

Damon R. Vaughan

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Education

Northern Arizona University – School of Forestry

Ph.D. in Forestry, specialty: Wood Science
Faculty advisor: Dr. David Auty
4.0/4.0 GPA

Flagstaff, AZ

Aug 2016 – May 2020

Colorado State University – Warner College of Natural Resources

M.S. in Forestry, specialty: Forest Products
Faculty advisor: Dr. Kurt Mackes
4.0/4.0 GPA

Fort Collins, CO

Jan 2015 – Aug 2016

Colorado State University – Warner College of Natural Resources

B.S. in Forestry, concentration: Management
4.0/4.0 GPA, Summa Cum Laude distinction
Mathematics minor

Fort Collins, CO

Jan 2011 – Dec 2013

Research experience

Post-doctoral researcher, Gotsch lab

University of Kentucky, position based in Monteverde, Costa Rica

Mar 2022 - Present

Research Associate, Forest Operations and Biomass Utilization, Ecological Restoration Institute

Northern Arizona University, Flagstaff, Arizona

May 2020 – Feb 2022

PhD research

Northern Arizona University, Flagstaff, Arizona

Aug 2016 – May 2020

Dissertation subject: Modeling wood property variation in ponderosa pine, within-tree and across the landscape

Master's research

Colorado State University, Fort Collins, Colorado

Jan 2015 – Aug 2016

Thesis subject: Investigating the length of time that beetle-killed spruce trees remain viable for wood products after being killed by spruce beetle

Research technician

Colorado State Forest Service, Fort Collins, Colorado

Jan 2014 – Dec 2014

Student Lab Assistant II

Restoration Ecology Lab (P.I. Mark Paschke), Fort Collins, Colorado

Oct 2011 – Dec 2013

Research skills

- *Field and lab measurements:* Using, maintaining, troubleshooting, and occasionally constructing a wide variety of assessment tools to measure tree ecophysiology, forest inventory, and wood properties.
- *Disseminating results:* Publishing peer-reviewed papers (first author on nine published papers) and presenting at local, national, and international meetings/conferences.

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- *Statistical analysis in R:* Time series analysis, nonlinear mixed effects models, Bayesian models, cleaning and managing datasets with Tidyverse tools, generalized additive models, repeated measures analysis, spatial analysis using ArcGIS and R.
- *Supervising technicians in the field:* For my post-doc, I am responsible for supervising 2 Spanish-speaking technicians in the field. Field work consists of climbing trees, downloading data, and fixing sensors. As crew lead during my PhD research, I was responsible for the safety and productivity of our 3-person team. Work took place across northern Arizona ponderosa pine forests in varying weather and terrain conditions, and often required camping.
- *Supervising technicians in the lab:* Arranging schedules, teaching lab procedures, and helping with data analysis. For my post-doc, I supervise two technicians in the lab as they build various sensors, analyze data, and prep for field work. For my PhD, the technicians took wood density measurements and worked in the wood shop processing samples.
- *Project coordination and team management:* From May 2020 – Feb 2022, I was the project coordinator for a three-state Wood Utilization Team funded through a \$400,000 grant from the US Forest Service. The purpose was to increase collaboration among practitioners and develop educational modules for stakeholders.
- *Conference planning and hosting:* Responsible for coordinating two conferences in 2021: “Expanding the Forest Industry in the Southwest” (virtual, 1.5 days, 20+ speakers, 200+ participants), “Innovations in Forest Operations and Biomass Utilization in the Southwest” (in-person in November, 1.5 days, 20+ speakers). Experience developing agendas, handling logistics, marketing, registration, and being the point person during events.
- *Tree climbing for research:* Experience climbing trees in Costa Rica (up to around 100 feet) to install and maintain sensors and collect data, using both Single Rope and Double Rope technique and following arboriculture industry standards and practices.
- *Budget management:* PhD project had annual budget of \$4,500 for expenditures such as hourly student salaries, travel to conferences, equipment purchases, etc.
- *Forest inventory techniques:* Sampling design, tree diameter/height, acoustic velocity of standing trees, canopy metrics
- *Forestry tools:* Use and maintenance of chainsaws, ATV/skidding arch, shop tools, Vertex hypsometer, Fibre-Gen acoustic velocity probes
- *Dendrochronology:* Tree ring cross-dating using the R package dplR. Analyzing correlations between tree ring attributes (width, density) and climate variables using the R package treeclim.
- *Plant identification:* Trees, grasses, and shrubs. Familiarity with species in the high desert and intermountain west communities
- *X-ray densitometry:* Quintek Measurement Systems X-ray densitometer
- *Social science research:* Experience with telephone, mail, and email surveys after having successfully conducted two surveys of forestry contractors, each resulting in a peer-reviewed paper.

Teaching experience

Guest lectures at Northern Arizona University. All 75 minute classes.

- FOR599, Introduction to R for the natural sciences: Welcome to the Tidyverse (10/5/21 & 2/18/20)
- Silviculture 1: Silvicultural effects on wood quality (11/13/20)
- FOR599, Introduction to R for the natural sciences: Iterations with Purrr (3/31/20)
- FOR442/542, Wood Science and technology: Variations in wood specific gravity (3/5/19)
- FOR442/542, Wood Science and technology: Wood density and specific gravity (2/28/19)
- FOR101, Introduction to Forestry: Introduction to wood science and forest products: part 2 (4/17/18)
- FOR101, Introduction to Forestry: Introduction to wood science and forest products: part 1 (4/4/18)

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Teaching Practicum

NAU School of Forestry

Spring semester 2018

Semester-long course in which PhD students are taught how to effectively teach a college-level course

Teaching Assistant

F430 Forestry Field Practices, Red Feather Lakes, Colorado

Jan – May: 2013, 2015, 2016

Students worked in groups to write and implement thinning prescriptions in a ponderosa pine forest. As TA, I taught safe use and maintenance of chainsaws, four-wheelers, and arch skidders. Course took place every Saturday of the semester for 10-hour days at a remote location one hour from campus.

Other relevant work experience

Tree climber/trim technician

Swingle Tree Service, Fort Collins, Colorado

Sept 2007 - April 2009

Pruned and removed trees for private homeowners, businesses, and Fort Collins municipal streets. Single and double rope techniques employed; often single rope to access the canopy and double rope to move around within the canopy.

Instructor

Colorado Outward Bound School, Leadville, Colorado

Contract based, 2013-2015

Instructed mountaineering and backpacking courses in the Colorado backcountry for students of all ages, on trips up to 22 days. Set up and oversaw front- and back-country rock climbing sites. Supervised and mentored two employees: assistant instructor and intern.

Maintenance technician and delivery truck driver

Colorado State University- Mountain Campus, Pingree Park, Colorado

May - October, 2008 – 2011

Assisted in general maintenance and labor of a remote mountain campus located 1.5 hours from Fort Collins, CO. Specific projects included building two decks, insulating a cabin, re-siding a building, and constructing the campus entrance signs. Made weekly trips in a large truck/trailer to pick up all food and supplies needed at the campus.

Certifications

Professional Grant Proposal Writing Workshop. National Funding Foundation.

Completed August 2021

A self-guided collection of lessons and assignments with the end goal of producing a full grant proposal outline. Approximately 30 hours to complete the course.

Honors and awards

- 1st Place: 2019 SAF National Convention, Louisville, KY: Forest Science and Technology Board best student presentation competition
- ARCS Scholar, ARCS Foundation, 2019
- Graduate Student Government International Travel Award, Northern Arizona University, 2018
- Kay and Irene Hafen Scholarship, Northern Arizona University, 2017
- Wally Covington Travel Award, Northern Arizona University, 2017

Peer-reviewed publications

1. Nicholls, D., **D. Vaughan**, D. Mitchell, H.-S. Han, M. Smidt, J. Sessions. 2022. Forest bio-hubs to enhance forest health while supporting the emerging bioeconomy- A comparison between three U.S. regions. *Energies*. 15:931.
2. **Vaughan D.R.**, C. Edgeley, H.-S. Han. 2021. Forest contracting businesses in the US Southwest: Current profile and workforce training needs. *Journal of Forestry*.
3. **Vaughan D.R.**, D. Auty, T.E. Kolb, J. Dahlen, A.J. Sanchez Meador, K.H. Mackes. 2021. Wood density variation in naturally regenerating stands of *Pinus ponderosa* in northern Arizona, USA. *Canadian Journal of Forest Research*. 51:4.
4. **Vaughan D.R.**, D. Auty, J. Dahlen, A.J. Sanchez Meador, K.H. Mackes. 2021. Modelling variation in wood stiffness of *Pinus ponderosa* using static bending and acoustic measurements. *Forestry: An international Journal of Forest Research*. 94:232 – 243.
5. **Vaughan D.R.**, D. Auty, T.E. Kolb, A.J. Sanchez Meador, K.H. Mackes, J. Dahlen, W.K. Moser. 2019. Climate has a larger effect than stand basal area on wood density in *Pinus ponderosa* var. *scopulorum* in the Southwestern USA. *Annals of Forest Science*. 76:85.
6. **Vaughan D.R.**, K.H. Mackes, J.B. Webb. 2018. Time-since-death and its effects on wood from beetle-killed Engelmann spruce in southwest Colorado. *Forest Science*. 64(3), pp. 316-323.
7. **Vaughan D.R.**, K. Mackes, M. Eckhoff. 2017. Bond requirements on state-owned forest land in the western United States. *Journal of Testing and Evaluation*. 45(4), pp. 1442-1450.
8. **Vaughan D.R.** and K.H. Mackes. 2017. Shrinkage and static bending properties of *Juniperus scopulorum* from the Rocky Mountains. *Forest Products Journal*. 67(1-2), pp. 39-43.
9. Mackes K.H., T. Costanzo, R. Coleman, M. Eckhoff, **D. Vaughan**. A protocol for heat treating black walnut wood infested with walnut twig beetle. *Forest Products Journal*: 66(5-6), pp. 274-279.
10. **Vaughan D.R.** and K.H. Mackes. 2016. Utilizing Russian olive at the Colorado State Forest Service: A case study. *Forest Products Journal*: 66(3-4), pp. 241-249.
11. **Vaughan D.R.** and K.H. Mackes. 2015. Characteristics of Colorado Forestry Contractors and their Role in Current Forest Health Issues. *Forest Products Journal*: 65(5-6), pp. 217-225.

Conference presentations

1. **Vaughan D.R.**, H.-S. Han, P. Seligman, N. Anderson. “Identification and evaluation of railroad networks in the US Southwest to strategically transport small logs and biomass”. Forest Products Society International Convention 2021. Delivered via Zoom, June 2021.
2. **Vaughan D.R.**, D. Auty, A. Sanchez Meador, T.E. Kolb, K.H. Mackes. Variations in wood density of ponderosa pine across three national forests in Arizona. Society of American Foresters National Convention. Kentucky International Convention Center, Louisville, KY. November 2019.
3. **Vaughan D.R.**, D. Auty, T.E. Kolb, A. Sanchez Meador, K.H. Mackes, J. Dahlen, K. Moser. “Effects of basal area and climate on wood density of southwestern US ponderosa pine in a replicated stand density experiment”. 21st International Nondestructive Testing and Evaluation of Wood Symposium. Katholische Academy, Freiburg, Germany, September 25 2019.
4. **Vaughan D.R.**, D. Auty, J. Dahlen, A. Sanchez Meador, K.H. Mackes, T.E. Kolb. Effect of stand density and climate on the wood properties of ponderosa pine. New Frontiers in Forecasting Forests, IUFRO Division 5.01.04. Stellenbosch University, Western Cape, South Africa, September 28, 2018.
5. **Vaughan D.R.**, D. Auty, A. Sanchez Meador, K. Mackes, T. Kolb. Effects of stand basal area on ponderosa pine wood quality. Western Mensurationists Annual Meeting 2018, Western Mensurationists. High Country Conference Center, Flagstaff, AZ, June 19, 2018.

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6. **Vaughan D.R.**, K. Mackes. Time-since-death and its effects on wood from beetle-killed Engelmann spruce in southwest Colorado. Forest Products Society 70th International Convention, Forest Products Society. Portland, OR, June 27-29, 2016.
7. **Vaughan D.R.**, K. Mackes. Utilizing Russian olive: A case study. Plant Health Care Conference, International Society of Arboriculture and Colorado Tree Coalition. Hilton Hotel, Fort Collins, CO, June 18, 2015.
8. **Vaughan D.R.**, K. Mackes. Characteristics of Colorado's Forestry Contractors. Forest Products Society 69th International Convention, Forest Products Society, Georgia Tech Center, Atlanta, GA, June 10-12, 2015.
9. **Vaughan D.R.**, K. Mackes. Characteristics of Colorado's Forestry Contractors. Joint Annual Meeting, CO/WY Society of American Foresters, Colorado Timber Industry Association, and Colorado Tree Farmers, Hotel Colorado, Glenwood Springs, CO, May 7-9, 2015.
10. **Vaughan D.R.**, K. Mackes. Utilizing Russian olive at the CSFS Nursery: A Case Study. Colorado State Forest Service Partners Conference, Colorado State Forest Service, CO/WY Society of American Foresters, Antlers Hotel, Colorado Springs, CO, April 2015.

Community/volunteer activities

- **Volunteer community rock climbing steward**
Northern Arizona Climber's Coalition, Flagstaff, Arizona Spring 2017 – Feb 2022
Primarily involved in bolt replacement initiatives for local rock climbing routes. We carefully removed old mechanical bolts and replaced them with stainless steel glue-in bolts, without drilling additional holes. Also had the opportunity to volunteer at graffiti removal, trash cleanups, and trailwork days.
- **President**
Forestry Graduate Student Association, Flagstaff, Arizona Jan 2017 – Dec 2017
Convened bi-weekly meetings for graduate students in the School of Forestry. Responsible for organizing the department seminar, distributing travel grants, fundraising, and building community.
- **Volunteer**
Colorado State Forest Service, Fort Collins, Colorado Sep 2012 – Aug 2016
Participated in volunteer projects for the CSFS including tree plantings, Russian olive removals, and chipping slash
- **Volunteer Warehouse Assistant**
Food Bank of Larimer County, Fort Collins, Colorado Jan 2014 – Dec 2014
Volunteered for weekly two-hour shifts to help feed low-income residents of Larimer County.
- **Historian**
Society of American Foresters Alpha Student Chapter, Fort Collins, Colorado May 2012 - May 2013
Took pictures and kept a record of photos of club meeting and events, also served as temporary firewood sales coordinator for several months when the position was vacant.