

# Chris Guiterman

*Research Scientist*

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*Forest and fire ecology / Forest vulnerabilities to climate  
change / Vegetation type conversion / Use-inspired  
research / Applications in dendrochronology*

## Education

- 2016 Ph.D. University of Arizona, School of Natural Resources and the Environment, Tucson, AZ
- 2009 M.S. University of Maine, Orono, School of Forest Resources, Orono, ME
- 2005 B.A. Bates College, Geology Department, Lewiston, ME

## Positions

- 2017– Research Scientist. Laboratory of Tree-Ring Research, University of Arizona, Tucson, AZ
- 2010–2016 Graduate Research Associate; Course Instructor; Teaching Assistant. University of Arizona, Tucson, AZ
- 2007–2009 Graduate Research Assistant; Teaching Assistant. University of Maine, Orono, ME
- 2005–2007 Forest Inventory Technician. Camp II Forest Management, Joseph, OR

## Courses Taught

### Lead or co-instructor

- Summer 2019 **Dendrochronology Intensive Summer Course (DISC)**, *Laboratory of Tree-Ring Research, University of Arizona.*
- Spring 2014 **GEOG 303: Field Study in Environmental Geography**, *School of Geography and Development, University of Arizona.*
- Summer 2013 **GEOG 230: Our Changing Climate (Online)**, *School of Geography and Development, University of Arizona.*
- Winter 2013 **GEOG 230: Our Changing Climate (Online)**, *School of Geography and Development, University of Arizona.*

- Summer 2012 **North American Dendroecological Fieldweek (NADEF)**, *Intro group*, Jemez Mountains, NM.
- Summer 2011 **GEOS 497K/597K: Dendroecology Fieldcourse**, *Laboratory of Tree-Ring Research*, University of Arizona.
- Fall 2011 **GEOG 397A: Field Course – Reading a Landscape**, *School of Geography and Development*, University of Arizona.
- Fall 2011 **GEOG 240: Our Dynamic Landscape**, *School of Geography and Development*, University of Arizona.
- Teaching assistant
- Fall 2010 **NATS 101: Physical Geography**, *School of Geography and Development*, University of Arizona.
- Summer 2009 **SFR 300: Forestry Summer Field Experience**, *School of Forest Resources*, University of Maine.
- Summer 2008 **SFR 300: Forestry Summer Field Experience**, *School of Forest Resources*, University of Maine.
- Fall 2003 **GEO: 230 Structural Geology**, *Geology Department*, Bates College.

## Grants & Fellowships

Total research funding: \$928,666

*Note: I served as the project lead and/or PI unless otherwise noted.*

- 2019–2021 **Integrated watershed hazard assessment for wildfire, floods, and debris flows on the Navajo Nation**, *BIA Tribal Resilience Program*, \$150,000.  
 ○ with A.M. Youberg
- 2020–2021 **Designing Climate Adaptation Plans for the forests of the Navajo Nation**, *Southwest Climate Adaptation Science Center*, \$225,328.  
 ○ with M.E.K. Evans (PI) and R.J. DeRose
- 2020 **A grove of stories: Dendrochronology of the Wheatfields Lake peel-tree grove on the Navajo Nation**, *University of Arizona Foundation Small Grants Program*, \$20,000.  
 ○ with W. Tsosie
- 2017–2018 **Dendrochronology study for Wupakti Residence 1 viga preservation**, *National Park Service, Wupakti National Monument*, \$14,377.  
 ○ with R.H. Towner (PI)

- 2017–2018 **Sourcing construction timbers at Aztec Ruins National Monument**, *Western National Parks Association*. Grant #17-01, \$7,400.  
 ○ with R.H. Towner (PI)
- 2017–2018 **Ancient Trees and global change: A vulnerability assessment of old-growth forests on the Navajo Nation**, *BIA Tribal Climate Resilience Program*, \$216,694.  
 ○ with E.Q. Margolis, C.D. Allen, and A.C. Becenti
- 2015–2017 **Climate drivers of tree growth across Navajo Forestlands: Incorporating dendrochronology into Continuous Forest Inventory to improve management strategies for a future climate**, *BIA Bureau of Forest Resource Planning and the Navajo Nation*, \$99,632.  
 ○ with E.Q. Margolis, and T.W. Swetnam
- 2014–2016 **Fire regimes, demography, and climatic sensitivities of Navajo forestlands: Insights from the past to inform tribal forest management**, *EPA STAR Fellowship # F13F51318*, \$84,000.
- 2013–2015 **Forest-to-shrub type conversions: climate-disturbance interactions in the southwestern U.S.**, *USGS Cooperative agreement G13AC00247*, \$53,000.  
 ○ with E.Q. Margolis (PI) and C.D. Allen
- 2014–2015 **Climatic sensitivities of Navajo forestlands: Use-inspired research to guide tribal forest management**, *Climate Assessment of the Southwest (CLIMAS) Fellowship, University of Arizona*, \$5,000.
- 2012–2014 **Dendrochronological Sourcing of Timbers from the Great Houses of Chaco Canyon, New Mexico**, *Bandelier National Monument, Desert Southwest CESU*. #UAZDS-381, \$10,735.  
 ○ with T.W. Swetnam, J.S. Dean, and C.D. Allen
- 2013–2014 **Dendroecological analyses of fire-origin shrublands in former conifer forests of the Jemez Mountains, New Mexico**, *Bandelier National Monument, Desert Southwest CESU* #UAZDS-402, \$35,000.  
 ○ with E.Q. Margolis, T.W. Swetnam, and C.D. Allen
- 2012–2013 **Dendrochronological Sourcing of Timbers from the Great Houses of Chaco Canyon, New Mexico**, *Western National Parks Association*. Grant #13-02, \$7,500.  
 ○ with T.W. Swetnam, J.S. Dean, and P.P. Creasman
- 2012 **Conference travel grant**, *University of Arizona Graduate and Professional Student Council*, \$500.

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## Awards and Honors

- 2018 Young Forester of the Year. Southwestern Section of the Society of American Foresters
- 2016 College of Science Scholarship. University of Arizona
- 2016 William G. McGinnies Graduate Scholarship in Arid Land Studies. School of Natural Resources & the Environment, University of Arizona
- 2015 Galileo Circle Scholar. College of Science, University of Arizona
- 2014 Best presentation, School of Earth and Environmental Sciences (SEES) Earth-week competitive plenary session. University of Arizona
- 2014 Andrew Ellicott Douglass Memorial Scholarship. Laboratory of Tree-Ring Research, University of Arizona
- 2011 Graduate College Fellowship. University of Arizona
- 2009 Phi Kappa Phi Honor Society. University of Maine
- 2009 Best Poster Presentation Award. Northeast Society of American Foresters (SAF) Conference Portland, Maine
- 2008 Golden Key International Honor Society. University of Maine
- 2008 Charles E. Schomaker Memorial Scholarship. School of Forest Resources, University of Maine
- 2004 Sigma Xi Honor Society. Bates College

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## Publications

- In review **A history of recurrent, low-severity fire without fire exclusion in southeastern pine savannas, USA**, *M Rother, J Huffman, C Guiterman, K Robertson, and N Jones*, *Forest Ecology and Management*.
- 2020 **Continental-scale tree-ring based projection of Douglas-fir growth – Testing the limits of space-for-time substitution**, *S Klesse, RJ DeRose, F Babst, B Black, L Anderegg, J Axelson, A Ettinger, H Griesbauer, C Guiterman, G Harley, J Harvey, YH Lo, A Lynch, C O'Connor, C Restaino, D Sauchyn, J Shaw, D Smith, J Villanueva-Díaz, L Wood, and M Evans*, *Global Change Biology* (early online), doi:10.1111/gcb.15170.
- 2020 **Convergence of Evidence Supports a Chuska Mountains Origin for the Plaza Tree of Pueblo Bonito, Chaco Canyon**, *CH Guiterman, CH Baisan, NB English, J Quade, JS Dean, and TW Swetnam*, *American Antiquity* 85 (2), 331-346, doi:10.1017/aaq.2020.6.
- 2019 **Spatiotemporal variability of human-fire interactions on the Navajo Nation**, *CH Guiterman, EQ Margolis, CH Baisan, DA Falk, CD Allen, and TW Swetnam*, *Ecosphere* 10 (11), e02932, doi:10.1002/ecs2.2932.

- 2018 **Sampling bias overestimates climate change impacts on forest growth in the southwestern United States**, *S Klesse, RJ DeRose, CH Guiterman, AM Lynch, CD O'Connor, JD Shaw, and MEK Evans*, *Nature Communications* 9 (1), 1-9, doi:10.1038/s41467-018-07800-y.
- 2018 **‘burnr’: Fire history analysis and graphics in R**, *SB Malevich, CH Guiterman, and EQ Margolis*, *Dendrochronologia* 49, 9-15, doi:10.1016/j.dendro.2018.02.005.
- 2018 **Dendroecology meets genomics in the common garden: new insights into climate adaptation**, *MEK Evans, PF Gugger, AM Lynch, CH Guiterman, JC Fowler, S Klesse, and E Riordin*, *New Phytologist* 218 (2), 401-403, doi:10.1111/nph.15094.
- 2018 **Long-term persistence and fire resilience of oak shrubfields in dry conifer forests of northern New Mexico**, *CH Guiterman, EQ Margolis, CD Allen, DA Falk, and TW Swetnam*, *Ecosystems* 21 (5), 943-959, doi:10.1007/s10021-017-0192-2.
- 2016 **Revisiting human-environment interactions in Chaco Canyon and the American Southwest**, *JL Betancourt and CH Guiterman*, *Past Global Changes* 24 (2), 64-65, doi:10.22498/pages.24.2.64.
- 2016 **A new digital field data collection system for dendrochronology**, *PW Brewer, CH Guiterman*, *Dendrochronologia* 38, 131-135, doi:10.1016/j.dendro.2016.04.005.
- 2016 **Eleventh-century shift in timber procurement areas for the great houses of Chaco Canyon**, *CH Guiterman, TW Swetnam, JS Dean*, *Proceedings of the National Academy of Sciences* 113 (5), 1186-1190, doi:10.1073/pnas.1514272112.
- 2015 **Dendroecological methods for reconstructing high-severity fire in pine-oak forests**, *CH Guiterman, EQ Margolis, and TW Swetnam*, *Tree-Ring Research* 71 (2), 67-77, doi:10.3959/1536-1098-71.2.67.
- 2015 **Dendrochronological evaluation of ship timber from Charlestown Navy Yard (Boston, MA)**, *PP Creasman, C Baisan, and C Guiterman*, *Dendrochronologia* 33, 8-15, doi:10.1016/j.dendro.2014.10.001.

- 2013 **Signal strength in sub-annual tree-ring chronologies from *Pinus ponderosa* in northern New Mexico**, *R Brice, K Lorion, D Griffin, A Macalady, C Guiterman, J Speer, L Benakoun, A Cutter, M Hart, M Murray, S Nash, R Shepard, A Stewart, and H Wang*, *Tree-Ring Research* 69 (2), 81-86, doi:10.3959/1536-1098-69.2.81.
- 2012 **Long-Term Thinning Effects on the Leaf Area of *Pinus strobus* L. as Estimated from Litterfall and Individual-Tree Allometric Models**, *CH Guiterman, RS Seymour, and AR Weiskittel*, *Forest Science* 58 (1), 85-93, doi:10.5849/forsci.10-002.
- 2011 **Influences of conventional and low-density thinning on the lower bole taper and volume growth of eastern white pine**, *CH Guiterman, AR Weiskittel, and RS Seymour*, *Northern Journal of Applied Forestry* 28 (3), 123-128, doi:10.1093/njaf/28.3.123.
- [Other publications and reports](#)
- 2019 **The origins of great house construction timbers at Chaco Canyon**, *CH Guiterman and CH Baisan*, *Archaeology Southwest Magazine* .
- 2019 **Vulnerabilities of Navajo Nation Forests to Climate Change**, *CH Guiterman and EQ Margolis*, Final Report to the Bureau of Indian Affairs and Navajo Nation.
- 2017 **Bedrock Geology of Mt. Washington, Presidential Range, NH**, *J Eusden, B Anderson, C Castro, P Gardner, C Guiterman, S Higgins, K Kugel, A Reid, C Rodda, and C Tamposi*, in Johnson, B and Eusden, JD, ed., *Guidebook for field trips in Western Maine and Northern New Hampshire*: New England Intercollegiate Geological Conference, Bates College, p. 177-196.
- 2015 **Climatic sensitivities of Navajo forestlands: use-inspired research to guide tribal forest management**, *CH Guiterman*, Report for Climate & Society Fellowship, Climate Assessment of the Southwest.
- 2015 **Dendroecological analyses of fire-origin shrublands in former conifer forests of the Jemez Mountains, New Mexico**, *CH Guiterman, EQ Margolis, and TW Swetnam*, Final report to NPS Bandelier National Monument (DS CESU project UAZDS-402). Laboratory of Tree-Ring Research, University of Arizona, Tucson, AZ. 40 p.

- 2014 **Dendrochronological sourcing of timbers from the Great Houses of Chaco Canyon, New Mexico**, *CH Guiterman, TW Swetnam, JS Dean, and PP Creasman*, Final report to Chaco Culture National Historical Park and Western National Parks Association (WNPA Grant 13-02). Laboratory of Tree-Ring Research, University of Arizona, Tucson, AZ. 25 p.

## Software

- 2020 **dfoliatR: detection and analysis of insect defoliation signals in tree rings**, *CH Guiterman, AM Lynch, AN Axelson*, <https://chguiterman.github.io/dfoliatR/>.
- 2016 **burnr: Advanced fire history tools in R**, *SB Malevich, CH Guiterman, EQ Margolis*, <https://cran.r-project.org/web/packages/burnr/index.html>.
- 2019 **suRge: An extension of dfoliatR to accomodate insect-induced growth surges in trees**, *developed for Amy Hessl (West Virginia University)*, <https://github.com/chguiterman/suRge>.
- 2018 **slideRun: An extension of burnr to assess avalanche damage patterns on trees**, *developed for Erich Peitzsch and Greg Pederson (USGS Montana)*, <https://github.com/chguiterman/slideRun>.
- 2017 **burnr\_demo: A module-based R project for educating burnr users**, *CH Guiterman*, [https://github.com/chguiterman/burnr\\_demo](https://github.com/chguiterman/burnr_demo).

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## Presentations

### Invited seminars

- Mar 2020 **Unearthing the story of JPB-99, the Plaza Tree of Pueblo Bonito**, Laboratory of Tree-Ring Research seminar series, via Zoom.
- Feb 2018 **Shifting timber sources signal socioecological change at the descendant Chacoan cultural center, Aztec Ruins, New Mexico**, Laboratory of Tree-Ring Research seminar series, Tucson, AZ.
- Nov 2017 **On the vulnerabilities of Navajo forests to climate change**, Navajo Nation Department of Natural Resources Annual Summit, Twin Arrows Casino, AZ.
- Nov 2017 **Timber procurement patterns of the Aztec great houses**, Aztec Ruins National Monument, New Mexico, NA.

- Mar 2017 **Ancient origins for construction timbers of the Chacoan world (850-1240 CE)**, US Geological Survey seminar series, Tucson, AZ.
- May 2016 **Landscape-scale variability in forest response to climate, Navajo Nation, US Southwest**, William G. McGinnies Graduate Scholarship in Arid Land Studies annual lecture, Tucson, AZ.
- Mar 2016 **Persistence and fire regimes of oak shrubfields suggest increasing dominance with climate change**, Southwest Fire Science Consortium Webinar, (Available at: <https://www.youtube.com/watch?v=WeIuEKwV68M&feature=youtu.be>).
- Mar 2015 **Distant and shifting sources of Chaco timbers**, Tucson Festival of Books, Tucson, AZ.
- Oct 2014 **An integrated field data collection system for dendrochronology**, Laboratory of Tree-Ring Research seminar series, Tucson, AZ.
- Apr 2014 **Dendrochronological sourcing of timbers from the Great Houses of Chaco Canyon, New Mexico**, Laboratory of Tree-Ring Research seminar series, Tucson, AZ.
- Mar 2014 **The Beams of Chaco Culture: Unraveling an ancient environment in the Southwest**, Tucson Festival of Books, Tucson, AZ.
- Sep 2013 **Dendrochronological sourcing of timbers from the Great Houses of Chaco Canyon**, Visitors Center, Chaco Culture National Historical Park, NA.
- Mar 2013 **Tree-ring research and chronology building in the Chuska Mountains of the Navajo Nation**, Navajo Forestry Department, Ft Defiance, AZ.

#### [Conference presentations \(last five years\)](#)

- Nov 2019 **Modern area burned in a historical context in the Jemez Mountains, New Mexico**, *Margolis, E., C. Farris, C. D. Allen, L. Johnson, D. Falk, T. Swetnam, and C. Guiterman*, 8th International Fire Ecology and Management Congress, Tucson, AZ.
- Nov 2019 **Variable trajectories of Southwest ponderosa pine forests following high-severity fire**, *Iniguez, J., C. Guiterman, E. Margolis, C. Haffey, D. Carril*, 8th International Fire Ecology and Management Congress, Tucson, AZ.



- Nov 2019 **A synthesis of fire regimes in the southwestern United States**, *Guiterman, C., S. Malevich, E. Margolis, C. Baisan, E. Bigio, P. Brown, D. Falk, P. Fulé, and T. Swetnam*, 8th International Fire Ecology and Management Congress, Tucson, AZ.
- Jun 2019 **Beyond the tipping point in dry conifer forests of the US Southwest: Post-fire Gambel oak shrubfields as alternative stable states**, *Guiterman, C., E. Margolis, T. Assal, and C. Allen*, The North American Forest Ecology Workshop, Flagstaff, AZ.  
 ○ Invited special session
- Apr 2019 **A Case Study for Using Digital Field Data Collection**, *Brice, R., P. Brewer, C. Guiterman*, American Association of Geographers, Washington, D.C..
- Apr 2019 **No evidence of fire exclusion in the fire-scar record for the Red Hills Region of the US Southeast**, *Rother, M., J. Huffman, K. Robertson, C. Guiterman*, American Association of Geographers, Washington, D.C..
- Aug 2018 **The fingerprint of transhumance and climate on fire regimes of the Navajo Nation**, *Guiterman, C.H., E.Q. Margolis, D.A. Falk, and T.W. Swetnam*, Ecological Society of America, New Orleans, LA.  
 ○ Invited special session
- Jul 2018 **Disasters, natural variability, and resilience: How tree-ring data address today's challenges in forest ecosystems**, *Guiterman, C.H.*, Earth Science Information Partners (ESIP) Conference, Tucson, AZ.  
 ○ Plenary presentation
- May 2018 **Persistent fire-induced vegetation state switches in southwestern ponderosa pine forests**, *Guiterman, C.H.*, The Fire Continuum Conference, Missoula, MT.  
 ○ Invited special session
- Apr 2018 **Persistent fire-induced vegetation state switches in southwestern ponderosa pine forests**, *Guiterman, C.H.*, Society of American Foresters Southwest Section Meeting, Safford, AZ.
- Nov 2017 **Variability in tree-growth response to climate across dry conifer forests of the Navajo Nation**, *Guiterman, C.H., E.Q. Margolis, C.A. Woodhouse, A.P. Williams, D.A. Falk, and T.W. Swetnam*, Society of American Foresters, Albuquerque, NM.
- Aug 2017 **Targeted sampling designs influence tree-ring climate sensitivity: Implications for forest vulnerability assessments**, *Klesse, S., J. DeRose, C. O'Connor, D. Frank, C. Guiterman, J. Shaw, and M. Evans*, Ecological Society of America, Portland, OR.

- Apr 2017 **The origins of Chaco timbers by tree-ring based sourcing**, *Guiterman, C.H.*, Society of American Archaeologists, Vancouver, BC, Canada.  
 ○ Invited oral presentation
- Dec 2016 **Persistence and fire regimes of oak shrubfields suggest increased dominance with climate change**, *Guiterman, C.H., E.Q. Margolis, T.W. Swetnam, D.A. Falk, and C.D. Allen*, 3rd Southwest Fire Ecology Conference, Tucson, AZ.  
 ○ Invited special session oral presentation
- Dec 2016 **Navajo settlement, pastoralism, and the interruption of frequent fires in northeastern Arizona**, *Guiterman, C.H., E.Q. Margolis, C.H. Baisan, D.A. Falk, R.H. Towner, and T.W. Swetnam*, 3rd Southwest Fire Ecology Conference, Tucson, AZ.
- Oct 2015 **Climate Sensitivity of Navajo Forests: Use-inspired research to guide tribal forest management**, *Guiterman, C.H., A.C. Becenti, E.Q. Margolis, and T.W. Swetnam*, 13th Biennial Conference of Science and Management on the Colorado Plateau and Southwest Region, Flagstaff, AZ.  
 ○ Invited special session; A.C. Becenti, Head Forester, Navajo Forestry Department
- Apr 2015 **Tree-Ring Sourcing of Great House Timbers and the Plaza Tree of Pueblo Bonito, Chaco Canyon, New Mexico**, *Guiterman, C.H., T.W. Swetnam, J.S. Dean, C.H. Baisan, and N.B. English*, Society of American Archaeology, San Francisco, CA.

#### Conference posters (last five years)

- Apr 2018 **Drying surface water resources in the Chuska Mountains, Navajo Nation**, *Brice, R.L., C.H. Guiterman, C. McClellan\*, C. Woodhouse*, American Association of Geographers, New Orleans, LA.  
 ○ C. McClellan, Navajo Water Management Branch
- Dec 2016 **Climate Controls on Tree Growth Across Species and Sites in Northeastern Arizona**, *Schwan, M.R., C.H. Guiterman, and K.J. Anchukaitis*, American Geophysical Union, Fall Meeting, San Francisco, CA.  
 ○ Poster presentation by MRS, an undergraduate honors student under my mentorship
- Oct 2016 **Paleoclimatic Indicators of Surface Water Resources in the Chuska Mountains, Navajo Nation**, *Brice, R., C. Guiterman, C. McClellan, and C. Woodhouse*, Mountains Without Snow: What are the Consequences? Mountain Climate Conference, Leavenworth, WA.  
 ○ C. McClellan, Navajo Water Management Branch
- Jul 2016 **An 11th century shift in timber procurement areas for the great houses of Chaco Canyon**, *Guiterman, C.H., T.W. Swetnam, and J.S. Dean*, American Quaternary Association (AMQUA), Santa Fe, NM.

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#### Service

**Journal peer reviews:** *Dendrochronologia, Fire Ecology, Forest Ecology and Management, Forest Science, Geophysical Research Letters, International Journal of Wildland Fire, Journal*

*of Archaeological Method and Theory, Journal of Biogeography, Journal of Contemporary Water Research and Education, Journal of Hydrology, Journal of Vegetation Science, Tree-Ring Research, Urban Forestry and Urban Greening*

- 2019 **Conference review committee**, 8th International Fire Ecology and Management Conference, Association for Fire Ecologist, Tucson, AZ, November 18-22, 2019.
- 2019 **Conference organizer**, Healthy Forests-Healthy Watersheds: Enabling a Cultural Shift Toward Understanding the Beneficial Aspects of Forest Fire in a Changing Climate. November 13-15, 2019. Tucson, AZ.
- 2018 **Conference organizing committee**, Society of American Foresters Southwest Section Meeting, Safford, AZ, April 19-21, 2018.
- 2018 **Education Chair**, Southwest Section of the Society of American Foresters.
- 2017 **Grant proposal reviewer**, National Geographic Society.
- 2015 **Session Chair (de facto), Resource use, Environments, and Landscapes**, Society of American Archaeology Conference, April 15-18, 2015, San Francisco, CA.
- 2015 **Contributor, Chaco Research Archive. Chaco great house tree-ring database. 6,421 records**, <http://www.chacoarchive.org/cra/chaco-resources/tree-ring-database/>.
- 2015 **Contributor, NM588, Canyon del Potrero (Ponderosa pine) AD 620-2011, NM589, Narbona Pass (Ponderosa pine) AD 842-2010**, International Tree-Ring Databank.
- 2015 **Invited session co-chair, Collaborative environmental research in the Southwest: Examples from the field**, 13th Biennial Conference on Science and Management on the Colorado Plateau and Southwest Region. October 5-8, 2015, Flagstaff, AZ.
- 2014 **Fellowship proposal reviewer and selection committee member**, CLIMAS Climate & Society Fellowships.
- 2014 **Search committee for LTRR Director**, Laboratory of Tree-Ring Research .
- 2013 **Organizer, Tree-Ring Day**, SEES Earthweek.

- 2012 **Forests, Fire, and Tree Ring displays**, Flandrau Science Center museum exhibit on Sky Islands.
- 2012 **LTRR representative to UA School of Earth and Environmental Sciences (SEES) Earthweek**, 2012-2013 academic year.
- 2012 **LTRR graduate student faculty representative**, 2012-2013 academic year.
- 2011 **Interim Treasurer**, Southern Arizona Chapter of the Society of American Foresters.

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## Professional Society Memberships

- Tree-Ring Society
- Forest Stewards Guild
- Society of American Foresters
- Association for Fire Ecology
- Association of American Geographers
- Society of American Archaeology