

CURRICULUM VITAE
University of Idaho

NAME: Robert F. Keefe

DATE: January 22, 2022

RANK OR TITLE: Associate Professor of Forest Operations
Director, University of Idaho Experimental Forest

DEPARTMENT: Forest, Rangeland, and Fire Sciences

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DATE OF FIRST EMPLOYMENT AT UI: MS Research Assistant, 2002

DATE OF TENURE: Received March 2018.

DATE OF PRESENT RANK OR TITLE: August 2018

EDUCATION BEYOND HIGH SCHOOL:

Degrees:

PhD, University of Idaho, Moscow, ID, 2012, Natural Resources

MS, University of Idaho, Moscow, ID 2004, Forest Biometrics

BSF, Forestry, University of New Hampshire, Durham, NH, 1999

Certificates and Licenses (current):

USFS Certified Tree Climber

NWCG Type 5 Incident Commander (ICT5) / Type 4 Incident Commander Trainee / Type I Firefighter (FFT1) / Engine Boss Trainee / Firing Boss

EXPERIENCE:

Teaching, Extension and Research Appointments:

Associate Professor of Forest Operations, University of Idaho, Moscow, ID, 2018-Present

Forest Manager, UI Experimental Forest, 2012-Present

Assistant Professor of Forest Operations, University of Idaho, Moscow, ID, 2012-2018

Instructor, Forest Operations, University of Idaho, Moscow, ID, 2011

Teaching Assistant, Forest Operations, University of Idaho, Moscow, ID, 2010-2011

Research Technician, University of Kentucky Dept. of Forestry, Lexington, KY, 2007

Forest Biometrics Research Associate, Cooperative Forestry Research Unit, University of Maine, Orono, ME, 2004-2005

Research Assistant, Forest Biometrics Research Lab, University of Idaho, Moscow, ID, 2002-2004

Teaching Assistant, Forest Biometrics Research Lab, University of Idaho, Moscow, ID, 2002, 2003

Academic Administrative Appointments:

Director, University of Idaho Experimental Forest, 2017-Present

Forest Manager, University of Idaho Experimental Forest, 2012 -Present

Related Non-Academic Employment including Armed Forces:

Principal, Rob Keefe Forest Services, Durham, NH. 2006-2007

Principal, OTL Forestry Services, Durham, NH. 1999-2000

Forester, All Seasons Forestry, Plymouth, NH. 2006

Consulting:

Prior employment (consulting forestry)

Steep Corner Fire Investigation (2012)

TEACHING ACCOMPLISHMENTS:

Areas of Specialization:

Forest operations, logistics, safety research, emergency communications, prescribed and wildland fire management

Courses Taught: (title, course number, date(s))

SEM: Curr. Res. on the UIEF	FOR 501	2020
DS: Current Topics, Forest Management (1 cr)	FOR 502	2013
Cable Systems (2 cr)	FOR 436	2022,2021, 2020,2019,2018, 2017,2015, 2013
Forest Engineering and Harvesting (now Forest Operations, 3 cr)	FOR 430	2020,2019,2018,2017, 2016,2015,2014,2013, 2012, 2011, 2010
Low Volume Forest Roads (2, 3 cr)	FORP 432 / FOR 404 / 431	2022, 2021,2018,2017, 2016,2014, 2013,2011
Spatial Harvest Planning (2 cr)	FOR 404	2012
Intro. to Forest Management (1 cr)	FOR 102	2012

Forest Tractor and Cable Systems (4 cr)	FORP 434	2010
Quantitative Resource Analysis (3 cr)	FOR 394	2003

Teaching Assistant:

Forest Regeneration (2 cr)	FOR 324	2008
Quantitative Resource Analysis (3 cr)	FOR 394	2002
Forest Measurements (3 cr)	FOR 274	2003, 2001
Forest Inventory and Analysis (3 cr)	FOR 474	2003, 2001
Wood Science and Technology – University of New Hampshire	FORS 426	1999
Field Identification of North American Trees and Shrubs – University of New Hampshire	FORS 425	1998

Students Advised:

Undergraduate Students:

1. Advised 34 undergraduate advisees through completion of B.S. forestry degrees during the period 2012-2022.
2. 6 current undergraduate advisees as of spring, 2022.

Graduate Students Completed:

1. Jarred Saralecos (MS) – Graduated May 2014. Jarred is currently a PhD student in the Forest Biometrics Lab at the University of Montana working with David Affleck.
2. Ryan Jacobson (MS) – Graduated December 2015. Ryan is currently a PhD student in the Biomass and Bioenergy Research Group at the University of British Columbia working with Shahab Sokhansanj.
3. Conor Bell (MS) – Graduated August 2017. Conor is currently Principal, Bell Environmental Consulting, Baltimore, Maryland.
4. Ryer Becker (MS) – Graduated December 2017. Ryer is continuing on in the PhD program.
5. Ann Wempe (MS) – Graduated August 2018. Ann continued working with us as a Research Scientist and is now Outreach Coordinator for a 100,000-acre conservation trust estate.

Current Graduate Students:

1. Eloise Zimbelman (PhD)
2. Ryer Becker (PhD)

Graduate Committees (Completed and Current)

1. Catherine Wiechmann (MS)
2. Chris Chase (MS)
3. Zach Lyon (MS)
4. Jim Casey (MS)
5. Audra Cochran (MS)
6. Jeff Stenzel (MS)
7. Anjeleeca Tomayko (MS)
8. Heather Page (PhD)
9. Callie Collins (MS)
10. Kaitlyn Eldredge (MS)
11. Sarah Parkinson (MS)
12. Kelsey Jutilla (PhD)
13. Emily Yurcich (PhD)
14. Gerrit Belindt (PhD – BOKU, Vienna)

Materials Developed: (non-scholarship activity)**Courses Developed:**

1. FOR 430 Forest Operations (3 cr)
2. FOR 102 Intro. to Forest Management (1 cr)
3. FORP 430 Forest Engineering and Harvesting (3 cr)
4. FORP 432 / FOR 404 / FOR 431 Low Volume Forest Roads (3, 2 cr)
5. FOR 436 Cable Systems (2 cr)
6. FORP 434 Forest Tractor and Cable Systems (4 cr)
7. FOR 394 Quantitative Resource Analysis (3 cr)
8. FOR 210 Winter Harvesting (1 cr)

Non-credit Classes, Workshops, Seminars, Invited Lectures, etc.:

1. WLF 492 Wildlife Management – Wildlife Management on the UIEF (2016-Present)
2. FOR 427 Prescribed Burning Lab – Planning and implementation of Rx burn activities on UIEF (2012-Present)

3. REM 144 Introduction to Wildland Fire - Forestry and Fire on the UIEF (2017-Present)
4. FOR 102 Forest Management 1 and 2 (2013, 2014, 2015, 2016, 2017, 2018, 2019)
5. FOR 102 UIEF Field Tour (2012, 2013, 2014, 2015, 2017)
6. FOR 424 Final Presentation evaluations (2011, 2012, 2013, 2014)
7. 3P sampling (invited lecture), FOR 474 (2009)
8. Forest operations (invited lecture), FOR 374 (2009)
9. Using R for statistical analysis. Dept. of Mathematics and Statistics Seminar Series (2004)

Honors and Awards:

1. Faculty Excellence Award, College of Natural Resources Advisory Board, 2018
2. Outstanding Advisor Award, College of Natural Resources, 2018
3. Nominee, University Award for Excellence in Advising, 2018
4. Honorary Degree, Dept. of Agric. Ed. and Idaho FFA, University of Idaho, 2017
5. Nominee, University Award for Teaching Excellence, 2013
6. Outstanding PhD Graduate Student, Forest, Rangeland and Fire Sciences, University of Idaho (2012)
7. Certificate of Appreciation, University of Idaho President Duane Nellis: Invention Disclosure: Recreational rail cycle, motorized recreational off-road vehicle, and wheelchair for portable rail system

SCHOLARSHIP ACCOMPLISHMENTS: (Including scholarship of teaching and learning, artistic creativity, discovery, and application/integration)

Publications, Exhibitions, Performances, Recitals:

Refereed/Adjudicated Journal Articles (published, in press, and accepted):

1. Keefe, R.F., Zimelman, E.G. and G. Picchi. 2022. Use of individual tree and product level data to improve operational forestry. *Current Forestry Reports*. Proofs/In press.
2. Becker, R.M. and R.F. Keefe. 2022. Development of activity recognition models for mechanical fuel treatments using consumer-grade GNSS-RF devices and lidar. *Forestry* (Cambridge). In press.
3. Zimelman, E. G., & Keefe, R. F. 2021. Development and validation of smartwatch-based activity recognition models for rigging crew workers on cable logging operations. *PLOS One*, 16(5), e0250624.
4. Becker, R.M. and R.F. Keefe, 2020. "Prediction of fuel loading following mastication treatments in forest stands in North Idaho, USA", *Sustainability* 12(17):7025.
5. Keefe, R.F., Wempe, A.M., Becker, R.M., Zimelman, E.G., Nagler, E.S., Gilbert, S.L. and Caudill, C.C., 2019. "Positioning methods and the use of location and activity data in forests." *Forests* 10(5): 458.
6. Keefe, R. F., Zimelman, E.G., and Wempe, A.M. 2019. "Use of smartphone sensors to quantify the productive cycle elements of hand fallers on industrial cable logging operations." *International Journal of*

Forest Engineering 30(2): 132-143.

7. Wempe, A. M., Keefe, R.F., Newman, S.M. and Paveglio, T.B., 2019. "Intent to adopt location sharing for logging safety applications." *Safety* 5.1 (2019):7.
8. Collins, C., Brooks, R., Sturz, B., Nelson, A. and Keefe, R., 2018. Body Composition Changes of United States Smokejumpers during the 2017 Fire Season. *Fire*, 1(3), p.48.
9. Newman, S., Keefe, R., Brooks, R., Ahonen, E. and Wempe, A., 2018. Human factors affecting logging injury incidents in Idaho and the potential for real-time location-sharing technology to improve safety. *Safety*, 4(4), p.43.
10. Saul, D., Newman, S., Peterson, S., Kosse, E., Jacobson, R., Keefe, R., Devadoss, S., Laninga, T. and Moroney, J., 2018. Evaluation of Three Forest-Based Bioenergy Development Strategies in the Inland Northwest, United States. *Journal of Forestry*, 116(6), pp.497-504.
11. Becker, R.M., Keefe, R.F., Anderson, N.M. and Eitel, J.U., 2018. Use of lidar-derived landscape parameters to characterize alternative harvest system options in the Inland Northwest. *International Journal of Forest Engineering*, 29(3), pp.179-191
12. Lyon, Z.D., Morgan, P., Stevens-Rumann, C.S., Sparks, A.M., Keefe, R.F. and A.M.S. Smith. (2018). Fire behavior in masticated forest fuels: lab and prescribed fire experiments. *International Journal of Wildland Fire*
13. Qin, X., Keefe, R.F. and D. Daugaard (2018). Small landowner production of pellets from green, beetle-killed and burned lodgepole pine. *Energies* 11(3): 648. doi:10.3390/en11030648
14. Zimbelman, E.G. and R.F. Keefe (2018). Real-time positioning in logging: Effects of forest stand characteristics, topography, and line-of-sight obstructions on GNSS-RF transponder accuracy and radio signal propagation. *PLOS One*. <https://doi.org/10.1371/journal.pone.0191017>
15. Wempe, A. and R.F. Keefe (2017). Characterizing rigging crew proximity to hazards on cable logging operations using GNSS-RF: effect of positioning error on worker safety status. *Forests* 8(10): 357
16. Newman, S.G., Saul, D.A., Keefe, R.F., Jacobson, R.A., Laninga, T., and J. Moroney (2017). "The devil is in the details": Inland Northwest stakeholders' views on three forest-based bioenergy scenarios. *Forest Science* doi.org/10.5849/FS-2016-083
17. Bell, C.K., Keefe, R.F., and J.S. Fried. (2017). Validation of the OpCost logging cost model using contractor surveys. *International Journal of Forest Engineering* 28(2): 73-84. doi.org/10.1080/14942119.2017.1313488
18. Zimbelman, E.G., Keefe, R.F., Strand E.K., Kolden, C.A., and A.M. Wempe (2017). Hazards in motion: development of mobile geofences for use in logging safety. *Sensors* 17(4), 822; doi: 10.3390/s17040822
19. Becker, R.M., Keefe, R.F., and N.M. Anderson. (2017). Use of real-time GNSS-RF data to characterize the swing movements of forestry equipment. *Forests* 8(2), 44; doi:10.3390/f8020044
20. Grayson, L.M., R.F. Keefe, W.T. Tinkham, J.U.H. Eitel, J.D. Saralecos, A.M.S. Smith, and E.G. Zimbelman (2016). Accuracy of WAAS-enabled GPS-RF warning signals when crossing a terrestrial geofence. *Sensors* 16, 912; doi:10.3390/s16060912
21. Jacobson, R.A., Keefe, R.F., Smith, A.M.S., Laninga, T.J., Inman, D., Metlen, S. Saul, D.A., and S.M. Newman (2016). Multi spatial analysis of forest residue utilization for bioenergy. *Biofuels, Bioproducts, and Biorefining* 10.1002/bbb.1659
22. Saralecos, J.D., R.F. Keefe, W. T. Tinkham, R. H. Brooks, and L. R. Johnson (2015). Operational Influences Affecting Sawlog Weight and Volume Relationships in the Intermountain West. *Forest Products Journal* 65 (5-6):198-208

23. Saralecos, J.D., Keefe, R.F., Tinkham, W.T., Brooks, R.H., Smith, A.M., and L.R. Johnson (2014). Effects of harvesting systems and bole moisture loss on weight scaling of Douglas-fir sawlogs (*Pseudotsuga menziesii* var. *glauca* Franco). *Forests* 5:2289-2306. doi:10.3390/f5092289
24. Smith, A.M.S., C.A. Kolden, W.T. Tinkham, A. Talhelm, J.D. Marshall, A.T. Hudak, J.W. Anderson, A. Kliskey, L. Alessa, R.F. Keefe, M.F. Falkowski, L. Boschetti, J. Greenberg, and J.R. Gosz. (2014). Remote sensing the vulnerability of vegetation in natural terrestrial ecosystems. *Remote Sensing of Environment* 154:322-337
25. Hudak, A., Gonzalez, F., Byrne, J, Crookston, N, and R Keefe (2014). Using Climate-FVS to project landscape-level forest carbon stores for 100 years from field and LiDAR measures of initial conditions. *Carbon Management* 9:1. doi:10.1186/1750-0680-9-1
26. Strand, E.K., S.C. Bunting, and R.F. Keefe (2013). Influence of wildland fire along a successional gradient in sagebrush steppe and western juniper woodlands. *Rangeland Ecology & Management*. <http://dx.doi.org/10.2111/REM-D-13-00051.1>
27. Holden, Z., Klene, A., Keefe, R., and G. Moisen (2013). An inexpensive radiation shield for monitoring surface air temperatures. *Agricultural and Forest Meteorology* 180: 281-286
28. Keefe R.F. and A.S. Davis (2012). Marked, biased, filter (MBF): Use of digital X-radiography and mark-recapture to partition seed lots based on sampled individual seed quality attributes. *New Forests* 43(2):169-184. DOI: 10.1007/s11056-011-9271-y
29. Keefe R.F. and A.S. Davis (2010). Modeling individual conifer seed shape as a sum of fused partial ellipsoids. *Canadian Journal of Forest Research* 40(11): 2175-2186
30. Eitel J.U., R.F. Keefe, D.S. Long, A.S. Davis and L.E. Vierling (2010). Active ground optical remote sensing for improved monitoring of seedling stress in nurseries. *Sensors* 10(4): 2843-2850

Peer Reviewed/Evaluated:

1. Link, T.E., Johnson, T.R., Keefe, R.F., and Becker, R.M. 2020. The effectiveness of Idaho's Class I Stream Shade Rule: Analysis of Before-After Control-Impact Effective Shade Data. Idaho Dept. of Environmental Quality
2. Jain, Theresa; Sikkink, Pamela; Keefe, Robert; Byrne, John. 2018. To masticate or not: Useful tips for treating forest, woodland, and shrubland vegetation. Gen. Tech. Rep. RMRS-GTR-381. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 55 p.
3. Fried, J.S., Jain, T.J., Loreno, S., Keefe, R.F. and C.K. Bell (2017). A framework for evaluating forest restoration alternatives and their outcomes over time, to inform monitoring: bioregional inventory originated simulation under management (BioSum). In: Keyser, CE; Keyser, TL, eds. Proceedings of the 2017 Forest Vegetation Simulator (FVS) Virtual e-Conference. E-Gen. Tech. Rep. SRS-224. Asheville, NC: US Department of Agriculture Forest Service, Southern Research Station. p. 40-5
4. Bell, C.K., Keefe, R.F. and J.S. Fried (2017). OpCost: an open-source system for estimating costs of stand-level forest operations. PNW-GTR-960, USDA FS PNW Research Station. 32 p.
5. Keefe, R.F., T.R. Link, P. Dunnette, and R. Becker (2015). Monitoring the effectiveness of Idaho's Class I stream shade rule: quality assurance project plan. Idaho Dept. of Environmental Quality. Boise, ID.
6. Keefe, R.F. T. R. Link, P. Dunnette, and R. Becker (2015). Monitoring the effectiveness of Idaho's Class I stream shade rule: standard operating procedures for the measurement of relative stocking. Idaho Dept. of Environmental Quality. Boise, ID.
7. Link, T.R., Keefe, R.F., A. Fennema, and P. Dunnette (2015). Monitoring the effectiveness of Idaho's Class I

stream shade rule: standard operating procedures for the estimation of stream shade with a solar pathfinder. Idaho Dept. of Environmental Quality. Boise, ID.

8. Barkley, Y, Brooks, R., Keefe, R., Kimsey, M., McFarland, A., and C. Schnepf (2015). Idaho Forestry Best Management Practices. University of Idaho Extension.
9. Keefe, R., Anderson, N., Hogland, J. and K. Muhlenfeld (2014). Woody biomass logistics (Ch. 14). In: Karlen, D., Editor. Cellulosic Energy Cropping Systems. John Wiley and Sons, Ltd. West Sussex, UK. doi: 10.1002/9781118676332.ch14. pp. 251-279.

(Additional agency reports reviewed by staff scientists are listed in the ‘Other’ section below. Additional peer-reviewed/evaluated conference proceedings papers are listed in the presentation section below where appropriate.)

Other: (reports, proceedings, papers, citations and references, performances)

1. Brooks, R.H. and R.F. Keefe. (2013) Choosing the right harvesting system. Idaho Farm Bureau Quarterly 14(4).
2. TopoFireGIS web interface: Prototype system for predicting insect and climate-induced impacts on fire hazard in complex terrain. http://topofire.dbs.umt.edu/topofire/topofire_portal.php.
3. University of Idaho Experimental Forest web page (w/ Holli Sampson) (2013; 2015).
4. University of Idaho Forest Operations Research Lab web page (2013; 2015; 2018).
5. Portable Rail Project web page (2013).
6. University of Idaho Forest Operations Minor web page (2012)

Refereed/Adjudicated (currently submitted, in review, or in revision):

1. Becker, R.M. and Keefe, R.F. (In review). A novel smartphone-based activity recognition modeling method for tracked equipment in forest operations. PLOS One.
2. Keefe, R.F. and Townsend, K.R. (In preparation). Current Stand-based forest inventory and management on the University of Idaho Experimental Forest. To be submitted to: *Forests*.
3. Zimelman, E.G. and Keefe, R.F. (In preparation). Comparison of satellite and lidar for mapping the connectivity of real-time mesh radio networks for smart forestry and fire operations in Idaho. To be submitted to: Remote Sensing of Environment.
4. Keefe, R.F. Use of individual tree lidar products to identify areas of high conservation value for forest management planning. To be submitted to: TBD.

Peer Reviewed/Evaluated (currently submitted, in review, or in revision):

Presentations and Other Creative Activities:

1. New ground-based skidding equipment for the Intermountain Region. Presented at: Soil impacts from East and West Side Harvest Operations. Western Forestry and Conservation Association, Deborah Dumroese, PhD, Coordinator, November 17, 2021.

2. Matching harvesting equipment to your site. Presented at: Soil impacts from East and West Side Harvest Operations. Western Forestry and Conservation Association, Deborah Dumroese, PhD, Coordinator, November 17, 2021.
3. Keefe, R.F. 2021. New lidar-derived individual tree inventory products available for research and teaching on the University of Idaho Experimental Forest. GIS Day, University of Idaho. November 17, 2021.
4. Keefe, R.F. Pioneering operational uses of a new individual tree lidar product on the University of Idaho Experimental Forest. 2021 Society of American Foresters National Convention. November 3-6, 2021.
5. Keefe, R.F. and E.G. Zimbelman. 2021. Important considerations for using mobile and wearable device sensors to model worker productivity and develop digital health and safety applications for motor-manual operations. Joint meetings of the Council on Forest Engineering (COFE) and International Union for Forestry Mechanization (FORMEC), Corvallis, OR (Online), October, 2021.
6. Keefe, R.F. 2020. Students as Managers and Leaders. Biennial Conference on University Education in Natural Resources. Missoula, MT, March, 2020.
7. Keefe, R.F., Zimbelman, E.G. and A.M. Wempe. 2019. GNSS and other location technologies for logging safety. Western Ag Safety and Health Conference – Seattle, WA. August 7-9, 2019.
8. Wempe, A.M., Keefe, R.F., Newman, S.M., and Paveglio, T.B. 2019. Location-sharing for logging safety: Idaho logger perspectives. Western Ag Safety and Health Conference – Seattle, WA., August 7-9, 2019.
9. Zimbelman, E.G. and Keefe, R.F. 2019. Evaluation of wearable-based activity recognition modeling applications for logging safety. Western Ag Safety and Health Conference – Seattle, WA, August 7-9, 2019.
10. Keefe, R.F. 2019. (Invited). GNSS and other location technologies for logging safety. Pacific Northwest Logging Safety Summit. Eugene, OR., February 18, 2019.
11. Keefe, R.F. (2019-three presentations). Use of emergency location devices in logging safety. Idaho Logger Education to Advance Professionalism (LEAP) Update- Lewiston, Coeur d'Alene and Bonner's Ferry
12. Becker, R.M., Keefe, R.F., 2018. Use of lidar-derived landscape parameters to characterize alternative harvest system options in the Inland Northwest. Society of American Foresters Annual Meeting, Portland, OR. Oct. 3-7, 2018.
13. Keefe (2018). (Invited). Reducing Logging Fatality and Non-Fatal Trauma Incidence Rates with New Real-Time Operational GNSS-RF Communications, Recommended Safety Procedures, and Education. NIOSH Expanding Research Partnerships Webinar Series. May 16, 2018. (<https://www.cdc.gov/niosh/oep/expandpartnerwebinar.html>)
14. Zimbelman, E.G., Keefe, R.F., and Wempe, A.M. (2018). Using wearable technology and smartphone sensors to quantify work activities in forestry. Off the Grid 2018, Coeur d'Alene, ID, October 25–26, 2018. (Presentation).
15. Becker, R.M.*, Keefe, R.F. (2018). Use of real-time GNSS-RF to characterize the swing movements of forestry equipment. Off the Grid 2018, Coeur d'Alene, ID, October 25–26, 2018. (Presentation).
16. Keefe, R.F., Zimbelman, E.G., Wempe, A.M. and Becker R.M. (2018). Strengths and weaknesses of different real-time positioning systems for logging safety. Off the Grid 2018, Coeur d'Alene, ID, October 25–26, 2018. (Presentation).
17. Keefe, R.F., Zimbelman, E.G., and Wempe, A.M. (2018). Use of smartphone sensors to quantify the productive cycle elements of hand fallers. Council on Forest Engineering Annual Meeting, Williamsburg, VA, July 15–18, 2018. (Presentation).
18. Keefe, R.F. (2017) Real-time positioning analysis as an alternative to traditional time-and-motion studies in

- forest operations. Society of American Foresters National Convention, Albuquerque, NM. November 15-19, 2017. (Presentation).
19. Becker, R. and R.F. Keefe (2017). Use of LiDAR and simulation modeling to characterize alternative steep slope harvest system options in the Inland Northwest. Society of American Foresters National Convention, Albuquerque, NM. November 15-19, 2017. (Presentation).
 20. Wempe, A.M. and R.F. Keefe (2017). Evaluation of GNSS-RF transponder accuracy for logging operation safety applications and potential improvement. Society of American Foresters National Convention, Albuquerque, NM. November 15-19, 2017. (Presentation).
 21. Zimbelman, E.G. and R F. Keefe (2017). Hazards in motion: development of mobile geofences for use in logging safety. Society of American Foresters National Convention, Albuquerque, NM. November 15-19, 2017. (Presentation).
 22. Keefe, R.F. (2017) New technology and real-time analytics solutions for precision forestry, wildland fire and natural resources. Off the Grid 2017, Coeur d'Alene, Idaho. November 2-3, 2017.
 23. Keefe, R.F. (2017) Real-time data for production forestry: where we've been and where we're headed. Off the Grid 2017, Coeur d'Alene, Idaho. November 2-3, 2017.
 24. Becker, R. and Keefe, R.F. (2017) Using LiDAR and real-time GPS to evaluate harvest planning options. Off the Grid 2017, Coeur d'Alene, Idaho. November 2-3, 2017.
 25. Zimbelman, E.G. and Keefe, R.F. (2017). Using wearable technology and mobile phone sensors to quantify work activities in forestry. Off the Grid 2017, Coeur d'Alene, Idaho. November 2-3, 2017.
 26. Keefe, R.F. (2017) Real-time data for production forestry: where we've been and where we're headed. Off the Grid 2017, Coeur d'Alene, Idaho. November 2-3, 2017.
 27. Keefe, R.F. (2017). Real-time location and data sharing for forest operations: where we've been and where we're going. Council on Forest Engineering Annual Meeting, Bangor, ME. July 30-August 2, 2017. (Presentation).
 28. Becker, R. and R. F. Keefe (2017). Use of LiDAR and simulation modeling to characterize alternative steep slope harvest system options in the Inland Northwest. Council on Forest Engineering Annual Meeting, Bangor, ME. July 30-August 2, 2017. (Presentation).
 29. Wempe, A.M. and R.F. Keefe (2017). Evaluation of GNSS-RF transponder accuracy and potential improvements using two error correction methods: implications for logging safety. Council on Forest Engineering Annual Meeting, Bangor, ME. July 30-August 2, 2017. (Poster).
 30. Zimbelman, E.G. and R F. Keefe (2017). Real-time positioning in logging: effects of canopy, topography, and line-of-sight obstructions on GNSS-RF transmitter accuracy and radio signal propagation. Council on Forest Engineering Annual Meeting, Bangor, ME. July 30-August 2, 2017. (Poster).
 31. Zimbelman, E.G. and R.F. Keefe (2017). Hazards in motion: development of mobile geofences for use in logging safety. CDC/NIOSH NORA State of the Science Conference. Aurora, CO. June, 2017. (Poster).
 32. Fried, J.S., Jain, T., Loreno, S., Keefe, R.F., and C.K. Bell (2017). Bioregional inventory originated simulation under management (BioSum): a framework for evaluating forest restoration alternatives and their outcomes, over time, to inform monitoring. 2017 Forest Vegetation Simulator e-Conference, Fort Collins, CO. Feb 28-March 2, 2017. (Presentation).
 33. Keefe, R.F., Zimbelman, E.G., Wempe, A.M. and R.M. Becker (2017). Overview of real-time GNSS-RF positioning for forestry. Interview – Timberwest Magazine. September, 2017.
 34. Keefe, R.F., Zimbelman, E.G., Wempe, A.M. and R.M. Becker (2016). Overview of real-time GNSS-RF

- positioning for forestry. Invited presentation to John Deere Forestry Engineering. December, 2016. (Online presentation to 25+ design engineers globally).
35. Keefe, R.F., Zimbelman, E.G., Wempe, A.M. and R.M. Becker (2016). Real-time GNSS-RF positioning for logging safety. Invited webinar: Washington DNR forestry webinar series. October, 2016. (Webinar presentation).
 36. Keefe, R.F., Zimbelman, E.G., Newman, S.R., Wempe, A.M., Smith, A.M.S. and D. Veljkovic (2016). Real-time positioning systems for forest operations. Society of American Foresters National Convention, Madison, WI, November 5, 2016. (Presentation).
 37. Qin, X. and R.F. Keefe (2016). Small landowner production, costs, and quality of pellets produced from green, beetle-killed, and burned lodgepole pine. Society of American Foresters National Convention, Madison, WI, November 5, 2016. (Presentation).
 38. Becker, R. and R.F. Keefe (2016). Multi-transmitter GPS accuracy analysis for recording swing movements of harvesting machinery. Society of American Foresters National Convention, Madison, WI, November 5, 2016. (Presentation).
 39. Zimbelman, E.G. and R.F. Keefe (2016). Real-time tracking in logging: effects of canopy, aspect, and PDOP on GPS movement data and geofence accuracy. Society of American Foresters National Convention, Madison, WI, November 5, 2016. (Presentation).
 40. Zimbelman, E.G. and R.F. Keefe (2016). Hazard in motion: development of mobile geofences for use in logging safety and logistics. Council on Forest Engineering Annual Meeting and DEMO International. September 19-22, 2016. Vancouver, B.C. (Presentation).
 41. Becker, R. and R.F. Keefe (2016). Classifying productive cycle elements for shovel-harvesting of beetle-killed timber using real-time GNSS-RF. Council on Forest Engineering Annual Meeting and DEMO International. Vancouver, B.C. September 19-22, 2016. (Presentation).
 42. Fried, J.S., T.B. Jain, S. Loreno, C. Bell and R.F. Keefe (2016). Multi-dimensional cost-effectiveness of fuel treatments in dry mixed conifer forests: an inventory originated analysis. 5th International Fire Behavior and Fuels Conference, Portland, OR, April 11-14, 2016.
 43. Zimbelman, E.G. and R.F. Keefe (2016). Real-time GPS for logging. 2016 Intermountain Logging Conference, Spokane, WA, March 2016. (Presentation).
 44. Keefe, R.F. and K.S. Pregitzer (2016). University of Idaho Experimental Forest. Presentation to the College of Natural Resources Advisory Board Spring Meeting, Moscow, ID. April 1, 2016.
 45. Lyon, Z. A. Sparks, P. Morgan, C. Stevens-Rumman, R. Keefe and A.M.S. Smith (2015). Fire behavior in masticated fuels. Association for Fire Ecology 6th International Fire Ecology and Management Congress. Nov. 16-20, San Antonio, TX. (Poster).
 46. Keefe, R.F. and T. Link (2015). Development of a monitoring plan for Idaho's new Class I Stream Shade Rule. 2015 Water Quality Workshop, Boise ID, Feb 2-4, 2015. (Presentation).
 47. Keefe, R.F. and T. Link (2015). Development of a monitoring plan for Idaho's New Class I Stream Shade Rule. Forest Practices Act Advisory Committee, Coeur d'Alene and Boise ID, March, 2015. (Presentation).
 48. Saul, D., S. Newman, D. Gray, R. Keefe, S. Metlen, R. Jacobson, S. Devadoss, E. Kosse and S. Peterson (2015). Prosperity and sustainability: socioeconomic impacts of wood-based bioenergy development strategies. Poster presented at the 2015 BANR project Annual Meeting, Missoula, MT. (Presentation).
 49. Saul, D., S. Newman, D. Gray, R. Keefe, S. Metlen, R. Jacobson, S. Devadoss, E. Kosse and S. Peterson (2015). Prosperity and sustainability: socioeconomic impacts of wood-based bioenergy development strategies. Poster presented at the 2015 University of Idaho Experimental Forest Working Forests Field Day, Princeton, ID.

50. Becker R. and R.F. Keefe (2015). Dept. of Forest, Rangeland and Fire Sciences / College of Natural Resources Graduate Research Poster Competition (2015).
51. K.S. Pregitzer and R.F. Keefe (2015). Reforestation and Resilience. Presentation to the Idaho Forest Restoration Partnership meeting, Boise, ID, February, 2015.
52. Becker, R and R.F. Keefe (2015). Production and logistical analysis of harvesting beetle-killed timber for bioenergy on marginal cable logging hillslopes in the Inland Northwest. Society of American Foresters Annual Meeting, Baton Rouge, LA. (SAF Forest Science and Technology Board Outstanding Graduate Presentation Award winner – First place).
53. Keefe, R.F. and C. Rhoades (2015) Overview of the BANR project. Invited presentation to the Nez Perce-Clearwater National Forest Leadership Team. Kamiah, ID, June 2015.
54. Jacobson, R. and R.F. Keefe (2014). Modeling woody biomass utilization for energy feedstock in the northwest United States. Society of American Foresters National Convention and International Union of Forestry Research Organizations World Congress, Salt Lake City, Utah. October, 2014 (Presentation).
55. Bell, C.K. and R.F. Keefe (2014). FVS OptCost: A forest operations cost simulator developed in R. Society of American Foresters National Convention and International Union of Forestry Research Organizations World Congress, Salt Lake City, Utah. October, 2014 (Presentation).
56. C.K. Bell, R.F. Keefe and L. Grayson (2014). Development and validation of a physically based forest operations model. Society of American Foresters National Convention and International Union of Forestry Research Organizations World Congress, Salt Lake City, Utah. October, 2014 (Presentation).
57. Anderson, N., Chung, W., and R.F. Keefe (2014). Woody biomass feedstock logistics group. BANR Annual Meeting, Moscow, ID, October, 2014. (Poster).
58. Becker, R. and R.F. Keefe (2014). Production and logistical analysis of industrial forest operations options on marginal cable topography with beetle-killed timber. BANR Annual Meeting, Moscow, ID, October, 2014. (Poster).
59. Jacobson, R. and R.F. Keefe (2014). Modeling woody biomass utilization for energy feedstock in the northwest United States. BANR Annual Meeting, Moscow, ID, October, 2014. (Poster).
60. Brooks, R., Cochran, A., and R. Keefe (2014). Identifying operational challenges associated with harvesting beetle-killed timber: results of a contractor survey. BANR Annual Meeting, Moscow, ID, October, 2014 (Poster).
61. Keefe, R.F. (2014). Applications of multi transmitter GPS-VHF in forest engineering. 47th International Symposium on Forestry Mechanization and 5th International Forest Engineering Conference, Gerardmer, France, September 2014 (Presentation and conference proceedings).
62. Keefe, R.F. (2014). Design of the Phase II portable rail project track. 47th International Symposium on Forestry Mechanization and 5th International Forest Engineering Conference, Gerardmer, France. September 2014 (Poster).
63. Saralecos, J.D., R. F. Keefe, R. H. Brooks and L.R. Johnson (2014). Influence of region, seasonality, and species on weight to volume relationships of commercial sawlogs in Idaho. 47th International Symposium on Forestry Mechanization and 5th International Forest Engineering Conference, Gerardmer, France, September 2014 (Presentation).
64. Grayson, L. and R.F. Keefe (2014). 47th International Symposium on Forestry Mechanization and 5th International Forest Engineering Conference, Gerardmer, France, September 2014 (Poster).
65. Keefe, R.F. (2014). Update on Forest Operations education at the University of Idaho. Associated Logging Contractors Annual Fall Pig Feed, Coeur d'Alene, ID, September 2013.

66. Keefe, R.F. (2014) Real-time tracking and communications systems for harvest operations. Intermountain Forest Tree Nutrition Cooperative (Invited presentation).
67. Drzewucksi, T. and R.F. Keefe (2014). The Choker Keeper. 2014 Intermountain Logging Conference, Spokane, WA. (Poster).
68. Keefe, R.F. (2014). Using combined GPS-VHF for logging safety and work zone monitoring. 2014 Intermountain Logging Conference, Spokane, WA. (Poster).
69. Keefe, R.F. (2014). Application of carriage-mounted agricultural cameras and multi transmitter GPS-VHF to improve safety in cable logging operations. Oregon Logging Conference, Eugene, OR, February, 2014 (Invited presentation).
70. Saralecos, J.D. and R.F. Keefe (2014). Intermountain weight scaling methods. Inland Northwest Growth and Yield Cooperative Annual Meeting. March 2014.
71. Saralecos, J.D., and R.F. Keefe (2014). Factors affecting sawlog weight and volume conversions in Idaho. Timber Measurements Society Annual Meeting. Coeur d'Alene, ID. February 2014.
72. Keefe, R.F. (2013) A Multi-use transportation system for forestry and recreation: evaluation of an NIPF prototype. 2013 Society of American Foresters National Convention, Charleston, S.C. (Presentation).
73. Saralecos, J.D. and R.F. Keefe (2013) Influence of moisture loss on weight to volume relationships of sawlogs in Idaho. 2013 Society of American Foresters National Convention, Charleston, S.C. (Presentation).
74. Keefe, R.F. and D. Saul. (2013). Socioeconomic impacts of wood-based biofuels on northwest communities in the northern Rocky Mountains. Montana Forest Products Retention Roundtable, Missoula, MT. September 6, 2013 (Presentation).
75. Keefe, R.F. (2013). Update on Forest Operations education at the University of Idaho. Associated Logging Contractors Annual Fall Pig Feed, Coeur d'Alene, ID, September 2013.
76. Keefe, R.F., and K. David, (2013). Washington-Idaho forest owners field day at the University of Idaho Experimental Forest. July 13, 2013 (lead organizer, 24 workshops, presentations, and four research tours).
77. Keefe, R.F. and J.U.H. Eitel (2013). Application of carriage-mounted agricultural cameras to improve safety in cable logging operations in Idaho. Proceedings, 2013 Annual Meeting of the Council on Forest Engineering, Missoula, MT, July 7-10, 2013.
78. Saralecos, J. and R. Keefe (2013). Influence of moisture loss, seasonality, and species on weight to volume relationships of commercial sawlogs in Idaho. 2013 Annual Meeting of the Council on Forest Engineering, Missoula, MT, July 7-10, 2013.
79. Saralecos, J., and R. Keefe (2013). Weight scaling: Current and future trends. Intermountain Logging Conference, Spokane, WA. April 2013.
80. Brooks, R., Moroney, J., Keefe, R., and T. Laninga (2013). Biomass survey assessment of Idaho extension forestry stakeholders. International Wood Composites Symposium, Seattle, WA, April 2013. (Poster).
81. Keefe, R.F. (2013). Learning for landowners: At the University of Idaho Experimental Forest. Idaho Forest Owners Association Family Forest Landowners and Managers Conference, Moscow, ID, April 2013.
82. Keefe, R.F. (2013). Water bars and drainage structures. Idaho Logger Education to Advance Professionalism (LEAP) Update- Orofino, ID.
83. Keefe, R.F. (2013). Water bars and drainage structures. Idaho Logger Education to Advance Professionalism (LEAP) Update- St. Maries, ID.

84. Keefe, R.F. (2013). Water bars and drainage structures. Idaho Logger Education to Advance Professionalism (LEAP) Update- Post Falls, ID.
85. Keefe, R.F. (2013). Water bars and drainage structures. Idaho Logger Education to Advance Professionalism (LEAP) Update- Moscow, ID.
86. Brooks, R. and Keefe, R.F. (2013). University of Idaho extension forestry and forest operations. Forestry day at the legislature. Boise, ID. (2 posters).
87. Keefe, R.F. (2012). A statewide study to identify factors affecting log weight to volume conversion factors. Associated Logging Contractors fall meeting, Coeur d'Alene, ID.
88. Robinson, A.P., Keefe, R.F., and N.L. Crookston. (2012) Reconciliation exercises for fun and profit. Joint meeting of the Western Mensurationists and Western Forest Economists. Newport, OR, 2012.
89. Keefe R.F., Z.A. Holden, and A.S. Davis (2012). Coupling FASST and FVS to simulate climate and silvicultural impacts on seasonal operability of logging equipment. Fourth FVS Conference, Fort Collins, CO, April, 2012.
90. Keefe R.F. and A.S. Davis (2011). Simulating effects of climate, microclimate and wood use decisions on conifer regeneration. Society of American Foresters 2011 National Convention. Honolulu, Hawaii, November, 2011.
91. Keefe R.F. and A.S. Davis (2011). Effect of stand structure on below-canopy microclimate and conifer regeneration on the UI Experimental Forest. Society of American Foresters 2011 Summer Field Tour.
92. Keefe R.F. and A.S. Davis (2011). Precision seed quality assessment using digital X-ray radiography. Inland Empire Tree Improvement Cooperative, Coeur d'Alene, ID. (Presentation).
93. Davis, A.S. and R.F. Keefe. (2010). Nursery cultural practices to achieve targets: A case study in western larch irrigation. Target seedling symposium. Forest Nursery Association of British Columbia and Western Forest Nursery Association. Portland, OR.
94. Keefe R.F. and A.S. Davis (2010). Use of digital X-radiography to assess seed quality in conifer seeds. Intermountain Container Growers Annual Meeting, McCall, ID. (Presentation).
95. Kildisheva, O.A., A.S. Davis, and R.F. Keefe (2010). Mimicking nature: understanding seed ecology as a means of native plant restoration. Ecological Society of America. Pittsburgh, PA, USA, August 1-6, 2010.
96. Kildisheva, O.A., A.S. Davis, and R.F. Keefe (2010). *Spharalcea munroana*: strategies for improving seed germination. International Society of Seed Scientists Meeting on Seeds and the Environment, Salt Lake City, UT. June, 2010.
97. Keefe R.F. and A.S. Davis (2010). Effect of reference spatiotemporal disturbance frequency on stand structure and conifer germination. Seventh IUFRO International Conference on Uneven-Aged Silviculture. Ljubljana, Slovenia. September 23-26, 2010. (Presentation).
98. Keefe R.F. and A.S. Davis (2009). Measurement and modeling methods for predicting the germination of individual conifer seeds. Western Mensurationists Annual Meeting, Vancouver, WA. (Presentation).
99. Keefe R.F. and A.S. Davis (2008). How to develop a conifer seed collection plan for Idaho's primary forestlands. Idaho Department of Lands Reforestation Workshop, Moscow, ID. (Presentation).
100. Eitel, J.U.H., R.F. Keefe, D.S. Long, A.S. Davis, and P.E. Gessler. Suitability of optical ground sensors to monitor seedling quality. 29th Intermountain Container Seedling Growers' Association Annual Meeting. Coeur d'Alene, ID, October 2008.
101. Davis, A.S., R.F. Keefe, J.U.H. Eitel, D.S. Long, and P.E. Gessler. Potential for boom-mounted remote sensing applications in seedling quality monitoring. Canadian Institute of Forestry Centennial Conference. Fredericton, NB, Canada, September 2008.

102. Keefe R.F. and A.S. Davis (2008). After the soak: post-imbibition moisture exchange in ponderosa pine and Douglas-fir seed. Intermountain Container Growers Association meeting in Coeur d'Alene, ID. (Presentation).
103. Keefe R.F. and A.S. Davis (2008). Effect of minimum moisture content on morphology and water use efficiency of western larch seedlings. Intermountain Container Seedling Growers Association Annual Meeting. Moscow, ID. (Presentation).
104. Keefe R.F. (2006). Whither white pine? The return of large trees to the New England landscape. New England Society of American Foresters Annual Meeting, Manchester, NH. (Poster).

Professional Meeting Reviewed Papers

1. Zimbelman, E.G. and R.F. Keefe (2016). Hazards in motion: development of mobile geofences for use in logging safety and logistics. Council on Forest Engineering Annual Meeting and DEMO International. Vancouver, B.C. September 19-22, 2016.
2. Becker, R. and R.F. Keefe (2016). Classifying productive cycle elements for shovel-harvesting of beetle-killed timber using real-time GNSS-RF. Council on Forest Engineering Annual Meeting and DEMO International. Vancouver, B.C. September 19-22, 2016.
3. Keefe, R.F. (2014). Applications of multi transmitter GPS-VHF in forest engineering. 47th International Symposium on Forestry Mechanization and 5th International Forest Engineering Conference, Gerardmer, France, September 2014.
4. Saralecos, J.D., R. F. Keefe, R. H. Brooks and L.R. Johnson (2014). Influence of region, seasonality, and species on weight to volume relationships of commercial sawlogs in Idaho. 47th International Symposium on Forestry Mechanization and 5th International Forest Engineering Conference, Gerardmer, France. September 2014.
5. Bell, C.K. and R.F. Keefe (2014). FVS-OptCost: A new forest operations cost simulator linked with FVS. Council on Forest Engineering Annual Meeting, Moline, IL, June 22-25, 2014
6. Keefe, R.F. and J.U.H. Eitel (2013). Application of carriage-mounted agricultural cameras to improve safety in cable logging operations in Idaho. 2013 Annual Meeting of the Council on Forest Engineering, Missoula, MT, July 7-10, 2013.
7. Saralecos, J. and R. Keefe (2013). Influence of moisture loss, seasonality, and species on weight to volume relationships of commercial sawlogs in Idaho. 2013 Annual Meeting of the Council on Forest Engineering, Missoula, MT, July 7-10, 2013.
8. Davis, A.S., and R.F. Keefe (2011). Nursery cultural practices to achieve targets: A case study in western larch irrigation. Target Seedling Symposium. In: Riley, L. E.; Haase, D. L.; Pinto, J. R., tech. coords. National Proceedings: Forest and Conservation Nursery Associations - 2010. Proc. RMRS-P-65. Fort Collins, CO: USDA Forest Service, Rocky Mountain Research Station. p. 128-132.
9. Keefe R.F. and A.S. Davis (2010). Use of the angled mirror method to estimate three-dimensional seed shape parameters for the seedR model. International Society for Seed Science Third Meeting on Seeds and the Environment. Salt Lake City, Utah. June 2010.
10. Keefe R.F., Eitel J.U.H., Long D.S., Davis A.S., Gessler P. and A.M.S. Smith (2008). Potential for boom-mounted remote sensing applications in forest nurseries. Proceedings of the 2008 Western Forest and Conservation Nursery Association meeting, Missoula, MT. June 23-28, 2008.
11. Keefe, R.F. and A.S. Davis (2008). Reisenberg's principles revisited: a portable rail system for use in forest operations in sensitive areas. Presented at the 31st Annual Meeting of the Council on Forest Engineering: Addressing Forest Engineering Challenges for the Future. Charleston, SC. June 22-25, 2008.

Thesis and Dissertation

1. Keefe, R.F. 2011. Development, testing and use of a simple hybrid conifer germination model. Doctoral dissertation, University of Idaho. 134 p.
2. Keefe, R.F. 2004. Two-stage and zero-inflated modeling of forest regeneration on the Pacific Northwest coast. M.S. thesis, University of Idaho. 91 p.

Professional Workshops and Meetings:

1. Keefe, R.F. Use of individual tree level data in forest management and operations. Forester's Forum. February 2021.
2. Keefe, R.F. and T.R. Link. Developing a statewide monitoring study to evaluate Idaho's new Class I Stream Shade Law. Idaho Forest Practices Act Advisory Committee (FPAAC). November 2014.
3. Keefe, R.F. and D.A. Saul. Developing woody biomass development scenarios for the Inland Northwest: Forest industry stakeholder forum. 1912 Center, Moscow, ID, May 29, 2013.
4. Hogan, R. V. Cooper, and R.F. Keefe (2012). Log scaling practices in Idaho. Palouse-Snake River Society of American Foresters Professional Development Workshop, 2012.
5. Keefe, R.F. and R. Brooks (2012). Estimating logging costs. Associated Logging Contractors Annual Meeting professional development workshop.
6. Hudak, A. and R.F. Keefe (2012). LiDAR applications in forestry. Palouse-Snake River Society of American Foresters Professional Development Workshop, Moscow, ID.
7. First Friday Breakfasts for Professional Foresters and Students (2012). Hosted 8 informal breakfast meetings of the Palouse-Snake River Society of American Foresters.
8. Corrao, V. J. Erricxson, and R.F. Keefe (2012). A log trucking dispatch system for the Inland Empire. Palouse-Snake River Society of American Foresters regular meeting program, Moscow, ID.
9. Lemieux, J., and R.F. Keefe (2012). The Potlatch Corp. Real Estate Program. Palouse-Snake River Society of American Foresters regular meeting program. Moscow, ID.
10. Invited University of Idaho representative, Summit on Forest Operations and Forest Engineering Education in the West. Corvallis, OR, August 8-9, 2011.

OTT Invention disclosures:

1. Drzewucki, T., Beigh, P. and R. Keefe (2013). The Choker Keeper: A novel log choker attachment to reduce the tangling of chokers during cable logging operations. Provisional patent received: Spring, 2014. Provisional patent received.
2. Keefe, R.F. (2008) Recreational rail cycle, motorized recreational off-road vehicle, and wheel chair for portable rail system.

Grants and Contracts Awarded:

1. Becker, R.M. (2021). \$164,766. Postdoc Fellowship: Advancing technological and fundamental skillsets of next generation forest operations workforces through enhanced education and extension. USDA NIFA.

2. Link, T.R., Johnson, T.R., and R.F. Keefe (2019). Idaho Stream Shade Rule Effectiveness Study: Data Analysis and Report Preparation. Idaho Dept. of Environmental Quality. \$28,378.00.
3. Keefe, R.F. and E.G. Zimbelman (2018). Evaluation of wearable-based activity recognition modeling applications for logging safety. Pacific Northwest Ag Safety Center (UW). \$27,493.40.
4. Keefe, R.F., Smith, A.M., Eitel, J.U.H., Newman, S.M., and R.H. Brooks (2015). Reducing logging fatality and non-fatal trauma incidence rates with new real-time GPS-VHF communications, recommended safety procedures, and education. National Institute of Health (NIH) National Institute of Occupational Safety and Health (NIOSH). \$824,043.
5. Keefe, R.F. and T. Link (2014). Design of a monitoring study, QAPP, and SOP for evaluating the effectiveness of Idaho's new Class I Stream Shade Rule. Idaho Dept. of Environmental Quality. \$79,992.
6. Boschetti, L., Roy, D.P., Baraldi, A., Keefe, R.F., Smith, A.M.S., and A. T. Hudak (2013). Prototyping global industrial forest mapping, a Landsat spatio-temporal approach. NASA Land-Cover Land-Use Change ROSES. \$722,333.
7. Paustian, K. and 20+ others (2013). Sustainable biofuel feedstocks from beetle-killed wood: Bioenergy Alliance Network of the Rockies (BANR). USDA AFRI CAP. I serve as UI lead PI / administrator. \$380,000 of \$9,000,000+.
8. Fried, J.S., Jain, T., and R.F. Keefe (2013). Evaluating cost-effectiveness of multi-purpose fuel treatments in western mixed conifer forests considering hazard, risk, longevity, and co-benefits. Joint Fire Sciences Program. \$64,890 of \$212,387.
9. Morgan, P., A.M. Smith, and R.F. Keefe (2013). Masticated fuels and fire behavior in forests of the Northern Rockies. Joint Fires Sciences Program. \$406,544.40.
10. Saul, D., Gray, D., Peterson, R., Devadoss, S., Metlen, S., and R.F. Keefe (2012). Socioeconomic impacts of wood-based biofuels development strategies on Northern Rocky Mountain communities in the Northwest. USDA AFRI. \$59,000 of \$350,000.
11. Keefe, R.F (2012). Characterizing regional and seasonal log weight to volume relationships in Idaho. Idaho Dept. of Lands Forest Management Bureau. \$30,000.
12. Keefe, R.F (2012). Characterizing regional and seasonal log weight to volume relationships in Idaho. Associated Logging Contractors. \$500.
13. Davis, A.S. and R.F. Keefe (2009). Effects of wood supply scenarios on the conifer regeneration environment. Remsoft Inc. \$30,000 In-kind.
14. Keefe R.F. and Davis A.S. (2009) Measurement, sampling and statistical modeling methods to quantify conifer seed quality in forest nurseries using digital X-ray radiography. Faxitron Corporation. \$70,000 In-kind.
15. Davis A.S., Dumroese R.K., Karrfalt R.F., Keefe R.F., and Z.E. Lowe (2008). Characterization of seed germination requirements of Wyoming big sagebrush (*Artemisia tridentata*) for improved direct-seeding success in a changing climate. Great Basin Native Plant Selection and Increase Project \$60,000.
16. Keefe R.F. (2007). Does the triphasic water uptake hypothesis explain water relations in the seeds of *Pinus ponderosa* and *Pseudotsuga menziesii*? University of Idaho Student Research Grant program. \$1,500.
17. Davis A.S. and Keefe R.F. (2008). Hydrothermal time analysis of conifer seed germination. Pacific Regeneration Technologies. \$2,000.
18. Keefe R.F. (2008). Model-based optimization of seed germination timing. Honorable Mention. Decagon Devices G.A. Harris Fellowship. Equipment, sample processing gifts in kind.

Grants and Contracts Attempted (past unsuccessful and current submitted, pending):

1. Luckhart, S. et al. 2022. Northwest Regional Center of Excellence in Vector-borne Diseases. CDC. \$9,839,194. CDC. **Pending-In review.**
2. Keefe, R.F., Zimbelman, E.G., Spector, J. and C. Vella. 2021. Use of Location- and Wearable-based Occupational Activity Recognition to Quantify on-the Job Digital Health and Safety Metrics for the Forestry Workforce; *in* Pacific Northwest Ag Safety and Health (PNASH) Center, 2022-2027: Growing Agricultural Safety and Health with Technology. \$628,937 (UI) of \$9,784,831 total. CDC/NIOSH. **Pending-In review.**
3. Smith, A.M.S., J.W. Anderson, G. Harley, J.G. Moberly. 2021. Collaborative Research: Investigating the Xylem Dysfunction Hypothesis and the Cambium-Phloem Death Hypothesis as Mechanisms of Fire-Induced Tree Mortality. NSF. \$1,175,452. In review (Submitted 11/21). **Pending-In review.**
4. Smith, A.M.S., J.W. Anderson, G. Hartley, R.F., Keefe, E.K. Strand. 2021. Collaborative Research: Transforming fire ecology by integrating phylogeny and ecophysiology research to identify and assess how trees mechanistically respond to fire. **Pending-In review.**
5. Western States Fire Managers Moscow Mountain WUI (2022). Idaho Dept. of Lands / USFS fuels reduction grant for the UIEF. \$240,000. (**Pending - Third and final review phase**).
6. Zimbelman, E.G. and Keefe, R.F. (2021). Evaluation of wearable-based human activity recognition to quantify work productivity in precision forestry. \$164,766. Not funded.
7. Lyons, K., Belart, F., Keefe, R.F., and M. Cohen. (2020). PNASH Center Renewal Application: Use of simulators for logging incident response. \$400,000. Not funded.
8. Keefe, R.F., and Zimbelman, E.G. 2020. Evaluating connectivity of smartphone-based mesh networks in irregular, forested terrain. University of Idaho ORED RISE Fellowship program (internal). \$3000 - Unfunded.
9. Keefe, R.F. and X. Qin (2017-Unsuccessful). Developing a slip, trip, and fall hazard index rating system and smart phone app for forestry workers in mountain pine beetle-infested lodgepole pine stands. Pacific Northwest Ag Safety Center (UW). \$30,000.
10. Keefe, R.F., Nelson, A.S. and A.M.S. Smith. (2017-Unsuccessful). Integrating real-time positioning and LiDAR remote sensing into precision forestry throughout the life cycle of stand management. USDA AFRI. \$499,885.
11. Keefe, R.F., Jenkins, S. and G. Hess (2017-Unsuccessful). Evaluating the effectiveness of Idaho's Class I stream shade rule for conserving riparian habitat and water quality in the Great Northern LCC region. Great Northern Landscape Conservation Collaborative. \$80,000. (Unsuccessful).
12. Keefe, R.F., Newman, S.G., Paveglio, T.B., Kobziar, L.N. and R.H. Brooks (2016). Field evaluation of real-time GPS positioning and mobile ad-hoc network (MANET) radio systems for wildland fire. Dept. of Homeland Security / FEMA: \$1,500,000. (Unsuccessful).
13. Saul, D., Newman, S., Keefe, R., Davadoss, S., Gopaluni, B., Jacobson, R., Hulme, K. and S. Cook (2016). Technology and policy impacts on the long-term bioenergy development in communities and forests in the US Northwest. USDA AFRI, \$500,000. (Unsuccessful).
14. Keefe, R.F., Brooks, R.H., Newman, S.M., Brown, K., and L.S. Kobziar (2016). Real-time position, navigation, and timing for wildland firefighting: testing systems and expanding our capabilities. Vandal Ideas Project internal University of Idaho RFA. (Unsuccessful).

15. Coleman, M., Saul, D., McDonald, A., Keefe, R., Brooks, R., Talhelm, A., Laninga, T., Devadoss, S., Newman, S., Puettmann, M., Coates, E., and R. Eddings (2015). Increasing small-scale woody bioenergy adoption in Idaho's Clearwater Basin. Dept. of Energy. \$7,000,000. (Unsuccessful).
16. Keefe, R.F., Smith, A.M., Eitel, J.U.H., Brooks, R.H., and S. Newman (June 2014- first submission). Reducing logging fatality and non-fatal trauma incidence rates with new real-time GPS-VHF communications, recommended safety procedures, and education. National Institute of Health (NIH) National Institute of Occupational Safety and Health (NIOSH). \$820,762 (Unsuccessful).
17. Keefe, R., Coleman, M., Hudak, A., Strand, E., and Smith, A. (2012). U.S. National Needs for forest scientists trained in the management of integrated sawlog and woody biomass production systems. National Institute of Food and Agriculture. \$220,500 (Unsuccessful).
18. Coleman, M.D., and 20+ additional collaborators (2011). Mobile fast pyrolysis of forest biomass and agricultural residues for biofuel production. NIFA Biomass Research and Development Initiative Competitive Grants Program. \$7,000,000 (Unsuccessful).
19. Page-Dumroese D.S., Coleman M.D., and R.F. Keefe. (2011). Residue management, biochar production, and biochar application to maintain forest health and soil productivity. 2010 USDA Woody Biomass Utilization Grant. \$200,000 (Unsuccessful).
20. Keefe R.F. (2011). Design and cost evaluation of track sections for a low-impact, high production multi-use forest transportation system. University of Idaho Forest Products Entrepreneurship Grant.
21. Keefe R.F. and S.R. Shifley (2011). Characterizing the minimum sustainable harvest for four silvicultural systems in the Pacific Northwest. \$130,000. (Unsuccessful).
22. Keefe R.F. and A.S. Davis (2010). Modeling the germination timing of conifer seeds. NSF Doctoral Dissertation Improvement Grant. \$15,000. (Unsuccessful).

Honors and Awards:

1. Top 10% most cited papers in 2018:
2. Honorary degree (2017). Idaho FFA Association and University of Idaho Dept. of Agricultural and Extension Education.
3. Nominee (2013). Award for Teaching Excellence, University of Idaho.

SERVICE:

Director, University of Idaho Experimental Forest. 2017-present
 Forest Manager, University of Idaho Experimental Forest. 2012-Present.

Please note that I have listed many outreach, service, collaborative teaching and other activities associated with the Experimental Forest under the corresponding sections above.

Duties:

1. Development or strategic and tactical planning, oversight of all grants and contracts related to timber management, wildland and prescribed fire, reforestation, thinning, inventory, grazing, and recreation on the 10,300 acres of Idaho timberland. Annual budget planning and research coordination. Participation and forest certification through National and Idaho Tree Farm Programs. Preparation and annual revision of UIEF Forest Management Plan. Manage all non-research business operations totaling approx. \$750,000 annually.
2. Supervision of Assistant Manager, 25 seasonal and temporary staff, student-run and contract operations, seasonal

wildland fire crew and regular prescribed fire activities on 9 management areas covering 10,300 acres of productive Idaho timberland.

3. Coordination of research and teaching activities with College of Natural Resources and other University of Idaho faculty, staff, graduate and undergraduate students.
4. Coordination of 10-15 regular field workshops and activities, including, for example, Future Farmers of America statewide Forestry Career Development Event, Project Learning Tree Walk in the Woods, Idaho Forest Products Commission Architects Field Tour, various Extension Forestry workshops, etc.
5. Represent the UIEF on behalf of CNR on various committees, cooperatives, and boards.

Major Committee Assignments: (National, State, District, County, University, College, Departmental and dates)

1. Board Member, Intermountain Logging Conference. Attended summer advisory board planning retreat, McCall ID, July, 2019. multiple planning meetings. 2015-Present.
2. Steering Committee, Pacific Northwest Logging Safety Summit. Eugene, OR, February 2019 and Spokane, WA April 2020. Multiple planning meetings. 2019-2020.
3. CNR representative, University of Idaho Safety and Loss Control Committee (USLCC). 2015 – present.
4. College of Natural Resources Representative, Idaho Tree Farm Committee. 2013 - present.
5. Member, Idaho Forest Owners Association Forest Landowners and Managers Conference Steering Committee. 2013 – 2019.
6. Faculty Search Committee, Assistant / Associate Professor of Silviculture. 2014. (Dr. Andrew Nelson).
7. CNR Representative to the Idaho Dept. of Lands and Dept. of Environmental Quality Streamside Management Zone Implementation and Monitoring Committee. January, 2014.
8. Member, University of Idaho Extension Forestry Topic Team. 2014.
9. Member, Associated Logging Contractors Idaho Pro-Logger Certification Steering Committee. November, 2013 – present.
10. Forest Resources Representative to the CNR Curriculum Committee. September, 2013 – 2014.
11. Chair, CNR Curriculum Committee. November, 2013 – August, 2014.
12. CNR Associate Dean Search Committee, University of Idaho College of Natural Resources. 2012. (Dr. Tom Gorman).
13. Faculty Search Committee, Assistant Professor in Ecosystem Services Economics, College of Natural Resources, University of Idaho. (Dr. Kelly Wendland).
14. Faculty Search Committee (2008): Assistant Professor in Wildland Fire Science, College of Natural Resources, University of Idaho. (Dr. Phil Higuera).
15. Maine CFRU Research Communications Coordinator search committee, 2005.

Professional and Scholarly Organizations (including memberships, committee assignments, editorial services, offices held and dates)

1. Advisory Board, Intermountain Logging Conference. Attended summer advisory board planning retreats, multiple planning meetings. 2015-Present.
2. Steering Committee, National Council on Forest Engineering Annual Meeting, Missoula, MT. 2013.
3. Selected peer review responsibilities: Pacific Northwest Ag Safety and Health Center proposal peer review (2019); Forests (2017); Transactions of the ASABE (2017); International Journal of Forest Engineering (2019, 2017); Canadian Journal of Forest Research (2016, 2015, 2013, 2011, 2006); Forest Science (2017, 2016, 2013), Global Change Biology (2017); Silva Fennica (2014); Computers and Electronics in Agriculture (2017); Western Journal of Applied Forestry (2012; 2009; 2007), Sensors (2015); Native Plants Journal (2010).
4. Associate Editor, Forest Science, Special Issue on the Fourth Vegetation Simulator Conference, Ft. Collins, CO, 2012.
5. Chair, Twenty-sixth Inland Empire Forest Engineering Conference: Trends in Forest Operations in the Inland Empire (Session 1), and Sustainable Biomass Utilization (Session 2). Moscow, ID, March, 2011.
6. Chair, Palouse-Snake River SAF, 2012.
7. Chair-elect and Program Chair, Palouse-Snake River SAF, 2011.
8. Invited University of Idaho representative, Summit on Forest Operations and Forest Engineering Education in the West. Corvallis, OR, August 8-9, 2011.
9. Organizer and Supervisor, Idaho Future Farmers of America Statewide Forestry Career Development Event 2010-2017.
10. Instructor, National Advanced Silviculture Program Reforestation Short Course: *Conifer seed quality assessment*. Moscow, Idaho. 2010.
11. Reviewer (4 proposals); University of Idaho Student Research Grant Program. 2010.
12. Professional member, Society of American Foresters. 2004-present.
13. Professional member, Council on Forest Engineering. 2008-present.
14. Student member, International Society of Seed Science. 2008-2010.
15. Member, New Hampshire Timberland Owner's Association. 2005-2015,

Outreach Service: (Including popular press, interview articles, newspaper articles, workshops-seminars-tours organized, Extension impact statements)

1. Keefe, R.F. 2020. *Orofino High School Forestry and Forest Products Field Day on the University of Idaho Experimental Forest and Bennett Lumber Products*. March 2020.
2. Host / organizer, Idaho Master Forest Stewards Targeted Demonstration Workshop. August 2019.
3. Host / organizer, Idaho Future Farmers of America Statewide Forestry Career Development Event for over 120 Idaho high school students. June 2019.
4. Host / organizer, Idaho Future Farmers of America Statewide Forestry Career Development Event for over 120 Idaho high school students. June 2018.

5. Host / organizer, Idaho Future Farmers of America Statewide Forestry Career Development Event for over 110 Idaho high school students. June 2017.
6. Host / organizer, Project Learning Tree Walk in the Woods, University of Idaho Experimental Forest (June 2016).
7. Host / organizer, Idaho Future Farmers of America Statewide Forestry Career Development Event for over 110 Idaho high school students. June 2016.
8. Host / organizer, Idaho Lands Resource Coordinating Council Field Tour, University of Idaho Experimental Forest. June 2015.
9. Host / organizer, Idaho Future Farmers of America Statewide Forestry Career Development Event for over 120 Idaho high school students. June 2015.
10. Host / organizer, Project Learning Tree Walk in the Woods, University of Idaho Experimental Forest (June 2015).
11. Presenter / organizer: Idaho Forest Products Commission University of Idaho Experimental Forest field tour for Architecture graduate students. (September 2015)
12. Lead organizer, Working Forests Field Day at the UI Experimental Forest. Organized 15+ workshops for the general public and students. September 2015.
13. Presenter / organizer: Idaho Forest Products Commission University of Idaho Experimental Forest field tour for Architecture graduate students. September 2014.
14. What's new at the U? and Meet the Natives. Idaho Forest Products Commission Miracle at Work Field Tour, Matthew M. McGovern Jr. Memorial Tree Farm, Coeur d'Alene, ID. September 2014.
15. Forest Operations education and research at the University of Idaho. Associated Logging Contractors Fall Meeting and Annual Pigfeed. 2014.
16. Presenter / organizer: Idaho Forest Products Commission University of Idaho Experimental Forest field tour for Architecture graduate students. 2013.
17. Update on Forest Operations education and research at the University of Idaho. Associated Logging Contractors Fall Meeting and Annual Pigfeed. 2013.
18. IDL Forest Stewardship Field Tour, presenter, UI Experimental Forest / Roger Guernsey Outdoor Classroom. July 20, 2013.
19. Washington-Idaho Forest Owners Field Day at the University of Idaho Experimental Forest. Lead organizer with Kirk David. Over 140 participants, 25 presentations and current research tour. 2013.
20. Update on Forest Operations education and research at the University of Idaho. Associated Logging Contractors Fall Meeting and Annual Pigfeed. 2012.
21. Idaho Forest Owners Association January Meeting. 2013.
22. Palouse-Snake River Professional Society of American Foresters – Attended, participated in development of all professional meetings, workshops, and field tours. 2010-2012.
23. Inland Empire Society of American Foresters Annual Meeting. 2010-2011, 2013.
24. Inland Empire Tree Improvement Cooperative Annual Meeting. 2011, 2014.
25. National Society of American Foresters. 2010-2014; 2016-2017.
26. Intermountain Container Growers Association Annual Meeting. 2008-2010.

27. Western Mensurationists Annual Meeting. 2009; 2011.
28. National Council on Forest Engineering. Various (2008-2017).
29. Implementing uneven-aged management in New England- UNH Coop. Extension. 2007.
30. Logging for foresters. University of New Hampshire Cooperative Extension. 2007.

PROFESSIONAL DEVELOPMENT:

Teaching and Scholarship:

1. Biennial University Conference on Education in Natural Resources (2020)
2. Western Ag Safety and Health Conference (2019)
3. Society of American Foresters National Convention (2018, 2017, 2016, 2014, 2013, 2012).
4. National Council on Forest Engineering Annual Meeting (2018, 2017, 2015, 2013, 2011).
5. Western Regional Council on Forest Engineering Annual Meeting (2014).
6. Oregon Logging Conference (2017, 2016, 2015, 2014, 2013, 2012, 2011).
7. Intermountain Logging Conference (2019, 2018, 2017, 2016, 2015, 2014, 2013, 2012).
8. Forester's Forum (2021, 2019, 2018, various)
9. UBC TREENOMIX tree improvement workshop (2007)
10. University of Idaho Radiation Safety Training (2009)
11. Maintenance and use of digital X-ray equipment. Faxitron Corporation (2009)

Administration/Management:

1. *Influence*. Online course available from The Wharton School, University of Pennsylvania, via Coursera. Completed March 2018.
2. *Improving Communication Skills*. Online course available from The Wharton School, University of Pennsylvania, via Coursera. Completed January 2018.
3. Annual fireline refresher (RT-130) and arduous pack test. 2014-2017.
4. Idaho Dept. of Lands / USFS Guard School (NWCG) Type 5 Incident Commander / Type 1 Firefighter (FFT1/ICT5): S131/S133/S-211, Camp Lutherhaven; Coeur d'Alene, ID. June 2-9, 2016.
5. National Wildland Fire Coordinating Group (NWCG) Type II Firefighter: S130/S190/I-100/L180, Arduous Pack Test, Salida, CO (2014).
6. Recent wildland fire incident response: Big Lost Fire (2015); Strychnine Fire (2017)
7. Experience (NWCG qualifications): IC/Burn Boss for approximately 20 prescribed burns of varying size and

complexity, 2012-2017

8. CPR / First Aid (2015, 2017).
9. USFS Certified Tree Climber (2008)
10. USDA FS / Idaho Dept. of Lands Insects and Disease Workshop, Coeur d'Alene, ID. 2014.