic BioBlitz, Expert Scientist for alpine vegetation station, 100 participants, *Rocky Mountain National Park*
- 2012 Scientific Method Workshop, Science Discovery Program, 30 students, *Mountain Research Station*, Nederland, CO
- 2012 Vegetation Monitoring Workshop, Research Experience for Undergraduates, 12 students, *Mountain Research Station*, Nederland, CO

References

Post-doctoral research supervisor

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Post-doctoral research supervisor

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Professor, Hawkesbury Institute for the Environment
Western Sydney University
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Richmond, NSW 2753 Australia
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Ph.D. Adviser

Dr. William Bowman (william.bowman@colorado.edu)
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Former Director of the Mountain Research Station
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