

## *Harold Samuel James Zald*

---

### Research Ecologist

USDA Forest Service, Pacific Northwest Research Station  
3200 SW Jefferson Way, Corvallis, OR 97331  
harold.zald@usda.gov

### Courtesy Faculty

Oregon State University, College of Forestry  
Corvallis, OR 97331-5704  
zaldh@oregonstate.edu

### Adjunct Faculty

Humboldt State University, Department of Forestry and Wildland Resources  
1 Harpst St., Arcata, CA 95521  
hsz16@humboldt.edu

<http://zaldforestlab.weebly.com>

## **EDUCATION**

---

Ph.D. Forest Ecology, Oregon State University, Corvallis, OR, June 2010

M.S. Terrestrial Ecosystems, University of Michigan, Ann Arbor, MI, April 2002

B.S. Resource Ecology and Management, University of Michigan, Ann Arbor, MI, May 1997

## **RESEARCH INTERESTS**

---

- Integrating field data with remotely sensed imagery to support monitoring and conservation of forest ecosystems
- Forest responses to disturbance agents in complex mountain terrain and multi-owner landscapes
- Management of fire prone conifer forests with emphasis on ecosystem restoration and resilience to climate change
- Climatic, topographic, biotic, and disturbance controls of tree invasion in mountain meadows
- Disturbance ecology in the context of multiple stressors on forest ecosystems, global environmental change, and managing forests to promote resiliency of ecosystem services in response to global change

## **PROFESSIONAL EXPERIENCE**

---

Research Ecologist (GS-0408-13), USDA Forest Service, Pacific Northwest Research Station,  
August 2020 - present

Assistant Professor, Humboldt State University, Department of Forestry and Wildland Resources  
August 2016 – August 2020

Faculty Research Associate, Oregon State University, Department of Forest Engineering, Resources and Management,  
October 2014 – July 2016

Faculty Research Associate, Oregon State University, Department of Forest Ecosystems and Society,  
May 2011 – July 2014

Post-Doctoral Scholar, Oregon State University, Department of Forest Ecosystems and Society,  
April 2010 – May 2011

Graduate Research Assistant, Oregon State University, Department of Forest Ecosystems and Society,  
September 2005 – April 2010

Ecologist (GS-0408-9), USDA Forest Service, Pacific Northwest Research Station,  
May 2002 – September 2005

Graduate Research Assistant, University of Michigan, School of Natural Resources and Environment,  
May 2001 – September 2001

Graduate Research and Teaching Assistant, University of Alaska Fairbanks, School of Ag. and Land Res. Management,  
September 1999 – August 2000

Biological Science Technician (GS-0404-5), USDA Forest Service, Wenatchee National Forest, Washington,  
May 1998 – October 1998

## PUBLICATIONS

---

22. Goodwin MJ, North MP, **Zald HSJ**, Hurteau MD. (2020). Changing climate reallocates the carbon debt of frequent-fire forests. *Global Change Biology*: doi:10.1111/gcb.15318.
21. **Zald HSJ**, Kerns BK, Day MA. (2020). Limited effects of long-term repeated season and interval of prescribed burning on understory vegetation compositional trajectories and indicator species in ponderosa pine forests of Northeastern Oregon. *Forests*, 11, 834; doi:10.3390/f11080834.
20. Schooler S, **Zald HSJ**. (2019). Lidar prediction of small mammal diversity in Wisconsin, USA. *Remote Sensing*. 11,2222; doi:10.3390/rs11192222.
19. Goodwin, MJ, North MP, **Zald HSJ**, Hurteau MD (2018). The 15-year post-treatment response of a mixed-conifer understory plant community to thinning and burning treatments. *Forest Ecology and Management* 429: 617-624.
18. **Zald HSJ**, Dunn CD. (2018). Disentangling drivers of wildfire severity in a multi-owner forest landscape, Oregon USA. *Ecological Applications* 28: 1068-1080.
17. Matasci G, Hermosilla T, Wulder MA, White JC, Hobart GW, Coops NC, **Zald HSJ** (2018). Large-area mapping of forest structural attributes across the boreal forest of Canada using Landsat pixel composites and lidar plots. *Remote Sensing of Environment* 209: 90-116.
16. Meigs GW, **Zald HSJ**, Campbell JL, Keeton WS, Kennedy RE (2016). Do insect outbreaks increase forest fire severity? *Environmental Research Letters*. doi:10.1088/1748-9326/11/4/045008.
15. **Zald HSJ**, Spies TA, Siedl R, Pabst R, Steele EA, Olsen K. (2016). Complex mountain terrain and disturbance history drive patterns of forest carbon density in the western Oregon Cascades, USA. *Forest Ecology and Management* 366:193-207.
14. **Zald HSJ**, Spies TA, Twery M, Harmon ME (2016). Review of forest carbon calculators for managers, policy makers, and educators. *Journal of Forestry* 114:134-143.
13. **Zald HSJ**, Wulder MA, White JC, Hilker T, Hermosilla T, Hobart GW, Coops NC. (2016). Integrating Landsat pixel composites and change metrics with lidar plots to predictively map forest structure and aboveground biomass in Saskatchewan, Canada. *Remote Sensing of Environment* 176:188-201.
12. Meigs GW, Campbell JL, **Zald HSJ**, Kennedy RE, Bailey JD, Shaw DC (2015). Does wildfire likelihood increase following insect outbreaks in conifer forests? *Ecosphere* 6:art118.
11. **Zald HSJ**, Ohmann JL, Roberts HM, Henderson EB, Gregory MJ, McGaughey R, Braaten J (2014) Influence of LiDAR, Landsat time series disturbance history, and plot positional accuracy on the accuracy of imputation maps of forest composition and structure. *Remote Sensing of Environment* 143:26-38.
10. Henderson EB, Ohmann JL, Gregory MJ, Roberts HM, **Zald HSJ** (2014) Species distribution modeling for plant communities: Stacked single-species, or multivariate modeling approaches? *Applied Vegetation Science* 17:516-527.
9. Torresan C, Strunk J, **Zald HSJ**, Zhiqiang Y, Cohen WB (2014) Comparing statistical techniques to classify the structure of mountain forest stands using CHM-derived metrics in Trento province (Italy). *European Journal of Remote Sensing* 47:75-94.
8. **Zald HSJ**, Spies TA, Huso M, Gatzliolis D (2012) Climatic, landform, microtopographic, and overstory canopy controls of tree invasion in a subalpine meadow landscape, Oregon Cascades, USA. *Landscape Ecology* 27:1197-1212.
7. **Zald HSJ** (2009) Extent and spatial patterns of grass bald meadow loss (1948- 2000), Oregon Coast Range, USA. *Plant Ecology* 201:517-529.
6. **Zald HSJ**, Gray AN, North M, Kern RA (2008) Initial tree regeneration responses to fire and thinning treatments in a Sierra Nevada mixed-conifer forest, USA. *Forest Ecology and Management* 256:168-179.
5. Meyer M, North M, Gray AN, **Zald HSJ** (2007) Influence of soil thickness on stand characteristics in a Sierra Nevada mixed-conifer forest. *Plant and Soil* 294:113-123.
4. Hurteau M, North M, **Zald HSJ** (2007) Species-specific response to climate reconstruction in upper-elevation mixed-conifer forests of the western Sierra Nevada, California, USA. *Canadian Journal of Forest Research* 37:1681-1691.
3. North M, Innes J, **Zald HSJ** (2007) Comparison of thinning and prescribed fire restoration treatments to Sierran mixed-conifer historic conditions. *Canadian Journal of Forest Research* 37:331-342.
2. Gray AN, **Zald HSJ**, Kern RA, North M (2005) Stand conditions associated with tree regeneration in Sierran mixed-conifer forests. *Forest Science* 51:198-210.
1. Wilking M, Juday GP, Barber VA, **Zald HSJ** (2004) Recent climate warming forces contrasting growth responses of white spruce at treeline in Alaska through temperature thresholds. *Global Change Biology* 10:1724-1736.

## NON-PEER REVIEWED PUBLICATIONS

---

- Matasci G, Hermosilla T, Wulder MA, White JC, Hobart GW, **Zald HSJ**, Coops NC (2017). A space-time data cube: Multi-temporal forest structure maps from Landsat and LiDAR. *Geoscience and Remote Sensing Symposium (IGARSS), 2017 IEEE International*. doi: 10.1109/IGARSS.2017.8127523.
- Harmon ME, Spies TA, Olsen KA, Schneckeburger F, **Zald HSJ** (2013) Forest Sector Carbon Calculator. Version 2.0. <http://landcarb.forestry.oregonstate.edu/>.
- Zald HSJ**, Friesen C (2010) Tree invasion of subalpine parkland at Jefferson Park: Multi-scale controls of a complex landscape. *Northwest Oregon Ecology Group Newsletter* 9. <http://ecoshare.info/wp-content/uploads/2010/05/NWOECO-2010.pdf>
- Zald HSJ** (2002) Physiographic and reproductive components of treeline response to climatic variation in the Alaska Range. *Global Glimpses: Center for Global Change & Arctic System Research* 10(1):7-9. [http://www.cgc.uaf.edu/newsletter/gg10\\_1/2002gg-1.pdf](http://www.cgc.uaf.edu/newsletter/gg10_1/2002gg-1.pdf)

## GRANTS AND FELLOWSHIPS

---

- 2019-2022 CAL FIRE Greenhouse Gas Reduction Fund, Quantifying the carbon costs and benefits of maintaining fuel treatment effectiveness, PI: Matthew Hurteau, co-PIs: **Harold Zald**, Malcolm North, Robert York, \$446,036.
- 2019-2021 L.W Schatz Demonstration Tree Farm, Assessment of low cost UAV photogrammetry and RTK GPS technologies for forest inventory and road assessment, PI: **Harold Zald**, \$18,731
- 2019-2021 California State University System Agricultural Research Initiative, Assessment of low cost multi-angle UAV photogrammetry for forest inventory, PI: **Harold Zald**, \$39,215.
- 2018-2019 USGS Cooperative Agreement, Whitebark pine persistence in the Sierra Nevada, PI: **Harold Zald**, \$19,435
- 2016-2019 USDA National Institute of Food and Agriculture, Integrating multi-temporal satellite imagery and tree-rings to quantify responses of forest productivity to climate change and drought Stress in Northern California, PI: **Harold Zald**, \$54,000.
- 2017-2018 California State University System Agricultural Research Initiative, Integrating multi-temporal Landsat imagery and tree-rings to map forest growth responses to drought, PI: **Harold Zald**, \$35,748.
- 2016-2019 CAL FIRE Greenhouse Gas Reduction Fund, Quantifying the carbon costs and benefits of maintaining fuel treatment effectiveness, PI: Matthew Hurteau, co-PIs: **Harold Zald**, Malcolm North, Robert York, \$446,036.
- 2015-2018 USDA/USDI Joint Fire Sciences Program, Changes in forest vegetation and fuel conditions 15 years after prescribed fire, PI: Malcolm North, co-PIs: **Harold Zald**, Brandon Collins, Matthew Hurteau, \$386,000.
- 2015-2016 Oregon State University, College of Forestry, Mentored Work Experiences for Undergraduates Student Success Award, Dendrochronology methods training and mentorship, PI: **Harold Zald**, \$3,110.
- 2015 Oregon State University, Research Equipment Reserve Fund, Acu-gage single axis linear measuring machine, PI: John Bailey, co-PIs: **Harold Zald**, David Noone, Thomas Spies, \$15,600.
- 2014-2015 Natural Resources Canada, Pacific Forestry Centre, Integrating lidar plots and Landsat time series imagery to predictively map changes in forest biomass and vegetation structure in Canadian forests, PI: Thomas Hilker, co-PI: **Harold Zald**, \$78,500.
- 2011-2012 USDA Forest Service, Western Wildland Environmental Threat Assessment Center, Using lidar to improve the reliability of GNN vegetation and fuels maps for forest management and risk assessment, PI: Janet Ohmann, co-PI: **Harold Zald**, \$92,910.
- 2009 Dick and Doris Waring Graduate Student Travel Grant, Oregon State University, \$800.
- 2008 Hoener Memorial Fellowship, College of Forestry, Oregon State University, \$6,000.
- 2006-2007 Native Plant Society of Oregon, Predictive mapping of plant distributions and their underlying environmental determinants in a forest tundra ecotone, Jefferson Park, Oregon, PI: **Harold Zald**, \$750.
- 2000-2001 The Center for Global Change, University of Alaska Fairbanks, Response of treeline forests to climatic and physiographic variation, Alaska Range, PI: **Harold Zald**, \$10,000.

## TEACHING EXPERIENCE

---

- FWWS 501 Instructor, Research Methods & Planning, Forestry Watershed & Wildland Sciences, Humboldt State University, Arcata, CA, Fall 2018, Fall 2019.
- GSP 436 Instructor, Advanced Remote Sensing, Geospatial Program, Humboldt State University, Arcata, CA, Spring 2018, Spring 2020.
- FOR 431 Instructor, Forest Restoration, Department of Forestry and Wildland Resources, Humboldt State University, Arcata, CA, Spring 2020.
- FOR 210 Instructor, Introduction to Forest Measurements, Department of Forestry and Wildland Resources, Humboldt State University, Arcata, CA, Fall 2016, 2017, 2018.
- FS 599 Instructor, Tree-ring Methods and Applications in Ecology, Oregon State University, Corvallis, OR, Winter 2008.
- SNRE 418/518 Lab Instructor, Biology & Management of Insects, University of Michigan, Ann Arbor, MI, Winter 2001.
- GEOG 205 Lab Instructor, Elements of Physical Geography, University of Alaska Fairbanks, Fairbanks, AK, Fall 1999, Winter 2000.
- SNRE 307/507 Assistant Instructor, Habitats and Organisms, University of Michigan Biological Station, Pellston, MI, Summer 1999.

## INVITED PRESENTATIONS

---

- Zald HSJ**, Callahan CC, Hurteau MD, North MP. Stand and tree level effects of thinning and prescribed burning on tree growth responses to extreme drought in a Sierra Nevada mixed-conifer forest, California USA. Association for Fire Ecology 8th International Fire Ecology and Management Congress, Tucson, AZ. November 21, 2019.
- Zald HSJ**, Goodwin MJ, North MP, Hurteau MD, Gray AN. Tree regeneration and understory vegetation responses to second entry prescribed burns in a Sierra Nevada mixed conifer forest. Ecological Society of America Annual Meeting, Louisville, KY. August 15, 2019.
- Zald HSJ**, Dunn CD. Disentangling the drivers for fire severity in multi-owner landscapes. Invited talk for Humboldt State University Ecoseries, Arcata, CA, February 28, 2019.
- Integrating multi-temporal Landsat imagery and tree-rings to map climate driven changes in forest productivity in northern California. CSU ARI PI Meeting, Sacramento, CA, September 7, 2017.
- Remote sensing applications: Forest inventory and monitoring in the Pacific Northwest. USGS Geosciences and Environmental Change Science Center, Denver, CO, May 12, 2015.
- Tree cores, satellites, and laser beams: Forest ecology and management in an era of global change. California State University Chico, Chico, CA, February 9, 2015.
- Tree cores, satellites, and laser beams: Climate change and disturbance impacts on forest ecology and management in the Pacific States. California Polytechnic State University, San Luis Obispo, CA, November 6, 2014.
- Tree invasion of subalpine meadows in the Oregon Cascades. Marys Peak Group, Oregon Chapter, Sierra Club. Corvallis, OR, March 13, 2014.
- LiDAR, tree-rings, and snow: Reconstructing and modeling tree invasion of subalpine meadows in the Oregon Cascades, USA. Universität für Bodenkultur, Vienna, Austria, October 12, 2013.
- Reconstructing and modeling tree invasion of subalpine meadows in the Oregon Cascades. Corvallis Climate Change Impacts Community Seminar Series, Oregon State University, Corvallis, OR, May 21, 2013.
- Tree cores, satellites, and laser beams: Climate change and disturbance impacts on forest ecology and management in the Pacific States. Utah State University, Logan, UT, March 25, 2013.
- Incorporating LiDAR and Landsat disturbance history into mapping of vegetation composition and structure. Modeling Inventory Mapping and LiDAR meeting. USDA Forest Service, Portland, OR, February 14, 2013.
- Alpine and subalpine meadows, tree invasion, and climate change in the Pacific Northwest. Alpine Environments Symposium, Horning Lecture Series, Oregon State University, Corvallis, OR, January 18, 2013.
- Forest ecology and management in an era of global change: Past, present, and future research. Science Operations Center, Wisconsin Department of Natural Resources, Madison, WI, March 15, 2012.
- Measuring and mapping impacts of climate change and disturbance on forest ecosystems. Department of Biology, Grand Valley State University, Allendale, MI, November 30, 2010.

Climate change and disturbances in western forest ecosystems: Impacts and management. Division of Forestry and Natural Resources, West Virginia University, Morgantown, WV, September 23, 2010.

Climate change and forests of the Pacific Northwest: Potential impacts and management considerations. Biology Department Seminar Series, Linfield College, McMinnville, OR, May 13, 2010.

Tree core training. Data Collection Field Training, Forest Inventory and Analysis Program, USDA Forest Service, Rock Springs Guest Ranch, Bend, OR, April 4, 2008.

## PRESENTATIONS AND POSTERS

---

- Zald HSJ**, Dunn CD [talk]. Disentangling the drivers of wildfire severity in a multi-owner forest landscape, Oregon, USA. Ecological Society of America Annual Meeting, Portland, OR. August 9th, 2017.
- Zald HSJ**, Gray AN, North MP, Hurteau MD [talk]. Long-term tree regeneration responses following thinning and prescribed burning in a Sierra Nevada mixed-conifer forest California, USA. Ecological Society of America Annual Meeting, Portland, OR. August 7th, 2017.
- Zald HSJ**, Dunn CJ [talk]. Disentangling the drivers of wildfire severity in a multi-owner landscape. International Fire Behavior and Fuels Conference: Portland, OR, April 14, 2016.
- Zald HSJ**, Kerns BK, Day MA [poster]. Understory Vegetation Changes with Different Seasons and Intervals of Prescribed Burning. International Fire Behavior and Fuels Conference: Portland, OR, April 12, 2016.
- Zald, HSJ**, Hurteau MD, Koch G, North MP [talk]. Growth responses of old-growth trees to climate along a vertical canopy gradient. Ecological Society of America (ESA) Annual Meeting: Sacramento, CA, August 12, 2014.
- Zald, HSJ**, Ohmann JL, McGaughey R, Roberts HM, Gregory MJ, Kennedy RE [poster]. Influence of inventory plot and Landsat imagery positional accuracies on nearest-neighbor imputation maps of vegetation composition and structure. ForestSAT: Corvallis, OR, September 12, 2012.
- Zald, HSJ** [talk]. LiDAR, tree cores, and snow: Modeling fine-scale tree invasion into a subalpine meadow landscape under future snow scenarios, Oregon Cascades, USA. US Regional Association of the International Association of Landscape Ecology Annual Meeting: Portland, OR, April 11, 2011.
- Zald HSJ** [talk]. Multiscale climatic, topographic, and biotic controls of tree invasion in a subalpine parkland landscape, Jefferson Park, Oregon Cascades, USA. MTNCLIM 2010: H.J. Andrews Experimental Forest, Blue River, OR, June 9, 2010.
- Zald HSJ**, Spies TA, Huso M, Gatzliolis D [talk]. Seedling establishment in a subalpine parkland landscape: topographic, seed source, climatic, and disturbance controls. ESA Annual Meeting: Albuquerque, NM, August 3, 2009.
- Zald HSJ** [talk]. Extent and spatial patterns of grass bald land cover change (1948-2000), Oregon Coast Range, USA. Oregon State University, Department of Forest Science Annual Graduate Student Symposium: Corvallis, OR, May 29, 2008.
- Zald HSJ**, Gray AN, North M, Kern RA [talk]. Tree regeneration responses to fire and thinning in a Sierran mixed-conifer forest. Oregon State University, Department of Forest Science Annual Graduate Student Symposium: Corvallis, OR, May 16, 2007.
- Zald HSJ**, Gray AN [talk]. Tree regeneration strategies in response to burning and thinning restoration treatments in a Sierran mixed-conifer forest. ESA Annual Meeting: Portland, OR, August 2, 2004.

## SERVICE

---

- Manuscripts reviewed for: *Frontiers in Ecology and the Environment*, *Ecology*, *Ecological Applications*, *Ecosphere*, *Ecosystems*, *Forest Ecology and Management*, *Landscape Ecology*, *Journal of Vegetation Science*, *Journal of Biogeography*, *Journal of Environmental Management*, *Annals of Forest Science*, *Plant Ecology*, *Forest Science*, *Forests*, *International Journal of Wildland Fire*, *Northwest Science*, *International Journal of Remote Sensing*, *Remote Sensing and Environment*.
- California Forest Management Task Force, Science Advisory Panel, 2019-present.
- Faculty director, Board of directors, Humboldt State University Sponsored Programs Foundation, 2018-2020.
- Proposal reviewer, Humboldt State University, Agricultural Research Institute, 2018, 2020.
- Proposal reviewer, California Polytechnic State University, Agricultural Research Institute, 2019.
- Committee member, Humboldt State University, Forest Operations faculty search committee, 2019.

- Co-organizer, Organized Oral Session 22: Ecosystem Response to Multiple Fires. ESA Annual Meeting, Louisville, KY, August 15, 2019.
- External reviewer, USDA Forest Service, Region 5, NRV Assessment for subalpine forests of NW California
- Proposal reviewer, USDI Joint Fire Sciences Program GRIN, 2017.
- Ad-hoc proposal reviewer, National Science Foundation, Hydrologic Sciences Program, 2016
- Proposal reviewer, USDA/USDI Joint Fire Sciences Program, 2015.
- Proposal reviewer, McIntire-Stennis Cooperative Forestry Research Program, California Polytechnic University, 2015
- Co-organizer, Organized Oral Session 7: Understanding climate, disturbance, and forest dynamics from regional to individual tree scales in the Sierra Nevada. ESA Annual Meeting, Sacramento, CA, August 12, 2014.
- Session chair, Global Change 2. US-IALE Annual Symposium, Portland, OR, April 5, 2011.
- Co-organizer, Session B05: Carbon dynamics in fire-prone forests. AGU Fall Annual Meeting, San Francisco, CA, December 15, 2010.
- Ad-hoc manager, tree-ring lab, College of Forestry, Oregon State University, 2007-2014.
- Ad-hoc research proposal reviewer, Native Plant Society of Oregon, 2007, 2011.
- State Secretary (voting Board Member), Native Plant Society of Oregon, 2005-2008.

## **CERTIFICATIONS**

---

- Wilderness First AID & CPR certification, Wilderness Medicine Institute, Corvallis, OR, April 2004.
- Vegetation diversity and structure field data collector certification, Forest Inventory and Analysis Phase 3. USDA Forest Service, North Central Region, June 2001.
- Wildland Type 2 firefighter certification, Eastern Washington Interagency Coordinating Group, June 1998.
- Field data collector certification, National Forest Health Monitoring Program. USDA Forest Service, North Central Region, May 1997.

## **AWARDS**

---

- Faculty Award for Outstanding Achievement by a Ph.D. Student, Department of Forest Ecosystems and Society, College of Forestry, Oregon State University, 2008
- Carleton-McCarron Forestry Scholarship, University of Michigan, 2000
- Xi Sigma Pi Forestry Honors Society, Upsilon Chapter, 1997

## **MEDIA COVERAGE**

---

San Francisco Chronicle (3/11/2019), Jefferson Public Radio (7/31/2018), Oregon Public Radio (5/5/2018), Oregon Field Guide (spring 2016), High Country News (1/11/2016), aeon (2/25/14), Oregon Statesman Journal (9/22/13), Scientific American (2/1/13), Northwest Public Radio (11/2/12), ScienceDaily (11/2/12), Corvallis Gazette-Times (11/2/12).

## **MEMBERSHIPS**

---

Ecological Society of America, Association for Fire Ecology, Society of American Foresters, Native Plant Society of Oregon, and the Pacific Crest Trail Association