

# Mario Bretfeld

## Curriculum Vitae

University of Wyoming  
1000 E. University Ave.  
Laramie, WY 82071

*Private address removed  
for privacy reasons.*

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<https://plantecophysiology.com>

### EDUCATION

- Ph.D.      Biological Education (2014)  
University of Northern Colorado, Greeley, USA  
Dissertation: The effects of insect-induced competitor die-off on a pioneer, clonal tree species in Colorado: an assessment of temporal changes in *Populus tremuloides* distribution, physiological responses, and clonal integration.
- Diploma    Landscape Ecology (2010)  
Carl-von-Ossietzky University, Oldenburg, Germany  
Thesis: Management and Clonal Integration of Quaking Aspen in the Rocky Mountains.

### PROFESSIONAL EXPERIENCE

- 2017-present    Post-Doctoral Research Associate. University of Wyoming, Laramie WY.  
2015-2017      Post-Doctoral Fellow, Smithsonian Tropical Research Institute, Panamá.  
2013            Greenhouse Technician. University of Northern Colorado, Greeley CO.  
2009-2010     Research Assistant. School of Biological Sciences, University of Northern Colorado, Greeley CO.

### TEACHING EXPERIENCE

#### University of Wyoming

Plant Form and Function (Spring 2019; Co-Instructor)  
Vegetation Ecology (Fall 2018)  
Biology of Plants and Fungi (Fall 2018)

#### University of Northern Colorado

General Ecology (Fall 2012)  
Biological Perspectives (Summer 2014; TA from 2010-2014)  
Survey of Organismal Biology (TA from 2010-2014)  
German Civilization and Literature Survey II (TA Fall 2008)

## PUBLICATIONS

### Journal Articles

- Litt, G., Ogden, F.L., Mojica, A., Kempema, E.W., Hendrickx, J.M.H., Gardner, C.B., **Bretfeld, M.**, Regina, J.A., Harrison, J.B.J., Cheng, Y., Lyons, W.B. Land Cover Effects on Soil Infiltration Measured Using Plot Scale Rainfall Simulation in Steep Tropical Lowlands of Central Panama. *Hydrological Processes*. (in review).
- Bretfeld, M.**, Franklin, S.B., Peet, R.K. 2019. Long-term understory vegetation dynamics of mixed aspen forests in Rocky Mountain National Park, USA. *Journal of Vegetation Science*. DOI 10.1111/jvs.12712
- Cheng, Y., Ogden, F.L., Jianting, Z., **Bretfeld, M.** 2018. Land use dependent preferential flow paths affect hydrologic response of steep tropical lowland catchments with saprolitic soils. *Water Resources Research*. DOI 10.1029/2017WR021875
- Bretfeld, M.**, Ewers, B.E., Hall, J.S. 2018. Plant water use responses along secondary forest succession during the 2015/16 El Niño drought in Panama. *New Phytologist*: DOI 10.1111/nph.15071
- Bretfeld, M.**, Franklin, S.B., Hubbard, R.M. 2017. Initial evidence for simultaneous, bi-directional sap flow in roots of interconnected aspen ramets (*Populus tremuloides*). *Folia Geobotanica*: DOI 10.1007/s12224-017-9285-0
- Berry, C.Z., Evaristo, J., Moore, G., Poca, M., Steppe, K., Verrot, L., Asbjornsen, H., Borma, L.S., **Bretfeld, M.**, Hervé-Fernández, P., Seyfried, M., Schwendenmann, L., Sinacore, K., De Wispelaere, L., McDonnell, J. 2017. The two water worlds hypothesis: Addressing multiple working hypotheses and proposing a way forward. *Ecohydrology*: DOI 10.1002/eco.1843
- Bretfeld, M.**, Franklin, S.B., Peet, R.K. 2016. A multiple-scale assessment of long-term aspen persistence and elevational range shifts in the Colorado Front Range. *Ecological Monographs* 68(2): 244-260. DOI 10.1890/15-1195.1
- Bretfeld, M.**, Doerner, J.P., Franklin, S.B. 2015. Radial growth response and vegetative sprouting of aspen following release from competition due to insect-induced conifer mortality. *Forest Ecology and Management* 347: 96-106. DOI 10.1016/j.foreco.2015.03.006
- Bakker, J.P., Rosén, E., Ozinga, W.A., **Bretfeld, M.**, Feldt, T. & Stahl, J. 2012. Long-term effects of scrub clearance and litter removal on the re-establishment of dry alvar grassland species. *Ann. Bot. Fennici* 49: 21–30.

## GRANTS AND FELLOWSHIPS

Total awarded: \$170,747

- 2018            Bretfeld, M., Frank, J., Parsekian, A.D., Ewers, B.E. RAPID: Forest Ecosystem Response to Interacting Bark Beetle and Fire Disturbance are set up by Regeneration in the First Year. NSF Ecosystems RAPID. – \$164,997.
- 2018            NSF travel grant for *NSF/NIFA Water Sustainability and Climate (WSC) meeting*. Washington, DC. – \$1000.00

- 2016 Hendrickx, J.M.H., Ogden, F.L., Wade, T.C., Harrison, J.B.J., Podest, E., Trezza, R., Bretfeld, M., Hall, J.S., Nawa, R.P. Remote sensing for evapotranspiration and soil moisture mapping over dynamic land covers in the humid tropics. NASA Research Opportunities in Earth and Space Science (ROSES). – *not funded*.
- 2016 Bretfeld, M. National Science Foundation Travel Grant for AGU Chapman Conference on the Emerging Issues in Tropical Ecohydrology. Cuenca, Ecuador. – \$750.00
- 2016 Bretfeld, M. Hall, JS. Assessing hydrological ecosystem services along the transition between pasture and forest in the Panama Canal Watershed. Smithsonian Scholarly Studies award. – *not funded*.
- 2012 Bretfeld, M. Temporal changes in aspen distribution in the Colorado Front Range. Colorado Native Plant Society John W. Marr Fund – \$1000.00
- 2012 Bretfeld, M. Aspen (*Populus tremuloides*) in the Colorado Front Range: long-term changes in distribution and response to the recent mountain pine beetle (*Dendroctonus ponderosae*) outbreak. Colorado Mountain Club, Kurt Gerstle Fellowship – \$2000.00
- 2012 Bretfeld, M. The effects of inter- and intraspecific competition on flowering events of the clonal grass “creeping red fescue” (*Festuca rubra*). College of Natural and Health Sciences Student Research Grant – \$400.00
- 2011 Bretfeld, M., Franklin, S.B., Doerner, J.P. Effects of the Pine Beetle Outbreak on Aspen Growth and Reproduction. George Melendez Wright Climate Change Fellowship Program. – *not funded*.
- 2010 Bretfeld, M., Franklin, S.B. Intraclonal nursing behavior under different stress regimes. University of Northern Colorado Graduate Student Association Research Grant – \$600.00

## ACADEMIC HONORS AND AWARDS

- 2014 Ton Damman Award  
Awarded to a graduate student or very recent post-graduate scientist for the best oral presentation in Vegetation Science at the annual meeting of the Ecological Society of America.
- 2013 Graduate Student Academic Excellence Award  
Awarded to a full-time graduate international student who has demonstrated high achievement in his/her academic program and dedication to his/her field of study.
- 2012-2014 MacCracken Memorial Award  
Awarded to graduate students in the field of science teacher education.
- 2011-2013 Dr. Albert M. Winchester Graduate Fellowship in Biology  
Awarded to biology graduate students with a GPA of 3.0 or higher from undergraduate college.
- 2011-2012 Gerald D. Schmidt Memorial Biology Scholarship  
Awarded to biology students for research excellence.
- 2010-2014 Graduate Dean’s Scholarship  
Awarded to graduate students with a cumulative GPA of 3.2 or higher.

## PRESENTATIONS

### Conferences (\* denotes invited talks)

- 2018 Bretfeld, M. Parsekian, A.D., Ewers, B.E., Hall, J.S., Beverly, D.P., Kempema, E.W. A novel approach to assess differences in hillslope-scale soil water content in Panamanian low-land tropical landscapes. *American Geophysical Union Fall Meeting*. Washington, D.C.
- 2018 Frank, J.M., Bretfeld, M., Massman, W.J., Ewers, B.E., Dwire, K.A., Fornwalt, P.J., Huckaby, L.S., Korfmacher, J.L., Negrón J.F., Ryan, M.G., Beverly, B.P., Parsekian, A.D., Reed, D.E. Recovery of subalpine forest ecosystems following insect and fire disturbance. *Ameriflux PI Meeting*. Bloomington, IN.
- 2018\* Bretfeld, M. Aspen Ecology – Understanding the Role of Mountain Pine Beetles and Resource Sharing in Aspen Survival. *6<sup>th</sup> Annual Aspen Days*, Laramie, WY.
- 2017 Bretfeld, M., Ewers, B.E., Hall, J.S., Ogden, F.L., Beverly, D.P., Speckman, H.N. Root Hydraulics and Root Sap Flow in a Panamanian Low-Land Tropical Forest. *American Geophysical Union Fall Meeting*. New Orleans, LA.
- 2017 Ewers, B.E., Pleban, J.R., Aston, T., Beverly, D.P., Speckman, H.N., Hosseini, A., Bretfeld, M., Edwards, C., Yarkhunova, Y., Weinig, C., Mackay, D.S. Chlorophyll fluorescence is a rigorous, high throughput tool to analyze the impacts of genotype, species, and stress on plant and ecosystem productivity. *American Geophysical Union Fall Meeting*. New Orleans, LA.
- 2017 Bretfeld, M., Entem, A., Adamowicz, V., Fenichel, E., Ewers, B.E., Hall, J.S., Ogden, F. Payments for ecosystem services in the Panama Canal Watershed: Can hydrological benefits of forests and timber plantations outweigh their costs? *Western Forest Economist Meeting*, Ft. Collins, CO.
- 2016\* Bretfeld, M., Ewers, B.E., Hall, J.S. Effects of the 2015/16 ENSO event on tropical trees in regrowing secondary forests in Central Panama. *NGEE Tropics ENSO Research Meeting*. San Francisco, CA.
- 2016 Bretfeld, M., Ewers, B.E., Hall, J.S. Effects of the 2015/16 ENSO event on tropical trees in regrowing secondary forests in Central Panama. *American Geophysical Union Fall Meeting*. San Francisco, CA.
- 2016 Bretfeld, M., Ewers, B.E., Hall, J.S., Ogden, F.L. Sap flow based transpiration estimates in species-rich secondary forests of different ages in central Panama during a wet-season drought. *AGU Chapman Conference on the Emerging Issues in Tropical Ecohydrology*. Cuenca, Ecuador.
- 2015 Bretfeld, M., Ewers, B.E., Hall, J.S., Ogden, F.L. Sap flow based transpiration estimates in species-rich secondary forests of different ages in central Panama during a wet-season drought. *American Geophysical Union Fall Meeting*. San Francisco, CA.
- 2014 Bretfeld, M., Franklin, S.B., Peet, R.K. Assessing 40 years of change in aspen forests of the Rocky Mountain National Park (CO). *99<sup>th</sup> Ecological Society of America* annual meeting.
- 2012 Bretfeld, M. Stress response, annual and diurnal patterns in root sap flow of *Populus tremuloides*. *Guild of Rocky Mountain Ecologists and Evolutionary Biologists* annual meeting.
- 2012 Bretfeld, M., Franklin, S.B., Hubbard, R.M., Beverly, D.P. Annual patterns and stress response in root sap flow of *Populus tremuloides*. *97<sup>th</sup> Ecological Society of America* annual meeting. Portland, OR.

- 2011 Bretfeld, M., Franklin, S.B., Hubbard, R.M., Beverly, D.P. Quantifying clonal integration in *Populus tremuloides* via root sap flow. *96<sup>th</sup> Ecological Society of America* annual meeting. Austin, TX.
- 2010 Franklin, S.B., Bretfeld, M., Hubbard, R.M. Regeneration and Clonal Integration of Aspen. *95<sup>th</sup> Ecological Society of America* annual meeting. Pittsburgh, PA.
- 2009 Bretfeld, M., Franklin, S.B. Quantifying Clonal Integration in Quaking Aspen via Root Sap Flow. *Guild of Rocky Mountain Ecologists and Evolutionary Biologists* annual meeting.

### Symposia

- 2018 Frank, J.M., Bretfeld, M., Massman, J.M., Ewers, B.E., Dwire, K.A., Fornwalt, P.J., Huckaby, L.S., Korfmacher, J.L., Negrón, J.F., Ryan, M.G., Beverly, D.P., Parsekian, A. Recovery of subalpine forest ecosystems following insect and fire disturbance. *2018 AmeriFlux PI Meeting*. Bloomington, IN.
- 2018 Bretfeld, M., Ogden, F.L., Ewers, B.E., Hall, J.S., Hendrickx, J.M.H., Harrison, B.J., Kempema, E.W., Stallard, R.F., Cheng, Y., Zhu, J. An integrative synthesis of land use effects on hydrological functioning of steep seasonal lowland tropical catchments with Ferralsols. *NSF/NIFA Water Sustainability and Climate (WSC) meeting*. Washington, DC.
- 2016 Bretfeld, M., Ewers, B.E., Hall, J.S. Forests as Sponges - assessing drought resilience of regrowing secondary forests in the Panama Canal Watershed. *Tupper Talk Seminar*, Smithsonian Tropical Research Institute, Panama City, Panama.
- 2016 Bretfeld, M., Ewers, B.E., Hall, J.S., Ogden, F.L. Sap flow based transpiration estimates in species-rich secondary forests of different ages in central Panama during a wet-season drought. *Fellowship Symposium*. Smithsonian Tropical Research Institute, Panama City, Panama.
- 2013 Bretfeld, M., Beverly, D.P. Analysis of ecological data – An introduction to ordination and non-parametric tests using R. *The R-Project, University of Northern Colorado*.
- 2011 Bretfeld, M., Franklin, S.B. Quantifying Clonal Integration in Quaking Aspen via Root Sap Flow. *Academic Excellence Week Research Day, University of Northern Colorado*.

### Mentee Presentations

- 2016 **Hall J.S. [Jazlynn Shaydra]**, Hall, J.S. [Jefferson Scott], Ewers, B.E., Bretfeld, M., Beverly, D.P. Effect of forest age on tree water use in the Panama Canal Watershed. *101<sup>th</sup> Ecological Society of America* annual meeting. Fort Lauderdale, FL.
- 2015 **Heier, M.**, Bretfeld, M., Franklin, S.B., Doerner J.P. Radial Growth Response of Aspen Following Release from Competition Due to Insect-induced Conifer Mortality. *Academic Excellence Week Research Day, University of Northern Colorado* (won award for best undergraduate poster).
- 2012 **Vavra, E.** Bretfeld, M. The Clone Wars. A study of Plant Competition. *University of Northern Colorado Frontiers of Science Institute* (won award for best presentation and essay).

## SERVICE ACTIVITIES

- 2018 Mentor at Wyoming Established Program to Stimulate Competitive Research (EPSCoR) Summer Research Apprentice Program, aimed towards first-generation and underrepresented students interested in science.
- 2017 Outstanding Student Paper Awards (OSPA) Judge. *American Geophysical Union* Fall Meeting. New Orleans, LA.
- 2017 Session Chair: Evapotranspiration: Advances in in Situ Measurements and Remote Sensing Based Modeling Approaches. *American Geophysical Union* Fall Meeting. New Orleans, LA.
- 2015 Fellow Travel Award Committee. Smithsonian Tropical Research Institute, Panama.
- 2013-present Poudre Wilderness Volunteer. Patrolling, trail maintenance, invasive species control, and public outreach in northern Colorado's Canyon Lakes Ranger District.
- 2013 Volunteer Awards Judge for Longs Peak Science and Engineering Fair. University of Northern Colorado.
- 2012 BioBlitz Volunteer. Rocky Mountain National Park, CO. Representing University of Northern Colorado at exhibit and leading visitors and volunteer field crews to collect biodiversity data.
- 2011-2012 Research Mentor Frontier of Science Institute, University of Northern Colorado. Mentoring of high school students through developing and executing an ecological research project.
- 2010 Volunteer for Carolina Vegetation Survey "Pulse". North Central Piedmond, NC. Leading volunteer field crews to collect vegetation data using the Carolina Vegetation Survey Protocol.

## Academic Reviewer

- 2018 National Science Foundation Hydrologic Sciences Program (1), New Phytologist (1), Water Resources Research (1), Forests (1), Alpine Botany (1), Journal of Geoscience and Environmental Protection (1), Functional Plant Biology (1), Forest Ecology and Management (1)
- 2017 Ecohydrology (1), Oecologia (1), Water (1)
- 2016 Agricultural and Forest Meteorology (1), Tree Physiology (1)
- 2015 Ecological Applications (1), Ecosphere (1), Hydrological Processes (1), Trees – Structure and Function (1), Water Resources Research (1)

## LANGUAGES

German	native
English	fluent
Spanish	conversational

## MEMBERSHIP IN PROFESSIONAL SOCIETIES

American Geophysical Union  
Colorado Native Plant Society  
Ecological Society of America  
Western Aspen Alliance