

CURRICULUM VITAE

University of Idaho

NAME: Jan U.H. Eitel

DATE: 12/30/2019

RANK OR TITLE: Assistant Professor

DEPARTMENT: Natural Resources and Society

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<http://ecosensing.org>

DATE OF FIRST EMPLOYMENT AT UI: 2009

DATE OF TENURE: untenured

DATE OF PRESENT RANK OR TITLE: June 2018

EDUCATION BEYOND HIGH SCHOOL:

- 2006-2008 **PhD:** Natural Resources, Department of Forest Resources, University of Idaho
Advisors: Dr. Paul Gessler, Dr. Daniel Long, Dr. Raymond Hunt Jr., and Dr. Lee Vierling
Foci: Remote Sensing, Precision Agriculture, Nitrogen in Agricultural Systems, Spatial Modeling
Dissertation: *'Remote Sensing of Wheat Nitrogen Status for Improved Protein Management in Dryland Systems'*
- 2004-2005 **MSc:** Forestry, Department of Forest Resources, University of Idaho, Moscow, Idaho
Advisors: Dr. Paul Gessler, Dr. Alistair Smith, and Dr. Ronald Robberecht
Foci: Remote Sensing, Plant water relations
Thesis: *'Suitability of Existing and Novel Spectral Indices to Remotely Detect Water Stress in Populus Spp.'*
- 2002-2003 **BSc:** Forestry, Department of Forest Resources, University of Idaho, Moscow, Idaho
Advisor: Dr. Steven Brunsfeld
Foci: Forestry, Remote Sensing, GIS
- 1999-2002 **Pregraduate Degree (Diplom-Vorprüfung):** Forestry, Fakultät für Forst- und Umweltwissenschaften, Albert-Ludwigs-Universität Freiburg, Germany
Focus: Forest Ecology and Management

EXPERIENCE:

- 2018- Assistant Professor, Natural Resources and Society, University of Idaho, Moscow, Idaho
2012-2018 Research Assistant Professor, Department of Forest, Rangeland, and Fire Sciences, University of Idaho, Moscow, Idaho
- 2010- Science Faculty, McCall Outdoor Science School, University of Idaho Field Campus, McCall, Idaho
- 2010-2012 Research Scientist, Department of Forest Ecology and Biogeosciences, University of Idaho, Moscow, Idaho
- 2009-2010 Postdoctoral Scholar, Department of Forest Ecology and Biogeosciences, University of Idaho,

	Moscow, Idaho
2006-2008	Research and Teaching Assistant (PhD), Department of Forest Resources, University of Idaho, Moscow, Idaho
2006-2008	Research Assistant, Agricultural Research Service, Columbia Plateau Conservation Research Center, Pendleton, Oregon
2004-2005	Research and Teaching Assistant (MSc), Department of Forest Resources, University of Idaho, Moscow, Idaho
2001	Forest Technician Intern, Thurn und Taxis Forstbetrieb Ebnat, Ebnat, Germany
1999	Forest Technician Intern, Forstverwaltung Mayr-Melnhof, Salzburg, Austria
1998	Lance Corporal, 4th Transportation Battalion 10, Ellwangen, Germany

TEACHING ACCOMPLISHMENTS:

Areas of Specialization:

Ecology, Remote Sensing, Precision Agriculture

Courses Taught:

NRS566: *Advanced Field Ecology Course Design*, Spring 2013, 2014, 2016 (5 cr.) (two sections, co-taught with Dr. K. Eitel)
 NRS 560: *Placed-based Ecology I*, Fall 2010 – current (3 cr.) (two sections)
 NRS 563: *Teaching environmental education in a winter environment*, Spring 2017 (2 cr.) (two sections)
 NRS 562: *Field Science Teaching*, Fall 2015, 2016 (2 cr.) (co-taught with MOSS faculty)
 NRS 505: *Geospatial Tools for Educators*, Summer 2011 (1 cr.)
 NRS 504: *Socio-Ecological Systems: An Integrated Approach I* (1 cr.), Fall 2017 - current (two sections, co-taught with Drs. Wolfenden, Cohn, and K. Eitel)
 NRS 504: *Socio-Ecological Systems: An Integrated Approach II* (1 cr.), Spring 2018 - current (two sections, co-taught with Drs. Wolfenden, Cohn, and K. Eitel)
 FOR 503: *Introduction to R Software*, Fall 2011 (1 cr.) (two sections)
 NRS 502: *Remote Sensing and GIS for Ecologists*, Fall 2016 (1 cr.)
 NRS 503: *Introduction to Data Analysis and Visualization in R*, Fall 2017, Fall 2018 (1 cr.)
 FOR 102: *Introduction to Forest Management*, Spring 2014, 2015, 2016 (1 cr.) (responsible for teaching 3 day field trip)
 NR 101: *Exploring Natural Resources*, Summer 2013 (1 cr.)

Students Advised:

Undergraduate Students: ---

Graduate Students:

Andrew Maguire, PhD student, University of Idaho, major advisor, 2016 - current
 Micah Russell, PhD student, University of Idaho, major advisor, 2016 - current
 Jyoti Jennewein, PhD student, University of Idaho, major advisor, 2016 - current
 Heather Greaves, PhD student, University of Idaho, major advisor, 2013 - 2017
 Erik Boren, PhD student, University of Idaho, committee member, 2017- current
 Peter Schlesinger, PhD student, University of Idaho, PhD committee member, 2014 – 2017
 Vincent, PhD student, University of Idaho, PhD committee member, 2015- 2018
 Troy Magney, PhD student, University of Idaho, co-major advisor, 2011- 2015
 Mark Corrao, PhD student, University of Idaho, PhD committee member, 2013 – 2015
 Dan Krofcheck, PhD student, University of New Mexico, PhD committee member, 2011 – 2014
 Mark Shepard, MNR student, University of Idaho, major advisor, 2019 – current
 Hali Goodrich, MNR student, University of Idaho, major advisor, 2019 – current
 Josh Heaton, MNR student, University of Idaho, major advisor, 2019 – current

Mitchell Gage, MNR student, University of Idaho, major advisor, 2019 – current
 Susan Vance, MNR student, University of Idaho, major advisor, 2019
 Kate Job, MNR student, University of Idaho, major advisor, 2018 – 2019
 Kailee McKinney, University of Idaho, major advisor, 2018 – 2019
 Maison Power, University of Idaho, major advisor, 2018 – 2019
 Emma Woodworth, University of Idaho, major advisor, 2018 – 2019
 Daniel Lay, MNR student, University of Idaho, major advisor, 2017 - 2018
 Rachel Farrow, MNR student, University of Idaho, major advisor, 2017 - 2018
 Mackenzie Durham, MNR student, University of Idaho, major advisor, 2017 - 2018
 Laura Beck, MNR student, University of Idaho, major advisor, 2017 - 2018
 Patrick Ryan, MNR student, University of Idaho, major advisor, 2017 - 2018
 Brent Chouanard, M.S. student, University of Idaho, major advisor, 2016 – 2017
 Rebecca Schroeder, M.S. student, University of Idaho, major advisor, 2016 - 2017
 Zachery Hall, M.S. student, University of Idaho, major advisor, 2016 - 2017
 Kayla Bordelon, M.S. student, University of Idaho, major advisor, 2016 - 2017
 Christopher Gutierrez, M.S. student, University of Idaho, major advisor, 2015 - 2016
 William Adicoff, M.S. student, University of Idaho, major advisor, 2015 - 2016
 Zoe Mroz, M.S. student, University of Idaho, major advisor, 2015 - 2016
 Wesley Koster, M.S. student, University of Idaho, major advisor, 2015 - 2016
 Nell Davis, M.S. student, University of Idaho, major advisor, 2015 - 2016
 Brian Lawless, M.S. student, University of Idaho, major advisor, 2015 - 2016
 Megan McAndrews, M.S. student, University of Idaho, committee member, 2014- 2016
 Jessica Sanow, M.S. student, University of Idaho, major advisor, 2015 - 2016
 Andrew Trogstad-Isaacson, M.S. student, University of Idaho, major advisor, 2014- 2015
 Allyson Schaeffer, M.S. student, University of Idaho, major advisor, 2014- 2015
 Erica Guralnick, M.S. student, University of Idaho, major advisor, 2014- 2015
 Samuel Finch, M.S. student, University of Idaho, committee member, 2014 - 2015
 Cessidy Comer, M.S. student, University of Idaho, major advisor, 2014- 2015
 Lindsay Grayson, M.S. student, University of Idaho, committee member, 2014 – 2015
 Matthew Yourek, M.S. student, University of Idaho, committee member, 2014 – 2015
 James Casey, M.S. student, University of Idaho, committee member, 2014 – 2015
 Dirk Anderson, M.S. student, University of Idaho, major advisor, 2013 - 2014
 Ross Parsons, M.S. student, University of Idaho, major advisor, 2013 - 2014
 Lauren Smith, M.S. student, major advisor, University of Idaho, 2012-2013

Visiting Scientists:

Dr. Jingjue Jiang, Computer School, Wuhan University, A519, Wuhan, Hubei 430072, China
 Jingshan Lue, PhD candidate, College of Agriculture, Nanjing Agricultural University

Materials Developed:

Courses Developed:

NRS 560: *Principles of Ecology for Environmental Educators (Placed-based ecology I)* (4 cr.)

NRS 564: *Teaching environmental education in a winter environment (Placed based ecology II)* (2 cr.) (Co-

developed with Dr. Mark Wolfenden)

NRS 566: *Advanced Field Ecology Course Design* (5 cr.) (Co- developed with Dr. Karla Eitel and Dr. Justin Hougham)

NRS 504: *Socio-Ecological Systems: An Integrated Approach I* (1cr.) (Co-developed with Drs. K. Eitel, Wolfenden, and Cohn)

NRS 504: *Socio-Ecological Systems: An Integrated Approach II* (1 cr.) (Co-developed with Drs. K. Eitel, Wolfenden, and Cohn)

NRS 505: *Geospatial Tools for Educators* (1 cr.)

FOR 503: *Introduction to R Software* (1 cr.)

FOR 102: *Introduction to Forest Management* (1 cr.) (Developed 3-day field trip component)
 NR 101: *Exploring Natural Resources* (1 cr.)

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

Introduction to the R software environment for statistical computing and graphing (Fall 2010, Fall 2012)

SCHOLARSHIP ACCOMPLISHMENTS:

Publications, Exhibitions, Performances, Recitals:

Refereed/Adjudicated:

Jansen, V. S., Kolden, C. A., Greaves, H. E., **Eitel, J.U.H.** 2019. Lidar provides novel insights into the effect of pixel size and grazing intensity on measures of spatial heterogeneity in a native bunchgrass ecosystem. *Remote Sensing of Environment*, 235, 111432.

Greaves, H.E., **Eitel, J.U.H.**, Vierling, L.A., Boelman, N.T., Griffin, K.L., Magney, T.S., Prager, C.M., 2019. 20 cm resolution mapping of tundra vegetation communities provides an ecological baseline for important research areas in a changing Arctic environment. *Environ. Res. Commun.* 1, 105004. doi:10.1088/2515-7620/ab4a85

Maguire, A.J., **Eitel, J.U.H.**, Vierling, L.A., Johnson, D.M., Griffin, K.L., Boelman, N.T., Jensen, J.E., Greaves, H.E., Arjan J.H. Meddens. 2019. Terrestrial lidar scanning reveals fine-scale linkages between microstructure and photosynthetic functioning of small-stature spruce trees at the forest-tundra ecotone. *Agricultural and Forest Meteorology*, 269-270, 157-168.

Eitel, J.U.H., Maguire, A.J., Boelman, N., Vierling, L.A., Griffin, K.L., Jensen, J., Magney, T.S., Mahoney, P.J., Meddens, A.J.H., Silva, C., Sonnentag, O. 2019. Proximal remote sensing of tree physiology at northern treeline: Do late-season changes in the photochemical reflectance index (PRI) respond to climate or photoperiod? *Remote Sensing of Environment*, 221, 340-350.

Boelman, N., Liston, G.E., Gurarie, E., Meddens, A.J., Mahoney, P.J., Kirchner, P.B., Bohrer, G., Brinkman, T.J., Cosgrove, C.L., **Eitel, J.U.H.**, and Hebblewhite, M., 2019. Integrating snow science and wildlife ecology in Arctic-boreal North America. *Environmental Research Letters*, 14.

Mahoney, P.J., Liston, G.E., LaPoint, S., Gurarie, E., Mangipane, B., Wells, A.G., Brinkman, T.J., **Eitel, J.U.H.**, Hebblewhite, M., Nolin, A.W. and Boelman, N., 2018. Navigating snowscapes: scale-dependent responses of mountain sheep to snowpack properties. *Ecological Applications*, 28(7), 1715-1729.

Meddens, A.J., Vierling, L.A., **Eitel, J.U.H.**, Jennewein, J.S.*, White, J.C., & Wulder, M. A. 2018. Developing 5 m resolution canopy height and digital terrain models from WorldView and ArcticDEM data. *Remote Sensing of Environment*, 218, 174-188.

Ryer M. Becker, Robert F. Keefe, Nathaniel M. Anderson, **Jan U.H. Eitel.** 2018. Use of lidar-derived landscape parameters to characterize alternative harvest system options in the Inland Northwest, *International Journal of Forest Engineering*. <https://doi.org/10.1080/14942119.2018.1497255>

Magney, T.S., Logan, B.A., Reblin, J.S., Boelman, N.T., **Eitel, J.U.H.**, Greaves, H.E., Griffin, K.L., Prager, C.M., Vierling, L.A. 2017. Xanthophyll cycle activity in two prominent arctic shrub species.

Arctic, Antarctic, and Alpine Research, 49(2), 273-285

Silva, C., Hudak, A., Vierling, L., Klauberg, C., Garcia, M., Ferraz, A., Keller, M., **Eitel, J.U.H.**, Saatchi, S., **2017**. Impacts of Airborne Lidar Pulse Density on Estimating Biomass Stocks and Changes in a Selectively Logged Tropical Forest. *Remote Sens.* 9, 1068. doi:10.3390/rs9101068

Prager, C.M., Naeem, S., Boelman, N., **Eitel, J.U.H.**, Greaves, H., Heskell, M., Magney, T.S., Menge, D.N.L., Vierling, L.A., Griffin, K.L. **2017**. A gradient of nutrient enrichments reveals nonlinear impacts of fertilization of Arctic plant diversity and ecosystem function. *Ecology and Evolution*, 7(7), 2449-2460, DOI: 10.1002/ece3.2863

Corrao, M.V., Link, T.E., Heinse, R., **Eitel, J.U.H.** **2017**. Modeling of terracette-hillslope soil moisture as a function of aspect, slope and vegetation in a semi-arid environment. *Earth Surface Processes and Landforms*, DOI: 10.1002/esp.4114.

Ma, L.X., Zheng, G., **Eitel, J.U.H.**, Magney, T.S., Moskal, L.M. **2017**. Retrieving forest canopy extinction coefficient from terrestrial and airborne lidar. *Agricultural and Forest Meteorology*, 236, 1-21.

Greaves, H.E.*, Vierling, L.A., **Eitel, J.U.H.**, Boelman, N., Magney, T.S., Prager, C.M.*, Griffin, K.L. **2017**. Applying terrestrial lidar for evaluation and calibration of airborne lidar-derived shrub biomass estimates in Arctic tundra. *Remote Sensing Letters*, 8:2, 175-184, DOI: 10.1080/2150704X.2016.1246770.

Zheng, G., Ma, L.X., **Eitel, J.U.H.**, He, W., Magney, T.S., Moskal, L.M., Li, M.S. **2017**. Retrieving directional gap fraction, extinction coefficient, and effective leaf area index by incorporating scan angle information from discrete. *IEEE Transactions on Geoscience and Remote Sensing*, 55(1), 577-590.

Gersony, J.T., Prager, C.M., Boelman, N.T., **Eitel, J.U.H.**, Gough, L., Greaves, H.E., Griffin, K.L., Magney, T.S., Sweet, S.K., Vierling, L.A., Naeem, S. **2016**. Scaling thermal properties from the leaf to the canopy in the Alaskan arctic tundra. *Arctic, Antarctic, and Alpine Research*, 48(4), 739-754.

Cohn, T.S., Wyckoff, W., Rinella, M., **Eitel, J.U.H.** **2016**. Seems like I hardly see them around anymore: Historical geographies of Cottonwood decline along the Wind River. *Water History*, 8(4), 405-429, 10.1007/s12685-016-0187-5.

Eitel, J.U.H., Höfle, B., Vierling, L.A., Abellán, A., Asner, G., Deems, J.S., Blennie, C., Joerg, P.C., LeWinter, A., Magney, T.S.*, Mandlbürger, G., Morton, D., Müller, J., Vierling, K. **2016**. Beyond 3-D: the new spectrum of lidar applications for Earth and Ecological sciences. *Remote Sensing of Environment*, 186, 372-392.

Eitel, J.U.H., Magney, T.S., Vierling, L.A., Greaves, H.E.*, Zheng, G. **2016**. An automated method to quantify crop height and calibrate satellite-derived biomass using hypertime lidar. *Remote Sensing of Environment*, 187, 414-422.

Magney, T.S.*, **Eitel, J.U.H.**, Vierling, L.A. **2016**. Mapping wheat nitrogen uptake from RapidEye vegetation indices. *Precision Agriculture*, 17 (4).

Ma, L., Zheng, G., **Eitel, J.U.H.**, Magney, T.S.*, Moskal, M. **2016**. Determining woody-to-total area ratio using terrestrial laser scanning (TLS). *Agricultural and Forest Meteorology*, doi:10.1016/j.agrformet.2016.06.021

Magney, T.S.*, **Eitel, J.U.H.**, Griffin, K.L., Boelman, N.T., Greaves, H.E.*, Prager, C.M., Logan, B.A., Zheng, G., La, M., Fortin, E.A., Oliver, R.Y., Vierling, L.A. **2016**. LiDAR canopy radiation model reveals patterns of photosynthetic partitioning in an Arctic shrub. *Agricultural and Forest Meteorology*, 221, 78–93. doi:10.1016/j.agrformet.2016.02.007

- Corrao, M.*, Heinse, R., **Eitel, J.U.H.**, Cosens, B., Link, T. **2016**. Soil Moisture Differences between Terracette Benches and Risers on Semiarid Rangeland Hillslopes. *Vadose Zone Journal*, 15 (1), 1-10.
- Krofcheck, D.J.*, **Eitel, J.U.H.**, Lippitt, C.D., Vierling, L.A., Schulthess, U., Litvak, M.E. **2016**. Remote sensing based simple models of GPP in both disturbed and undisturbed pinon-juniper woodlands in the southwestern U.S. *Remote Sensing*, 8, 2-16.
- Magney, T.S.*, **Eitel, J.U.H.**, Huggins, D.R., Vierling, L.A. **2016**. Proximal NDVI derived phenology improves in-season predictions of wheat quantity and quality. *Agricultural and Forest Meteorology*, 217, 46-60.
- Magney, T.S.*, Vierling, L.A., **Eitel, J.U.H.**, Huggins, D.R., Garrity, S.R. **2016**. Response of high frequency Photochemical Reflectance Index (PRI) measurements to environmental conditions in wheat. *Remote Sensing of Environment*, 173, 84-97.
- Ma, L., Zheng, G., **Eitel, J.U.H.**, Moska, M., He, W., Huang, H. **2016**. Improved salient feature-based approach for automatically separating photosynthetic and non-photosynthetic components within terrestrial lidar point cloud data of forest canopies. *IEEE Transactions on Geoscience and Remote Sensing*, 54 (2), 679-696.
- Boelman, N.T., Holbrook, J.D., Greaves, H.E.*, Krause, J.S., Chumura, H.E., Magney, T.S.*, Perez, J.H., **Eitel, J.U.H.**, Gough, L., Vierling, K.T., Wingfield, J.C., Vierling, L.A. **2016**. Airborne laser scanning and spectral remote sensing give a bird's eye perspective on arctic tundra breeding habitat at multiple spatial scales. *Remote Sensing of Environment*, 184, 337-349.
- Boelman, N.T., Magney, T.S., Logan, B.A., Griffin, K.L., **Eitel, J.U.H.**, Greaves, H.E., Prager, C.M., Vierling, L.A. **2016**. Spectral determination of concentrations of functionally diverse pigments in increasingly complex arctic tundra canopies. *Oecologia*, 182(1), 85-97.
- Greaves, H.E.*, Vierling, L.A., **Eitel, J.U.H.**, Boelman, N.T., Magney, T.S.*, Prager, C.M., Griffin, K.L. **2016**. High-resolution mapping of aboveground shrub biomass in Arctic tundra using lidar and imagery. *Remote Sensing of Environment*, 184, 361-373
- Grayson, L.M.*, Keefe, R.F., Tinkham, W.T., **Eitel, J.U.H.**, Saralecos, J.D., Smith, A.M.S., Zimelman, E.G. **2016**. Accuracy of WAAS-Enabled GPS-RF Warning Signals When Crossing a Terrestrial Geofence. *Sensors*, 16(6), 912, doi:10.3390/s16060912
- Corrao, M., Link, T., Cosens, B., Eitel, J.U.H., Heinse, R. **2015**. Using Science to Bridge Management and Policy: Terracette Hydrologic Function and Water Quality Best Management Practices in Idaho. *Rangelands*
- Parsons, R., **Eitel, J.U.H.**, Whitney, B., Eitel, K.B., Magney, T.S., Vierling, L.A. Connecting the Dots: Lasers Link Students to their 3-D World. **2015**. Science Scope
- Anderson, C.L., Miller, B.G., Eitel, K.B., Veletsianos, G., Eitel, **Eitel, J.U.H.**, Hougham, R.J. **2015**. Exploring Techniques for Integrating Mobile Technologies into Field-Based Environmental Education. *Electronic Journal of Science Education*, 19 (6).
- Greaves, H.E., Vierling, L.A., **Eitel, J.U.H.**, Boelman, N.T., Magney, T.S., Prager, C.M., Griffin, K.L., **2015**. Estimating aboveground biomass and leaf area of low-stature Arctic shrubs with terrestrial LiDAR. *Remote Sensing of Environment*, 164, 26-35. doi:10.1016/j.rse.2015.02.023
- Veletsianos, G., Miller, B., Eitel, K.B., **Eitel, J.U.H.**, Hougham, J., Hansen, D. **2015**. Lessons Learned from the Design and Development of Technology-Enhanced Outdoor Learning Experiences. *TechTrends*
- Eitel, J.U.H.**, Magney, T.S., Vierling, L.A., Dittmar, G. **2014**. Assessment of crop foliar nitrogen using

a novel dual-wavelength laser system and implications for conducting laser-based plant physiology. *ISPRS Journal of Photogrammetry and Remote Sensing*, 97, 229-240.

Eitel, K.B., Wilhelm, F., Parsons, R., **Eitel, J.U.H.** 2014. Lakes Alive! *Science Scope*, 38(2), 22-29.

Magney, T.S., Eusden, S.A., **Eitel, J.U.H.**, Logan, B., Jiang, J., Vierling, L.A. 2014. Assessing Leaf Photoprotective Mechanisms using Terrestrial LiDAR: Towards Mapping Canopy Photosynthetic Performance in Three-dimensions. *New Phytologist*, 201, 344-356.

Eitel, J.U.H., Magney, T.S., Vierling, L.A., Brown, T.T., Huggins, D.R. 2014. LiDAR based biomass and crop nitrogen estimates for rapid, non-destructive assessment of wheat nitrogen status. *Field Crops Research*, 159, 21-32.

Krofcheck, D.J., Eitel, J.U.H., Vierling, L.A., Schulthess, U., Hilton, T.M., Dettweiler-Robinson, E., Pendleton, R., Litvak, M.E. 2014. Detecting mortality induced structural and functional changes in a pinon-juniper woodland using Landsat and RapidEye time series. *Remote Sensing of Environment*, 151, 102-113.

Charbonnier, F., le Maire, G., Dreyer, E., Casanoves, F., Christina, M., Dauzat, J., **Eitel, J.U.H.**, Vaast, P., Vierling, L.A., Roupsard, O. 2013. Competition for light in heterogeneous canopies: Application of MAESTRA to a coffee (*Coffea arabica* L.) agroforestry system. *Agricultural and Forest Meteorology*, 181, 152-169.

Eitel, J.U.H., Vierling, L.A., Magney, T.S. 2013. A lightweight, low cost autonomously operating terrestrial laser scanner for quantifying and monitoring ecosystem structural dynamics. *Agricultural and Forest Meteorology*, 180, 86-96.

Naupari, J.A., Vierling, L.A., **Eitel, J.U.H.** 2013. Delineating native and invasive plant functional groups in shrub-steppe vegetation using bidirectional reflectance. *Journal of Applied Remote Sensing*, 7, doi: 10.1117/1.JRS.7.073563.

Magney, T. S., Eitel, K.B., **Eitel, J.U.H.**, Schon, J., Jansen, V.S., Rittenburg, R.A., Vierling, L.A. 2013. Keeping a (Digital) Eye on Our Planet's Clock. *The Science Teacher*, 80, 37-43.

Vierling, L.A., Yu, Y., **Eitel, J.U.H.**, and Oldow, J.S. 2012. Shrub characterization using terrestrial laser scanning and implications for airborne LiDAR assessment. *Canadian Journal of Remote Sensing*, 38(6), 1-14.

Hudak, A.T., Strand, E.K., Vierling, L.V., Byrne, J., **Eitel, J.U.H.**, Martinuzzi, S., Falkowski, M.J. 2012. Quantifying Aboveground Forest Carbon Pools and Fluxes from Repeat LiDAR Surveys. *Remote Sensing of Environment*, 123, 25-40.

Eitel, J.U.H., Vierling, L.A., Litvak, M.E., Long, D.S., Schulthess, U., Ager, A.A., Krofcheck, D.J., Stoscheck, L. 2011. Broadband, red-edge information from satellites improves early stress detection in a New Mexico conifer woodland. *Remote Sensing of Environment*, 115, 3640-3646.

Sankey, J.B. †, **Eitel, J.U.H.** †, Glenn, N.F., Germino, M.J., Vierling, L.A. 2011. Quantifying relationships of burning, roughness, and potential dust emission with laser altimetry of soil surfaces at submeter scales. *Geomorphology*, 135, 181-190. (†=equal first authorship)

Eitel, J.U.H., Williams, C.J., Vierling, L.A., Al-Hamdan, O.Z., Pierson, F.B. 2011. Suitability of terrestrial laser scanning for studying surface roughness effects on concentrated flow erosion processes in rangelands. *Catena*, 87, 398-407.

Eitel, J.U.H., Vierling, L.A., Long, D.S., Hunt, E.R. 2011. Early season remote sensing of wheat nitrogen status using a green scanning laser. *Agricultural and Forest Meteorology*, 151: 1338-1345.

Hunt, E.R., Daughtry, C.S.T., **Eitel, J.U.H.**, Long, D.S. **2011**. Remote sensing chlorophyll content at leaf and canopy scales using a visible band index. *Agronomy Journal*, 103, 1090-1099.

Eitel, J.U.H., Vierling, L.A., Long, D.S., Litvak, M., Eitel, K.C.B. **2011**. Simple assessment of needleleaf and broadleaf chlorophyll content using a flatbed color scanner. *Canadian Journal of Forest Research*, 41: 1445-1451.

Garritty, S.R., **Eitel, J.U.H.**, Vierling, L.A. **2011**. Disentangling the relationships between plant pigments and the photochemical reflectance index reveals a new approach for remote estimation of carotenoid content. *Remote Sensing of Environment*, 115: 628-635.

Smith, A.M.S., **Eitel, J.U.H.**, and Hudak, A.T. **2010**. Spectral Analysis of Charcoal on Soils: Implications for Wildland Fire Severity Mapping Methods. *International Journal of Wildland Fire*, 19: 976-983.

Eitel, J.U.H., Vierling, L.A., Long, D.S., **2010**. Simultaneous measure of plant structure and chlorophyll content in broadleaf saplings with a terrestrial laser scanner. *Remote Sensing of Environment*, 114: 2229-2237.

Eitel, J.U.H., Keefe, R.F., Long, D.S., Davis, A.S., and Vierling, L.A., **2010**. Active ground optical remote sensing for improved monitoring of seedling stress in nurseries. *Sensors*, 10: 2843-2850.

Long, D.S., **Eitel, J.U.H.**, and Huggins, D.R., **2009**. Assessing nitrogen status of dryland wheat using the canopy chlorophyll content index. *Crop Management*, doi:10.1094/CM-2009-1211-01-RS.

Eitel, J.U.H., Long, D.S., Gessler, P.E., Hunt, E.R., and Jr., Brown, D.J., **2009**. Sensitivity of Ground-Based Remote Sensing Estimates of Wheat Chlorophyll Content to Variation in Soil Reflectance. *Soil Science Society of America Journal*, 73: 1715-1723.

Pimstein, A., **Eitel, J.U.H.**, Long, D.S., Mufradi, I., Karnieli, A., Bonfil, D.J., **2009**. A spectral index to monitor the head-emergence of wheat in semi-arid conditions. *Field Crops Research*, 111: 218-225.

Eitel, J.U.H., Long, D.S., Gessler, P.E. and Hunt, E.R., Jr., **2008**. Combined Spectral Index to Improve Ground-Based Estimates of Nitrogen Status in Dryland Wheat. *Agronomy Journal*, 100: 1694-1702.

Eitel, J.U.H., Long, D. S., Gessler, P. E. and Smith, A. M. S., **2007**. Using in-situ measurements to evaluate the new RapidEye™ satellite series for prediction of wheat nitrogen status. *International Journal of Remote Sensing*, 28: 4183-4190.

Eitel, J.U.H., Gessler, P.E., Smith, A.M.S. and Robberecht, R., **2006**. Suitability of existing and novel spectral indices to remotely detect water stress in *Populus* spp. *Forest Ecology and Management*, 229: 170-182.

Peer Reviewed/Evaluated:

Veletsianos, G., Miller, B., Bradley Eitel, K., **Eitel, J.U.H.**, and Hougham, R.J. **2012**. Localizing Adventure Learning: Teachers and Students as Expedition Leaders and Members. In P. Resta (Ed.), *Proceedings of Society for Information Technology & Teacher Education*. International Conference 2012 (pp. 2164-2169). Chesapeake, VA: AACE.

Hunt, E.R., Long, D.S., **Eitel, J.U.H.**, Daughtry, C.S. 2010. Remote of leaf chlorophyll content at multiple scales using red, green and blue sensing bands [abstract]. *Proceedings of SPIE Optics and Photonics*. 2010 CDROM.

Keefe, R.F., **Eitel, J.U.H.**, Long, D.S., Davis, A.S., Gessler, P.E., Smith, A.M.S. **2009**. Potential for boom-mounted remote sensing applications in seedling quality monitoring. In: Dumroese, R. K.; Riley, L. E., tech. coords. *National Proceedings: Forest and Conservation Nursery Associations-2008*. Proc. RMRS-

P-58. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, p. 48-51.

Eitel, J.U.H., Long, D.S., **2007**. Predicting Wheat Nitrogen Status with Remote Sensing. Dryland Agricultural Research Annual Report, p. 30-35.

Popular Press Publications:

Vierling, L.A. and **Eitel, J.U.H. 2015**. The Buzz about Drones. Society of American Foresters, Western Forester.

Jensen, T. **2014**. Fine Tuning Remote Sensing Technologies for Nitrogen Application in Semi-Arid Cereal Crops, Better Crops with Plant Food, 98(3): 7-8. Article is based on my dissertation work published in Eitel et al. (2008, 2009; see details for publications under refereed publications above)

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

Lecigne, B., **Eitel, J.U.H. 2018**. viewshed3d: Compute Viewshed in 3D Terrestrial Laser Scanner Scenes of Ecosystems. R package version 1.0.0. <https://CRAN.R-project.org/package=viewshed3d>

Jennewein, J., Magney, T.S., Gasch, C., **Eitel, J.U.H.**, Vierling, L.A. **2015**. Using time-lapse imagery for applied agricultural monitoring. REACCH Annual Report, year 4, 102-103.

Magney, T.S., Yourek, M., Ward, N., Finch, S., **Eitel, J.U.H.**, Vierling, L.A., Brooks, E., Huggins, D., Brown, D. **2015**. Determining the controls on nitrogen uptake from space. REACCH Annual Report, year 4, 72-73.

Vierling, L.A., **Eitel, J.U.H.**, Boelman, N.T., Griffin, K.L., Greaves, H., Magney, T.S., Prager, C., Ajayi, M., and Gibson, R. **2013**. Bare earth LiDAR dataset for Toolik Field Station, AK, and nearby field sites along Dalton Highway. doi:10.7923/G4057CV5

Vierling, L.A., **Eitel, J.U.H.**, Boelman, N.T., Griffin, K.L., Greaves, H., Magney, T.S., Prager, C., Ajayi, M., and Gibson, R. 2013. Four-band, 5cm resolution orthophotographs of Toolik Field Station, AK, and nearby field sites along Dalton Highway. doi:10.7923/G4VD6WCW

Magney, T.S., Dann, L., Finch, S., Vierling, L.A., **Eitel, J.U.H. 2014**. Assessing crop performance with time-lapse photography, REACCH Annual Report, Year 3, 50-51.

Keefe, R., **Eitel, J.U.H. 2013**. Application of carriage-mounted agricultural cameras to improve safety in cable logging operations, 2013 Council on Forest Engineering, Missoula, MT.

Magney, T.S., Vierling, L.A., **Eitel, J.U.H. 2012**. The Hills Have Eyes ... and Lasers, LEDs, Photodiodes, Time-Lapse Cameras, and Satellites. The OutREACCH, A quarterly report by Regional Approaches to Climate Change, Pacific Northwest Agriculture, August, 2012, Vol. I, Issue 2. https://www.reacchpna.org/files/9813/4763/7375/August_2012_Vol_1_Issue_2.pdf

Eitel, J.U.H., Hollenhorst, S., Eitel, K.C.B et al. **2012**. A Strategic Plan for the Development of a Field Research Station at the University of Idaho's McCall Field Campus.

Refereed/Adjudicated (currently scheduled or submitted):

Peer Reviewed/Evaluated (currently scheduled or submitted):

Data products

Greaves, H.E., **Eitel, J.U.H.**, L. Vierling, N. Boelman, K. Griffin, T. Magney, and C. Prager. 2019. High-Resolution Vegetation Community Maps, Toolik Lake Area, Alaska, 2013-2015. ORNL DAAC, Oak Ridge, Tennessee, USA. <https://doi.org/10.3334/ORNLDAAAC/1690>

Greaves, H.E., L. Vierling, **J.U.H. Eitel**, N. Boelman, T. Magney, C. Prager, and K. Griffin. 2018. High-Resolution Shrub Biomass and Uncertainty Maps, Toolik Lake Area, Alaska, 2013. ORNL DAAC, Oak Ridge, Tennessee, USA. <https://doi.org/10.3334/ORNLDAAAC/1573>

Presentations and Other Creative Activities: (i.e. slide sets, web pages, video productions, etc., provide date and location)

2012 – 2013. Assisted development of MOSS Adventure Learning website used as an outreach tool for parents, teachers and students in MOSS residential programs; funded by NSF CI:TEAM project titled “Adventure Learning through water and MOSS”, Award #1135577

2012 – present. Created and maintain “<http://ecosensing.org>” website to disseminate teaching materials and research.

Professional Meeting Papers, Workshops, Showings, Recitals:

Eitel, J.U.H., Griffin, K.L., Boelman, N., Meddens, A.J., Jensen, J., Vierling, L.A., Maguire, A., Schmiede, S.C. and Jennewein, J.S. **2019**. Remote sensing of intra-annual tree growth dynamics in a boreal forest. Oral presentation at the AGU Fall Meeting, December 9, San Francisco.

Maguire, A., **Eitel, J.U.H.**, Griffin, K.L., Magney, T.S., Long, R., Boelman, N., Bruner, S., Jennewein, J.S., Jensen, J., Schmiede, S.C. and Vierling, L.A. **2019**. Assessing the sensitivity of shoot-level chlorophyll fluorescence to scalable proxies of absorbed radiation in an evergreen needleleaf forest. Poster presentation at the AGU Fall Meeting, December 9, San Francisco

Eitel, K., Cohn, T., Seven, K., **Eitel, J.U.H.**, Vierling, L., Uh, C., White Temple, E., Davis, M., Dixon, R., Carter, M. **2018**. Integrating Cultural and Scientific Identities at DRONE Camp: an Indigenous Environmental Science Course for High School Students.

Jennewein, J.S., Mahoney, P., Meddens, A.J.H., Hebblewhite, M., Gilbert, S., Boelman, N., Frye, G., Joly, K., King-Jones, K., Julianus, E., Paragi, T., Seaton, K., Vierling, L.A., **Eitel, J.U.H.** **2018**. Using Remotely Sensed Features of Habitat Structure to Assess Behavioral Thermoregulation of Alaskan Moose in Response to Increasing Temperatures. AGU Fall Meeting, December 10 – 14, Washington, D.C.

Jensen, J.E., A. Maguire, R. Oelkers, L. Andreu, N. Boelman, R. D’Arrigo, K. Griffin, C. Silva, J. Jennewein, A.J.H. Meddens, M. Russell, L. A. Vierling, and **J.U.H. Eitel**. **2018**. Using aerial lidar to understand the role of climate and herbivory in shaping forest demographics at the Arctic forest-tundra ecotone. AGU Fall Meeting, December 10 – 14, Washington, D.C.

Maguire, A.J., **Eitel, J.U.H.**, Griffin, K.L., Magney, T.S., Boelman, N.T., Vierling, L.A., Schmiede, S.C., Bruner, S.G., Jensen, J.E., Hiers, E. **2018**. Assessing the sensitivity of ChlF to canopy structure at the forest-tundra ecotone: toward remotely sensing light use efficiency dynamics. AGU Fall Meeting, December 10-14, Washington, D.C.

Schmiege, S.C., Griffin, K.L. Boelman, N., Bruner, S., **Eitel, J.U.H. 2018.** Vertical gradients in physiological function and pigment allocation at the Forest Tundra Ecotone: Implications for scaling up leaf level carbon fluxes in white spruce stands. AGU Fall Meeting, 10-14 December, Washington D.C.

Eitel, J.U.H., Maguire, A.J., Boelman, N., Vierling, L.A., Griffin, K.L., Jensen, J., Magney, T.S., Mahoney, P.J., Meddens, A.J.H., Silva, C., Sonnentag, O. **2018** Evaluating the potential of fall trends in photochemical reflectance index (PRI) time-series to improve understanding of climate change effects at northern treeline. AGU Fall Meeting, 10-14 December, Washington D.C.

Jensen, J. E., A. Maguire, R. Oelkers, L. Andreu, N. Boelman, R. D'Arrigo, K. Griffin, C. Silva, J. Jennewein, A.J.H. Meddens, M. Russell, L. A. Vierling, and **J.U.H. Eitel. 2018.** Towards lidar-based mapping of tree-age at the Forest Tundra Ecotone. Fourth ABoVE Science Team Meeting, January 23-26, Seattle WA.

Eitel, J.U.H., Boelman, N.T., Griffin, K.L., Vierling, L.A., Jensen, J.J., Maguire, A.J., Meddens, A., Russell, M. **2017.** Lidar, passive spectral, and ecophysiological approaches to link Forest Tundra Ecotone structure and function. Poster presented at the Arctic-Boreal Vulnerability Experiment Conference in Boulder, CO, USA, January 2017.

Meddens, A.J.H., Vierling, L.A., **Eitel, J.U.H.**, Jennewein, J.S., Silva, C.A., White, J.C., and Wulder, M.A. **2017.** Estimating vegetation height from WorldView-02 and ArcticDEM data for broad ecological applications. AGU Fall Meeting, 11-15 December, New Orleans, LA.

Maguire A.J., **Eitel, J.U.H.**, Vierling, L.A., Johnson, D.M., Griffin, K.L., Boelman, N.T., E. Jensen, J.J., and Hiers, E. **2017.** Using terrestrial lidar to Elucidate Structure-to-Function Relationships of Spruce Saplings at the Forest-Tundra Ecotone. AGU Fall Meeting, New Orleans, LA, December 2017.

Jensen, J. E., Maguire, A.J., Oelkers, R., Andreu, L., Boelman, N., D'Arrigo, R., Griffin, K., Jennewein, J., Meddens, A.J.H., Russell, M., Vierling, L.A., **Eitel, J.U.H. 2017.** Towards lidar-based mapping of tree age at the Forest Tundra Ecotone. AGU Fall Meeting, 11-15 December, New Orleans, LA.

Jennewein, J.S., Hebblewhite, M., Meddens, A.J.H., Gilbert, S., Vierling, L.A., Boelman, N.T., **Eitel, J.U.H. 2017.** Assessing the Utility of Temporally Dynamic Terrain Indices in Alaskan Moose Resource Selection. AGU Fall Meeting, 11-15 December, New Orleans, LA.

Jensen, J. E., A. Maguire, R. Oelkers, L. Andreu, N., Boelman, R. D'Arrigo, K. Griffin, J. Jennewein, A.J.H. Meddens, M. Russell, L. Vierling, **J.U.H. Eitel. 2017.** *Chasing Treeline: Reconstructing the history of the Forest-Tundra Ecotone using lidar-derived tree height.* Poster presented at the Arctic-Boreal Vulnerability Experiment Conference in Boulder, CO, USA, January 2017.

Maguire A.J., **Eitel, J.U.H.**, Vierling, L.A., Johnson, D.M., Griffin, K.L., Boelman, N.T., E. Jensen, J.J., and Hiers, E. **2017.** Evaluating relationships between seedling establishment and microtopography at the Forest-Tundra Ecotone using terrestrial lidar. Poster presented at the Arctic-Boreal Vulnerability Experiment Conference in Boulder, CO, USA, January 2017.

Eitel, J.U.H. 2016. Precision agriculture through the eyes of a laser. Armidale, Australia, December 5, 2016 (*invited*).

Eitel, J.U.H. 2016. Ecology through the eyes of a laser. Brisbane, Australia, December 8, 2016 (*invited*).

Greaves, H., Vierling, L.A., **Eitel, J.U.H.**, Boelman, N., Magney, T.S., Prager, C.M., Griffin, K.L. **2016.** High-resolution maps of shrub biomass and canopy volume near Toolik Field Station. Arctic LTER annual meeting, Woods Hole, MA, April 2016.

Eitel, J.U.H., Boelman, N., Griffin, K., Vierling, L.A. **2015**. LiDAR, passive spectral, and ecophysiological approaches to link Forest Tundra Ecotone structure and function. NASA ABoVE Science Team Meeting, September 29, 2015, Minneapolis, MN (*invited*).

Magney, T.S., **Eitel, J.U.H.**, Vierling, L.A., Greaves, H.E. **2015**. Hyper-temporal lidar for tracking fine-scale changes in vegetation structure, phenology, and physiology. AGU Fall Meeting, San Francisco, CA, December 2015.

Sanow, J., **Eitel, J.U.H.**, Vierling, L.A., Fremier, A. **2015**. Testing the suitability of an autonomously operating terrestrial laser scanner (ATLS) to provide accurate snow depth measurements. AGU Fall Meeting, San Francisco, CA, December 2015.

Eitel, J.U.H., Magney, T.S., Vierling, L.A., Greaves, H.E. **2015**. 5D LiDAR and its potential to advance phenomics. Advanced in field-based high-throughput phenotyping and data management: grains and specialty crops, November 9-10, 2015, Spokane, WA (*invited*)

Corrao, M.V., T.E. Link, **J.U.H. Eitel**, and R. Heinse. **2015**. Terracette Influences on Spatial Patterns of Soil Moisture in a Semiarid Rangeland Environment. Presentation: Hydrophiles Water Research Symposium - Oregon State University. Corvallis, OR. April 26 – 28, 2015.

Eitel, J.U.H. 2015. Promoting Remote Sensing Research and Education in Idaho. Poster session presented at: USGS Headquarters, Reston, VA, 23 February 2015.

Schönert, M., Zillmann, E., Weichelt, H., **Eitel, J.U.H.**, Magney, T.S. **2015**. Agricultural biophysical parameters and the Tasseled Cap Transformation for RapidEye data. IGFT 2015 – ASPRS Annual Conference, May 4-8, 2015, Tampa, Florida.

Greaves, H., Vierling, L.A., **Eitel, J.U.H.**, Boelman, N., Magney, T.S., Boelman, N., Griffin, K.L. **2015**. Using Airborne and Terrestrial Lidar to Estimate Biomass of Low-Stature Arctic Tundra Shrubs. Canadian Remote Sensing Society Meeting, June 8-11 2015, St. John's Newfoundland.

Höfle, B., Koenig, K., Griesbuam, L., Kiefer, A., Hämmerle, M., **Eitel, J.U.H.**, Koma, Z. LiDAR Vegetation Investigation and Signature Analysis System (LVISA). Geophysical Research Abstracts, Vol. 17, EGU 2015-1537, EGU General Assembly 2015.

Magney, T.S., **Eitel, J.U.H.**, Griffin, K., Zheng, G., Boelman, N., Logan, B., Greaves, H., Prager, C., Fortin, L., Oliver, R., Ma, L., Vierling, L. Ground based remote sensing and physiological measurements provide insights into canopy optimization in arctic shrubs. AGU Fall Meeting, San Francisco, CA, December 2014.

Greaves, H., Vierling, L.A., **Eitel, J.U.H.**, Boelman, N., Magney, T.S., Prager, C., Griffin, K.L. Estimating aboveground biomass of low-stature Arctic shrubs with terrestrial LiDAR. AGU Fall Meeting, San Francisco, CA, December 2014.

Vierling, L.A., Magney, T.S., **Eitel, J.U.H.** Remote detection of water stress conditions via a diurnal photochemical reflectance index (PRI) improves yield prediction in rainfed wheat. AGU Fall Meeting, San Francisco, CA, December 2014.

Brown, D.J., D.R. Huggins, C.O. Stockle, E. Brooks, **J.U.H. Eitel**, K.M.Painter, L.A.Vierling and C.Reardon. Site-Specific Climate-Friendly Farming: Benefits and Challenges of Transdisciplinary Research. ASA-SSSA-CSSA Annual Meeting. Long Beach, CA. Nov. 2 (2014)

Magney, T., N.K. Ward, E. Brooks, D.R. Huggins, S. Finch, **J.U.H. Eitel**, L.A. Vierling, M. Yourek, T.R. Anderson, C.O. Stockle and D. Brown. Assessing the controls on spatio-temporal nitrogen uptake patterns using a biophysical process model and high resolution satellite imagery. ASA-SSSA-CSSA Annual Meeting. Long Beach, CA. Nov. 2 (2014)

Eitel, J.U.H., Vierling, L.A., Magney, T.S., Greaves, H.E., Vierling, K.T., Hudak, A.T., Boelman, N.T.,

Griffin, K.L., Dittmar, G. 2014. Beyond 3-D. International Workshop 3D Vegetation Mapping using Advanced Remote Sensing - Implications for Seamless Modeling of Terrestrial Ecosystems, September 24th-26th, St.Oswald, Germany (*invited*)

Eitel, J.U.H. Beyond 3-D. Boise State University, June 11th. 2014

Vierling, L.A., Finch, S., Vogeler, J., Silva, C., Vierling, K.T., Hudak, A.T., and **Eitel, J.U.H.** 2014. Using LiDAR to quantify multiple ecosystem attributes at the individual landowner scale. Quantification of Ecosystem Services: Concepts and Measurement Workshop. CATIE/CGIAR, Turrialba, Costa Rica, 12 March 2014 (*invited*).

Charbonnier, F., le Maire, G., Dreyer, E., Casanoves, F., Christina, M., Dauzat, J., **Eitel, J.U.H.**, Vaast, P., Vierling, L.A., Vand den Meersche, K., Harmand, J-M., Rouspard, O. The End of The Sun/Shade dichotomy in AFS: mapping of plant light budgets in multistrata heterogeneous plots. Presented at: World Congress on Agroforestry, 10-14 February 2014, Delhi, India.

Corrao, M.V., **J.U.H. Eitel**, T.E. Link, and R. Heinse. 2014. Hillslope terracettes and vadose zone hydrology: implications for natural resource management. Presentation: American Water Resource Association – Integrated Water Resource Management Conference, Reno, NV. June 30 – July 2, 2014.

Eitel, J.U.H. 2014. Promoting Remote Sensing Education in Idaho. Poster session presented at: USGS Headquarters, Reston, VA, 24 February 2014.

Corrao, M.V., **Eitel, J.U.H.**, Link, T.E., Heinse, R. 2013. Hillslope terracettes and vadose zone hydrology: implications for natural resource management. Poster session presented at: Idaho NSF EPSCoR annual meeting, Oct 7-9, McCall, ID.

Magney, T.S., Greaves, H.E., Vierling, L.A., Eitel, J.U.H., Boelman, N.T., Griffin, K.L., Prager, C., Ayaji, M., and Gibson, R. 2013. Quantifying shrub encroachment in Northern Alaska using LiDAR. AGU Fall Meeting, San Francisco, CA, December 2013.

Magney, T.S., Vierling, L.A., **Eitel, J.U.H.**, Finch, S., Huggins, D., Brooks, E., and Yourek, M. **2013**. The use of different satellite sensors in assessing crop performance. Far West Agribusiness Conference, Pasco, WA, December 2013. (*invited*)

Vierling, L.A., **Eitel, J.U.H.**, Garrity, S.R., Greaves, H.E., and Magney, T.S. **2013**. Linking ecosystem structure and function from the leaf to the canopy using low altitude remote sensing: a humble overview. AGU Fall Meeting, San Francisco, CA, December 2013. (*invited*)

Vierling, L.A., Martinuzzi, S., Hudak, A.T., **Eitel, J.U.H.**, Vogeler, J., Magney, T., and Vierling, K.T. **2013**. Earth in 3-D: shedding new light on environmental studies using lasers. Whitman College, Walla Walla, WA, 17 October 2013 (*invited*)

Vierling, L.A., Martinuzzi, S., Hudak, A.T., **Eitel, J.U.H.**, Vogeler, J., Greaves, H., Magney, T., Boelman, N., Griffin, K., and Vierling, K.T. **2013**. Lasers, Ecology, and YOU. University of Alaska Fairbanks/Toolik Field Station LTER, North Slope, AK, 16 July 2013 (*invited*)

Vierling, L.A., Boelman, N.T., **Eitel, J.U.H.**, Griffin, K.L., Greaves, H.E., Magney, T.S., and Prager, C. **2013**. Quantifying thresholds in arctic tundra vegetation structure and ecosystem function using LiDAR and multispectral remote sensing. NASA Terrestrial Ecology Science Team Meeting, La Jolla, CA, April 30-May 2, 2013. (*invited*)

Vierling, L.A., Magney, T.S., Greaves, H.E., and **Eitel, J.U.H.** **2013**. Reflecting on Alaska: Advanced remote sensing approaches to understand tundra vegetation change. Columbia University, New York, NY, 4 March 2013. (*invited*)

Greaves, H.E., Magney, T.S., Vierling, L.A., **Eitel, J.U.H.**, Boelman, N.T., Griffin, K.L., and Prager,

C.* **2013**. Quantifying thresholds in arctic tundra vegetation structure and ecosystem function using LiDAR and multispectral remote sensing. Arctic LTER annual meeting, Woods Hole, MA, 5 March 2013. (*invited*)

Magney, T.S., Vierling, L.A., **Eitel, J.U.H.** 2013. Determining Crop Structure and Function Using LiDAR and Narrowband Radiometers. Regional Approaches to Climate Change Integration Meeting, Moscow, ID, 11 January 2013. (*invited*)

Eitel, J.U.H., Magney, T.S., Vierling, L.A., Brown, T., Huggins, D.R. **2012**. A novel mobile dual-wavelength laser system for improved site-specific nitrogen fertilizer applications. AGU Fall Meeting, San Francisco, 3 - 6 December, 2012.

Magney, T.S., Vierling, L.A., **Eitel, J.U.H.**, Campbell, G., Cobos, D.R., Campbell, C. **2012**. Design and Testing of a Narrowband Spectral Radiometer for Quantifying Plant Biophysical Properties. AGU Fall Meeting, San Francisco, 3 - 6 December, 2012.

Vierling, L.A., Finch, S., Vierling, K.T., Strand, E.K., Hudak, A.T., Vogeler, J., Martinuzzi, S., **Eitel, J.U.H.**, and Falkowski, M.J. **2012**. Lasers on the Landscape: Quantifying 3-D ecosystem structure to map continuous surfaces of aboveground carbon, avian species richness, and tree species distributions. AGU Fall Meeting, San Francisco, 3 - 6 December, 2012 (*invited*)

Eitel, K.C.B., Miller, B.G., Veletsianos, G., **Eitel, J.U.H.**, O'Hair, M., Schon, J. and Hougham, R.J. **2012**. Adventure Learning Through Water and MOSS – a novel approach to engaging K-12 students in climate change issues. AGU Fall Meeting, San Francisco, 3 - 6 December, 2012.

Corrao, M.V., **Eitel, J.U.H.**, Wessel, M., Link, T., Heinse, R. **2012**. Assessment of Hillslope Terracing Effects on Vadose Zone Hydrology Using Terrestrial LiDAR and Electromagnetic Induction. ASA, CSSA, and SSSA International Annual Meetings, Cincinnati, Ohio, 21-24 October 2012.

Krofcheck, D.J., **Eitel, J.U.H.**, Vierling, L.A., Schulthess, U., Robinson, E., Litvak, M.E. **2012**. Linking structural with functional changes in a piñon-juniper woodland using a time series of satellite data and eddy covariance. ForestSAT 2012, Corvallis, Oregon, 11-14 September 2012.

Eitel, J.U.H., Vierling, L.A., Magney, T.S. **2012**. Suitability of a green scanning terrestrial laser scanner for mapping foliar biochemistry (*oral presentation*). Idaho NASA EPSCoR Annual Meeting, 2-3 October 2012.

Eitel, J.U.H., Vierling, L.A., Magney, T.S. **2012**. Autonomously operating terrestrial laser scanner for monitoring forest ecosystems at a very high temporal resolution (*oral presentation*). SilviLaser 2012, Vancouver/Canada, 16-19 September 2012.

Magney, T.S., Eusden, S.A., **Eitel, J.U.H.**, Vierling, L.A., Logan, B.A. **2012**. Remote Estimation of Photosynthetic Efficiency Using a Green Terrestrial Laser Scanner. SilviLaser 2012, Vancouver/Canada, 16-19 September 2012.

Hudak, A.T., Strand, E.K., Vierling, L.V., Byrne, J., **Eitel, J.U.H.**, Martinuzzi, S., Falkowski, M.J. **2012**. Estimating aboveground forest carbon pools and fluxes from repeat field and LiDAR surveys. Canadian Forest Service Northern Forestry Centre, Edmonton, Alberta, Canada, 29 Feb 2012. (*oral presentation*).

Vierling, L.A., Martinuzzi, S., Adam, P., Finch, S., Hudak, A.T., **Eitel, J.U.H.**, Strand, E.K., Falkowski, M.J., Vogeler, J., and Vierling, K.T. **2012**. Lasers on the landscape: Quantifying 3-D ecosystem structure to map continuous surfaces of carbon and species distributions. University of Wisconsin Department Forest and Wildlife Ecology Visiting Seminar, Madison, WI, 17 February 2012 (*invited*).

Eitel, J.U.H., Lee A. Vierling, Dan S. Long. **2011**. Remote sensing of foliar biochemistry with a green scanning terrestrial laser scanner. AGU Fall Meeting, San Francisco, 5-9 December 2011.

Vierling, L.A., Garrity, S.R., Campbell, G., Coops, N.C., **Eitel, J.U.H.**, Gamon, J.A., Hilker, T. et al. **2011**. Quantifying seasonal dynamics of canopy structure and function using inexpensive narrowband spectral radiometers (*invited*). AGU Fall Meeting, San Francisco, 5-9 December 2011.

Brown, D.J., Brooks, E.S., **Eitel, J.U.H.**, Huggins, D.R., Painter, K., Rupp, R., Smith, J.L., Stockle, C., Vierling, L.A. **2011**. Site-Specific, Climate-Friendly Farming. Presented at the American Geophysical Union Fall Meeting, San Francisco, CA, December, 2011.

Eitel, J.U.H., Hollenhorst, S.J., Eitel, K.C.B. et al. **2011**. Idaho Mountain Research Station. Annual Meeting of the Organization of Biological Field Stations, UC Davis Bodega Bay Marine Laboratory, 22-25 September 2011.

Eitel, J.U.H., Williams, C.J., Vierling, L.A., Al-Hamdan, O.Z., Pierson, F.B. **2011**. Surface roughness effects on concentrated flow erosion processes in rangelands pre- and post-fire. Interior West Fire Ecology Conference, Snowbird, UT, 14-17 November 2011.

Eitel, J.U.H., and Vierling, L.A. **2011**. Beyond 3D. CATIE/PCP/UI Conference: From the Leaf to the Landscape: Field and Remote Sensing Approaches for Understanding Vegetation Structure and Dynamics. CATIE, Turrialba, Costa Rica, 12-13 May 2011.

Vierling, L.A., Martinuzzi, S., Hudak, A.T., Garrity, S.R., **Eitel, J.U.H.**, Strand, E.K., Falkowski, M.J., Vogeler, J., and Vierling, K.T. **2011**. The role of remote sensing data in understanding agro-ecological legacies. CATIE/PCP/UI Conference: From the Leaf to the Landscape: Field and Remote Sensing Approaches for Understanding Vegetation Structure and Dynamics. CATIE, Turrialba, Costa Rica, 12-13 May 2011.

Eitel, J.U.H., Vierling, L.A., Litvak, M., Krofcheck, D., Stoscheck, L. **2011**. Red-edge satellite information improves early stress detection in forests. 3rd Annual EPSCoR Tri-State Western Consortium Meeting, Santa Ana Pueblo, NM, 7 April 2011.

Long, D.S., **Eitel, J.U.H.** **2011**. Combined spectral indices for remote sensing of leaf chlorophyll content of dryland wheat and direct sensing in agriculture. International Symposium on Sensing in Agriculture. February 21-24, 2011, Haifa, Israel.

Eitel, J.U.H. **2011**. Predicting Rill Erosion in Rangelands using Fine-scale Surface Roughness Derived from Terrestrial Laser Scanner Data. Soil Seminar Series, Spring 2011, Washington State University, March 7th, 2011, Pullman, WA.

Eitel, J.U.H., Williams, C.J., Vierling, L.A., Al-Hamdan, O.Z., Pierson, F.B. **2010**. Suitability of terrestrial laser scanner derived surface roughness for predicting rill erosion in rangeland ecosystems. Presented at the American Geophysical Union Annual Fall Meeting in San Francisco.

Sankey, J.B., Germino, M.J., Glenn, N.F., **Eitel, J.U.H.**, Vierling, L.A. **2010**. Post-fire soil stability and relation to vegetation at landscape to microsite scales. Alternative Management Strategies in Big Sagebrush Steppe: Perspectives, Opportunities and Supporting Evidence - 2010 Idaho Section Annual Symposium and Winter Meeting November 10-12, 2010, Idaho Falls, ID.

Eitel, J.U.H. **2010**. Use of Remote Sensing for Improved Protein Management. Invited speaker, University of Würzburg, Germany.

Vierling, L.A., Martinuzzi, S., Hudak, A.T., Garrity, S.R., **Eitel, J.U.H.**, Strand, E.K., Falkowski, M.J., Vierling, K.T. **2010**. Landsat Time Series-based Vegetation Change: Context for Understanding Ecological Legacies. Landsat Science Team Semi-Annual Meeting, Boise, ID, 16 June 2010.

Hunt, E.R., Jr., Daughtry, C.S.T., **Eitel, J.U.H.**, Long, D.S. **2009**. Remote sensing chlorophyll content of leaves and canopies using red, green and blue wavebands. ASA-CSSA-SSSA International Annual Meetings, Pittsburg, PA, 1 November 2009.

Eitel, J.U.H., Long, D.S., Gessler, P.E., Hunt, E.R., Jr., and Brown, D.J. **2008.** Sensitivity of Remote Sensing Estimates of Wheat Chlorophyll Content to Varying Soil Reflectance. ASA-CSSA-SSSA International Annual Meetings, Houston, TX, 8 October 2008.

Eitel, J.U.H., Keefe, R.F., Long, D.S., Davis, A.S. and Gessler, P.E. **2008.** Suitability of optical ground sensors to monitor seedling quality. 29th Annual Intermountain Container Seedling Growers' Association Meeting, Coeur d'Alene, ID, 9 October 2008.

Eitel, J.U.H., Long, D.S., and Gessler, P.E. **2007.** Evaluation of Multispectral Based Radiative Transfer Model Inversion to Estimate Leaf Area Index in Wheat. ASA-CSSA-SSSA International Annual Meetings, New Orleans, LA, 8 November 2007.

Eitel, J.U.H. **2007.** Suitability of space-borne imaging systems to predict wheat nitrogen status. Invited speaker, RapidEye AG, Brandenburg an der Havel, Germany.

Eitel, J.U.H. and Gessler, P. E. **2006.** Suitability of air- and spaceborne imaging systems to detect low and moderate levels of water stress in field grown populus spp. NASA ISGC Research Symposium, Moscow, ID, 18 October 2006.

Eitel, J.U.H. **2006.** Evaluation of spectral indices to remotely detect water stress in populus spp. Invited speaker, USDA Agricultural Research Service Hydrology and Remote Sensing Laboratory, Beltsville, Maryland.

Eitel, J.U.H., Gessler, P.E., Smith, A.M.S., Robberecht, R. **2005.** Suitability of Existing NIR and Novel SWIR Spectral Indices to Remotely Detect Water Stress in Populus spp. American Geophysical Union Annual Fall Meeting, San Francisco, CA, 9 December 2005.

Patents:

Grants and Contracts Awarded:

2019 – current	PI: Jan Eitel: Toward an improved understanding of the mechanisms driving solar induced chlorophyll fluorescence across the structurally complex forest-tundra ecotone. NASA Terrestrial Ecology, \$90,000
2018 - current	PI: Jan Eitel: Toward landscape scale estimation of canopy snow interception using remotely-sensed forest structure information and snowfall event characteristics. NASA Terrestrial Ecology, \$90,000
2018 - current	PI: Jan Eitel: Novel remote sensing approaches for improved monitoring and protection of Forest Lands. USDA National Institute of Food and Agriculture, \$166,000
2016-current Identify Foundation,	PI: Karla Eitel, Co-PIs: Jan Eitel, Teresa Cohn, Lee Vierling. ITEST: Building STEM in Native American Students with UAV Technology. National Science Foundation, \$1.2 million
2015-current	PI: Jan Eitel, Co-PIs: Boelman, N., Griffin, K. Vierling, L.A. LiDAR, passive spectral, and ecophysiological approaches to link Forest Tundra Ecotone structure and function. NASA Terrestrial Ecology, \$1,218,228
2015-current	PI: Natalie Boelman, Co-PIs: Eitel, J.U.H., Hebblewhite, M., Prugh, L., Bohrer, G., Vierling, L.A. Animals on the move: Remotely based determination of key drivers influencing

- movements and habitat selection of highly mobile fauna throughout the ABoVE study domain. NASA Terrestrial Ecology, **\$1,536,289**
- 2015-2018 PI: Keefe, R., Co-PIs: Eitel, J.U.H., Smith, A., et al. Reducing Logging Fatality and Non-fatal Trauma Incidence Rates with New Real-Time Operational GPS-VHF Communications and Safety Procedures. NIH, **\$820,000**
- 2014-2015 PI: Alex Fremier, Co-PI: Jan Eitel. Lake Pend Oreille Winter Erosion Monitoring. Idaho Fish and Game, **\$150,000**
- 2014-2017 PI: Jan Eitel. StateView Program Development and Operations for the State of Idaho, USGS, **\$23,673**
- 2014-2015 PI: Joel B. Sankey, Co-PIs: Jan U.H. Eitel, Tim Andrews. Remotely operated, ground-based lidar system for monitoring earth surface processes, USGS Innovation Center for earth sciences, **\$56,700**
- 2012-2015 PI: Lee Vierling, Co-PIs: Jan Eitel, Natalie Boelman, Kevin Griffin. Quantifying thresholds in arctic tundra vegetation structure and ecosystem function using LiDAR and multispectral remote sensing, NASA, 2013-2015, **\$1.25 million**
- 2012-2013 Specific PI: Jan Eitel, Co-PI: Lee Vierling. Remote Sensing for Climate Friendly Farming, cooperative agreement between the University of Idaho and the RapidEye AG, Satellite imagery with a value of ~ **\$10,000**
- 2011-2013 PI: Brant Miller, Co-PIs: Jan Eitel, George Veletsianos, Karla Eitel. Adventure Learning through Water and MOSS, NSF, 2012-2013, **\$170,812**
- 2011-2012 PI: Jan Eitel, Co-PI: Lee Vierling. NASA EPSCoR Collaboration Grant, NASA, **\$4000**
- 2010-2015 PI: David Brown, Co-PIs: Jan Eitel, Lee Vierling, David Huggins, Claudio Stockle, Erin Brooks. Site-Specific Climate-Friendly Farming, USDA-NIFA, 2011-2015, **\$4.6 million**
- 2010-2011 PI: Jan Eitel, Co-PI: Lee Vierling. Assessment and Review of Remote Sensing Technologies for Threat Detection, Specific cooperative agreement between the University of Idaho and the US Forest Service, 2010-2012, **\$33,000**
- 2009-2010 PI: Jan Eitel, Co-PI: Lee Vierling. Evaluation of RapidEye Satellite Imagery for Capability of Predicting Mid-season Wheat Nitrogen Status, Specific cooperative agreement between the University of Idaho and the USDA-Agricultural Research Service, **\$16,000**
- 2009-2010 PI: Jan Eitel, Co-PI: Lee Vierling. Mapping carbon sequestration potential of forest ecosystems based on RapidEye imagery, Specific cooperative agreement between the University of Idaho and the RapidEye AG, Satellite imagery with a value of ~ **\$20,000**

Honors and Awards:

- 2017 Outstanding researcher award (faculty nominated), College of Natural Resources, University of Idaho
- 2017 Outstanding teacher award (student nominated), College of Natural Resources, University of Idaho

- 2009 Outstanding graduate student, College of Natural Resources, University of Idaho
 2009 Outstanding graduate student, Forest Resources Department, College of Natural Resources, University of Idaho

SERVICE:

Major Committee Assignments:

- 2019 NASA Terrestrial Ecology review panel member, August 13-15, 2019, Washington, D.C.
 2019 – current University of Idaho, College of Natural Resources, Committee on Committees
 2015 – current University of Idaho's ad hoc Unmanned Aircraft Systems Committee member
 2016 NASA NESSF-Carbon Cycle Ecosystems panel member, April 6, 2016, Washington, D.C.
 2014 NASA Early Career Grants, Feb 10, 2014, external proposal reviewer
 Faculty search committee member for UI McCall Outdoor Science School faculty
 2013 NASA Terrestrial Ecology Peer Review Panel Member, Sept 17-20, 2013, Washington, D.C.
 2010 Member of the "Department of Interior Strategic Sciences Working Group" that was established in response to the Deep Water Horizon oil spill in the Gulf of Mexico

Professional and Scholarly Organizations:

- 2016- Terrestrial Laser Scanning International Interest Group
 2006-2008 American Society of Agronomy
 2006-2008 Crop Science Society of America
 2006-2008 Soil Science Society of America
 2005- American Geophysical Union
 2013- AmericaView

Outreach Service:

- 2019 Instructed high school students from the Nez Perce Reservation (Idaho) in remote sensing technology applications for natural resource management, McCall, Idaho, July 4 2019
 2019 Invited panelist for discussion focusing on climate change effects, McCall, Idaho, Jan 9, 2018
 2018 Helped organize and co-chair an AGU session focusing on 'Earth Science Research and Change Detection Using Multitemporal Lidar and Structure from Motion', Washington DC, December 14, 2018
 2018 Outreach activities focusing on ecological research with local highschool students, McCall-Donnelly High School
 2018 Invited presenter at 'Outdoor Conversations' organized by the McCall Public library. Presentation focused on my northern treeline work in Alaska and Canada.
 2018 Helped prepare and deliver a 10-day summer camp with the goal to improve Native American student science identity through culturally relevant use of UAV technology for managing natural resources.
 2018 STEM Fair, November 7, 2018, Boise, Idaho
 2017 Invited presenter at the IARPC Terrestrial Ecology Group meeting, July 2017
 2017 Development and delivery of agricultural outreach program to K-12 students in Grangeville, ID, November and December 2017
 2017 Guest lecturer at Lapwai Highschool, November 9, 2017, Lapwai, Idaho
 2017 Invited speaker at the Nez Perce State Tribal Education Partnership Project (STEP) meeting, June 20, 2017, McCall, Idaho

- 2017 Helped prepare and deliver a 10-day summer camp with the goal to improve Native American student science identity through culturally relevant use of UAV technology for managing natural resources.
- 2016 Co-organizer and presenter of 'Terrestrial Laser Scanning for Ecology – New field technology to help measure and monitor vegetation structure' workshop, December 2nd, 2016 in Fremantle, Australia.
- 2016 Co-developed and delivered a one-day outdoor class for pre-kindergarten children, May 2016
- 2015 Invited presenter during May AmericaView membership meeting, May 13th, 2015
- 2015 Invited presenter during the 'Drones for Forestry' workshop, February 27, 2015 in Coeur d'Alene, Idaho. Total participants: 37, contact hours: 3 hours.
- 2014 Invited speaker at the Southwest Idaho GIS User Group Meeting, McCall, ID, June 13th, 2014
- 2014 Congressional visits in Washington DC to promote the work of AmericaView
- 2014 AmericaView outreach committee member
- 2013 Congressional visits in Washington DC to promote the work of AmericaView
- 2013 Organized two, 6 day long remote sensing summer camps for K-12 students
- 2013 Outdoor guest lecture to the Boise State Biology Club, May 5, 2013, McCall, Idaho
- 2012 "Muddy Squirrel" service learning project in collaboration with the US Forest Service Muddy Squirrel Project
- 2012 "Phoebe Creek Restoration" service learning project in collaboration with the Nez Perce Tribe Watershed Division and the US Forest Service.
- 2012 Speaker: '*MY vita, MY research, UI field research station*' – Rotary, February 28, 2012, McCall, Idaho
- 2010 Speaker: '*Low-cost high tech: incorporating technology, engineering, and math into the science classroom*' - EPSCoR Teacher Weekend, McCall, Idaho
- 2010 Discover Engineering Day, '*Natural Hazards and Engineering Challenges for the Urban-Wildland Interface*', Boise State University
- 2009 Speaker: '*The use of terrestrial LiDAR to map soil microtopography*' - EPSCoR Teacher Weekend, McCall, Idaho
- 2009 Speaker: '*The use of terrestrial LiDAR to map soil microtopography*' - Upward Bound Math Science, McCall Outdoor Science School, McCall, Idaho
- 2008 Speaker: '*Ground-optical sensing of nitrogen in dryland wheat*' - USDA Agricultural Research Service field day, Pendleton, Oregon
- 2007 Speaker: '*Aerial sensing of nitrogen in hard red spring wheat*' - USDA Agricultural Research Service field day, Pendleton, Oregon
- 2007 Speaker: '*Radiative transfer model inversion to estimate nitrogen status in wheat*' - Umatilla County, Oregon State University extension weed tour, Echo, Oregon