

STEVEN L. VOELKER, PH.D.

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College of Forest Resources and Environmental Science
Michigan Technological University
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ACADEMIC EMPLOYMENT

Associate Professor, College of Forest Resources and Environmental Science

Michigan Technological University, Aug 2021-present

Research Assistant Professor, Department of Environmental Biology

SUNY-ESF, 2019-2021

Assistant Professor, Department of Plants Soils & Climate and the Ecology Center

Utah State University, 2016-2019

Post-Doctoral Researcher, Department of Forest Ecosystems & Society

Oregon State University, 2014-2016

Post-Doctoral Researcher, Department of Integrative Biology, University of California, Berkeley; Department of Biology & Southern Oregon University; Biology Department, 2011-2014

Post-Doctoral Researcher, Department of Wood Science and Engineering

Oregon State University, 2009-2011

EDUCATION

Oregon State University, Corvallis, OR

Ph.D., Forest Science & Wood Science, *Co-Advisors*: Barbara Lachenbruch and Frederick Meinzer

Dissertation title: Functional decreases in hydraulic and mechanical properties of field-grown transgenic poplar trees caused by modification of the lignin synthesis pathway through downregulation of the 4-coumarate: coenzyme A ligase gene. September 2004 – June 2009

University of Missouri, Columbia, MO

M.S., Forestry, *Co-Advisors*: Rose-Marie Muzika and Richard Guyette

Thesis title: Causes of forest decline and consequences for oak-pine stand dynamics in southeastern Missouri. January 2002 – August 2004

University of Wisconsin-Stevens Point, Stevens Point, WI

B.S., Forest Management. *Faculty Advisors*: Jan Harms and James Cook

Senior Project: Vegetation of Powers Bluff County Park: A Report to Wood County Parks and Forestry, Wisconsin Rapids, WI. September 1997 – May 2001

PEER-REVIEWED PUBLICATIONS

h-index: 20

i10-index: 27

Mentoring: *graduate student, **undergraduate student, *visiting scientist**

JIF = Journal Impact Factor

39. Dangerfield CR, SL **Voelker**, CA Lee. 2021. Long-term impacts of road disturbance on old-growth coast redwood forests. *Forest Ecology and Management* 499: 119595. JIF = 2.83
38. Chavarie L, SL **Voelker**, MJ Hansen, CR Bronte, AM Muir, MS Zimmerman and CC Krueger. 2021. Temporal instability of lake trout phenotypes: synchronicity of growth rates and morphology linked to environmental variables? *Evolutionary Applications* 14: 1159-1177. JIF = 4.013
37. Walker AP, MG De Kauwe, A Bastos, S Belmecheri, K Georgiou, R. Keeling, S McMahon, BE Medlyn, DJO Moore, RJ Norby, S Zaehle, KJ Anderson-Teixeira, G. Battipaglia, RJW Brienen, K Cabugao, M Cailleret, E Campbell, P Canadell, P Ciais, ME Craig, D Ellsworth, G Farquhar, S Fatichi, JB Fischer, D Frank, H Graven, L Gu, V Haverd, K Heilmann, BA Hungate, C Iversen, F Joos, M Jiang, TF Keenan, J Knauer, WK Smith, C Korner, VO Leshyk, S Leuzinger, Y Liu, N Macbean, Y Malhi, T McVicar, J Penuelas, J Pongratz, AS Powell, T Riutta, MEB Sabot, J Schleucher, S Sitch, B Sulman, B Taylor, C Terrer, M Torn, K Treseder, AT Trugman, S Trumbore, PJ van Mantgem, SL **Voelker**, M Whelan and PA Zuidema. 2021. Tansley Review: Integrating evidence for a terrestrial carbon sink caused by increasing atmospheric CO₂. *New Phytologist* 229: 2413-2445. JIF = 7.43
36. *Keen RM, SL **Voelker**, BJ Bentz S-YS Wang. 2020. Stronger influence of growth rate than severity of drought stress on mortality of large ponderosa pines during the 2012-2015 California Drought. *Oecologia*. 194: 359-370. JIF = 2.90
35. RJW Brienen, LJJ Caldwell, L Duchesne, SL **Voelker**, A Di Filippo, G Locoselli, J Schoengart, J Barichivich, S Helama, D. Galbraith and E Gloor. 2020. Observations of a globally consistent trade-off between growth and lifespan constrains carbon sink. *Nature Communications* 11: 4241. JIF = 11.80
34. *Pettit JM, SL **Voelker**, RJ DeRose, JI Burton 2020. Spruce beetle outbreak was not driven by drought stress: evidence from a tree-ring iso-demographic approach indicate temperatures were more important. *Global Change Biology* 26: 5829-5843. JIF = 8.44
33. *Chien Y-T, S-YS Wang, Y Chikamoto, SL **Voelker**, J Meyer and J-H Yoon. 2019. North American winter dipole: Observed and simulated changes in circulation modes. *Atmosphere* 10: 793. JIF = 1.70
32. Lavergne A, SL **Voelker**, AM Csank, H Graven, HJ de Boer, V Daux, I Robertson, I Dorado-Liñán, E Martinez-Sancho, G Battipaglia, KJ Bloomfield, FC Meinzer, JJ Camarero, R Clisby, Y Fang, A Menzel, CJ Still, RM Keen, JS Roden, TE Dawson, IC Prentice. 2020. Historical trends in the stomatal limitation of photosynthesis: empirical support for an optimality principle. *New Phytologist* 225: 2484-2497. JIF = 7.43
31. *Pettit JM, Burton JI, DeRose RJ, Long JN, **Voelker** SL. 2019. Epidemic spruce beetle outbreak modifies drivers of Engelmann spruce seedling establishment. *Ecosphere* 10: e02912. JIF = 2.75
30. Jiang Y, CJ Still, GFM Page, *B Rastogi, S Wharton, FC Meinzer, SL **Voelker** and JB Kim. 2019. Trend and control in water use efficiency of an old-growth coniferous forest in the Pacific Northwest. *Environmental Research Letters* 14: 0704029. JIF = 6.20
29. **Voelker** SL, S-YS Wang, TE Dawson, JS Roden, CJ Still, FJ Longstaffe, A. Ayalon. 2019. Tree-ring isotopes adjacent to Lake Superior reveal cold winter anomalies in the Great Lakes Region of North America. *Scientific Reports* 9: 4412. JIF = 4.61
28. **Voelker** SL, AG Merschel, FC Meinzer, CJ Still, *DE Ulrich and TA Spies. 2019. Fire deficits have increased drought-sensitivity in dry conifer forests; fire frequency and tree-ring carbon isotope evidence from Central Oregon. *Global Change Biology* 25: 1247-1262. JIF = 8.44
27. Liu X, L Zhao, SL **Voelker**, G Xu, X Zeng, X Zhang, L Zhang, W Sun, Q Zhang, G Wu and X Li. 2018. Warming and CO₂ enrichment modified the ecophysiological responses of Dahurian larch and Mongolia pine

- during the past century in the permafrost region of northeastern China. *Tree Physiology* 39: 88-103. JIF = 3.59
26. **Ratcliff CJ, SL **Voelker**, AL Nolin. 2018. Tree-ring carbon isotope records from the western Oregon Cascade Mountains primarily record summer maximum temperatures. *Tree-Ring Research* 74: 185-195. JIF = 1.77
25. **Voelker** SL, JS Roden, TE Dawson. 2018. Millennial-scale tree-ring isotope chronologies from coastal redwoods provide insights on controls over California hydroclimate variability. *Oecologia* 187: 897-909. JIF = 2.90
24. **Voelker** SL, RJ DeRose, MF Bekker, C Sriladda N Leksungnoen and RK Kjelgren. 2018. Anisohydric behavior links growing season evaporative demand to ring-width increment. *Trees - Structure and Function*. 32: 735-749. JIF = 1.71
23. **Voelker** SL and FC Meinzer. 2017. Where and when does stem cellulose $\delta^{18}\text{O}$ reflect a leaf water enrichment signal? *Tree Physiology* 37: 551-553. JIF = 3.59
22. **Voelker** SL, MC Stambaugh, JR Brooks, FC Meinzer, B Lachenbruch and RP Guyette. 2017. Evidence that greater CO_2 has increased the temperature-sensitivity of tree growth: a comparison of modern and paleo oaks. *Oecologia* 183: 1183-1195. JIF = 2.90
21. ***Cornejo-Oviedo E, SL **Voelker**, DB Mainwaring, DA Maguire, FC Meinzer, JR Brooks. 2017. Basal area growth, carbon isotope discrimination, and intrinsic water use efficiency after fertilization of Douglas-fir in the Oregon Coast Range. *Forest Ecology and Management* 398: 285-295. JIF = 2.83
20. **Voelker** SL, JR Brooks, FC Meinzer, R Anderson, M K-F Bader, G Battipaglia, KM Becklin, D Beerling, D Bert, JL Betancourt, TE Dawson, JC Domec, RP Guyette, C Körner, SW Leavitt, S Linder, JD Marshall, M Mildner, J Ogée, I Panyushkina, HJ Plumpton, KS Pregitzer, M Saurer, AR Smith, RTW Siegwolf, MC Stambaugh, AF Talhelm, JC Tardif, PK Van de Water, JK Ward and L Wingate. 2016. A dynamic leaf gas-exchange strategy is conserved in woody plants under changing ambient CO_2 : evidence from carbon isotope discrimination in paleo and CO_2 enrichment studies. *Global Change Biology* 22: 889-902. JIF = 8.44
19. **Voelker** SL, X Feng, SW Leavitt, IP Panyushkina, DA Grimley, D Grimm, JP Marsicek, B Shuman and BB Curry. 2015. Hydroclimate of the North American mid-continent during the last deglaciation. *Quaternary Research* 83: 336-344. JIF = 2.20
18. *Lee C, SL **Voelker**, RM Holdo and RM Muzika. 2014. Tree architecture predicts growth and mortality rates in Midwestern oaks. *Canadian Journal of Forest Research* 44: 1005-1012. JIF = 1.68
17. *Marias DE, FC Meinzer, DC Shaw, DR Woodruff, SL **Voelker** and B Lachenbruch. 2014. Effect of hemlock dwarf mistletoe on the physiology of host western hemlock using tree ring ^{13}C and ^{18}O . *Tree Physiology* 34: 595-607. JIF = 3.59
16. **Voelker** SL, JR Brooks, FC Meinzer, JS Roden, A Pazdur, S Pawelczyk, P Hartsough, K Snyder, L Plavcová, J Šantrůček. 2014b. Isolating relative humidity: dual isotopes $\delta^{18}\text{O}$ and δD as deuterium deviations from the global meteoric water line. *Ecological Applications* 24: 960-975. JIF = 4.25
15. *Saffell BJ, FC Meinzer, SL **Voelker**, D Shaw, JR Brooks, B Lachenbruch, J McKay. 2014. Tree-ring isotopes record the impact of a foliar fungal pathogen on CO_2 assimilation and growth in Douglas-fir. *Plant, Cell & Environment* 37: 1536-1547. JIF = 6.17
14. *Saffell BJ, FC Meinzer, DR Woodruff, DC Shaw, SL **Voelker** and B Lachenbruch. 2014. Seasonal carbohydrate dynamics and growth in Douglas-fir trees experiencing chronic, fungal-mediated reduction in leaf area. *Tree Physiology* 34: 218-208. JIF = 3.59

STEVEN L. VOELKER, PH.D.

13. **Voelker SL**, FC Meinzer, B Lachenbruch, JR Brooks and RP Guyette. 2014. Drivers of radial growth and carbon isotope discrimination of bur oak (*Quercus macrocarpa* Michx.) across continental gradients in precipitation, vapor pressure deficit and irradiance. *Plant, Cell & Environment* 37: 766-779. JIF = 6.17
12. **Voelker SL**, **P-E Noirot-Cosson, MC Stambaugh, ER McMurry, FC Meinzer, B Lachenbruch and RP Guyette. 2012. Spring temperature responses of oaks are synchronous with North Atlantic conditions during the last deglaciation. *Ecological Monographs* 82: 169-187. JIF = 8.04
11. McCulloh K, DM Johnson, FC Meinzer, SL **Voelker**, B Lachenbruch and J-C Domec. 2012. Hydraulic architecture of two species differing in wood density: opposing strategies in co-occurring tropical pioneer trees. *Plant, Cell & Environment* 35: 116-125. JIF = 6.17
10. McCulloh K, FC Meinzer, JS Sperry, B Lachenbruch, SL **Voelker**, DR Woodruff and J-C Domec. 2011. Comparative hydraulic architecture of tropical tree species representing a range of successional status and wood density. *Oecologia* 167: 27-37. JIF = 2.90
9. **Voelker SL**, B Lachenbruch, FC Meinzer and SH Strauss. 2011. Reduced wood stiffness and strength, and altered stem form, in young antisense *4CL* transgenic poplar with reduced lignin contents. *New Phytologist* 189: 1096-1109. JIF = 7.21
8. **Voelker SL**, B Lachenbruch, FC Meinzer, P. Kitin and SH Strauss. 2011. Transgenic poplars with reduced lignin show impaired xylem conductivity, growth efficiency and survival. *Plant, Cell & Environment* 34: 655-668. JIF = 6.17
7. **Voelker SL**, B Lachenbruch, FC Meinzer, M Jourdes, C Ki, AM Patten, LB Davin, NG Lewis, GA Tuskan, L Gunter, SR Decker, MJ Selig, R Sykes, ME Himmel, P Kitin, O Shevchencko and SH Strauss. 2010. Antisense down-regulation of *4CL* expression alters lignification, tree growth and saccharification potential of field-grown poplar. *Plant Physiology* 154: 874-886. JIF = 6.28
6. Kitin P, SL **Voelker** B Lachenbruch, FC Meinzer and SH Strauss. 2010. Tyloses and phenolic deposits in xylem vessels impede water transport in low-lignin transgenic poplars: a study by cryo-fluorescence microscopy. *Plant Physiology* 154: 887-898. JIF = 6.28
5. McCulloh K, JS Sperry, B Lachenbruch, FC Meinzer, PB Reich and SL **Voelker**. 2010. Moving water well: comparing hydraulic efficiency in twigs and trunks of coniferous, ring-porous, and diffuse-porous saplings from temperate and tropical forests. *New Phytologist* 186: 439-450. JIF = 7.21
4. **Voelker SL**, RM Muzika and RP Guyette. 2008. Individual tree and stand level influences on the growth, vigor and decline of red oaks in the Ozarks. *Forest Science* 54: 8-20. JIF = 1.70
3. Taylor AM, JR Brooks, JJ Morell and SL **Voelker**. 2008. Correlation of carbon isotope ratios in the cellulose and wood extractives of Douglas-fir. *Dendrochronologia* 26: 125-131. JIF = 2.10
2. Parke JL, E Oh, SL **Voelker**, EM Hansen, G Buckles, and B Lachenbruch. 2007. *Phytophthora ramorum* colonizes tanoak xylem and is associated with reduced stem water transport. *Phytopathology* 97: 1558-1567. JIF = 3.01
1. **Voelker SL**, RM Muzika, RP Guyette and MC Stambaugh. 2006. Historical CO₂ growth enhancement declines with age in *Quercus* and *Pinus*. *Ecological Monographs* 76: 549-564. JIF = 8.04

OTHER PUBLICATIONS

9. Lehman MM, Cormier M-A, P. Schuler, M. Leuenberg, SL **Voelker**. 2021. Hydrogen isotopic signature in trees: From source water to tree rings. Chapter 11 in *Stable Isotopes in Tree Rings: inferring Physiological, Climate and Environmental Responses*. Book In Press. Eds: JS Roden, JR Brooks, RTW Siegwolf, M Saurer

STEVEN L. VOELKER, PH.D.

8. Saurer M, SL **Voelker**. 2021. Intrinsic water-use efficiency derived from stable carbon isotopes of tree rings. 2021. Chapter 14 in *Stable Isotopes in Tree Rings: inferring Physiological, Climate and Environmental Responses*. Book In Press. Eds: JS Roden, JR Brooks, RTW Siegwolf, M Saurer
7. Siegwolf, RTW, M. Savard, T. Grams, SL **Voelker**. Impact of increasing CO₂, and air pollutants (NO_x, SO₂, Ozone) on the C and O isotope ratio in tree rings. 2021. Chapter 23 in *Stable Isotopes in Tree Rings: inferring Physiological, Climate and Environmental Responses*. Book In Press. Eds: JS Roden, JR Brooks, RTW Siegwolf, M Saurer
6. Ulrich DEM, SL **Voelker**, JR Brooks, FC Meinzer. 2021. Insect and pathogen influences on tree-ring isotopes. 2021. Chapter 24 in *Stable Isotopes in Tree Rings: inferring Physiological, Climate and Environmental Responses*. Book In Press. Eds: JS Roden, JR Brooks, RTW Siegwolf, M Saurer
5. Watts A, FC Meinzer, TA Spies, AG Merschel and SL **Voelker**. 2020. Crowded and Thirsty: Fire exclusion leads to Greater Drought Sensitivity in Mixed Conifer Forests. USDA Forest Service PNW Research Station Science Findings Issue 233. <https://www.fs.usda.gov/treesearch/pubs/61466>
4. Lee CA, SL **Voelker** and P Angwin. Investigating causes of Bishop pine decline on California's North Coast. 2019. pp. 145-152 *In: Forest Health Monitoring: National Status, Trends, and Analysis 2018*. USDA Forest Service General Technical Report SRS-239.
3. **Voelker** SL. 2011. Age-dependent changes in environmental influences on tree growth and their implications for forest responses to climate change. *In Size- and age-related changes in tree structure and function*, FC Meinzer, T Dawson and B Lachenbruch (eds.). pp. 455-479, DOI: 10.1007/978-94-007-1242-3_17.
2. Lachenbruch B, SL **Voelker**, FC Meinzer and SH Strauss. 2010. Structural and functional differences among transgenic hybrid poplar lines with varying lignin contents. Proceedings of the 6th Plant Biomechanics Conference, Cayenne, French Guiana, Nov. 16-21, 2009
1. Guyette RP, RM Muzika, and SL **Voelker**. 2007. The historical ecology of fire, climate, and the decline of shortleaf pine in the Ozarks. *In JM Kabrick, DC Dey, D Gwaze (eds.)*. Shortleaf pine restoration and ecology in the Ozarks: proceedings of a symposium, USDA For. Serv. GTR-NRS-P-15, pp. 8-18.

MANUSCRIPTS SUBMITTED FOR PEER-REVIEW

*Keen RM, SL **Voelker**, S-YS Wang, ML Goulden, *CR Dangerfield TE Dawson, CJ Still. Was increasing drought sensitivity a long-term early warning signal prior to the 2012-2015 California drought event? *In Review at Global Change Biology*.

MANUSCRIPTS IN PREPARATION

*Keen RM, SL **Voelker**, BJ Bentz S-YS Wang, CJ Still, TE Dawson. *In Prep for Journal of Geophysical Research Biogeosciences*. Opposing responses of tree-level and ecosystem-level water use efficiency to vapor pressure deficit during the 2012-2015 California Drought.

*CR Dangerfield, SL **Voelker** and LL Yocom. Integrated aerial imagery and lidar data detect forest dieback in tall redwoods near roads and forest edges. *In Prep for Landscape Ecology*.

INVITED PRESENTATIONS [Since 2010]

Voelker SL, RM Keen, SYS Wang, BJ Bentz, M Goulden, CR Dangerfield, TE Dawson and CJ Still. Hindsight is 20/20 for the 2012-2015 California drought: Tree-rings forecasted widespread forest mortality decades prior to the event. AGU Virtual Conference, December 2020.

Voelker SL. Insights on quaternary environments from plant ecophysiology and multi-proxy climate reconstruction approaches. Nelson Lecture, Syracuse University, Dept. of Earth Sciences, February 2020

STEVEN L. VOELKER, PH.D.

- Voelker SL.** Tracking drought stress responses to forest density using carbon isotopes across dry mixed conifer forests of the Western United States. Organized Session: Effectiveness of fire and fuel treatments to promote resilience to drought. 8th International Fire Ecology and Management Congress. Tucson, AZ, November 2019
- Voelker SL.** How Rings Have Told the Hidden Stories Trees Hold. Climate Adaptive Peaks Seminar, Dept of Environment and Forest Biology, SUNY-ESF, Syracuse, NY, September 2019
- Voelker SL.** Tree-ring carbon isotopes: Tracers of a Changing Environment. Climate Adaptation Science Colloquium. Logan, UT, November 2018
- Voelker SL.** New Perspectives in Dendroclimatology. Climate Adaptation Science Interdisciplinary Research Forum. Logan, UT, November 2017
- Voelker SL.** Drought interactions with forest pests: a review of physiological mechanisms leading to tree death. Western Forest Insect Work Conference, Jackson, WY, May 2017.
- Voelker SL.** 2000 years of past climate events in Utah and the West -- and potential for gaining new climate knowledge from tree-rings. USU Spring Runoff Conference, Logan, UT, March 2017.
- Voelker SL.** From drought to deluge: Insights on drivers of climatic variability from a 1100-year record of California coastal redwood stable isotopes. USU Dept. of Geosciences Seminar, February 2017.
- Baguskas SA, SL **Voelker**, CJ Still et al., Impact of historic drought on the size and age structure of a Bishop pine (*Pinus muricata*) forest on Santa Cruz Island, California. Northern California Botanist Meeting, January 2017.
- Voelker SL** and FC Meinzer. An overview of drought impacts on whole tree physiology, morbidity and death. California Forest Pest Council Meeting, Davis, CA, November 2016.
- Voelker SL.** Forest health and drought stress in the Great Basin and across the West: Potential for insights and education on the roles of changing climate and fire regimes. NSF-funded Spring Valley Field Station Workshop on Great Basin Environments, Hidden Canyon Retreat, Nevada, August 2016.
- Voelker SL.** CO₂-effects on leaf gas exchange as inferred from tree-ring stable isotopes. Ameridendro Conference, Mendoza, Argentina, April 2016.
- Dawson TE, JS Roden, SL **Voelker**, JA Johnstone, and AR Ambrose. Using redwood tree ring chronologies to obtain the long-view on California's coastal climate. December 2014.
- Voelker SL.** Oh, what a tree can tell! A history in rings. Friday Science Seminar Series, Southern Oregon University, May 2012.
- Voelker SL.** Unraveling a mystery of Earth history: linking tree physiology and paleoecology, OSU EcoEvo Seminar, April 2012.
- Voelker SL.** Tree-ring insights on paleoclimate and past forest productivity, Max-Planck Institute for Biogeochemistry, Jena, Germany, April 2011.
- Voelker SL.** A meta-analysis and review of paired $\delta^2\text{H}$ and $\delta^{18}\text{O}$ for the interpretation of paleo-climate and paleo-ecohydrology, BASIN conference on stable isotopes in water cycle research, Keystone, CO, March 2011.
- Voelker SL.** Controls on tree growth, wood density and photosynthesis on annual to millennial scales, Dept. of Wood Science & Engineering, OSU, May 2010.
- Voelker SL.** Progress towards understanding late Pleistocene to Holocene climates in central North America using tree physiology, growth and stable isotopes Dept. of Geology and Geophysics, OSU, April 2010.
- Voelker SL.** Progress towards understanding changes in tree growth rates over the past millennium and during the Pleistocene-Holocene transition, University of Arizona Tree-Ring Laboratory, March 2010.

STEVEN L. VOELKER, PH.D.

CONTRIBUTED PRESENTATIONS [since 2010]

- *Dangerfield CR, LL Yocom, SL **Voelker**. Impacts of road disturbance on old growth coast redwood forests. ESA (online), Salt Lake City, UT, August 2020.
- Belmecheri S, D Frank, S **Voelker**, A Laverigne. Global trends of tree-ring carbon isotope discrimination under rising atmospheric CO₂ and changing climate. EGU (online), Vienna, Austria, May, 2020.
- Cernusak LA, A Barbeta, R Bögelein, RT Bush, JP Ferrio, LB Flanagan, A Gessler, P Martín-Gómez, R Hirl, A Kahmen, C Keitel, C-T Lai, N Munksgaard, DB Nelson, J Ogée, JS Roden, H Schnyder, SL **Voelker**, L Wang, H Stuart-Williams, L Wingate, W Yu, L Zhao, Cuntz M. The dominant environmental driver of leaf water stable isotope enrichment differs for ²H compared to ¹⁸O. EGU (online), Vienna, May 2020.
- Cuntz M, A Barbeta, R Bögelein, RT Bush, JP Ferrio, LB Flanagan, A Gessler, P Martín-Gómez, R Hirl, A Kahmen, C Keitel, C-T Lai, N Munksgaard, DB Nelson, J Ogée, JS Roden, H Schnyder, SL **Voelker**, L Wang, H Stuart-Williams, L Wingate, W Yu, L Zhao, LA Cernusak. The dominant environmental driver of leaf water stable isotope enrichment differs for ²H compared to ¹⁸O. AGU, San Francisco, December 2019.
- *Keen RM, SL **Voelker**, BJ Bentz and SY Wang. Stronger influence of growth rate than severity of drought stress on mortality of large ponderosa pine during the 2012-2015 California Drought event. AGU, San Francisco, December 2019.
- Voelker** SJ, JI Burton, K O'Keefe, KA McCulloh, CR Dangerfield. Lake-effect climate increases summer drought impacts on the growth and physiology of sugar maple and white spruce in temperate to boreal ecotone forests. Ecological Society of America Meeting, Louisville, KY, August 2019.
- Voelker** SL, AG Merschel, FC Meinzer, TA Spies and CJ Still. Fire-deficits increase drought stress and diminish forest resilience in conifer forests from Central Oregon. Society of American Foresters National Meeting, Portland, OR, October 2018.
- Voelker** SL, AG Merschel, FC Meinzer, TA Spies and CJ Still. Fire-deficits have diminished forest resilience through greater stand occupancy and drought stress in dry conifer forests: tree-ring carbon isotope evidence from Central Oregon. International Association of Vegetation Science, Bozeman, MT, July 2018.
- Lee CA, SL **Voelker**, R Muzika, P Angwin, G Giusti, T Sholars, L Webb, B O'Neil. Further investigations of north coast pine decline. California Forest Pest Council Meeting, Davis, CA, November 2017.
- Jiang Y, B Rastogi, JL Kim, SL **Voelker**, FC Meinzer, CJ Still. Measured and modeled evidence for two-fold increase in water use efficiency at an old-growth forest site in the Pacific Northwest. AGU, San Francisco, CA, December 2017.
- Voelker** SL, AG Merschel, FC Meinzer, TA Spies and CJ Still. Fire suppression has led to greater drought-sensitivity in dry conifer forests: tree-ring carbon isotope evidence from Central Oregon. AGU, San Francisco, CA, December 2016.
- Belmecheri S, R Guerrieri and SL **Voelker** Regulation of leaf-gas exchange strategies of woody plants under elevated CO₂. AGU, San Francisco, CA, December 2016.
- Ambrose AR, W. Baxter, C. Wong, TE Dawson, A Carroll and SL **Voelker**. Climate and physiological effects on leaf and tree-ring stable isotopes in California redwoods. AGU, San Francisco, CA, December 2016.
- Baguskas, SA, SL **Voelker**, B Rastogi, BT Greer, L Gao, RA Miller, RC Arce and CJ Still. Impact of historic drought on size and age structure and function of a Bishop pine (*Pinus muricata*) forest on Santa Cruz Island, California, ESA, Baltimore, MD, August 2015.
- Voelker** SL, JA Johnstone, JS Roden and TE Dawson. Multi-proxy approaches to isolating low-frequency climate signals from tree-ring $\delta^{13}\text{C}$, $\delta^{18}\text{O}$ and ring-widths, AGU, San Francisco, CA, December 2013.

STEVEN L. VOELKER, PH.D.

Voelker SL, FC Meinzer, B Lachenbruch, JR Brooks, MC Stambaugh and RP Guyette. Colder springs and warmer, wetter summers during the late glacial climate of central North America: inferences from stable isotopes δD and $\delta^{13}C$ and wood anatomy of sub-fossil oak wood, ESA, Portland, OR, August 2012.

***Marias** DE, FC Meinzer, DC Shaw, DR Woodruff, **SL Voelker**, B Lachenbruch. Effect of hemlock dwarf mistletoe on the physiology of host western hemlock using tree rings and C and O stable isotopes, ESA, Portland, OR, August 2012.

***Saffell** BJ, FC Meinzer, B Lachenbruch, **SL Voelker** and DC Shaw. Use of tree-ring stable isotopes to quantify Swiss Needle Cast disease severity in Douglas-fir, ESA, Portland, OR, August 2012.

Voelker SL, FC Meinzer, B Lachenbruch, JR Brooks, MC Stambaugh and RP Guyette. Development and application of a paleoclimate proxy for spring temperatures in central North America: did low temperatures limit tree physiological function during the Younger-Dryas? EGU, Vienna, Austria, April 2011.

Meinzer FC, KA McCulloh, J Sperry, B Lachenbruch, **SL Voelker**, DR Woodruff, J-C Domec. Comparative hydraulic architecture of early and late successional tropical species. ESA, Austin, TX, August 2011.

TEACHING & MENTORING

Current Teaching Responsibilities:

Instructor: FW4150, Forest and Natural Resource Management, MTU Undergrad course

Past Teaching Responsibilities:

Instructor: EB 120, Global Environment and the Evolution of Human Society, ESF Undergrad course

Instructor: EB 340, Forest and Shade Tree Pathology, ESF Undergraduate course

Instructor: PSC 2700, Climate Change Impacts, USU Undergraduate course

Instructor: PSC 6900, Dendrochronology and Dendroclimatology, USU Graduate course

Instructor: Introduction to Environmental Science, OSU Undergraduate course

Primary Advisor: Victor Humanes Fuente, Ph.D. student, SUNY-ESF, GPES Program, July 2021-

Primary Advisor: Cody Dangerfield, M.S. student, USU, Plants, Soils and Climate Dept., Aug 2018-Oct 2020

Primary Advisor: Rachel Keen, M.S. student, USU, Plants, Soils and Climate Dept., Jan 2017-May 2019

Co-advisor: Jessika Carlstrom, M.S. student, USU, Dept. of Wildland Resources, Aug 2016-Jun 2018

Committee member: Keenan Rivers, M.S. student, SUNY-ESF, SRM Dept., June 2020-

Committee member: Lissa Pelletier, M.S. student, SUNY-ESF, SRM Dept., Aug 2018-

Committee member: Jared Williams, M.S. student, SUNY-ESF, SRM Dept., Aug 2018-

Committee member: Adam Fisher, M.S. student, USU, Dept. of Watershed Sciences: Aug 2017-Sep 2019

Committee member: Yu-Tang Chien, M.S. student, Plants, Soils and Climate Dept., Jan 2018-Jun 2019

Responsible for mentoring >30 technicians in field and laboratory skills, data analyses and scientific writing.

Guest lecturer in >10 classes

Assistant instructor at the NSF-funded 16th Annual North American Dendroecological Fieldweek, June 2006.

Teaching assistant for 7 courses between 1999 and 2005: *Wood Anatomy*, OSU, 2005.

STEVEN L. VOELKER, PH.D.

MEMBERSHIP

American Geophysical Union
Tree-Ring Society
Ecological Society of America
Society of American Foresters
International Association of Vegetation Science

FUNDED PROPOSALS [Career total = \$1,522,845]

Grant funded by NSF Division of Atmospheric and Geospace Sciences, Paleo Perspectives on Climate Change Program, *Collaborative Research: Winter Climate Anomalies across North America: Benchmarking Instrumental Trends and Model Projections with High Resolution Paleoclimatology*. Award: \$504,060 to USU and \$190,287 to the U. of Minnesota, 2019-2021. Co-PI's: SL **Voelker**, SYS Wang and D Griffin.

Grant funded by the Save The Redwoods League. *A quantitative assessment of historic impacts to redwood forest health by the construction of Freeway 101 through Humboldt Redwoods State Park*. Award: \$25,000, 2017, Co-PIs: SL **Voelker**, CA Lee.

Grant funded by the Utah Agricultural Experimental Station. *Development of Tree-Ring Isotope Records of Growing Season Temperature and Multi-Proxy Records of Winter Precipitation to Improve Hydroclimatic Projections for the Intermountain West*. Five-year project with an annual budget of \$10,000. PI: SL **Voelker**

Grant funded by the Huron Mountain Wildlife Foundation for collection of tree cores and netting of Lake Trout to obtain otolith-based growth rates. *Insights on Synchronous Temperature Responses of Lake Trout and Trees at the Huron Mountain Club*. Award: \$3,520, 2017, Co-PIs: SL **Voelker**, L. Chavarie, A. Muir.

Sub-award from NSF Macrosystems Grant to Jim Ehleringer, Gabe Bowen et al. for ITCE: Inter-university Training for Continental-scale Ecology. Awarded to Co-PIs TE Dawson, CJ Still and SL **Voelker** for project entitled: *Drought, Isotopes & Ecosystem Resilience in the West: DrIER-W*. Award: \$47,254, 2017.

Grant funded from the USDA Forest Service, Forest Health Monitoring Program, "Investigating Causes of Bishop Pine (*Pinus muricata* D. Don) Mortality on California's North Coast." Co-PIs: SL **Voelker** and C Lee. 2-year budget: \$115,724 (\$56,556 from USFS and \$59,168 matching funds from California Department of Forestry and Fire Protection).

Grant funded by the Huron Mountain Wildlife Foundation for travel and tree core collection. *Do tree growth responses to climate change differ among boreal forest species within the lake effect zone of Lake Superior*. Award: \$2,000, 2015, PI: SL **Voelker**.

Grant funded by the University of Wisconsin Department of Botany, *Tree-ring collection and leaf gas exchange measurements at Turkey Lakes Watershed*. Award: \$5,000, 2015, Co-PIs: KA McCulloh and SL **Voelker**.

Grant funded by the Swiss Needle Cast Cooperative, *Test for the effect of Swiss Needle Cast on tree carbohydrate reserves*. Award: \$10,000, 2012-2013. Co-PI's: *BJ Saffell, FC Meinzer, DR Woodruff and SL **Voelker**.

Grant funded by the Swiss Needle Cast Cooperative, *Use of tree-ring stable isotopes to test for the effect of fog on Swiss Needle Cast infection severity*. Award: \$10,000, 2012-2013. Co-PI's: *BJ Saffell, SL **Voelker** and FC Meinzer.

Grant funded by NSF, Division of Environmental Biology, Ecosystems Cluster, *Collaborative Research: Testing tree carbon capture from paleo to present*. Award: \$560,000 to OSU and the U. of Missouri, 2009-2012. Co-PI's: SL **Voelker**, B Lachenbruch, FC Meinzer, JR Brooks, RP Guyette.

STEVEN L. VOELKER, PH.D.

PROPOSALS PENDING

None.

SERVICE & SYNERGISTIC ACTIVITIES

Invited contributor to a new book including more than 100 authors with an aim at a global synthesis of knowledge and state of the art methods being applied in the field of Tree-Ring Stable Isotopes. I helped correspond with the editors at the initial organization stages of the book to identify potential authors, am co-authoring three chapters and will be reviewing other chapters. This book is being published by Springer, as part of their series on Tree Physiology. It should be Published in 2021.

Invited contributor to ICOFEST: *Integrating CO₂ Fertilization Evidence Streams and Theory* a meeting of 60 participants who are disciplinary experts on CO₂-fertilization effects on vegetation productivity and storage and the Global Carbon Sink. The goal of this group is to synthesize current evidence, theory and knowledge gaps across scientific fields – and thereby set a research agenda for the field and produce at least one comprehensive and state-of-the-art review paper on CO₂ fertilization and additional papers reviewing evidence within disciplines. (September 2018, Biosphere II, Oracle, AZ; Sponsors DOE and Oak Ridge National Laboratory).

Peer-reviewer for >30 journals (alphabetical order; journals I most frequently review for are underlined): *Agricultural and Forest Meteorology*; *American Midland Naturalist*; *Biogeosciences Discussions*; *Biomass & Bioenergy*; *BioScience*; *Canadian Journal of Forest Research*; *Dendrochronologia*; *Ecological Monographs*; *Ecology*; *Environmental Research Letters*; *Forest Ecology and Management*; *Geophysical Research Letters*; *Functional Ecology*; *Global Change Biology*; *Global Ecology and Biogeography*; *Hydrological Processes*; *Journal of Ecology*; *Journal of Geophysical Research: Atmospheres*; *Journal of Geophysical Research: Biogeosciences*; *Journal of Snow and Landscape Research*; *Natural Areas Journal*; *Nature Communications*; *Nature GeoScience*; *New Phytologist*; *Northern Journal of Applied Forestry*; *Oecologia*; *Plant Cell*; *Plant, Cell & Environment*; *Proceedings of the National Academy of Sciences USA*; *Remote Sensing of Environment*; *Science of the Total Environment*; *Scientific Reports*; *Tree Physiology*; *Trees-Structure & Function*

Proposal Ad-Hoc Reviewer or Panel Member:

USDA NIFA AFRI Physiology of Agricultural Plants Panel Member (2021)

US National Science Foundation DEB Program, Population and Community Cluster (2021) [1 proposal]

National Science Foundation Paleo Perspectives on Climate Change program (2020) [1 proposal]

European Research Council Advanced Grants Program (2019)

Swiss National Science Foundation (2018)

US National Science Foundation Paleo Perspectives on Climate Change program (2020) [1 proposal]

US National Science Foundation Paleo Perspectives on Climate Change program (2018) [2 proposals]

US National Science Foundation Paleo Perspectives on Climate Change program (2017) [2 proposals]

US NOAA / Minnesota Sea Grant (2017)

Awarded 2020 Manier Award and \$1000 honorarium from the Huron Mt. Wildlife Foundation for best scientific paper that utilized Huron Mt. Club lands.

STEVEN L. VOELKER, PH.D.

Co-organizer of AGU session *Forests in the Anthropocene: trading water for carbon from the leaf to ecosystem*, 2016.

Awarded visiting scholar fellowship to train at the University of Arizona Tree-Ring Laboratory, 2010.

Contributor of 38 tree-ring data collections to the International Tree-Ring Data Bank managed by NOAA, <https://www.ncdc.noaa.gov/data-access/paleoclimatology-data/datasets/tree-ring>. Many more contributions are forthcoming.

Contributor to a large data set of tree-ring carbon isotope values analyzed as part of a meta-analysis (Lavergne et al. 2020) that is available here: <https://nph.onlinelibrary.wiley.com/doi/full/10.1111/nph.16314>