

# CURRICULUM VITA

**NAME:** Lee Alexander Vierling

**DATE:** 19 October 2023

**RANK OR TITLE:** University Distinguished Professor

**DEPARTMENT:** Natural Resources and Society

**OFFICE LOCATION AND CAMPUS ZIP:** Campus Core, College of Natural Resources Bldg. Room 19

**OFFICE PHONE:** (208) 885-7911

**EMAIL:** leev@uidaho.edu

**WEB:** www.uidaho.edu/cnr/faculty/vierling-1

**DATE OF FIRST EMPLOYMENT AT UI:** Fall, 2004

**DATE OF TENURE:** July 1, 2008

**DATE OF PRESENT RANK OR TITLE:** May 1, 2020

## EDUCATION BEYOND HIGH SCHOOL:

### Degrees:

Ph.D., Environmental Biology, University of Colorado at Boulder, 1999.

B.A., Geology, *Magna cum laude* with thesis distinction, The Colorado College, 1992.

## EXPERIENCE:

### Teaching, Extension, and Research Appointments:

University Distinguished Professor, Department of Natural Resources and Society, University of Idaho (May 2020-present).

Affiliate Faculty, University of Idaho Environmental Science Program (2004-present).

Affiliate Faculty, Center for Tropical Agriculture and Ecology (CATIE), Costa Rica (2010-present).

Professor, Department of Natural Resources and Society, University of Idaho (September 2015-April 2020).

Associate Professor, Department of Forest, Rangeland, and Fire Sciences, University of Idaho, (July 2008-2015).

Affiliate Faculty, Department of Conservation Social Sciences, University of Idaho, (2013-2015).

Visiting Scientist, Center for Tropical Agriculture and Ecology (CATIE), Costa Rica (2010-2011).

Harold Heady Endowed Professor of Rangeland Ecology, University of Idaho. (2006-2011).

Assistant Professor, Department of Rangeland Ecology and Management, University of Idaho, (September 2004 – June 2008).

Associate Professor, Institute of Atmospheric Sciences, South Dakota School of Mines and Technology. (April 2004 - September 2004).

Assistant Professor, Institute of Atmospheric Sciences, South Dakota School of Mines and Technology. (June 1999 - April 2004).

Graduate Student/Research Assistant/Teaching Assistant, University of Colorado. (August 1994 - May 1999).

Visiting Professor, The Colorado College. (January 1998).

Paraprofessional, The Colorado College. (1991 - 1993).

Research Assistant, The Colorado College. (May 1990 - August 1990).

### Academic Administrative Appointments:

Director, University of Idaho Environmental Science Program (2020-2022).

Department Head, Department of Natural Resources and Society (2016-2022).

Executive Director, UI-CNR McCall Field Campus and McCall Outdoor Science School (2012-2019).

**Governmental:**

Research Assistant, National Center for Atmospheric Research (1993 - 1995).  
 Participant, Graduate Student Summer Fellowship Program, NASA Goddard Space Flight Center.  
 (June 1995 - August 1995).

**Consulting:**

Education: Biological Sciences Curriculum Study, Content Reviewer, "Solving Pollution Problems" 4<sup>th</sup>  
 grade education module, Boulder, Colorado. (1998).  
 Government: State of Texas Oxidant Study, Boulder, Colorado. (1997).

**TEACHING ACCOMPLISHMENTS:****Areas of Specialization:**

Global sustainability and environmental change  
 Environmental remote sensing  
 Spatial ecology  
 Biogeochemistry  
 Biosphere-atmosphere interactions  
 Science communication and education (ages "K-gray")

**Courses Taught:**

<u>Number</u>	<u>Title</u>	<u>Enrollment</u>	<u>Credit Hours</u>
<b>Summer 1991: The Colorado College</b>			
Geology 130 (TA)	Introductory Geology	20	4
<b>Spring 1993: The Colorado College</b>			
Geology 130 (TA)	Introductory Geology	25	4
<b>Spring 1997: University of Colorado</b>			
Env. Biol. 1040 (TA)	Biology: A Human Approach	20	2
<b>Spring 1998: The Colorado College</b>			
Environmental Science 310	Current Global Change Research	10	2
<b>Spring 2000: South Dakota School of Mines and Technology</b>			
Atmospheric Science 401	Global Environmental Change	6	3
<b>Fall 2000: South Dakota School of Mines and Technology</b>			
Atmospheric Science 510	Introduction to Environmental Remote Sensing	10	3
Atmospheric Science 690	Graduate Seminar in Remote Sensing	5	2
<b>Spring 2001: South Dakota School of Mines and Technology</b>			
Atmospheric Science 401	Global Environmental Change	29	3
<b>Fall 2001: South Dakota School of Mines and Technology</b>			
Atmospheric Science 690	Biosphere-Atmosphere Interactions Seminar	7	2
<b>Spring 2002: South Dakota School of Mines and Technology</b>			
Atmospheric Science 401	Global Environmental Change	23	3
<b>Fall 2002: South Dakota School of Mines and Technology</b>			
Atmospheric Science 410	Introduction to Environmental Remote Sensing	17	3

<b>Spring 2003: South Dakota School of Mines and Technology</b>			
Atmospheric Science 401	Global Environmental Change	20	3
<b>Spring 2004: South Dakota School of Mines and Technology</b>			
Atmospheric Science 401	Global Environmental Change	14	3
<b>Spring 2005: University of Idaho</b>			
Forest Resources 429	Landscape Ecology	29	2
<b>Fall 2005: University of Idaho</b>			
Range Ecology 502	IDL Programming for Natural Resources	3	2
<b>Spring 2006: University of Idaho</b>			
Range Ecology 483	Senior Project Presentation	1	1
Range Ecology 499	DS:Landscape Ecology	2	2
Range Ecology 504-04	ST:Landscape Ecology	4	3
Range Ecology/Forest Resources 429	Landscape Ecology	20	2
Range Ecology/Wildlife/Geography 504	Landscape Genetics	11	2
Range Ecology 404	Landscape Ecology Practicum	2	1
Range Ecology 502-03	Directed Study: GIS in Natural Resources	1	1
<b>Fall 2006: University of Idaho</b>			
Natural Resources 101	Exploring Natural Resources	17	1
Range Ecology 504	Remote Sensing Readings	7	1
<b>Spring 2007: University of Idaho</b>			
Range Ecology/Forest Resources/Geography 501	Ecology From Afar: The Use of Remote Sensing in Spatial Ecology	23	1
Range Ecology/Geography 404	Global Environmental Change	15	3
Range Ecology/Forest Resources 429	Landscape Ecology	15	2
<b>Fall 2007: University of Idaho</b>			
Forest Resources 472	Remote Sensing of the Environment	20	3
<b>Spring 2008: University of Idaho</b>			
REM/GEOG/WLF 504	Landscape Approaches to Conservation and Ecology	10	2
REM/GEOG/WLF 501	Space Matters: Landscape Conservation and Ecology	23	1
REM 501	Tri-State Short Course: Remote Sensing in Rangelands	75	1
<b>Fall 2008: University of Idaho</b>			
REM/FOR 472	Remote Sensing of the Environment	10	3-4
<b>Spring 2009: University of Idaho</b>			
REM/GEOG 450	Global Environmental Change	40	3
REM 429	Landscape Ecology	29	3
<b>Fall 2009: University of Idaho</b>			
REM/FOR 472	Remote Sensing of the Environment	23	3-4
CORE 125	The Earth and Our Place on It (Honors section)	26	4
<b>Spring 2010: University of Idaho</b>			

CORE 175	The Earth and Our Place on It (Honors section)	17	3
<b>Fall 2011: University of Idaho</b>			
REM/FOR 472	Remote Sensing of the Environment	42	3
NR 101	Exploring Natural Resources	22	1
<b>Spring 2012: University of Idaho</b>			
FOR 552	Current Literature in Remote Sensing	6	1
<b>Fall 2012: University of Idaho</b>			
REM/FOR 472	Remote Sensing of the Environment	28	4
<b>Spring 2013: University of Idaho</b>			
FOR 552	Current Literature in Remote Sensing	6	1
<b>Fall 2013: University of Idaho</b>			
REM/FOR 472	Remote Sensing of the Environment	10	4
<b>Spring 2014: University of Idaho</b>			
FOR 552	Current Literature in Remote Sensing	7	1
<b>Fall 2014: University of Idaho</b>			
FOR 501	FRFS Cutting Edge Research	18	1
<b>Spring 2015: University of Idaho</b>			
FOR/REM 501	FRFS Cutting Edge Research	26	1
FOR 552	Current Literature in Remote Sensing	9	1
<b>Fall 2015: University of Idaho</b>			
REM/FOR 472	Remote Sensing of the Environment	18	4
<b>Spring 2016: University of Idaho</b>			
FOR/CSS 504	Treeline: Structure and Function	2	2
FOR 552	Current Literature in Remote Sensing	6	1
<b>Fall 2016: University of Idaho</b>			
REM/FOR 472	Remote Sensing of the Environment	29	4
NRS 501	Contemporary Issues in Society and Natural Resources	23	1
<b>Spring 2017: University of Idaho</b>			
FOR 552	Current Literature in Remote Sensing	7	1
ENVS 400	Environmental Science Seminar	23	2
<b>Fall 2017: University of Idaho</b>			
NRS/FOR 472	Remote Sensing of the Environment	22	4
NRS 501	Contemporary Issues in Society and Natural Resources	9	1
<b>Spring 2018: University of Idaho</b>			
FOR 552	Current Literature in Remote Sensing	8	1
<b>Fall 2018: University of Idaho</b>			
NRS 472	Remote Sensing of the Environment	17	4
<b>Fall 2019: University of Idaho</b>			
NRS 472/504	Remote Sensing of the Environment	17	4

**Spring 2020: University of Idaho**

NRS 552	Current Literature in Remote Sensing	7	1
ENVS 102	Field Activities in Environmental Science	14	1

**Fall 2020: University of Idaho**

NRS 472	Remote Sensing of the Environment	21	4
NRS/ENVS 498	Sustainability and Environment Internship Advisor	4	1

**Spring 2021: University of Idaho**

NRS 501	Seminar: Natural and Social Migrations	27	1
ENVS 400	Environmental Science Seminar	9	1
NRS 552	Current Literature in Remote Sensing	2	1

**Spring 2022: University of Idaho**

NRS 501	Seminar: Approaches to Interdisciplinary Research	28	1
ENVS 300	Environmental Science Seminar	19	1
ENVS 504	Teaching Dual Credit Environmental Science	5	1

**Fall 2023: University of Idaho**

NRS 472	Remote Sensing of the Environment (online format)	22	4
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**Students Advised:****Undergraduate Advising:**

I have advised about 5 undergraduates per year across a wide range of UI degrees including Ecology and Conservation Biology, Forest Resources, Environmental Science (in all tracks, Social, Physical and Biological), Rangeland Ecology and Management, and Natural Resources Conservation (both Science and Policy/Management tracks). In addition, I have advised about one undergraduate senior thesis project per year in Natural Resources Conservation, Environmental Science, and Ecology/Conservation Biology.

**Undergraduate Student Clubs:**

Environmental Science Club, faculty advisor (2019-present)  
 Conservation and Environment Club, faculty advisor (2016; 2019-2021)  
 Ecology and Conservation Biology Club, faculty advisor (2005-2007)

**Former Graduate Student Advisees (graduation date, university):**

Ph.D. Carlos Silva (2018, University of Idaho, Received Outstanding Departmental and College-wide Graduate Student of the Year Awards)  
 Dissertation title: "Advanced methods for 3D forest characterization and mapping from lidar remote sensing data"  
 Current position: Assistant Professor, University of Florida

Heather Greaves (2017, University of Idaho, Received Outstanding Departmental and College-wide Graduate Student of the Year Awards)  
 Dissertation title: "Applying lidar and high-resolution multispectral imagery for improved quantification and mapping of tundra vegetation structure and distribution in the Alaskan Arctic"  
 Current position: Research Scientist, University of Alaska-Fairbanks and Columbia University

Aline Ortega-Pieck (2017, University of Idaho/CATIE Joint Doctoral Program)  
 Dissertation title: "From carbon to fish: Understanding mechanisms of human impacts on freshwater ecosystems"

Current Position: Postdoctoral Scholar, University of Idaho

Peter Schlesinger (2017, University of Idaho/CATIE Joint Doctoral Program)  
Dissertation title: “Understanding patterns of land-cover and land-use change in the Trifinio region of Central America”  
Current Position: Research Associate, University of Leicester

Carlos Muñoz Brenes (2017, University of Idaho)  
Dissertation title: “Crossing the Line on Governance: Evaluating the Impact of National and Transboundary Protected Areas on Land Cover Outcomes in Central America”  
Current Position: Chief Social Scientist, Conservation International

Zayra Ramos (2016, University of Idaho/CATIE Joint Doctoral Program)  
Dissertation title: “Systematic conservation planning for ecosystem services: opportunities for improving spatial targeting of ecosystem service payments in Costa Rica”  
Current Position: Lecturer, University of Wageningen, Netherlands

Troy Magney (2015, University of Idaho, Received Outstanding Departmental, College, and University-wide Graduate Student Awards)  
Dissertation title: “Assessing the spatial and temporal controls on plant function using ground-based remote sensing”  
Current position: Assistant Professor, University of California, Davis

Adina Chain (2014, University of Idaho/CATIE Joint Doctoral Program)  
Dissertation title: “A Functional Trait Based Approach to Understand Tropical Forest Composition and Function in a Costa Rican Landscape”  
Current position: Research Associate, CATIE, Costa Rica

Melanie Johnson (2012, University of Idaho)  
Dissertation title: “Spatial Approaches for Understanding Current and Future Landscape Development Patterns and Environmental Impacts in a Northern Minnesota Lake District”  
Current position: Associate Professor, Paul Smith’s College, New York

Javier Ñaupari (2010, University of Idaho)  
Dissertation title: “The Use of Multi-Angle Remote Sensing to Quantify Vegetation Structure and Composition in Semi-Arid Rangelands”  
Current position: Principal Professor and Director, Office of Interinstitutional Management and Global Affairs, Universidad Nacional Agraria La Molina (Peru)

Sebastian Martinuzzi (2010, University of Idaho, Received Outstanding Departmental Graduate Student Award)  
Dissertation title: “LiDAR Remote Sensing for Wildlife Habitat Characterization and Modeling: Incorporating Remotely Sensed Vegetation Structure into Current Assessments of Animal Distribution and Conservation”  
Current position: Associate Scientist, NASA Goddard Space Flight Center and University of Wisconsin, Madison

Steve Garrity (2010, University of Idaho, Received Outstanding College-wide Graduate Student Award)  
Dissertation title: “The Influence of Leaf Pigments, Canopy Phenology, and Solar Radiation Regime on Remotely Sensed Estimates of Photosynthetic Efficiency and Potential, Canopy Photosynthesis, and Net Ecosystem Exchange”  
Current position: Director of AROYA Product Development, METER Group, Inc., Miami, Florida

Eva Strand (2007, University of Idaho, Awarded Outstanding REM Graduate Student)  
Dissertation title: “Landscape Scale Response to Woody Plant Encroachment in Western Juniper Woodlands: Effects on Spatial Patterns, Biogeochemical Cycling, and Aspen Habitats”  
Current position: Associate Professor, University of Idaho

Xuexia Chen (2004, South Dakota School of Mines and Technology)  
Dissertation title: “Improvements in Quantifying and Monitoring Terrestrial Land Cover across Scales Using Remote Sensing Techniques”  
Current position: Senior Support Scientist, NASA Goddard Space Flight Center, Science Systems and Applications, Inc.

M.S. Samuel Finch (2015, University of Idaho)  
Thesis title: “Estimating Nitrogen Content of Dryland Wheat Fields Using Landsat Imagery”

Patrick Adam (2012, University of Idaho)  
Thesis title: “Using Satellite and Airborne LiDAR to Predict Woodpecker Presence at the Landscape Scale”

Jessica Yanyin Xu (2010, University of Idaho)  
Thesis title: “Measurement of Shrub Canopy Structures Using Terrestrial Laser Scanning and Implications for Airborne LiDAR Application”

Meghan Calhoon (2007, University of Idaho)  
Thesis title: “Early Detection of Fire-induced Delayed Tree Mortality Using Hyperspectral Remote Sensing”

Rick Clawges (2006, South Dakota School of Mines and Technology)  
Thesis title: “Use of LiDAR in Ecological Investigations: Case Studies for Avian Habitat Assessment and Estimation of Biophysical Properties of Western Larch (*Larix occidentalis*)”

Eric Rowell (2005, South Dakota School of Mines and Technology)  
Thesis title: “Estimating Forest Biophysical Variables from Airborne Laser Altimetry in a Ponderosa Pine Forest”

Kurtis Nelson (2005, South Dakota School of Mines and Technology)  
Thesis title: “Evaluating the Effects of Spatial Scale on Remotely Sensed Mapping of Burn Severity: A Comparison of Landsat and MODIS Data”

Michael Toomey (2004, South Dakota School of Mines and Technology)  
Thesis title: “Remote Sensing of Arboreal Leaf Area Index and Foliar Moisture Using Empirically and Physically-Based Methods”

Subhan Turlapaty (2004, South Dakota School of Mines and Technology)  
Thesis title: “Mechanical Engineering Analysis of a Scientific Imaging Aerostat”

Mark Fersdahl (2004, South Dakota School of Mines and Technology)  
Thesis title: “Seasonal Variations of MODIS Vegetation Index Products in a Coniferous Forest Canopy”

Denise Dykstra-Santoro (2002, South Dakota School of Mines and Technology)  
Thesis title: “An Analysis of Directional Flux Footprints at the Black Hills Experimental Forest AmeriFlux Tower”

Graduate Committee Service (program, major advisor, and graduation date, if applicable):

Ph.D. Robert Breckenridge (Environmental Science; M. Dakins; 2007)  
Michael Falkowski (Natural Resources; P. Gessler; 2008)  
Eileen Perry (Geography; K. Humes; 2008)  
Zack Holden (Natural Resources; P. Morgan; 2008)  
Jan Eitel (Natural Resources; P. Gessler; 2008)  
Niko Balkenhol (Natural Resources; L. Waits; 2009)  
Jennifer Jensen (Geography; K. Humes; 2009)  
Thomas Rodhouse (Natural Resources; K. Vierling; 2011)  
Rob Keefe (Natural Resources; A. Davis; 2011)  
Thomas Thompson (Natural Resources; K. Reese; 2012)  
Arjan Meddens (Environmental Science; J. Hicke; 2012)  
Sandya Kesoju (Plant, Soil, and Entomological Sciences; T. Prather; 2012)  
John Wallace (Environmental Science; T. Prather; 2013)  
Joel Sauder (Natural Resources; J. Rachlow; 2014)  
Natalia Estrada (Natural Resources, A. Fremier; 2014)  
Jerome Sebbaduka (Washington State University; D. Brown; 2014)  
Irene Shaver (Environmental Science, L. Hormel; 2014)  
Kate Cleary (Natural Resources, L. Waits; 2015)  
Alejandra Martinez-Salinas (Natural Resources, K. Vierling; 2016)  
Sara Galbraith (Plant, Soil, and Entomological Sciences; N. Bosque-Perez; 2016)  
Case Prager (Columbia University; K. Griffin and S. Naeem; 2017)  
Mary Engels (Water Resources; R. Heinse, 2015-2018)  
Andrea Melchiorre (Natural Resources; L. Boschetti, 2020)  
Micah Russell (Water Resources; J. Eitel, 2020)  
Andrew Maguire (Natural Resources; J. Eitel, 2020)  
Jyoti Jennewein (Natural Resources; J. Eitel, 2020)  
Jessica Stitt (Natural Resources; K. Vierling, 2022)  
Eloise Zimbelman (Natural Resources; R. Keefe, 2022)  
Manuel Santiago Plata (Natural Resources; L. Waits, in progress)  
Eli Estey (Environmental Science, in progress)

M.S. Russell Beck (Masters of Natural Resources; P. Gessler; 2005)  
James Dickinson (Forest Resources; P. Gessler; 2005)  
Lauren Shapiro (Forest Resources; P. Morgan; 2006)  
Stacie Robinson (Environmental Science; L. Waits; 2006)  
Brent Slone (Geography; R. Dezzani; 2007)  
Jesse Lewis (Wildlife Resources; J. Rachlow; 2007)  
Andrea Kuchy (Rangeland Ecology and Management; S. Bunting; 2008)  
Priscilla Nyamai (Plant, Soil, and Entomological Sciences; T. Prather; 2009)  
Peter Gag (Forest Resources; K. Kavanagh; 2009)  
Benjamin Hoppus (Forest Resources; L. Fins; 2009)  
Breezy Jackson (Environmental Science; A. Sowards; 2009)  
Keith Bickford (Architecture; B. Haglund; 2010)  
Jeff Lonneker (Forest Resources; P. Gessler; 2010)  
Eric Herschmer (Forest Resources; T. Link; 2010)  
Jody Vogeler (Wildlife Resources; K. Vierling; 2011)  
Ben Bright (Geography; J. Hicke; 2011)  
Freddy Argotty (CATIE Maestria Program, P. Imbach; 2012)  
Damon Husebye (Plant, Soil, and Entomological Sciences, S. Eigenbrode; 2013)  
Charles Swift (Wildlife Resources; K. Vierling; 2016)  
Jessica Sanow (Natural Resources; J. Eitel; 2016)  
Ayana Glover (Plant, Soil, and Entomological Sciences; E. Brooks; 2018)  
Bingbing Xu (Geography, J. Hicke; 2018)



Amy Thorson (Natural Resources; M. Wolfenden; 2019)  
Will Weygint (Natural Resources; J. Eitel; 2022)

**Post-Doctoral Researcher Advisees:**

Alistair Smith (2004-2005; joint with P. Gessler)  
Steven Sesnie (2007)  
Jan Eitel (2009-2010)  
Troy Magney (2015)  
Arjan Meddens (2016-2017)

**Research Scientist Mentored:**

Jan Eitel (2010-2012)

**Visiting Scientist Mentored:**

Jingjue Jiang (Wuhan University Computer Science Dept., 2013-2014)

**Courses Developed:** Field Activities in Environmental Science, Current Global Change Research, Global Environmental Change, Introduction to Environmental Remote Sensing, Landscape Genetics (with Lisette Waits and Raymond Dezzani), Landscape Ecology (modified existing course), Pacific Northwest Tri-State Rangeland Ecology Short Course on Remote Sensing in Rangelands; The Earth and Our Place on It; Current Literature in Remote Sensing; numerous Seminar courses with various topics of focus relating to global change and environmental sustainability.

**Guest Lecturing in Educational Programs On or Off Campus:**

I typically provide ~1-2 academic guest lectures per semester at the University of Idaho and elsewhere. I stopped keeping track of these when I became department head. Below are some examples from previous years.

“A Primer on LiDAR in Natural Resources Sciences”, University of Idaho Introduction to Spatial Analysis for Natural Resources class (12/2/2014, 3/25/2015).

“How to Estimate Aboveground Biomass Using LiDAR”, Columbia University Forest Ecology class (11/18/2014).

“Connecting the Dots: A Story of LiDAR-Based Environmental Research and Outreach”, University of Idaho FRFS Graduate Seminar class (11/5/2014).

“The Great Exhale: Reflections on a Breathing Planet”, University of Idaho (2/7/2012).

“The Earth as a System: Feedbacks, Couplings, and Models”, University of Idaho SEEDS International Environmental Leadership program (1/24/2012).

“The Role of Remote Sensing Data in Understanding Ecological Legacies”, Colorado College, Colorado Springs, CO (10/11/2010).

“200 kilohertz and a Cessna: Using lasers to measure forest dynamics for global carbon accounting”, University of Idaho Electrical and Computer Engineering Seminar Series (4/15/2010).

“Minding the Gigatons: Determining Carbon Storage in Forest Ecosystems of Idaho...and Beyond”, University of Idaho Sustainability Forum (2010).

“Earth System Science Education K-Gray: Laying Down the Drawbridge, and Throwing Away the Key”, University of Idaho, Moscow, ID (2007, 2009).

“NR101: A Time of Global Change, A Time for Personal Change”, University of Idaho, Moscow, ID (2007).

“The Earth Systems Connections Elementary Curriculum”, McDonald Elementary School, Moscow, ID (2006 - 2007).

“Land-use choices: Balancing Human Needs and Ecosystem Function”, University of Idaho, Moscow, ID (2006).

“Remote Sensing of Global Change”, University of Idaho, Moscow, ID (2006).

“Teaching in the Field”, University of Idaho, Moscow, ID (2006, 2007).

“Remote Sensing: What is it, and why do Landscape Ecologists do it?”, University of Colorado, Boulder, CO (1997).

“The Use of Remote Sensing in Global Change Study”, University of Idaho, Moscow, ID (December 2006).

“A Global Change Sampler Plate”, University of Idaho, Moscow, ID (2005).

“The Anatomy of a Wildfire”, University of Idaho, Moscow, ID (2005).

“Using Multi-angle Remote Sensing to Identify Shrub Cover”, University of Idaho, Moscow, ID (April 2005).

“The Use of Remote Sensing in Global Change Studies”, University of Idaho, Moscow, ID (December 2004).

“The Earth Systems Connections Elementary Curriculum”, Little Wound Elementary School, Kyle, SD (August 1999 - May 2004).

“The Earth Systems Connections Elementary Curriculum”, Wilson Elementary School, Rapid City, SD (August 1999 - May 2004).

“Sustainability and Global Ecology”, University of Colorado, Boulder, CO (1998).

“How to Survive (and do Science) in the African Congo”, University of Colorado, Boulder, CO (1997).

## **SCHOLARSHIP ACCOMPLISHMENTS:**

**Publications (\* denotes student; \*\*denotes student or postdoc I directly advised on project):**

### **Refereed Book Chapters:**

BC2. Zimmerman, P. R., Updegraff, K., Capehart, W. J., Price, M. H., Vierling, L. A. (2005). *C-Lock: A method to maximize carbon sequestration value to agro-forestry producers and purchasers* (pp. 131-150). Elsevier, Oxford: Green Trading Markets: Developing the Second Wave.

BC1. Vierling, L. A., West, A. (1998). Biogenic volatile organic compounds. *In: Terrestrial Ecosystems and the Atmosphere*, Schimel, D.S. and Monson, R.K., eds. (pp. 59-75). Boulder, CO: NCAR Advanced Studies Program Colloquium Publication.

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

ORCID ID: [Lee Vierling \(0000-0001-5344-1983\) - ORCID](https://orcid.org/0000-0001-5344-1983). ISI Researcher ID: E-6428-2010. Current ISI citation “h-index” = 49 and Google Scholar “h-index” = 61. \*\* denotes student or postdoctoral advisee; \* denotes other students/postdocs

- J136. Schmiege, S.C.\*, Griffin, K.L., Boelman, N.T., Vierling, L.A., Bruner, S.G.\*, Min, E. et al. (2023). Vertical gradients in photosynthetic physiology diverge at the latitudinal range extremes of white spruce. *Plant, Cell & Environment*, 46, 45–63. <https://doi.org/10.1111/pce.14448>
- J135. Weygint, W.A.\*, Eitel, J.U.H., Maguire, A.J., Vierling, L.A., Griffin, K.L., Boelman, N.T., and Jensen, J.E.\* (2023). Comparison of snow disappearance date estimates and tree stem radial growth onset at the forest-tundra ecotone. *Agricultural and Forest Meteorology*, <https://doi.org/10.1016/j.agrformet.2023.109388>.
- J134. Griffin, K.L., Griffin, Z.M., Schmiege, S.C.\*, Bruner, S.G.\*, Boelman, N.T., Vierling, L.A. et al. (2022). Variation in White spruce needle respiration at the species range limits: a potential impediment to Northern expansion. *Plant, Cell & Environment*, 45, 2078–2092. <https://doi-org.uidaho.idm.oclc.org/10.1111/pce.14333>.
- J133. Weygint, W.A.\*, Eitel, J.U.H., Maguire, A.J., Vierling, L.A., Johnson, D.M., Campbell, C.S., and Griffin, K.L. (2022). Leaf temperatures and environmental conditions predict daily stem radial variations in a temperate coniferous forest. *Ecosphere*, <https://doi.org/10.1002/ecs2.4465>.
- J132. Silva C.A., Hudak, A.T., Vierling, L.A., Valbuena, R., Cardil, A., Mohan, M., Alves de Almeida, D. R., Broadbent, E. N., Almeyda Zambrano, A.M., Wilkinson, B., Sharma, A., Drake, J.B., Medley, P.B., Vogel, J.G., Atticciati Prata, G., Atkins, J.W., Hamamura, C., Johnson, D.J., Klauberg, C. (2022). Treetop: A Shiny-based application and R package for extracting forest information from lidar data for ecologists and conservationists. *Methods in Ecology and Evolution*, <https://doi.org/10.1111/2041-210X.13830>.
- J131. Stitt, J.M.\*, Hudak, A.T., Silva, C.A., Vierling, L.A., and Vierling, K.T. (2022). Evaluating the use of lidar to discern snag characteristics important for wildlife. *Remote Sensing*, 14, 720; <https://doi.org/10.3390/rs14030720>.
- J130. Stitt, J.M.\*, Hudak, A.T., Silva, C. A., Vierling, L.A., and Vierling, K.T. (2021). Characterizing individual tree-level snags using airborne lidar-derived canopy gaps within closed-canopy conifer forests. *Methods in Ecology and Evolution*, <https://doi.org/10.1111/2041-210X.13752>.
- J129. Griffin, K.L, Schmiege, S.C.\*, Bruner, S.G.\*, Boelman, N.T., Vierling, L.A., and Eitel, J.U.H. (2021). High leaf respiration rates may limit the success of white spruce saplings growing in the Kampfzone at the Arctic treeline. *Frontiers in Plant Science*, <https://doi.org/10.3389/fpls.2021.746464>.
- J128. Jennewein, J.S.\*, Eitel, J.U.H., Joly, K., Long, R.A., Maguire, A.J., Vierling, L.A., and Weygint, W. (2021). Estimating integrated measures of forage quality for herbivores by fusing optical and structural remote sensing data. *Environmental Research Letters*, 16 (2021), <https://doi.org/10.1088/1748-9326/ac09af>.
- J127. Davidson, S.C., Bohrer, G., Gurarie, E.\*, LaPoint, S.\*, Mahoney, P.J.\*, Boelman, N.T., Eitel, J.U.H., Prugh, L.R., Vierling, L.A., Jennewein, J.\*, et al. (2020). Ecological insights from three decades of animal movement tracking across a changing Arctic. *Science*, 370 (6517): 712-715.

- J126. Jennewein, J.S.\* , Hebblewhite, M., Mahoney, P.\* , Gilbert, S., Meddens, A.J.H., Boelman, N.T., Joly, K., Jones, K., Kellie, K.A., Brainerd, S., Vierling, L.A., and Eitel, J.U.H. (2020). Behavioral modifications by a large-northern herbivore to mitigate warming conditions. *Movement Ecology*, 8 (39), <https://doi.org/10.1186/s40462-020-00223-9>.
- J125. Jennewein, J.S.\* , Eitel, J.U.H., Pinto, J.R., and Vierling, L.A. (2020). Toward Mapping Dietary Fibers in Northern Ecosystems Using Hyperspectral and Multispectral Data. *Remote Sensing* 12(16), 2579; <https://doi.org/10.3390/rs12162579>.
- J124. Eitel, J.U.H., Griffin, K.L., Boelman, N.T., Maguire, A.J.\* , Meddens, A., Jensen, J.\* , Vierling, L.A., Schmiede, S.\* , and Jennewein, J.\* (2020). Remote sensing tracks daily radial wood growth of evergreen needleleaf trees. *Global Change Biology*, <https://doi.org/10.1111/gcb.15112>.
- J123. Maguire, A.J.\* , Eitel, J.U.H., Griffin, K.L., Magney, T.S., Long, R.A., Vierling, L.A., Schmiede, S.C.\* , Jennewein, J.S.\* , Weygint, W.\* , Boelman, N.T., and Bruner, S.G.\* (2020). On the functional relationship between fluorescence and photochemical yields in complex canopies: Implications for interpreting large-scale solar-induced-fluorescence measurements. *Geophysical Research Letters*, 10.1029/2020GL087858.
- J122. Prager, C.\* , Boelman, N.T., Eitel, J.U.H., Gersony, J.\* , Greaves, H., Heskell, M., Magney, T.S., Naem, S., Vierling, L.A., and Griffin, K.L. (2020). A mechanism of expansion: Arctic deciduous shrubs capitalize on increasing nutrient availability. *Oecologia*, <https://doi.org/10.1007/s00442-019-04586-8>.
- J121. Greaves, H.E.\*\* , Eitel, J.U.H., Vierling, L.A., Boelman, N.T., Griffin, K.L., Magney, T.S.\*\* , and Prager, C.\* (2019). 20 cm resolution mapping of tundra vegetation communities provides an ecological baseline for important research areas in a changing Arctic environment. *Environmental Research Communications*, 1, 105004. doi:10.1088/2515-7620/ab4a85.
- J120. Maguire, A.J.\* , Eitel, J.U.H., Vierling, L.A., Griffin, K.L., Boelman, N.T., Johnson, D.M., Jensen, J.E.\* , Greaves, H.E.\* , and Meddens, A.J.H.\*\* (2019). Terrestrial lidar scanning reveals fine-scale linkages between microstructure and photosynthetic functioning of spruce saplings at the forest-tundra ecotone. *Agricultural and Forest Meteorology*, 269-270 (2019): 157-168.
- J119. Stitt, J.M.\* , Svancara, L.K., Vierling, L.A., and Vierling, K.T. (2019). Smartphone lidar can measure tree cavity dimensions for wildlife studies. *The Wildlife Society Bulletin*, doi: 10.1002/wsb.949.
- J118. Boelman, N.T., Liston, G.E., Gurarie, E., Meddens, A.J.H.\*\* , Mahoney, P.J.\* , Kirchner, P.B., Bohrer, G., Brinkman, T.J., Cosgrove, C.L., Eitel, J.U.H., Hebblewhite, M., Kimball, J.S., LaPoint, S., Nolin, A.W., Pedersen, S.H., Prugh, L.R., Reinking, A.K., Vierling, L.A. (2019). Integrating snow science and wildlife ecology in Arctic-boreal North America. *Environmental Research Letters*, 14 (2019), <https://doi.org/10.1088/1748-9326/aaec1>.
- J117. Eitel, J.U.H., Maguire, A.\* , Boelman, N.T., Vierling, L.A., Griffin, K.L., Jensen, J.\* , Magney, T.S.\*\* , Mahoney, P.\* , Meddens, A.\*\* , Silva, C.\*\* , and Sonnentag, O. (2019). Proximal remote sensing 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 (2019): 340-350. <https://doi.org/10.1016/j.rse.2018.11.022>.
- J116. Muñoz Brenes, C.\*\* , Jones, K.W., Schlesinger, P.\*\* , Robalino, J., and Vierling, L.A. (2018). The impact of protected area governance and management capacity on ecosystem function in Central America. *PLoS ONE*, 13(10): e0205964. <https://doi.org/10.1371/journal.pone.0205964>.
- J115. Meddens, A.J.H.\*\* , Vierling, L.A., Eitel, J.U.H., Jennewein, J.S.\* , Boelman, N.T., White, J.C., & Wulder, M.A. (2018). Developing high-resolution canopy height and digital terrain

models for arctic regions from WorldView-2 and ArcticDEM data. *Remote Sensing of Environment*, 218: 174-188.

- J114. Silva, C.A.\*\* , Klauberg, C., Hudak, A.T., Vierling, L.A., Liesenberg, V., Bennett, L.G., Scheraiber C.F., and Schoeninger, E.R. (2018). Estimating stand height and tree density in *Pinus taeda* plantations using in situ data, airborne LiDAR, and k-nearest neighbor imputation. *Anais da Academia Brasileira de Ciências* 90(1): 295-309.
- J113. Bae, S., Mueller, J., Lee, D., Vierling, K.T., Vogeler, J.C., Vierling, L.A., Hudak, A.T., and Thorn, S. (2018). Taxonomic, functional, and phylogenetic diversity of bird assemblages are oppositely associated to productivity and heterogeneity in temperate forests. *Remote Sensing of Environment*, 215: 145-156.
- J112. Chain-Guadarrama, A.\*\* , Imbach, P., Vilchez-Mendoza, S., Vierling, L.A., and Finegan, B. (2018). Potential trajectories of old-growth Neotropical forest functional composition under climate change. *Ecography*, 41(1): 75-89, doi: 10.1111/ecog.02637.
- J111. Silva, C.A.\*\* , Hudak, A.T., Vierling, L.A., Klauberg, C., Garcia, M., Ferraz, A., Keller, M., Eitel, J., and Saatchi, S. (2017). Impacts of airborne lidar pulse density on estimating biomass stocks and changes in a selectively logged tropical forest. *Remote Sensing*, 9(10): 1068; doi:10.3390/rs9101068.
- J110. Silva, C.A.\*\* , Hudak, A.T., Klauberg, C., Vierling, L.A., Gonzalez-Benecke, C., de Padua, S., Carvalho, C., and Estraviz-Rodriguez, L.C. (2017). Combined effect of pulse density and grid cell size on predicting and mapping aboveground carbon in fast-growing Eucalyptus forest plantation using airborne lidar data. *Carbon Balance and Management*, 12 (13); doi: 10.1186/s13021-017-0081-1.
- J109. Silva, C.A.\*\* , Klauberg, C., Hudak, A.T., Vierling, L.A., Wan Mohd Jaafar, W.S., Mohan, M., Garcia, M., Ferraz, A., Cardil, A., and Saatchi, S. (2017). Predicting stem total and assortment volumes in an industrial *Pinus taeda* L. forest plantation using airborne laser scanning data and random forest. *Forests*, 8 (254); doi: 10.3390/f8070254.
- J108. Swift, C.\* , Vierling, K.T., Hudak, A.T., and Vierling, L.A. (2017). Relationships among vegetation structure, canopy composition, and avian richness patterns across an aspen-conifer forest gradient. *Canadian Journal of Remote Sensing*, doi: 10.1080/07038992.2017.1317205.
- J107. Prager, C.M.\* , Naeem, S., Boelman, N.T., Eitel, J.U.H., Greaves, H.E.\*\* , Heskell, M.A., Magney, T.S.\*\* , Menge, D.N.L., Vierling, L.A., and Griffin, K.L. (2017). A gradient of nutrient enrichment reveals non-linear impacts of fertilization on Arctic plant diversity and ecosystem function. *Ecology and Evolution*, 7: 2449-2460, doi: 10.1002/ece3.2863.
- J106. Magney, T.S.\*\* , Logan, B.A., Reblin, J., 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): 277-289, doi: 10.1657/AAAR0016-044.
- J105. Greaves, H.E.\*\* , Vierling, L.A., Eitel, J.U.H., Boelman, N.T., Magney, T.S.\*\* , Prager, C.M.\* , and 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.
- J104. Schlesinger, P.\*\* , Munoz-Brenes\*\* , C., Jones, K.W., and Vierling, L.A. (2016). The Trifinio Region: a case study of transboundary forest change in Central America. *Journal of Land Use Science*, DOI: 10.1080/1747423X.2016.1261948.
- J103. Eitel, J.U.H., Magney, T.S.\*\* , Vierling, L.A., Greaves, H.E.\*\* , and Zheng, G. (2016). An automated method to quantify crop height and calibrate satellite-derived biomass using hypertemporal lidar. *Remote Sensing of Environment*, 187 (2016): 414-422.

- J102. Martinez-Salinas, A.\* , DeClerck, F., Vierling, K.T., Vierling, L., Legal, L., Vilchez-Mendoza, S., Avelino, J. (2016). Bird functional diversity supports pest control services in a Costa Rican coffee farm. *Agriculture, Ecosystems, and Environment*, 235(2016): 277-288. <http://dx.doi.org/10.1016/j.agee.2016.10.029>.
- J101. 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., and Naeem, S. (2016). Scaling thermal properties from the leaf to the canopy in the Alaskan arctic tundra. *Arctic, Antarctic, and Alpine Research*, 48(4): 745-760. DOI: <http://dx.doi.org/10.1657/AAAR0016-013>.
- J100. Eitel, J.U.H., Höfle, B., Vierling, L.A., Abellan, A., Asner, G.P., Deems, J.S., Glennie, C.L., Joerg, P.C., LeWinter, A.L., Magney, T.S., Mandlbürger, G., Morton, D.C., Müller, J., and Vierling, K.T. (2016). Beyond 3-D: the new spectrum of lidar applications for earth and ecological sciences. *Remote Sensing of Environment*, 186 (2016): 372-392. <http://dx.doi.org/10.1016/j.rse.2016.08.018>.
- J99. Peura, M., Silveyra Gonzalez, R., Muller, J., Heurich, M., Vierling, L.A., Monkkonen, M., and Bassler, C. (2016). Mapping a ‘cryptic kingdom’: performance of lidar derived environmental variables in modelling the occurrence of forest fungi. *Remote Sensing of Environment*, 186 (2016): 428-438. [dx.doi.org/10.1016/j.rse.2016.09.003](http://dx.doi.org/10.1016/j.rse.2016.09.003).
- J98. Magney, T.S.\*\* , Eitel, J.U.H., and Vierling, L.A. (2016). Mapping wheat nitrogen uptake from RapidEye vegetation indices. *Precision Agriculture*, 18(4): 429-451. doi: [10.1007/s11119-016-9463-8](https://doi.org/10.1007/s11119-016-9463-8).
- J97. Boelman, N.T., Holbrook, H.E.\*\* , Krause, J.\* , Magney, T.\*\* , Perez, J.\* , Eitel, J.U.H., Gough, L., Vierling, K.T., Wingfield, J., and Vierling, L.A. (2016). LiDAR gives a bird’s eye perspective on arctic tundra breeding habitat at multiple spatial scales. *Remote Sensing of Environment*, 184(2016): 337-349. doi: [10.1016/j.rse.2016.07.012](https://doi.org/10.1016/j.rse.2016.07.012).
- J96. Greaves, H.\*\* , Vierling, L.A., Eitel, J.U.H., Boelman, N.T., Magney, T.S.\*\* , Prager, C.M.\* , and Griffin, K.L. (2016). High-resolution mapping of aboveground shrub biomass in Arctic tundra using airborne lidar and imagery. *Remote Sensing of Environment*, 184(2016): 361-373. doi:[10.1016/j.rse.2016.07.026](https://doi.org/10.1016/j.rse.2016.07.026).
- J95. Boelman, N.T., Magney, T.S.\*\* , Prager, C.\* , Griffin, K.L., Eitel, J.U.H., Greaves, H.E.\*\* , and Vierling, L.A. (2016). Spectral determination of concentrations of functionally diverse pigments in increasingly complex arctic tundra canopies. *Oecologia*, doi:[10.1007/s00442-016-3646-x](https://doi.org/10.1007/s00442-016-3646-x).
- J94. Silva, C.\*\* , Hudak, A., Vierling, L.A., Loudermilk, E., O’Brien, J., Hiers, J., Jack, S., Gonzalez-Benecke, C., Lee, H., Falkowski, M., and Khosravipour, A. (2016). Imputation of individual longleaf pine (*Pinus palustris* Mill.) tree attributes from field and LiDAR data. *Canadian Journal of Remote Sensing*, doi: [10.1080/07038992.2016.1196582](https://doi.org/10.1080/07038992.2016.1196582).
- J93. Abelleira Martinez, O.J.\* , Fremier, A.K., Gunter, S., Ramos-Bendaña, Z.\*\* , Vierling, L.A., Galbraith, S.M.\* , Bosque-Perez, N.A., and Ordoñez, J.C. (2016). Scaling-up of functional traits for ecosystem services: concepts and methods. *Ecology and Evolution*, doi: [10.1002/ece3.2201](https://doi.org/10.1002/ece3.2201).
- J92. Silva, C.A.\*\* , Klauberg, C., Liesenberg, V., Carvalho, S.P.C., Hudak, A.T., Vierling, L.A., and Rodriguez, L.C.E. (2016). A principal components approach to determine stem volume in a Brazilian industrial forest plantation using LiDAR. *Forestry: An International Journal of Forest Research*, doi: [10.1093/forestry/cpw016](https://doi.org/10.1093/forestry/cpw016).
- J91. Glenn, N.F., Neuenschwander, A., Vierling, L.A., Spaete, L.P., Li, A., Shinneman, D., Pilliod, D., Arkle, R., and McIlroy, S. (2016). Landsat 8 and ICESat-2: Performance and potential synergies for quantifying dryland ecosystem vegetation cover and biomass. *Remote Sensing of Environment*, doi:[10.1016/j.rse.2016.02.039](https://doi.org/10.1016/j.rse.2016.02.039).

- J90. Magney, T.S.\*\* , Eitel, J.U.H., Griffin, K.L., Boelman, N.T., Greaves, H.E.\*\* , Prager, C.M.\* , Logan, B.A., Zheng, G., Ma, L., Fortin, E.A.\* , Oliver, R.Y.\* , and Vierling, L.A. (2016). LiDAR canopy radiation model reveals patterns of photosynthetic partitioning in an arctic shrub. *Agricultural and Forest Meteorology*, 221(2016): 78-93.
- J89. Krofcheck, D.J.\* , Eitel, J.U.H., Lippitt, C., Vierling, L.A., Schulthess, U., and Litvak, M.E. (2016). Remote sensing based simple models of GPP in both disturbed and undisturbed piñon-Juniper woodlands in the Southwestern U.S. *Remote Sensing*, 8(1), 20; doi: 10.3390/rs8010020.
- J88. Magney, T.S.\*\* , Vierling, L.A., Eitel, J.U.H., Huggins, D.R., and Garrity, S.R. (2016). Response of high frequency photochemical reflectance index (PRI) measurements to environmental conditions in wheat. *Remote Sensing of Environment*, 173(2016): 84-97.
- J87. Magney, T.S.\*\* , Eitel, J.U.H., Huggins, D.R., and Vierling, L.A. (2016). Proximal NDVI derived phenology improves in-season predictions of wheat quantity and quality. *Agricultural and Forest Meteorology*, 217(2016): 46-60. doi:10.1016/j.agrformet.2015.11.009.
- J86. Parsons, R.\* , Eitel, J., Whitney, B., Magney, T.\*\* , Eitel, K., and Vierling, L.A. (2015). Connecting the dots: lasers link students to their 3-D world. *Science Scope*, 39(2): 28-35.
- J85. Holbrook, J.D.\* , Vierling, K.T., Vierling, L.A., Adam, P.\*\* , and Hudak, A.T. (2015). Occupancy of red-naped sapsuckers in a coniferous forest: Using LiDAR to understand effects of vegetation structure and disturbance. *Ecology and Evolution*, doi: 10.1002/ece3.1768.
- J84. Galbraith, S.M.\* , Vierling, L.A., and Bosque-Perez, N.A. (2015). Remote sensing and ecosystem services: Current status and future opportunities for the study of bees and pollination-related services. *Current Forestry Reports*, doi: 10.1007/s40725-015-0024-6.
- J83. Rodhouse, T.J., Ormsbee, P.C., Irvine, K.M., Vierling, L.A., Szewczak, J.M., and Vierling, K.T. (2015). Establishing conservation baselines with dynamic distribution models for bat populations facing imminent decline. *Diversity and Distributions*, 21: 1401-1413. DOI: 10.1111/ddi.12372.
- J82. Greaves, H.\*\* , Vierling, L.A., Eitel, J.U.H., Magney, T.S.\*\* , Boelman, N.T., Prager, C.\* , and 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.
- J81. Shaver, I.\* , Chain-Guadarrama, A.\*\* , Cleary, K.\* , Sanfiorenzo, A.\* , Santiago-Garcia, R.J.\* , Bosque-Perez, N., DeClerck, F., Finegan, F., Hormel, L., Sibelet, N., Vierling, L.A., Waits, L., and Fagan, M.\* (2015). Coupled social, economic and ecological outcomes of agricultural intensification in Costa Rica and the future of biodiversity conservation in tropical agricultural regions. *Global Environmental Change* (2015): 74-86. Doi: 0.1016/j.gloenvcha.2015.02.006.
- J80. Lugumira, J.S.\* , Brown, D.J., Dennison, P.E., Hansen, M.K., and Vierling, L.A. (2014). Delineating dambo catenary soil-landscape units using aerial gamma-ray and terrain data: a comparison of classification approaches. (2014). *International Journal of Remote Sensing*, 35(24): 8272-8294. Doi: 10.1080/01431161.2014.979302.
- J79. Klos, Z.\* , Chain-Guadarrama, A.\*\* , Link, T., Finegan, B., Vierling, L.A., and Chazdon, R. (2014). Throughfall heterogeneity in tropical forested landscapes as a focal mechanism for deep percolation. *Journal of Hydrology*, 519(2014): 2180-2188. DOI: 10.1016/j.jhydrol.2014.10.004.
- J78. Eitel, J.U.H., Magney, T.S.\*\* , Vierling, L.A., and 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 (2014): 229-240. doi: 10.1016/j.isprsjprs.2014.09.009.

- J77. Vogeler, J.C.\*, Hudak, A.T., Vierling, L.A., Evans, J., Green, P., and Vierling, K.T. (2014). Terrain and vegetation structural influences on local avian species richness in two mixed-conifer forests. *Remote Sensing of Environment*, 147 (2014): 13-22.
- J76. Vierling, K.T., Swift, C.\*, Vogeler, J.\*, Hudak, A.T., and Vierling, L.A. (2014). How much does the time lag between wildlife field data collection and LiDAR data acquisition matter for studies of animal distributions? A case study using bird communities. *Remote Sensing Letters*, 5(2): 185-193. doi: 10.1080/2150704X.2014.891773.
- J75. Eitel, J.U.H., Magney, T.S.\*\* , Vierling L.A., Huggins, D., and Brown, T.\* (2014). Lidar remote sensing advances quantification of wheat biomass and nitrogen status during the critical early growing season. *Field Crops Research*, 159(2014): 21-32.
- J74. Krofcheck, D.J.\*, Eitel, J.U.H., Vierling, L.A., Schulthess, U., Hilton, T.M., Dettweiler-Robinson, E., Pendleton, R., and Litvak, M.E. (2014). Detecting mortality induced structural and functional changes in a piñon-juniper woodland using Landsat and RapidEye time series. *Remote Sensing of Environment* 151: 102-113. doi: 10.1016/j.rse.2013.11.009
- J73. Magney, T.\*\* , Eusden, S.\* , Eitel, J.U.H., Logan, B.A., Jiang, J., and Vierling, L.A. (2014). Assessing leaf photoprotective mechanisms using terrestrial LiDAR: Towards mapping canopy photosynthetic performance in three dimensions. *New Phytologist*, 201(1): 344-356. doi: 10.1111/nph.12453.
- J72. Vierling, L.A., Vierling, K.T., Adam, P.\*\* , and Hudak, A.T. (2013). Using satellite and airborne LiDAR to model woodpecker habitat occupancy at the landscape scale. *PLOS ONE*, doi: 10.1371/journal.pone.0080988.
- J71. Charbonnier, F.\* , le Maire, G., Dreyer, E., Casanoves, F., Christina, M., Dauzat, J., Eitel, J., Vaast, P., Vierling, L.A., and 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 (2013):152–169.
- J70. Vogeler, J.C.\*, Hudak, A.T., Vierling, L.A., and Vierling, K.T. (2013). LiDAR-derived canopy architecture predicts Brown Creeper occupancy of two western coniferous forests. *The Condor*, 115(3): 614-622.
- J69. Eitel, J.U.H., Vierling, L.A., and Magney, T.\*\* (2013). A lightweight, low cost, autonomously operating terrestrial laser scanner for quantifying and monitoring ecosystem structural dynamics. *Agricultural and Forest Meteorology*, 180 (2013): 86-96.
- J68. Ñaupari, J.A.\*\* , Vierling, L.A., and 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(1), 073563; doi: 10.1117/1.JRS.7.073563.
- J67. Meddens, A.J.H.\* , Hicke, J.A., Vierling, L.A., and Hudak, A.T. (2013). Evaluating methods to detect bark beetle-caused tree mortality using single-date and multi-date Landsat imagery. *Remote Sensing of Environment* 132: 49-58.
- J66. Magney, T.\*\* , Eitel, K.B., Jansen, V.\* , Eitel, J.U.H., Schon, J.\* , Rittenburg, B.\* , and Vierling, L.A. (2013). Keeping a (digital) eye on our planet's clock. *The Science Teacher* 80(1): 37-43.
- J65. Martinuzzi, S.\*\* , Gould, W., Vierling, L.A., Hudak, A.T., Nelson, R., and Evans, J. (2013). Quantifying tropical dry forest type and succession: substantial improvement with LiDAR. *Biotropica* 45(2): 135-146. doi: 10.1111/j.1744-7429.2012.00904.x.
- J64. 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): 709-722.
- J63. Rodhouse, T. J.\* , Ormsbee, P.C., Irvine, K.M., Vierling, L.A., Szewczak, J.M., and Vierling, K.T. (2012). Assessing the status and trend of bat populations across broad



- geographic regions with dynamic distribution models. *Ecological Applications* 22(4): 1098-1113.
- J62. Hudak, A.T., Strand, E.K., Vierling, L.A., Byrne, J.C., Eitel, J.U.H., Martinuzzi, S., and Falkowski, M.J. (2012). Quantifying aboveground forest carbon pools and fluxes from repeat LiDAR surveys. *Remote Sensing of Environment* 123 (2012): 25-40. doi:10.1016/j.rse.2012.02.023.
- J61. Rodhouse, T.J.\*, Irvine, K.M., Vierling, K.T., and Vierling, L.A. (2011). Estimating temporal trend in the presence of spatial complexity: a Bayesian hierarchical model for a wetland plant population undergoing restoration. *PLoS ONE* 6(12): e28635. doi:10.1371/journal.pone.0028635.
- J60. Eitel, J.U.H.\*\*\*, Vierling, L.A., Litvak, M.E., Long, D.S., Schulthess, U., Ager, A.A., Krofcheck, D.\*, and Stocheck, L. (2011). Broadband, red-edge information from satellites improves early stress detection in a New Mexico conifer woodland. 115: 3640-3646. *Remote Sensing of Environment*, doi:10.1016/j.rse.2011.09.002.
- J59. Jensen, J.R.\*, Humes, K.S., Hudak, A.T., Vierling, L.A., and Delmelle, E. (2011). Evaluation of the MODIS LAI product using independent lidar-derived LAI: a case study in mixed conifer forest. *Remote Sensing of Environment*, 115 (12): 3625-3639. doi:10.1016/j.rse.2011.08.023.
- J58. Sankey, J.B., Eitel, J.U.H.\*\*\*, Glenn, N.F., Germino, M.J., and 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. doi:10.1016/j.geomorph.2011.08.016.
- J57. Eitel, J.U.H.\*\*\*, Williams, J., Vierling, L.A., Al-Hamdan, O., and Pierson, F. (2011). Suitability of terrestrial laser scanning for studying surface roughness effects on concentrated flow erosion processes in rangelands. *Catena* 87: 398-407. doi: 10.1016/j.catena.2011.07.009.
- J56. Eitel, J.U.H.\*\*\*, Vierling, L.A., Long, D.S., Litvak, M.E., and Eitel, K.B. (2011). Simple assessment of needleleaf and broadleaf chlorophyll content using a flatbed color scanner. *Canadian Journal of Forest Research* 41: 1445-1451. doi:10.1139/X11-05.
- J55. Goldberg, C.S.\*, Pocewicz, A.\*, Nielsen-Pincus, M.\*, Waits, L.P., Morgan, P., Force, J.E., and Vierling, L.A. (2011). Predictions of ecological and social impacts of alternative residential development policies to inform decision making in a rural landscape. *Conservation Letters* doi: 10.1111/j.1755-263X.2011.00194.x.
- J54. Eitel, J.U.H.\*\*\*, Vierling, L.A., Long, D., and Hunt, E.R. (2011). Early season remote sensing of wheat nitrogen status using a green scanning laser. *Agricultural and Forest Meteorology* 151 (2011) 1338- 1345. doi:10.1016/j.agrformet.2011.05.015.
- J53. Vierling, L. A., Martinuzzi, S., Asner, G.P., Stoker, J., and Johnson, B.R. (2011). Lidar: providing structure. *Frontiers in Ecology and the Environment*, 9(5): 261-262. doi:10.1890/11.WB.009.
- J52. Meddens, A.\*, Hicke, J.A., and Vierling, L.A. (2011). Evaluating the potential of multispectral imagery for mapping multiple stages of tree mortality. *Remote Sensing of Environment*, 115, 1632-1642.
- J51. Garrity, S.R.\*\*\*, Eitel, J.U.H.\*\*\*, and 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. doi:10.1016/j.rse.2010.10.007.

- J50. Vierling, K.T., Bäessler, C., Brandl, R., Vierling, L.A., Weiß, I., and Müller, J. (2011). Spinning a laser web: predicting spider distributions using lidar. *Ecological Applications*, 21:577–588. doi: 10.1890/09-2155.1.
- J49. Holden, Z.A.\*, Morgan, P., Smith, A.M.S., and Vierling, L. (2010). Beyond Landsat: multi-scale assessment of four satellite sensors for detecting burn severity in ponderosa pine forests of the Gila Wilderness, NM, USA. *International Journal of Wildland Fire* 19, 449–458.
- J48. Eitel, J.U.H.\*\*, Vierling, L.A., and Long, D. (2010). Simultaneous measure of plant structure and chlorophyll content in broadleaf saplings with a terrestrial laser scanner. *Remote Sensing of Environment*, 114 (2010) 2229–2237; doi:10.1016/j.rse.2010.04.025.
- J47. 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(4), 2843-2850; doi:10.3390/s100402843.
- J46. Garrity, S.R.\*\*, Vierling, L.A., and Bickford, K.\*\* (2010). A simple filtered photodiode instrument for continuous measurement of narrowband NDVI and PRI. *Agricultural and Forest Meteorology*. 150(3): 489-496. doi:10.1016/j.agrformet.2010.01.004.
- J45. Nielsen-Pincus, M.\*, Goldberg, C.S.\*, Pocewicz, A.\*, Force, J.E., Waits, L.P., Morgan, P., and Vierling, L.A. (2010). Predicted effects of residential development on a northern Idaho landscape under alternative growth management and land protection policies. *Landscape and Urban Planning*, 94: 255-263. doi:10.1016/j.landurbplan.2009.10.011.
- J44. Calhoun, M.J.\*\*, Vierling, L.A., and Matzner, S.L. (2009). Effects of burn intensity on soil organic carbon and nitrogen three years post-fire in a *Pinus ponderosa* forest. *Proceedings of the South Dakota Academy of Sciences*, 88: 109-118.
- J43. Martinuzzi, S.\*\*, Vierling, L.A., Gould, W.A., Vierling, K.T., and Hudak, A.T. (2009). Incorporating remotely sensed tree canopy cover data into broad scale assessments of wildlife species distribution and conservation. *Journal of Applied Remote Sensing*, 3, 033568; doi: 10.1117/1.3279080.
- J42. Martinuzzi, S.\*\*, Vierling, L.A., Gould, W.A., Falkowski, M.\*, Evans, J.S., Hudak, A.T., and Vierling, K.T. (2009). Mapping snags and understory shrubs for a LiDAR-based assessment of wildlife habitat suitability. *Remote Sensing of Environment*, 113: 2533–2546.
- J41. Strand, E.K.\*\*, Vierling, L., Bunting, S.C., and Gessler, P.E. (2009). Quantifying successional rates in western aspen woodlands: Current conditions, future predictions. *Forest Ecology and Management*, 257(8): 1705-1715.
- J40. Strand, E.K.\*\*, Vierling, L.A., and Bunting, S.C. (2009). A spatially explicit model to predict future landscape composition of aspen woodlands under various management scenarios. *Ecological Modelling*, 220: 175-191, doi:10.1016/j.ecolmodel.2008.09.010.
- J39. Garrity, S.R.\*\*, Vierling, L.A., Smith, A.M.S., Falkowski, M.J., and Hann, D.B. (2008). Automatic detection of shrub location, crown area, and cover using spatial wavelet analysis and aerial photography. *Canadian Journal of Remote Sensing*, 34: S376-S384.

- J38. Falkowski, M.J.\*, A.M.S. Smith, P.E. Gessler, A.T. Hudak, L.A. Vierling, and J.S. Evans. (2008). The influence of conifer forest canopy cover on the accuracy of two individual tree measurement algorithms using LiDAR data. *Canadian Journal of Remote Sensing*, 34: S338-S350.
- J37. Jensen, J.R.\*, Humes, K.S., Vierling, L.A., and Hudak, A.T. (2008). Discrete return lidar-based prediction of leaf area index in two conifer forests. *Remote Sensing of Environment*, 112, 3947-3957.
- J36. Smith, A.M.S., Greenberg, J. A., and Vierling, L.A. (2008). Introduction to Special Section: The Remote Characterization of Vegetation Structure: New methods and applications to landscape-regional-global scale processes. *Journal of Geophysical Research-Biogeosciences*, 113, G03S91, doi: 10.1029/2008JG000748.
- J35. Clawges, R.\*\* , Vierling, K. T., Vierling, L. A., Rowell, E. M.\*\* (2008). The use of lidar remote sensing to estimate avian species diversity, density, and occurrence in a pine/aspen forest. *Remote Sensing of Environment*, 112(5): 2064-2073, doi: 10.1016/j.rse.2007.08.023.
- J34. Strand, E. K.\*\* , L. A. Vierling, A. M. S. Smith, and S. C. Bunting (2008), Net changes in aboveground woody carbon stock in western juniper woodlands, 1946-1998, *Journal of Geophysical Research-Biogeosciences*, 113, G01013, doi:10.1029/2007JG000544.
- J33. Pocewicz, A.\* , Nielson-Pincus, M.\* , Goldberg, C.\* , Johnson, M.\*\* , Morgan, P., Force, J., Waits, L. P., Vierling, L. A. (2008). Predicting land use change: comparison of models based on landowner surveys and historical land cover trends. *Landscape Ecology*, 23:195-210. doi: 10.1007/s10980-007-9159-6.
- J32. Vierling, K. T.† , Vierling, L. A.† , Gould, W., Martinuzzi, S.\*\* , Clawges, R.\*\* (2008). Lidar: Shedding new light on habitat characterization and modeling. *Frontiers in Ecology and the Environment*, 6(2): 90-98. doi: 10.1890/070001.  
(† = equal first authorship)
- J31. Lewis, J. S.\* , Rachlow, J. L., Garton, E. O., Vierling, L. A. (2007). Effects of habitat on GPS collar performance: using data screening to reduce location errors. *Journal of Applied Ecology*, 44: 663-671. doi: 10.1111/j.1365-2664.2007.01286.x.
- J30. Clawges, R.\*\* , Vierling, L. A., Calhoun, M.\*\* , Toomey, M. P.\*\* (2007). Use of a ground-based scanning lidar for estimation of biophysical properties of western larch (*Larix occidentalis*). *International Journal of Remote Sensing*, 28(19): 4331 - 4344. doi: 10.1080/01431160701243460.
- J29. Pocewicz, A.\*\* , Vierling, L. A., Lentile, L., Smith, R.\*\* (2007). View angle effects on relationships between MISR vegetation indices and leaf area index in a recently burned ponderosa pine forest. *Remote Sensing of Environment*, 107: 322-333.
- J28. Storfer, A., Murphy, M. A.\* , Evans, J. S., Goldberg, C. S.\* , Robinson, S.\* , Spear, S.F.\* , Dezzani, R., Delmelle, E., Vierling, L. A., Waits, L. (2007). Putting the "landscape" in landscape genetics. *Heredity*, 98: 128-142.
- J27. Vierling, L. A., Vierling, K. T. (2006). Creating Undergraduate Community Ambassadors of Earth System Science. *Journal of Geoscience Education*, 54(3), 283-286.
- J26. Vierling, L. A., Frykholm, J. A., Glasson, G. (2006). Learning mathematics and earth system science: via satellite. *Journal of Geoscience Education*, 54(3), 262-271.

- J25. Falkowski, M.\* , Smith, A. M., Hudak, A. T., Gessler, P. E., Vierling, L. A., Crookston, N. (2006). Automated estimation of individual conifer tree height and crown diameter via two-dimensional wavelet analysis of lidar data. *Canadian Journal of Remote Sensing*, 32(2), 153-161.
- J24. Chen, X.\*\* , Vierling, L. A. (2006). Spectral mixture analyses of hyperspectral data acquired using a tethered balloon. *Remote Sensing of Environment*, 103, 338-350.
- J23. Vierling, L. A., Fersdahl, M.\*\* , Chen, X.\*\* , Li, Z.\*\* , Zimmerman, P. R. (2006). The Short Wave Aerostat-Mounted Imager (SWAMI): A novel platform for acquiring remotely sensed data from a tethered balloon. *Remote Sensing of Environment*, 103, 255-264.
- J22. Rowell, E.\*\* , Seielstad, C., Vierling, L. A., Queen, L., Shepperd, W. (2006). Using laser altimetry-based segmentation to refine automated tree identification in managed forests of the Black Hills, South Dakota. *Photogrammetric Engineering and Remote Sensing*, 72(12), 1379-1388.
- J21. Strand, E. K.\*\* , Smith, A.M.S., Bunting, S.C., Vierling, L. A., Hann, D. B., Gessler, P. E. (2006). Wavelet estimation of plant spatial patterns in multi-temporal aerial photography. *International Journal of Remote Sensing*, 27(10), 2049-2054.
- J20. Toomey, M. P.\*\* , Vierling, L. A. (2006). Estimating equivalent water thickness in a conifer forest using Landsat TM and ASTER data: a comparison study. *Canadian Journal of Remote Sensing*, 32(4), 288-299.
- J19. Chen, X.\*\* , Vierling, L. A., Deering, D. W. (2005). A simple and effective image normalization method to improve landscape change detection across sensors and across time. *Remote Sensing of Environment*, 98, 63-79.
- J18. Zimmerman, P. R., Price, M. H., Peng, C., Capehart, W. J., Updegraff, K., Kozak, P.\* , Vierling, L. A., Baker, E., Kopp, F., Duke, E., Das, C.\* (2005). C-Lock (patent pending): a system for estimating and certifying carbon emission reduction credits for the sequestration of soil carbon on agricultural land. *Adaptation and Mitigation Strategies for Global Change*, 10, 307-331.
- J17. Chen, X.\*\* , Vierling, L. A., Deering, D. W., Conley, A. H. (2005). Monitoring boreal forest LAI across a Siberian burn chronosequence: a MODIS validation study. *International Journal of Remote Sensing*, 26(24), 5433-5451.
- J16. Toomey, M. P.\*\* , Vierling, L. A. (2005). Multispectral remote sensing of landscape level foliar moisture: techniques and applications for forest ecosystem monitoring. *Canadian Journal of Forest Research*, 35(5), 1087-1097.
- J15. Chen, X.\*\* , Vierling, L. A., Rowell, E.\*\* , DeFelice, T. (2004). Using lidar and effective LAI data to evaluate IKONOS and Landsat 7 ETM+ vegetation cover estimates in a ponderosa pine forest. *Remote Sensing of Environment*, 91(1), 14-26.
- J14. Harley, P. C., Vasconcellos, P., Vierling, L. A., Cleomir de S. Pinheiro, C., Greenberg, J., Guenther, A., Klinger, L., Soares de Almeida, S., Neill, D., Baker, T., Phillips, O., Malhi, Y. R. (2004). Variation in potential for isoprene emissions among Neotropical forest sites. *Global Change Biology*, 10, 1-21.
- J13. Serca, D., Guenther, A. B., Klinger, L. F., Vierling, L. A., Harley, P. C., Druilhet, A., Greenberg, J., Baker, B., Baugh, W., Bouka-Biona, C., Loemba-Ndembu, J. (2001). EXPRESSO flux measurements at upland and lowland Congo tropical forest site. *Tellus*, 53B(3), 220-234.

- J12. Vierling, L. A., Wessman, C. A. (2000). Photosynthetically active radiation dynamics within a monodominant Congolese rain forest canopy. *Agricultural and Forest Meteorology*, 103(3), 265-278.
- J11. Guenther, A. B., Archer, S., Greenberg, J. P., Harley, P. C., Helmig, D., Klinger, L. F., Vierling, L. A., Wildermuth, M., Zimmerman, P. R., Zitzer, S. (1999). Biogenic hydrocarbon emissions and landcover/climate change in a subtropical savanna. *Physics and Chemistry of the Earth*, 24(6), 659-667.
- J10. Helmig, D., Klinger, L. F., Guenther, A. B., Vierling, L. A., Zimmerman, P. R., Geron, C. (1999). Biogenic volatile compound emissions. 2. Flux potentials from three sites in the U.S. *Chemosphere*, 38, 2189-2204.
- J9. Helmig, D., Klinger, L. F., Guenther, A. B., Vierling, L. A., Zimmerman, P. R., Geron, C. (1999). Biogenic volatile compound emissions. I. Identifications from three sites in the U.S. *Chemosphere*, 38, 2163-2187.
- J8. Guenther, A. B., Baugh, B., Brasseur, G., Greenberg, J. P., Harley, P. C., Klinger, L. F., Serca, D., Vierling, L. A. (1999). Isoprene emission estimates and uncertainties for the Central African EXPRESSO study domain. *Journal of Geophysical Research - Atmospheres*, 104(D23), 30,625-30,639.
- J7. Isebrands, J. G., Guenther, A. B., Harley, P. C., Helmig, D., Klinger, L. F., Vierling, L. A., Zimmerman, P. R., Geron, C. (1999). Volatile organic compound emission rates from mixed deciduous and coniferous forests in Northern Wisconsin, USA. *Atmospheric Environment*, 33, 2527-2536.
- J6. Vierling, L. A. (1998). Palynological evidence for late- and postglacial environmental change in central Colorado. *Quaternary Research*, 49, 222-232.  
doi:10.1006/QRES.1997.1960
- J5. Vierling, L. A., Deering, D. W., Eck, T. F. (1997). Differences in arctic tundra vegetation type and phenology as seen using bidirectional radiometry in the early growing season. *Remote Sensing of Environment*, 60(1), 71-82.
- J4. Eck, T. F., Deering, D. W., Vierling, L. A. (1997). Estimation of total albedo from spectral hemispheric reflectance for arctic tundra. *International Journal of Remote Sensing*, 18(17), 3535-3549.
- J3. Guenther, A. B., Baugh, W., Davis, K., Hampton, G., Harley, P. C., Klinger, L. F., Vierling, L. A., Zimmerman, P. R., Allwine, E., Dilts, S., Lamb, B., Westberg, H., Baldocchi, D., Geron, C., Pierce, T. (1996). Isoprene fluxes measured by enclosure, relaxed eddy accumulation, surface-layer gradient, and mixed layer mass balance techniques. *Journal of Geophysical Research - Atmospheres*, 101(D13), 18,555-18,567.
- J2. Guenther, A. B., Greenberg, J. P., Harley, P. C., Helmig, D., Klinger, L. F., Vierling, L. A., Zimmerman, P. R., Geron, C. (1996). Leaf, branch, stand and landscape scale measurements of volatile organic compound fluxes from US woodlands. *Tree Physiology*, 16, 17-24.
- J1. Helmig, D., Vierling, L. A. (1995). Water adsorption capacity of the solid adsorbents Tenax TA, Tenax GR, Carbotrap, Carbotrap C, Carbosieve SIII, and Carboxen 569 and water management techniques for the atmospheric sampling of volatile organic trace gases. *Analytical Chemistry*, 67(23), 4380-4386.

*In review/In press*

- R1. Eitel, K.B., Wheeler, A., Seven, K., Pinkham, J., Cohn, T., Uh, C., White Temple, E., Davis, M., Eitel, J.U.H., Carter, M., McFarland, J., Dixon, R., and Vierling, L.A. Culturally sustaining pedagogy in an outdoor environmental science education program to support students' identities as Indigenous people and scientists. *Journal of Geoscience Education*, in review.

### Refereed Scholarly Media/Electronic Contributions, Analysis Code, and Datasets:

#### *Datasets (Published)*

- D5. Eitel, J., A.J. Maguire\*, K. Griffin, N. Boelman, J.E. Jensen\*, S.C. Schmiede\*, and L. Vierling. 2020. ABoVE: Photochemical Reflectance and Tree Growth, Brooks Range, Alaska, 2018-2019. ORNL DAAC, Oak Ridge, Tennessee, USA. <https://doi.org/10.3334/ORNLDAAC/1781>
- D4. Greaves, H.E.\*\* , J. Eitel, 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/ORNLDAAC/1690>
- D3. Greaves, H.E.\*\* , L. Vierling, J. 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/ORNLDAAC/1573>
- D2. 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](https://doi.org/10.7923/G4057CV5).
- D1. 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.\* 2013b. Four-band, 5cm resolution orthophotographs of Toolik Field Station, AK, and nearby field sites along Dalton Highway. doi: [10.7923/G4VD6WCW](https://doi.org/10.7923/G4VD6WCW).

#### *Refereed Computer Analysis Code (Published)*

- CC2. Silva, C.A., Hudak, A.T., Vierling, L.A., Valbuena, R., Cardil, A., Mohan, M., Alves de Almeida, D.R., Broadbent, E.N., Zambrano, A., Wilkinson, B., Sharma, A., Drake, J., and Medley, P. (2021). R package: Treetop. <https://github.com/carlos-alberto-silva/weblidar-treetop>.
- CC1. Silva, C.A.\*\* , Crookston, N.L., Hudak, A.T., and Vierling, L.A. 2015. R package: rLiDAR. <http://cran.r-project.org/web/packages/rLiDAR/index.html>.

#### *Instructional Material: Educational Software (Published)*

- M2. Vierling, L. A., Frykholm, J. A., Glasson, G. (2005). The Earth Systems Connections Elementary Curriculum, v. 2.0. National Aeronautics and Space Administration. NASA publication number NP-2005-05-407-HQ. (25,000 copies printed and distributed nationally).
- M1. Vierling, L. A., Frykholm, J. A., Glasson, G. (2004). The Earth Systems Connections Elementary Curriculum, v. 1.2. National Aeronautics and Space Administration. NASA publication number EC-2004-03-004-HQ. (7,000 copies printed and distributed nationally).

**Peer Reviewed/Evaluated:**

**Major Proceedings Papers and Technical Reports:**

- PP13. Jennewein, J.\*\* , Magney, T.S.\*\* , Gasch, C.\* , Eitel, J.U.H., and Vierling, L.A. (2015). Using time-lapse imagery for applied agricultural monitoring. REACCH Annual Report, Year 4, 102-103.
- PP12. Magney, T.S.\*\* , Yourek, M.\* , Ward, N.\* , Finch, S.\*\* , Eitel, J.U.H., Vierling, L.A., Brooks, E., Huggins, D., and Brown, D. (2015). Determining the controls on nitrogen uptake from space. REACCH Annual Report, Year 4, 72-73.
- PP11. 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.
- PP10. Aycrigg J. , G. Beauvais, T. Gotthardt, K. Boykin, S. Williams, S. Lennartz, K. T. Vierling, S. Martinuzzi\*\* , and L. A. Vierling. (2010). Mapping species ranges and distributions models across the United States. Gap Analysis Bulletin. Vol. 18.
- PP9. Martinuzzi, S.\*\* , Vierling, L.A., Gould, W.A., and Vierling, K.T. (2008). Improving broad-scale predictive assessments of wildlife species distribution and habitat availability with LiDAR data: measurement priorities for the Inland Northwest USA. 2008 Annual Gap Bulletin, United States Geological Survey.
- PP8. Garrity, S. R.\*\* , Vierling, L. A., Strand, E. K.\*\* , Hinson, J., Smith, A. M. S., Soulen, M., Naupari, J.\* (2006). The use of aerial photography and satellite imagery for landcover mapping on a ranch in west-central Idaho. St. Louis, MO: Proceedings of the Grazing Lands Conservation Initiative Annual Meeting.
- PP7. Derr, K. D.\*\* , Vierling, L. A., Matzner, S. L. (2005). Effects of different fire intensities on understory vegetation diversity in the Jasper Burn area of the Black Hills (vol. 83, pp. 189-195). Proceedings of the South Dakota Academy of Sciences.
- PP6. Toomey, M. P.\*\* , Vierling, L. A. (2004). Remote sensing of landscape level foliar moisture using Landsat TM SWIR reflectance and image transformation. Salt Lake City, UT: American Society of Photogrammetry and Remote Sensing, Proceedings of the 2004 Remote Sensing Applications Center 2004 Conference.
- PP5. Glasson, G., Frykholm, J. A., Vierling, L. A. (2003). Using Traditional Ecological Knowledge to Develop an Earth System Science Elementary Curriculum. Philadelphia, PA: Proceedings of the National Association for Research in Science Teaching.
- PP4. Vierling, L. A., Rowell, E. M.\*\* , Chen, X.\*\* , Dykstra, D.\*\* , Vierling, K. (2002). Relationships among airborne scanning LiDAR, high resolution multispectral imagery, and ground-based inventory data in a ponderosa pine forest. Toronto: Proceedings of the IEEE International Geoscience and Remote Sensing Symposium (IGARSS).
- PP3. Vierling, L. A., Frykholm, J. A., Glasson, G. (2002). The earth systems connections elementary curriculum: a world of contexts for teaching and learning remote sensing. Toronto: Proceedings of the IEEE International Geoscience and Remote Sensing Symposium (IGARSS).
- PP2. Wylie, B. K., Meyer, D. J., Choate, M. J., Vierling, L. A., Kozak, P.\* (2000). Mapping woody vegetation and eastern red cedar in the Nebraska sand hills using AVIRIS. Pasadena, CA: Summaries of the Ninth JPL Airborne Earth Science Workshop, NASA Jet Propulsion Laboratory.

- PP1. Vierling, L. A., Deering, D. W., Eck, T. F. (1996). Nadir and bidirectional surface measurements of arctic tundra: site differentiation and vegetation phenology early in the growing season (4th ed., pp. 1897-1900). Lincoln, NE: Proceedings of the International Geoscience and Remote Sensing Symposium.

### **Thesis and Dissertation:**

- T2. Vierling, L. A. (1999). Light heterogeneity and gas exchange dynamics above and within a monodominant Congolese rain forest canopy. Boulder, CO: University of Colorado, Ph.D. Dissertation.
- T1. Vierling, L. A. (1992). The Late-Quaternary paleoenvironmental history of Lost Park, Tarryall Mountains, central Colorado: a palynological study. Colorado Springs, CO: The Colorado College, Undergraduate Honors Thesis.

### **Articles Appearing in the Popular Press/Magazines:**

- M2. Vierling, L.A. and Eitel, J.U.H. (2015). The Buzz about Drones. *Western Forester*.
- M1. Vierling, L.A. (2012). The Great Exhale. *The Christian Century*, 129(11): 11-12.

### **Workshops and Symposia Organized:**

- WS5. Vierling, L.A. and Duncanson, L. "Carbon, Diversity and Forest Health", Session chairs for the 12<sup>th</sup> annual SilviLaser conference, Vancouver, BC, Canada, 17 September 2012.
- WS4. Vierling, L.A. "Quantifying Ecosystem Services", Oral Session organized for the 4<sup>th</sup> Annual NSF EPSCoR Western Consortium Tri-State Meeting, Sun Valley, ID, 4 April 2012.
- WS3. Vierling, L.A., and Roupsard, O. "From the Leaf to the Landscape: Field and Remote Sensing Approaches for Understanding Vegetation Structure and Dynamics", CIRAD/PCP workshop and symposium, Turrialba, Costa Rica, May, 2011.
- WS2. Vierling, L.A., Vierling, K.T., and Martinuzzi, S.\*\* "Lidar Measures of Ecosystem Structure: Implications for Biodiversity and Wildlife Habitat Modeling", Ecological Society of America Annual Meeting Organized Oral Session, Albuquerque, NM, August, 2009.
- WS1. Vierling, L.A. Program Committee Chair and Conference Lead, Pacific Northwest Tri-State Short Course in Rangeland Ecology, Boise, ID, April 2008.

### **Scholarly Presentations** (\*denotes student/postdoc; \*\*denotes my student/postdoc advisee)

- P189. Jennewein, J.S.\*, Eitel, J.U.H. Joly, K., Long, R., Maguire, A.\*, Vierling, L.A., and Weygint, W.\* 2020. Estimating integrated measures of forage nutritional quality for herbivores in northcentral Alaska using hyperspectral and unmanned-aerial systems. Presentation at 2020 Fall meeting of the American Geophysical Union. Virtual Meeting.
- P188. Jensen, J.E.\*, Griffin, K.L., Eitel, J.U.H., Boelman, N., Vierling, L.A., Maguire, A.\* 2020. The influence of environmental variables on intra-seasonal radial stem growth dynamics at the Arctic forest-tundra ecotone using point dendrometers. Presentation at 2020 Fall meeting of the American Geophysical Union. Virtual Meeting.



- P187. 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.\* , Vierling, L.A., and Weygint, W.\* 2019. Assessing the sensitivity of shoot-level chlorophyll fluorescence to scalable proxies of absorbed radiation in an evergreen needleleaf forest. AGU Fall Meeting 2019. December 9-13, San Francisco, CA.
- P186. 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. AGU Fall Meeting 2019. December 9-13, San Francisco, CA.
- P185. 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.
- P184. Eitel, K., Cohn, T., Seven, K., Eitel, J., 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. Abstract ED11C-0736 presented at AGU 2018 Fall Meeting, December 10-14, Washington, D.C.
- P183. 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.
- P182. 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.\*\* , Sonntag, 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.
- P181. Meddens A.J.H.\*\* , Vierling L.A., Eitel J.U.H, Jennewein J.\* , Silva C.A.\* , Boelman N.T., White J., Wulder M. (2018). Developing high-resolution canopy height and digital terrain models using WorldView-2 and ArcticDEM data. Fourth ABoVE Science Team Meeting, January 23–26, Seattle, WA.
- P180. 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. American Geophysical Union, December 11-14, New Orleans LA.
- P179. Davidson S, Bohrer G, LaPoint S\* , Gurarie E\* , Eitel J, Hebblewhite M, Jennewein J, Mahoney P\* , Meddens A\* , Oliver R, Palm E\* , Prugh L, Vierling L, Boelman N (2017). Animals on the Move: status of data acquisition and archiving. Airborne Science Planning & 3rd ABoVE Science Team Meeting, Boulder, Colorado, USA, 19 January 2017.
- P178. Meddens A.J.H.\*\* , Vierling L.A., Eitel J.U.H., Boelman N.T., Jennewein J.\* , and Maguire A.\* (2017). Characterizing and evaluating the Arctic Digital Elevation Model product with LiDAR data for spatial modeling. 3rd ABoVE Science Team Meeting, Boulder, CO, January, 2017.
- P177. Jensen, J.E.\* , Maguire\* , A., 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). Chasing Treeline: Reconstructing the history of the Forest-Tundra Ecotone using lidar-derived tree height (2017). 3rd ABoVE Science Team Meeting, Boulder, CO, January, 2017.
- P176. Eitel J.U.H., Boelman, N.T., Griffin, K.L., Vierling, L.A., Jensen, J.\* , Maguire, A.\* , Jennewein, J.\* , Meddens, A.J.H.\*\* , Russell, M.\* (2017). LiDAR, passive spectral, and ecophysiological

approaches to link Forest Tundra Ecotone structure and function (2017). 3rd ABoVe Science Team Meeting, Boulder, CO, January, 2017.

- P175. Vierling, L.A., Greaves, H.E.\*\* , Magney, T.S.\*\* , Gersony, J.\* , Prager, C.M.\* , Meddens, A.\*\* , Boelman, N.T., Griffin, K.L., Naeem, S., and Eitel, J.U.H. Reflecting on Toolik: Recent advances for understanding Arctic ecology using lidar data. Toolik Field Station All-Scientists meeting, Portland, OR, January 27-28, 2017.
- P174. Vierling, L.A., Smith, R., Eitel, K., Benner, S., Miller, B., Schneider, J., and Penney, S. Workforce development, external engagement, and diversity update for Idaho EPSCoR MILES: update and goals. Idaho NSF EPSCoR Annual Meeting. Boise, ID. October 29, 2015.
- P173. Magney, T.S.\*\* , Griffin, K.L., Boelman, N.T., Eitel, J.U.H., Greaves, H.\*\* , Prager, C.\* , Logan, B., Oliver, R.\* , Fortin, E.\* , Vierling, L.A. Ground based remote sensing and physiological measurements provide novel insights into canopy photosynthetic optimization in arctic shrubs. American Geophysical Union Annual Meeting. San Francisco, CA. December 15-19 2014.
- P172. Greaves, H.\*\* , Vierling, L.A., Eitel, J.U.H., Boelman, N.T., Griffin, K., Magney, T.\*\* Estimating aboveground biomass of low-stature Arctic shrubs with terrestrial LiDAR. American Geophysical Union Annual Meeting. San Francisco, CA. December 15-19 2014.
- P171. 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. American Geophysical Union Annual Meeting. San Francisco, CA. December 15-19 2014.
- P170. Vierling, L.A., Eitel, J.U.H., Vierling, K., Greaves, H.\*\* , Magney, T.\*\* , Martinuzzi, S., Vogeler, J.\* , Hudak, A., Parsons, R.\* , Silva, C.\*\* Unveiling multiple dimensions of ecology using LiDAR. Departmental Seminar, Department of Geography, University of Idaho, Moscow, ID. Dec. 3, 2014 (*invited*).
- P169. Vierling, L.A., Eitel, J.U.H., Vierling, K., Greaves, H.\*\* , Magney, T.\*\* , Martinuzzi, S., Vogeler, J.\* , Hudak, A., Parsons, R.\* , Silva, C.\*\* Beyond 3-D: Unveiling multiple dimensions of ecology using LiDAR. Departmental Seminar, Department of Ecology, Evolution, and Environmental Biology (E3B), Columbia University, New York, NY. Nov. 18, 2014 (*invited*).
- P168. Magney, T.\*\* , Sam Finch\*\* , Nicole Ward\* , Erin Brooks, Dave Huggins, Jan Eitel, Lee Vierling, Todd Anderson, Matt Yourek\* , Claudio Stockle, Dave Brown, Fidel Maureira. 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.
- P167. Eitel, J.U.H., Vierling, L.A., Magney, T.S.\*\* , Greaves, H.E.\*\* , 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-26<sup>th</sup>, 2014, St.Oswald, Germany (*invited*).
- P166. Vierling, L.A., Penney, S., Eitel, K., Benner, S., Busche, C., Green, C., Hernandez, J., Lindquist, E., Makings, D., Miller, B., Smith, R., and Solomon, M. 2014. ONEIdaho: How Idaho's Experimental Program to Stimulate Competitive Research (EPSCoR) is Bridging the Gap Between the Classroom and STEM Careers. Idaho Conference on STEM Education Challenges and Innovative Solutions: Overcoming STEM Education Barriers in Rural States, Boise, ID, 28 May 2014 (*invited*).
- P165. Vierling, L.A., Finch, S.\*\* , Vogeler, J.\* , Silva, C.\*\* , Vierling, K.T., Hudak, A.T., and Eitel, J. 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*).

- P164. Greaves, H.E.\*\* , Magney, T.S.\*\* , Vierling, L.A., Eitel, J.U.H., Boelman, N.T., Griffin, K.L., and Prager, C.\* 2014. Using terrestrial and airborne LiDAR to quantify shrub structure and biomass in Arctic tundra. Arctic LTER annual meeting, Woods Hole, MA, 26 February 2014 (oral presentation).
- P163. Hudak, A.T., S. Finch\*\* , K. Vierling, L. Vierling, J. Vogeler\* , and C. Swift\* . Ecosystem services with backyard benefits: avian diversity, forest diversity, and carbon sequestration on Moscow Mountain. Sponsored by White Pine Chapter, Idaho Native Plant Society, Moscow, Idaho, 23 Jan 2014. (oral presentation).
- P162. 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*)
- P161. 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.
- P160. 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*).
- P159. 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*).
- P158. Wendland, K. and Vierling, L. 2013. The impact of land tenure and conservation strategies on LCLUC and ecosystem services at transboundary sites in Mesoamerica. Trifinio Stakeholder Workshop, Esquipulas, Guatemala, 15 August 2013.
- P157. 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*).
- P156. Litvak, M.E., Asner, G.P., Boelman, N.T., Buermann, W., McDowell, N.G., Schwalm, C., Schaefer, K., and Vierling, L.A. Vulnerability, thresholds, tipping points: NASA Terrestrial Ecology response to the USGCRP 2015 agenda. NASA Terrestrial Ecology Science Team Meeting, La Jolla, CA, April 30-May 2, 2013. (*invited*).
- P155. 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*).
- P154. Wendland, K., Vierling, L., Schlesinger, P.\*\* , and Muñoz, C.\* 2013. An evaluation of the impact of conservation strategies on land cover/land use change at a transboundary site in Mesoamerica. NASA Land Cover and Land Use Change Science Team Meeting, Rockville, MD, April 2-4, 2013. (*invited*).
- P153. 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*).

- P152. 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)*
- P151. Krofcheck, D.J.\* , Eitel, J.U.H., Vierling, L.A., Schulthess, U., and Litvak, M.E. 2012. High spatial resolution remote sensing imagery improves GPP predictions in disturbed, semi-arid woodlands. AGU Fall Meeting, San Francisco, CA, December 2012.
- P150. Magney, T.S.\*\* , Vierling, L.A., Eitel, J.U.H., Campbell, G., Campbell, C., and Cobos, D. 2012. Design and testing of a narrowband spectral radiometer for quantifying plant biophysical properties. AGU Fall Meeting, San Francisco, CA, December 2012.
- P149. Vierling, L.A., Finch, S.\*\* , Vierling, K.T., Strand, E.K., Hudak, A.T., Vogeler, J., Martinuzzi, S., Eitel, J., 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, CA, December 2012. *(invited)*
- P148. Chahal, M.K.\* , Brown, D.J., Brooks, E.S., Campbell, C., Cobos, D., and Vierling, L.A. 2012. Field-scale soil moisture space-time geostatistical modeling for complex Palouse landscapes in the inland Pacific Northwest. AGU Fall Meeting, San Francisco, CA, December 2012.
- P147. Eitel, J.U.H., Magney T.S.\*\* , Vierling, L.A., Brown, T.\* , and Huggins, D. 2012. A novel, mobile dual wavelength laser altimetry system for improved site-specific nitrogen fertilizer applications. AGU Fall Meeting, San Francisco, CA, December 2012.
- P146. Argotty, F.\* , Cifuentes, M., Imbach, P., Vilchez, S., Casanoves, F., Ibrahim, M., and Vierling, L.A. 2012. Quantification of forest carbon degradation in Nicaragua using RapidEye remote sensing data: El Cua and Wiwili case studies. AGU Fall Meeting, San Francisco, CA, December 2012.
- P145. Vierling, L.A. 2012. Photosynthesis from afar: Using radiometers and lasers to derive primary productivity of terrestrial plants. Washington State University School of Biological Sciences Seminar, Pullman, WA, November 26, 2012. *(invited)*
- P144. Bruner, E.A.\* , Brown, D., Huggins, D., Brooks, E., Eitel, J.U.H., Magney, T.\*\* , Vierling, L.A., Poggio, M.\* , and Brown, T.T.\* 2012. Science-based zone mapping for site-specific N management in dryland wheat-based cropping systems on complex, Pacific Northwest Palouse landscapes. American Society of Agronomy/Crop Science Society of America/Soil Science Society of America joint meeting, Cincinnati, OH, October 24, 2012.
- P143. Magney, T.S.\*\* , Eusden, S.A.\* , Eitel, J.U.H., Vierling, L.A., and Logan, B.A. 2012. Remote estimation of photosynthetic efficiency using a green terrestrial laser scanner. 12<sup>th</sup> Annual SilviLaser Conference, Vancouver, BC, Canada, September, 2012.
- P142. Finch, S.\*\* , Vierling, L.A., Vierling, K.T., and Hudak, A.T. 2012. A case study using field surveys and LiDAR to quantify aboveground carbon, bird diversity, and tree species richness to prioritize conservation based on multiple ecosystem services. 12<sup>th</sup> Annual SilviLaser Conference, Vancouver, BC, Canada, September, 2012.
- P141. Eitel, J.U.H., Vierling, L.A., and Magney, T.S.\*\* 2012. Autonomously operating terrestrial laser scanner for monitoring forest ecosystems at a very high temporal resolution. 12<sup>th</sup> Annual SilviLaser Conference, Vancouver, BC, Canada, September, 2012.

- P140. Vierling, L.A., Vierling, K.T., Martinuzzi, S., Vogeler, J., and Hudak, A.T. 2012. MacArthur's Ladder: Advancing the role of LiDAR in assessing and conserving biodiversity. 12<sup>th</sup> Annual SilviLaser Conference, Vancouver, BC, Canada, September, 2012. (*invited*).
- P139. Krofcheck, D.\* , Eitel, J.U.H., Vierling, L.A., and Litvak, M.E. 2012. Linking structural with functional changes of a semi-arid woodland in central New Mexico using a time series of high resolution satellite imagery and eddy covariance measurements. ForestSAT 2012 Biennial Conference, Corvallis, OR, September, 2012.
- P138. Rodhouse, T.J.\* , Ormsbee, P.C., Irvine, K.M., Vierling, L.A., Szewszak, J.M., and Vierling, K.T. 2012. Annual turnover in bat occupancy patterns: predictions from life history theory with implications for conservation and monitoring. Ecological Society of America Annual Meeting, Portland, OR, August, 2012.
- P137. Vierling, L.A., Finch, S.\*\* , Vierling, K.T., Vogeler, J.\* , Adam, P.\*\* , Strand, E., Eitel, J., Martinuzzi, S., and Falkowski, M. 2012. A case study using field surveys and LiDAR to quantify carbon and bird diversity for establishing conservation priorities. 4<sup>th</sup> Annual NSF EPSCoR Western Consortium Tri-State Meeting, Sun Valley, ID, 4 April 2012.
- P136. Galbraith, S.\* , Bosque-Perez, N., Ramos, Z.\*\* , and Vierling, L.A. 2012. Pollination services in changing landscapes: Understanding the distribution of native bee populations in Hojancha, Costa Rica. Entomological Society of America, Pacific Branch Meeting.
- P.135. Vierling, L.A. 2012. Design and deployment of narrowband spectral radiometers to quantify vegetation dynamics. University of Idaho Department of Plant, Soils, and Entomological Sciences Visiting Seminar, Moscow, ID, 22 February 2012 (*invited*).
- P.134. Vierling, L.A., Adam, P.\*\* , Martinuzzi, S., 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*).
- P.133. Vierling, L.A., Martinuzzi, S., Finch, S.\*\* , Hudak, A.T., Eitel, J.U.H., Strand, E.K., Falkowski, M.J., Vogeler, J.\* , and Vierling, K.T. 2012. The role of remote sensing data in understanding land use legacies. PolicyMix Marxan Conference: Spatially explicit analysis of policy mix effectiveness and efficiency, CATIE, Turrialba, Costa Rica, 30 January-3 February, 2012 (*invited*).
- P.132. Magney TS\*\* , Eitel JUH, Vierling LA (2011): Beyond 3-D: Temporal and Biochemical Applications of a Green Terrestrial Laser Scanner. Terrestrial Laser Scanning Workshop, Boulder, CO 2011.
- P.131. Vierling, L.A.; Dennis D. Baldocchi; Nicholas C. Coops; Jan Eitel; Mark A. Friedl; John A. Gamon; Steven R. Garrity; Thomas Hilker; Karl F. Huemmrich; Andrew D. Richardson; Crystal Schaaf; Oliver Sonnentag; Craig E. Tweedie. Beyond Greenness: towards a continuous phenology of vegetation. Presented at the American Geophysical Union Fall Meeting, San Francisco, CA, December, 2011.
- P130. Klos, P.Z.\* , Chain, A.\*\* , Vierling, L.A., Link, T.E., and Finegan, B. Throughfall heterogeneity in forested landscapes as a focal mechanism for deep percolation: yes or no? Presented at the American Geophysical Union Fall Meeting, San Francisco, CA, December, 2011.
- P129. Vierling, Lee A.; Steven R. Garrity; Gaylon Campbell; Nicholas C. Coops; Jan Eitel; John A. Gamon; Thomas Hilker; Daniel J. Krofcheck; Marcy E. Litvak; Javier A. Naupari; Andrew D. Richardson; Oliver Sonnentag; Martin van Leeuwen. Quantifying seasonal dynamics of canopy

- structure and function using inexpensive narrowband spectral radiometers. Presented at the American Geophysical Union Fall Meeting, San Francisco, CA, December, 2011. *(Invited)*
- P128. Eitel, J.U.H., Vierling, L.A., and Long, D.S. Remote sensing of foliar biochemistry with a terrestrial laser scanner. Presented at the American Geophysical Union Fall Meeting, San Francisco, CA, December, 2011.
- P127. Krofcheck, D.J.\*, Eitel, J.U.H., Vierling, L.A., Schulthess, U., Litvak, M.E. Assessing ecosystem function of a Piñon-Juniper woodland using a time series of high resolution satellite imagery and eddy covariance measurements. Presented at the American Geophysical Union Fall Meeting, San Francisco, CA, December, 2011.
- P126. 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.
- P125. Vierling, L.A. 2011. Design and deployment of narrowband spectral radiometers to quantify vegetation dynamics. Washington State University Soil Science Seminar Series, 28 November 2011. *(Invited)*.
- P124. Adam, P.M.\*\*\*, Vierling, L.A., Vierling, K., Hudak, A.T., Strand, E.K., 2011. Assessing Pileated woodpecker habitat from space: predicting presence from lidar derived forest structure. Ecological Society of America, Austin, TX, August 2011.
- P123. Strand, E.K., S.C. Bunting, L.A. Vierling 2011. Landscape Dynamics in Aspen Woodlands on the Owyhee Plateau, Idaho, Oral presentation, State-and-Transition Landscape Modeling Conference Portland, Oregon June 15-17, 2011.
- P122. 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.
- P121. Hudak, A., E. Strand and L. Vierling. Inventory approaches to biomass supply assessment. Small-Scale Energy from Forest Biomass Workshop, University of Idaho Extension, Smelterville, Idaho, 29 Apr 2011.
- P120. Vierling, K.T., L.A. Vierling, B. Linkhart, P. Adam, J. Aycrigg, J. Murray, G. Sadoti, D. Vent, and J. Vogeler. Placing the keystones: elucidating interactions among woodpeckers and cavity-dependent species for improved vertebrate conservation and management. Idaho Chapter of The Wildlife Society Annual Meeting, Idaho Falls, Idaho, April 2011.
- P119. Adam, P., L. Vierling, K. Vierling, E. Strand, A. Hudak. Characterization of woodpecker habitat using airborne and satellite lidar derived forest structure metrics. Idaho Chapter of The Wildlife Society Annual Meeting, Idaho Falls, Idaho, April 2011.
- P118. Hicke, J.A., Pfeifer, E., Meddens, A., and Vierling, L.A. Interactions between climate, insect outbreaks, and forests. US-IALE 26th Annual Symposium, Portland, Oregon, 3-7 Apr 2011. *(invited)*
- P117. Hudak, A., E. Strand, L. Vierling, J. Eitel, and S. Martinuzzi. Multi-temporal LiDAR for mapping change in aboveground carbon pools in an actively managed coniferous forest. US-IALE 26th Annual Symposium, Portland, Oregon, 3-7 Apr 2011.

- P116. Adam, P.M.\*\* , Vierling, L.A., Vierling, K., Hudak, A.T., Strand, E.K, 2011. Assessing Pileated woodpecker habitat from space: predicting presence from lidar derived forest structure. Ecological Society of America, Austin, TX, August 2011.
- P115. Meddens, A. \*, Hicke, J.A., and Vierling, L.A. Classifying multiple stages of mountain pine beetle disturbance using multispectral aerial imagery in north-central Colorado. Presented at the American Geophysical Union Fall Meeting, San Francisco, CA, December, 2010.
- P114. Adam, P.\*\* , Vierling, L., Vierling, K., Strand, E., and Hudak, A. Using satellite and airborne lidar to predict woodpecker presence at the landscape scale. Presented at the American Geophysical Union Fall Meeting, San Francisco, CA, December, 2010. (*note: this talk was featured on the BBC website (<http://www.bbc.co.uk/news/science-environment-11867165>) and BBC World Service, aired December 2010*).
- P113. Eitel, J.U.H.\*\* , Williams, J., Vierling, L., Al-Hamdan, O., and Pierson, F. Suitability of terrestrial laser scanner derived surface roughness for predicting rill erosion in rangeland ecosystems. Presented at the American Geophysical Union Fall Meeting, San Francisco, CA, December, 2010.
- P112. 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.
- P111. Vierling, L.A. The Great Exhale: Reflections on a Breathing Planet. Colorado College Department of Geology Symposium in honor of William Fischer and Eiler Henrickson, Colorado Springs, CO, October 8, 2010 (invited).
- P110. Vierling, L.A. The Role of Remote Sensing Data in Understanding Ecological Legacies, CATIE Scholarly Seminar, Turrialba, Costa Rica, 16 September 2010 (invited).
- P109. Hudak, A., E. Strand and L. Vierling. Utility of remotely sensed data for future forest inventory and monitoring. International Forestry Student Association (IFSA) Symposium, Kookmin University, Seoul, South Korea, 20 Aug 2010 (invited).
- P108. Hudak, A., E. Strand and L. Vierling. Assessment of coniferous forest carbon sequestration in the Northern Rockies, USA using LiDAR remote sensing, field surveys, and a forest growth model. International Union of Forestry Research Organizations (IUFRO) World Congress, Seoul, South Korea, 24 Aug 2010.
- P107. Vierling, L.A., Martinuzzi, S.\*\* , Hudak, A.T., Garrity, S.R.\*\* , Eitel, J.U.H.\*\* , Strand, E.K., Falkowski, M.J., and Vierling, K.T. Landsat Time Series-based Vegetation Change: Context for Understanding Ecological Legacies. Landsat Science Team Semi-Annual Meeting, Boise, ID, 16 June 2010 (invited).
- P106. Vierling, L.A., Strand, E.K., Eitel, J.U.H., and Hudak, A.T. 200 kilohertz and a Cessna: Using lasers to measure forest dynamics for global carbon accounting. University of Idaho, April, 2010.
- P105. Hudak, A.T., Strand, E.K., and Vierling, L.A. Quantifying growth and disturbance effects on forest biomass from repeated field plot and LiDAR measures. USFS Rocky Mountain Research Station All-Scientists Meeting, Fort Collins, CO, March, 2010.
- P104. Hudak, A., L. Vierling and E. Strand. Using multi-temporal LiDAR to quantify biomass change. Inland Northwest Growth & Yield (INGY) Cooperative Annual Winter Technical Meeting, Spokane, Washington, 9 Mar 2010. (oral presentation).

- P103. Garrity, S.R.\*\* and Vierling, L.A.. Spatial and temporal variability of canopy GPP within a flux tower footprint. Presented at the American Geophysical Union Fall Meeting, San Francisco, CA, December, 2009.
- P102. Martinuzzi, S.\*\*, Vierling, L.A., Gould, W.A., Hudak, A.T., Nelson, R., and Evans, J. Current Lidar applications in the Guánica Tropical Dry Forest Reserve. Presented at Silvilaser 2009, College Station, TX, October 2009.
- P101. Vierling, L.A., Hudak, A.T., and Strand, E.K. “Big Sky C Sequestration Partnership Forest Aboveground Carbon Assessment: Preliminary Validation”. Big Sky Carbon Sequestration Partnership Annual Meeting, Bozeman, MT, September, 2009. (invited)
- P100. Vierling, L.A. and Bradley, K. “Cutting Edge Science to the Public: Connecting the STEM Pipeline to EPSCoR Science at the McCall Outdoor Science School”. Idaho EPSCoR Annual Meeting, Moscow, ID, August 31, 2009 (invited).
- P99. Martinuzzi, S.\*\*, Vierling, L.A., Gould, W.A., Falkowski, M.J., Hudak, A.T., and Vierling, K.T. “Using discrete return lidar data to map the distribution of snags, understory shrubs, and avian habitat suitability in a mixed conifer forest”. Ecological Society of America Annual Meeting, Albuquerque, NM, August 6, 2009. (invited)
- P98. Vierling, L.A. “Lidar remote sensing: shedding new light on studies of forest ecosystem structure and function”. Presented at the International Institute of Tropical Forestry, Rio Piedras, Puerto Rico, March 12, 2009.(invited)
- P97. Martinuzzi, S\*\*, L.A. Vierling, W. Gould, M. Falkowski\*, J. Evans, A.T. Hudak, and K.T. Vierling. Characterizing Wildlife Habitat With LiDAR Data: Distribution Mapping Of Snags And Understory Shrubs. Presented at the American Geophysical Union Fall Meeting, San Francisco, CA, December, 2008.
- P96. Jensen J.L.\* , K.S. Humes, A.T. Hudak, and L.A. Vierling. Evaluation of MODIS and discrete-return lidar-based estimates of Leaf Area Index in conifer forests of northern Idaho. Presented at the American Geophysical Union Fall Meeting, San Francisco, CA, December, 2008.
- P95. Meddens, A.J.\*, J.A. Hicke, and L.A. Vierling. Multi-Scale Validation of Forest Insect Mortality Using QuickBird and Aerial Imagery. Presented at the American Geophysical Union Fall Meeting, San Francisco, CA, December, 2008.
- P94. Vierling, L.A. Rangeland Health and Remote Sensing: Merging Tradition with Technology. National Park Service/Upper Columbia Basin Network 5<sup>th</sup> Annual Science Meeting, Moscow, ID, October 15-16, 2008.
- P93. Garrity, S.R.\*\* , Mueller, K.L.\* , Michalak, A.M., Vierling, L.A., Hardiman, B.\* , and Vogel, C. Independent Assessments of fPAR for a Mixed Hardwood Forest Using a Variety of Optical Sensors, Presented at the Ecological Society of America Annual Meeting, Milwaukee, WI, August 2008.
- P92. Bickford, K.\*\* , Vierling, L.A., Garrity, S.R.\*\* , and Naupari, J.\*\* A simple filtered photodiode instrument for continuous measurement of narrowband NDVI and PRI, Presented at the 2008 International SpecNet Meeting, Centro di Ecologia Alpina, Trento, Italy, 30 June- 4 July, 2008.
- P91. Vierling, L.A. Climate Change, Carbon, and Rangelands, 2008 Tri-State Rangeland Ecology Short Course, Boise, ID, April 7-8, 2008.



- P90. Vierling, L.A. From Pixels to Production: Tools and Techniques for Using Remote Sensing to Understand Rangelands, 2008 Tri-State Rangeland Ecology Short Course, Boise, ID, April 7-8, 2008.
- P89. Hudak, A., J. Evans, D. McNamara, M. Falkowski\*, J. Jensen\*, S. Martinuzzi\*\*, L. Vierling, and T. Link. Forestry applications of LiDAR in the Interior Northwest. USGS Second National Lidar Meeting, Reston, VA, 21-22 May, 2008.
- P88. Pocewicz, A.\*, Nielsen-Pincus, M.\*, Goldberg, C.S.\*, Morgan, P., Force, J.E., Waits, L.P., and Vierling, L. Consequences of alternative residential development scenarios for agriculture, fire, water, and social acceptability in a rural landscape in north Idaho, USA. 23rd Annual Symposium of the United States Regional Chapter of the International Association for Landscape Ecology. April 7, 2008. Madison, WI.
- P87. Strand, E.K.\*\*, Bunting, S., and Vierling, L. Landscape scale assessment of aspen decline in the Owyhee Mountains, Idaho. Presented at the Society for Range Management Annual Meeting, February, 2008.
- P86. Jensen, J.R.\*, Humes, K., Hudak, A.T., and Vierling, L.A. Leaf Area Index Modeling and Mapping in Conifer Forests Using Multispectral and Lidar Data. Presented at the American Geophysical Union Fall Meeting, San Francisco, CA, December, 2007.
- P85. Vierling, L., Naupari, J.\*\*, Garrity, S\*\*, Guenther, A., Serça, D., and Burban, B. Low-cost sensor packages for measuring narrowband canopy reflectance: implications for understanding regional C exchange. Presented at the American Geophysical Union Fall Meeting, San Francisco, CA, December, 2007.
- P84. Garrity, S\*\*, and Vierling, L. Using narrowband vegetation indices to estimate ecosystem-atmosphere CO<sub>2</sub> flux by a mixed hardwood forest. Presented at the American Geophysical Union Fall Meeting, San Francisco, CA, December, 2007.
- P83. Meddens, A.\*, Hicke, J., Vierling, L., and Hudak, A. Estimating Aboveground Biomass Mortality of Lodgepole pine Caused by Mountain Pine Beetle in the Sawtooth Mountains, Idaho. Idaho Space Grant Consortium Annual Meeting, Moscow, ID, September, 2007.
- P82. Calhoon, M.J.\*\*, and Vierling, L. Early detection of delayed tree mortality postfire using hyperspectral remote sensing. Ecological Society of America/Society for Ecological Restoration Joint Annual Meeting, San Jose, CA. August, 2007.
- P81. Martinuzzi, S.\*\*, Vierling, L., Gould, W., Vierling, K., Hudak, A., and Nelson, R.F. Potential of LIDAR data to improve species modeling and habitat characterization. Ecological Society of America/Society for Ecological Restoration Joint Annual Meeting, San Jose, CA. August, 2007.
- P80. Vierling, L. From Surface to Satellite: Advanced methods for characterizing forest ecosystem structure and function. North Idaho Sustainable Forestry Teachers Tour. Lewiston, ID. June, 2007. (invited)
- P79. Jensen, J.R.\*, Humes, K., Hudak, A.T., and Vierling, L.A. Comparison of single sensor vs. integrated data analysis to estimate leaf area index over a range of highly variable forest conditions in northern Idaho. Association of American Geographers Annual Meeting, San Francisco. April, 2007.
- P78. Martinuzzi, S.\*\*, Vierling, L., Gould, W., Vierling, K., Hudak, A., and Nelson, R.F. The use of LIDAR data in improving species modeling and habitat characterization. Idaho Chapter of The Wildlife Society, 2007 Meeting, Pocatello, ID. March, 2007.

- P77. Naupari, J.\*\* , Garrity, S.\*\* , Vierling, L., Smith, A.M.S., Hinson, J., and Soulen, M. Automated Detection of Shrub Size, Location, and Cover Using Aerial Photography and Two-Dimensional Wavelet Analysis, Grazing Lands Conservation Initiative 2006 Meeting, St. Louis, MO. December, 2006. (invited)
- P76. Falkowski, M.J.\* , Smith, A.M.S., Gessler, P.E., Hudak, A.T., and Vierling, L.A., Automatically Measuring Individual Tree Crown Diameter and Height from LiDAR Data: A Comprehensive Evaluation of Spatial Wavelet Analysis, American Geophysical Union Fall Meeting, San Francisco, CA. December, 2006.
- P75. Greenberg, J., Smith, A.M.S., Vierling, L.A., Dobrowski, S., and Vanderbilt, V. "Landscape-scale characterization of individual plants using hyperspatial remote sensing: techniques, technologies, and applications." American Geophysical Union Fall Meeting, San Francisco, CA. December, 2006.
- P74. Xu, Y.\*\* , Garrity, S.R.\*\* , Vierling, L.A., Martins, D.K.\* , Shepson, P.B., and Stirm, B.H. "A software toolkit for processing and analyzing spectral and trace gas flux data collected via aircraft." American Geophysical Union Fall Meeting, San Francisco, CA. December, 2006.
- P73. Garrity, S.R.\*\* , Vierling, L.A., Turnipseed, A., Vogel, C., Shepson, P., and Martins, D.\* "A comparison between spectrally derived vegetation indices and CO<sub>2</sub>/H<sub>2</sub>O fluxes measured over a hardwood forest." American Geophysical Union Fall Meeting, San Francisco, CA. December, 2006.
- P72. D.K. Martins\* , D.K., Shepson, P.B., Jacox, M., Smith, J., Garrity, S.\*\* , Vierling, L., H.P. Schmid, Vogel, C., Zimmerman, J.R., Wyss, P., Santini, R., and Stirm, B. "A comparison of CO<sub>2</sub> and sensible heat flux measurements from aircraft and tower-based platforms." American Geophysical Union Fall Meeting, San Francisco, CA. December, 2006.
- P71. Strand, E.K.\*\* , Vierling, L.A., Bunting, S.C., and Smith, A.M.S. "Net Changes in Above Ground Woody Carbon Stock in Western Juniper Woodlands using Wavelet Techniques and Multi-temporal Aerial Photography." American Geophysical Union Fall Meeting, San Francisco, CA. December, 2006.
- P70. Vierling, L.A. "Seeing the Leaves for the Forest: Some Improved Approaches for Foliar Remote Sensing." 2006 Idaho Space Grant Consortium Research Symposium, Moscow, ID. October, 2006.
- P69. Lewis, J.S.\* , Rachlow, J.L., Garton, E.O., and Vierling, L.A. "Effects of habitat on GPS collar performance: using data screening to reduce location errors." The Wildlife Society Annual Meeting, Anchorage, AK, September 2006.
- P68. Clawges, R.\*\* , Vierling, K., and Vierling, L. "Use of airborne lidar for assessment of avian habitat and estimation of select vegetation indices in the Black Hills National Forest, South Dakota, USA" IEEE International Geoscience and Remote Sensing Symposium (IGARSS), Denver, CO, July, 2006.
- P67. Vierling, L. "The Heart of Darkness? The Effect of Atmospheric Dimming on Rainforests of the Congo...and Beyond." Boise State University Geosciences Department, Boise, ID, March, 2006. (invited)
- P66. Garrity, S.\*\* , Vierling, L., and Smith, A.M.S. "Automated detection of shrub size, location, and cover using aerial photography and two-dimensional wavelet analysis." Society for Range Management Annual Meeting, Vancouver, BC, February, 2006.

- P65. Strand, E.\*\* , Vierling, L., and Bunting, S. “Predicting landscape composition under varying fire regimes in quaking aspen.” Society for Range Management Annual Meeting, Vancouver, BC, February, 2006.
- P64. Strand, E.K\*\*, Vierling, L.A., Smith, A.M.S., Bunting, S.C., Hann, D.B., and Gessler, P.E. “Wavelet Estimation of Plant Spatial Patterns in Multi-temporal Aerial Photography.” American Geophysical Union Fall Meeting, San Francisco, CA December, 2005.
- P63. Vierling, L. and Chen, X.\*\* “A simple and effective image normalization method to improve landscape change detection across sensors and across time.” American Society for Photogrammetry and Remote Sensing Intermountain/Northern Rockies regional meeting, Boise, ID. November, 2005 (invited).
- P62. Vierling, L. “From the Leaf to the Landscape: New Prospects for Scaling Measures of Ecosystem Structure and Function.” Washington State University, Pullman, WA. October, 2005 (invited).
- P61. Nelson, K.\*\* , Zhu, Z., Vierling, L., and Ohlen, D. “Evaluating the Effects of Spatial Scale on Remotely- Sensed Mapping of Burn Severity: A Comparison of Landsat and MODIS Data” Annual Pecora Remote Sensing Conference, Sioux Falls, SD. October, 2005.
- P60. Vierling, L. “A Global Change Sampler Plate: Observations, Challenges, and Opportunities.” Bates College, Lewiston, ME. October, 2005.
- P59. Vierling, L., and Chen, X.\*\* “Sub-pixel vegetation cover estimates from remotely sensed imagery: Concepts, applications, and validation using an unmanned aerial vehicle.” The Wildlife Society Annual Meeting, Madison, WI. September, 2005 (invited).
- P58. Vierling, L. “A Global Change Sampler Plate: Observations, Challenges, and Opportunities.” University of Wyoming, Laramie, WY. June, 2005 (invited).
- P57. Vierling, L., Frykholm, J., Glasson, G., and Campbell, R.\*\* “The Earth Systems Connections Elementary Curriculum.” University of Wyoming, Laramie, WY. June, 2005 (invited).
- P56. Vierling, L., Chen, X.\*\* , Rowell, E.\*\* , and DeFelice, T. “The Use of Lidar to Validate Sub-Pixel Forest Cover Estimates from IKONOS and Landsat.” Lidar Concepts and Resource Applications Workshop, USFS/RSAC, Salt Lake City, UT. May, 2005 (invited).
- P55. Seielstad, C., Rowell, E.\*\* , Queen, L., Hardy, C., McCaughey, W., and Vierling, L. “Assessing Forest Fuels with Airborne Laser Altimetry.” Lidar Concepts and Resource Applications Workshop, USFS/RSAC, Salt Lake City, UT. May, 2005.
- P54. Vierling, L., and Vierling, K. “Creating Undergraduate Community Ambassadors for Earth System Science” American Geophysical Union Fall Meeting, San Francisco, CA. December, 2004.
- P53. Chen, X.\*\* , Vierling, L., and Deering, D. “A Simple and Effective Image Normalization Method to Monitor Boreal Forest Change in a Siberian Burn Chronosequence across Sensors and across Time.” American Geophysical Union Fall Meeting, San Francisco, CA. December, 2004.
- P52. Toomey, M.\*\* and Vierling, L. “A Comparison of Landsat TM and ASTER for Equivalent Water Thickness Derivation in a Ponderosa Pine Ecosystem.” American Geophysical Union Fall Meeting, San Francisco, CA. December, 2004.
- P51. Vierling, L., Frykholm, J., Glasson, G., and Campbell, R.\*\* “The Earth Systems Connections Elementary Curriculum.” NASA Earth and Space Science Annual Education Workshop, NASA-Johnson Space Center, Houston, TX. November, 2004 (invited).

- P50. Vierling, L., Frykholm, J., and Glasson, G. "The Earth Systems Connections Elementary Curriculum: Contextual Learning Opportunities for Understanding the Earth as a System." NASA Earth Science Education Community Vision Meeting, Monterey, CA. November, 2004.
- P49. Vierling, L. "From the Leaf to the Landscape: Using Advanced Remote Sensing Techniques to Identify Plant Canopy Structure." Idaho National Environmental and Energy Laboratory (INEEL), Idaho Falls, ID. October, 2004 (invited).
- P48. Chen, X.\*\*, Vierling, L., Rowell, E.\*\*, and DeFelice, T. "Using Lidar and Effective LAI to Evaluate Vegetation Cover Estimates from IKONOS and Landsat 7 in a ponderosa pine forest." ForestPARC Lidar User's Conference, Moscow, ID. May, 2004 (invited).
- P47. Vierling, L. "From the Leaf to the Landscape: Using Advanced Remote Sensing Techniques to Detect and Map Vegetation Functional Groups." University of Idaho, Moscow. May 2004 (invited interview seminar).
- P46. Chen, X.\*\*, Vierling, L., Deering, D., and Conley, A. "The Temporally Invariant Cluster (TIC) Method: a New Relative Radiometric Normalization Scheme for Detecting Landscape Change Using Multi-temporal Images." American Society for Photogrammetry and Remote Sensing Annual Meeting, Denver, CO. May 2004.
- P45. Smith, R.\*\*, Chen, X.\*\*, Conley, A., and Vierling, L. "Using MODIS and ETM+ to examine the effect of spatial scale on leaf area index estimates in forest burn chronosequences." Tenth Biennial USDA Forest Service Remote Sensing Applications Conference, Salt Lake City, UT. April 2004.
- P44. Rowell, E.\*\*, Vierling, L., and Shepperd, W. "Using Lidar Remote Sensing to Supplement Forest Inventory Variables and to Characterize Canopy Fuels in the Black Hills Experimental Forest." Tenth Biennial USDA Forest Service Remote Sensing Applications Conference, Salt Lake City, UT. April 2004.
- P43. Toomey, M.\*\* and Vierling, L. "Remote Sensing of Landscape Level Foliar Moisture Using Landsat TM SWIR Reflectance." Tenth Biennial USDA Forest Service Remote Sensing Applications Conference, Salt Lake City, UT. April 2004.
- P42. Frykholm, J., Vierling, L., and Glasson, G. "Teaching Mathematics and Science...Via Satellite." International Consortium for Research in Science and Mathematics Education (ICRSME), Concepcion, Chile. March, 2004.
- P41. Vierling, L.A., Chen, X.\*\*, Fersdahl, M.\*\*, and Zimmerman, P. "Research and Outreach with the Short Wave Aerostat-Mounted Imager (SWAMI)." National Science Foundation CAREER Awardee Conference, Arlington, VA, January 2004 (invited).
- P40. Zimmerman, P., Price, M., Updegraff, K., Kozak, P.\*, Capehart, B., Vierling, L., and Wylie, B. "Rangelands and Carbon Sequestration: Science and Marketing Issues." Presented at the Wyoming Council of Carbon Sequestration, Casper, Wyoming. January 2004 (invited).
- P39. Vierling, L.A., Chen, X.\*\*, Fersdahl, M.\*\*, and Zimmerman, P. "The Short Wave Aerostat-Mounted Imager (SWAMI): A Novel Hyperspectral Remote Sensing Instrument Platform." American Geophysical Union Fall Meeting, San Francisco, CA. December 2003 (invited).
- P38. Vierling, L.A., Frykholm, J., and Glasson, G. "Bringing Cutting-Edge Concepts to the Elementary Classroom: The Earth Systems Connections Science, Math, & Technology Curriculum." Presented at the annual NASA AESP/ERC educational resource workshop, NASA-Langley Research Center, Langley, VA. November 2003 (invited).

- P37. Zimmerman, P., Price, M., Updegraff, K., Kozak, P.\*, Capehart, B., and Vierling, L. "Standardized Carbon Emission Reduction Credits: Maximized Value to Producers and Industry." Basin Electric Annual Meeting, Bismarck, ND. Invited address. November 2003 (invited).
- P36. Vierling, L.A. "Forests, Fires, and CO<sub>2</sub>: Local Transformations, Global Implications." University of Idaho, Moscow, ID. October 2003 (invited).
- P35. Vierling, L., J. Frykholm, and G. Glasson. "Cutting-Edge Concepts for the Elementary Classroom: The Earth Systems Connections Science, Math, & Technology Curriculum." Western Regional NASA Space Grant Directors Meeting, Rapid City, SD. September, 2003 (invited).
- P34. Vierling, L., Frykholm, J., and Glasson, G. "The Earth Systems Connections Elementary Curriculum: Contextual Learning Opportunities for Building Ecological Knowledge." Presentation at the Ecological Society of America annual meeting, Savannah, GA, August 2003.
- P33. Smith, R.\*\*, and Vierling, L. "Improved ground- and satellite-based methods for deriving LAI in a burned ponderosa pine ecosystem." Presentation at the Ecological Society of America annual meeting, Savannah, GA, August 2003.
- P32. Zimmerman, P., M. Price, W. Capehart, L. Vierling, C. Peng, E. Baker, G. Duke, F. Kopp, H. Mott, C. Das\*, K. Updegraff, and C. Groseth. "C-Lock: a method for maximizing carbon sequestration in agricultural systems." In: Second Annual Conference on Carbon Sequestration: Developing and Validating the Technology Base to Reduce Carbon Intensity. Alexandria, VA, May 5–8, 2003. Online: <http://www.carbonsq.com/proceedings.cfm>.
- P31. Chen, X.\*\*, Conley, A. and Vierling, L. "Remotely sensed estimates of Leaf Area Index in forests of Central Siberia using MODIS Data." South Dakota Academy of Sciences annual meeting, Rapid City, SD, April 2003. Poster presentation.
- P30. Vierling, L., Frykholm, J., and Glasson, G. "Connecting Elementary Children with Earth Systems Science Using Satellite Imagery, Mapping, and Mathematics." Presented at the National Science Teachers Association annual meeting, Philadelphia, PA, March 2003.
- P29. Glasson, G., Frykholm, J., and Vierling, L. "Using Traditional Ecological Knowledge to Develop an Earth System Science Elementary Curriculum." Presented at the National Association for Research in Science Teaching annual meeting, Philadelphia, PA, March 2003.
- P28. Vierling, L., Chen, X.\*\*, Conley, A., Deering, D., Derr, K., Matzner, S., Rowell, E.\*\*, Smith, R.\*\*, Swets, D., and Toomey, M.\*\* "Remote Determination of Leaf Area Index Along Fire Chronosequences in the Black Hills and Southern Siberia." Presented at the NASA EPSCoR Annual Conference, Washington, DC, March 2003.
- P27. Glasson, G., Frykholm, J., and Vierling, L. "Earth Systems Science: Crossing Cultural Borders." Presentation at the Mid-Atlantic Association for the Education of Teachers of Science, Natural Bridge, VA, October, 2002.
- P26. Vierling, L., Rowell, E.\*\*, Smith, R.\*\*, Chen, X.\*\*, and Toomey, M.\*\* "From surface to satellite: using remote sensing to measure and monitor forest ecosystems." South Dakota Association of Environmental Professionals 6th Annual Conference, Rapid City, SD, October, 2002 (invited).
- P25. Chen, X.\*\*, Vierling, L., Dykstra, D.\*\*, Rowell, E.\*\*, and Capehart, W. "Assessing fractional tree coverage using IKONOS, Landsat 7, and LiDAR data in a ponderosa pine forest via sub-pixel interpretation." Presented at the Ecological Society of America annual meeting, Tucson, AZ, August, 2002.

- P24. Rowell, E.\*\* , Vierling, L., Dykstra, D.\*\* , and Chen, X.\*\* “Small footprint LiDAR estimates of canopy gap structure in a ponderosa pine forest.” Presented at the Ecological Society of America annual meeting, Tucson, AZ, August, 2002.
- P23. Vierling, L., Rowell, E.\*\* , and Dykstra, D.\*\* “LIDAR: A promising approach to estimating Western forest fire susceptibility.” Presented at the ESRI User’s Conference, San Diego, CA, July, 2002.
- P22. Vierling, L., Frykholm, J., and Glasson, G. “The Earth Systems Connections Elementary Curriculum: A World of Contexts for Teaching and Learning Remote Sensing.” Presented at the IEEE International Geoscience and Remote Sensing Symposium, Toronto, Canada, June, 2002. Oral presentation (invited lecture).
- P21. Vierling, L., Rowell, E.\*\* , Chen, X.\*\* , Dykstra, D.\*\* , and Vierling, K. “Relationships Among Airborne Scanning LiDAR, High Resolution Multispectral Imagery, and Ground-Based Inventory Data in a Ponderosa Pine Forest.” Presented at the IEEE International Geoscience and Remote Sensing Symposium, Toronto, Canada, June, 2002. Poster presentation.
- P20. Vierling, L. “The Heart of Darkness: Understanding Light and Photosynthesis in a Congolese Rain Forest Canopy.” Black Hills Chapter of Sigma Xi, Semi-annual meeting, Rapid City, SD, April, 2002 (invited).
- P19. Chen, X.\*\* , Vierling, L., Rowell, E.\*\* , Dykstra, D.\*\* , Capehart, W., and DeFelice, T. “Relationships Among IKONOS Imagery, Airborne Scanning LIDAR, and Ground-Based Tree Inventory Data in a Ponderosa Pine Forest: A Multiple Endmember Approach.” USGS/NIMA/NASA High Spatial Resolution Commercial Imagery Workshop, Reston, VA, March, 2002. Oral presentation.
- P18. Vierling, L., Frykholm, J., and Glasson, G. “It’s elementary, my dear! Earth systems science and mathematics lessons for K-5 inquiry.” National Science Teachers Association annual meeting, San Diego, CA, March, 2002. Oral presentation.
- P17. Vierling, L., Frykholm, J., and Glasson, G. “Global Greenup: An interactive elementary level earth system science and mathematics lesson.” National Science Teachers Association annual meeting, San Diego, CA, March, 2002. Oral presentation (invited).
- P16. Glasson, G., Frykholm, J., and Vierling, L. “Development of an Elementary Earth Systems Science and Mathematics Curriculum.” Association for the Education of Teachers in Science Annual Meeting, Charlotte, N.C., January, 2002. Oral presentation.
- P15. Vierling, L., Baker, B., Dykstra, D.\*\* , Zimmerman, P., Clay, D., Robbins, C.\*\* , and Meyers, T. “Short- and long-term studies of ecosystem-atmosphere CO<sub>2</sub> exchange in South Dakota.” South Dakota Academy of Sciences Annual Meeting, Vermillion, SD, April, 2001. Oral presentation.
- P14. Chen, X.\*\* , Vierling, L., Doering, M.\*\* , Engebretsen, R.\*\* , Johnson, G., Nelson, K.\*\* , Obr, N.\*\* , Pasala, A.\*\* , and Zimmerman, P. “Development of the Short Wave Aerostat-Mounted Imager (SWAMI): A novel instrument for conducting small- to intermediate-scale remote sensing measurements.” South Dakota Academy of Sciences Annual Meeting, Vermillion, SD, April, 2001. Oral presentation.
- P13. Vierling, L., Frykholm, J., and Glasson, G. “Earth Systems Connections: Integrative Lessons for Use at the Elementary Level.” National Science Teachers Association annual meeting, St. Louis, MO. March, 2001. Oral Presentation.

- P12. Frykholm, J., Glasson, G., & Vierling, L. "Making Connections: Curricular Innovations in Elementary Mathematics, Science, and Technology Education." Association of Mathematics Teacher Educators annual meeting, Costa Mesa, CA. January, 2001. Oral presentation.
- P11. Glasson, G.E, Frykholm, J., & Vierling, L. "Earth Systems Connections: Development of Elementary Science, Mathematics, and Technology Curriculum." Mid-Atlantic Association for the Education of Teachers of Science, Corbin, Kentucky. September, 2000.
- P10. Vierling, L. "The Heart of Darkness? Investigating light and CO2 dynamics within a monodominant Congolese rain forest canopy," University of Utah Biology Department, Salt Lake City, UT. March, 2000 (invited).
- P9. Frykholm, J., Vierling, L., and Glasson, G. E. "Earth Systems Connections: An Integrated K-4 Science, Mathematics, and Technology Curriculum." International Consortium for Research in Science and Mathematics Education (ICRSME), San Jose, Costa Rica. February, 2000.
- P8. Vierling, L., Guenther, A., Harley, P., Serca, D., Bouka-Biona, C., and Wessman, C. "Ecosystem-Atmosphere Exchange of Isoprene and CO2 at the EXPRESSO African Tropical Rainforest Site: Impacts of Clouds and Haze on Canopy Fluxes," International Global Atmospheric Chemistry Conference, Seattle, WA. August, 1998.
- P7. Vierling, L. "Impacts of Cloud and Haze Cover on the Photosynthesis of a Tropical Rain Forest Canopy," Environmental Protection Agency STAR Conference, Arlington, VA. June, 1998 (invited).
- P6. Vierling, L., and Harley, P. "Light and Temperature Within a Tropical Rainforest Canopy Under Varying Cloud Cover: Implications for Canopy Level CO2 Exchange," Ecological Society of America Annual Meeting, Albuquerque, NM. August, 1997.
- P5. Vierling, L. "Pieces of a Puzzle: Using Interdisciplinary Approaches to Study Planetary Breathing," National Center for Atmospheric Research, Boulder, CO. February, 1997 (invited).
- P4. Vierling, L., Deering, D., and Eck, T. "Differentiation of Arctic Tundra Vegetation Types and Aspects of Vegetation Phenology Early in the Growing Season Using Bidirectional Radiometry," IEEE International Geoscience and Remote Sensing Symposium, Lincoln, NE. May, 1996.
- P3. Vierling, L., Deering, D., and Eck, T. "Reflecting on Alaska: Using Surface Bidirectional Reflectance Characteristics to Differentiate Arctic Tundra Vegetation Types," Goddard Space Flight Center, Greenbelt, MD. August, 1995 (invited).
- P2. Vierling, L. "The Use of Stratigraphic and Palynological Analyses in Reconstructing Past Climates," The Colorado College, Colorado Springs, CO. October, 1993 (invited).
- P1. Vierling, L., and Sullivan, D. "The Late-Quaternary Paleoenvironmental History of Lost Park, Tarryall Mountains, Central Colorado: A Palynological Study," American Quaternary Association 12th biennial meeting, Davis, CA. August, 1992.

### **Grants and Contracts Pending and Awarded:**

#### **Research Contracts, Events or Other Financial Arrangements:**

*Awards received as a faculty member:*

G60. Source of Support:	UI President's Sustainability Initiative (Water)
Project Title:	Team SINEW: Sustaining Idaho's Needs in Environment and Water
Award Amount:	\$13,000

Period of Award: June 2020-March 2022  
 Vierling Role: Principal Investigator

G59. Source of Support: NASA  
 Project Title: LiDAR, Passive Spectral, and Ecophysiological Approaches to Link Forest Tundra Ecotone Structure and Function  
 Award Amount: \$1.22 million  
 Period of Award: September 2015-August 2021  
 Vierling Role: Co-Principal Investigator (Jan Eitel, UI, PI)  
 Award Number: NNX15AT86A

G58. Source of Support: NSF  
 Project Title: ITEST: Building STEM identity in Native American students with UAV technology  
 Award Amount: \$1,101,525  
 Period of Award: February 2016-January 2020  
 Vierling Role: co-Principal Investigator (K. Eitel, PI)  
 Award Number: 1513349

G57. Source of Support: NASA  
 Project Title: Multisensor fusion for mapping of low-stature Arctic vegetation communities and woody biomass  
 Award Amount: \$90,000  
 Period of Award: September 2015-August 2018  
 Vierling Role: Principal Investigator/Advisor (Note: this is a Graduate Fellowship to H. Greaves, and co-advised with Jan Eitel, UI)  
 Award Number: NNX15AP04H

G56. Source of Support: NASA  
 Project Title: Animals on the move: Remotely Based Determination of Key Drivers Influencing Movements and Habitat Selection of Highly Mobile Fauna throughout the ABoVE Study Domain  
 Award Amount: \$1.56 million  
 Period of Award: September 2015-August 2020  
 Vierling Role: Co-Principal Investigator (Natalie Boelman, Columbia University, Lead PI)  
 Award Number: NNX15AT89A

G55. Source of Support: National Science Foundation  
 Project Title: EPSCoR RII Track 1: Managing Idaho's Landscapes for Ecosystem Services  
 Award Amount: \$20,000,000  
 Period of Award: 6/01/13-5/31/18  
 Vierling Role: State Lead, External Engagement/Workforce Development  
 Award Number: EPS-1301792

G54. Source of Support: National Science Foundation  
 Project Title: CNH-Ex: Quantifying linkages among land-use policies, agricultural intensification, habitat fragmentation and social-ecological resilience in a tropical biological corridor  
 Award Amount: \$248,733  
 Period of Award: 6/01/13-5/31/15  
 Vierling Role: Co-Principal Investigator (L. Waits, UI, PI)  
 Award Number: 1313824

G53. Source of Support: USDA-Forest Service



Project Title: Upscaling fine-scale plant understory biodiversity to the stand and landscape levels with airborne lidar  
 Award Amount: \$29,400  
 Period of Award: 6/21/13-5/23/18  
 Vierling Role: Principal Investigator  
 Award Number: 13-JV-11221633-114

G52. Source of Support: NASA  
 Project Title: Land tenure, property rights and land cover and land use change at transboundary sites in the Mesoamerican Biological Corridor  
 Award Amount: \$298,350  
 Period of Award: 1/1/13-12/31/16  
 Vierling Role: University of Idaho PI (K. Wendland, Colorado State U., Lead PI)  
 Award Number: NNX13AC70G

G51. Source of Support: NASA  
 Project Title: Quantifying Thresholds in Arctic Tundra Vegetation Structure and Ecosystem Function Using LiDAR and Multispectral Remote Sensing  
 Award Amount: \$865,620  
 Period of Award: 11/1/12-10/31/16  
 Vierling Role: Principal Investigator  
 Award Number: NNX12AK83G

G50. Source of Support: National Science Foundation  
 Project Title: University of Idaho McCall Field Campus Research Infrastructure Planning  
 Award Amount: \$25,000  
 Period of Award: 2/1/11-1/31/13  
 Vierling Role: Co-PI (S. Hollenhorst, PI)

G49. Source of Support: National Science Foundation  
 Project Title: Collaborative Research: Sustainability dynamics for water resources in a rapidly urbanizing climatically sensitive region  
 Award Amount: \$75,000  
 Period of Award: 7/2010-6/2012  
 Vierling Role: Collaborator

G48. Source of Support: USDA/USFS  
 Project Title: Assessment and Review of Remote Sensing Technologies for Threat Detection  
 Award Amount: \$25,000  
 Period of Award: 7/2010-6/2012  
 Vierling Role: Principal Investigator

G47. Source of Support: NASA  
 Project Title: Collaborative development of a climate change curriculum for classrooms in the Intermountain West  
 Award Amount: \$547,726  
 Period of Award: 1/2011-12/2014  
 Vierling Role: Science Co-PI

G46. Source of Support: USDA/NIFA  
 Project Title: Site Specific Climate Friendly Farming  
 Award Amount: \$4.64 million (UI portion: \$1,319,844.83)  
 Period of Award: 4/1/2011-3/31/2017  
 Vierling Role: Co-PI/University of Idaho PI (David Brown, WSU, PI)  
 Award Numbers: 2011-67003-3034 and 2011-68002-30191

G45. Source of Support: National Science Foundation  
Project Title: IGERT: Evaluating resilience of ecological and social systems in changing landscapes: a doctoral research and education program in Idaho and Costa Rica  
Award Amount: \$3,200,000  
Period of Award: 9/2009-8/2015  
Vierling Role: Faculty Participant (N. Bosque-Perez, PI)

G44. Source of Support: US Forest Service  
Project Title: Relating avian diversity to potential old-growth forest structure as characterized by LiDAR  
Award Amount: \$20,600  
Period of Award: 7/21/09-7/21/14  
Vierling Role: Co-Principal Investigator (K. Vierling, PI)

G43. Source of Support: US Forest Service  
Project Title: Quantifying Carbon Sequestration of Coniferous Forests in the Northern Rockies Using LiDAR  
Award Amount: \$13,550  
Period of Award: 8/7/09 – 9/30/11  
Vierling Role: Principal Investigator

G42. Source of Support: University of Idaho Research Office  
Project Title: Acquisition of Terrestrial Laser Scanning Instrumentation to Conduct Multidisciplinary Research  
Award Amount: \$150,000  
Period of Award: 4/2009 (one-time capital equipment purchase, therefore no end date)  
Vierling Role: Principal Investigator

G41. Source of Support: USDA-ARS  
Project Title: Evaluation of Rapid Eye Satellite Imagery for Prediction of Mid-season Nitrogen Levels in Spring Wheat  
Award Amount: \$33,000  
Period of Award: 4/3/09 – 3/31/11  
Vierling Role: Principal Investigator

G40. Source of Support: US Department of Energy  
Project Title: Quantifying Carbon Sequestration of Coniferous Forests in the Northern Rockies Using Field Surveys, Stand Growth Modeling, and Lidar Remote Sensing  
Award Amount: \$105,592  
Period of Award: February, 2009 – December, 2010  
Vierling Role: Principal Investigator

G39. Source of Support: NSF  
Project Title: Idaho EPSCoR Research Infrastructure Improvement: Water Resources in a Changing Climate  
Award Amount: \$15,000,000  
Period of Award: September 1, 2008 – August 31, 2013  
Vierling Role: Senior Personnel, Outreach (P. Goodwin, U. of Idaho, PI)

G38. Source of Support: Bureau of Land Management  
Project Title: Quantifying fine scale wind and water erosion after disturbance  
Award Amount: \$159,500  
Period of Award: June 1, 2008 through September, 2013  
Vierling Role: Principal Investigator

G37. Source of Support: USGS GAP Analysis Program  
Project Title: Incorporation of keystone species maps in GAP models to improve species habitat and biodiversity assessments  
Award Amount: \$241,724  
Period of Award: August 15, 2008 through August 14, 2011  
Vierling Role: Co-PI (K. Vierling, PI)

G36. Source of Support: USDA Borlaug Fellowship Program  
Project Title: Spatial modeling to study landscape connectivity of neotropical tree species in fragmented landscapes: *Dipteryx panamensis* as a study case  
Award Amount: \$6,170  
Period of Award: August 16, 2007 through October 22, 2007  
Vierling Role: Principal Investigator

G35. Source of Support: United States Geological Survey  
Project Title: Algorithm Development for Improved Automated Remote Detection of Land Areas Containing High Fire Risk for Incorporation in LANDFIRE  
Award Amount: \$84,993  
Period of Award: July 30, 2007 through July 29, 2009  
Vierling Role: Principal Investigator

G34. Source of Support: United States Geological Survey  
Project Title: LANDFIRE product development for USGS/EROS  
Award Amount: \$30,000  
Period of Award: June 10, 2007 through December 30, 2007  
Vierling Role: Principal Investigator

G34. Source of Support: University of Idaho Interdisciplinary Grants Program  
Project Title: Landscapes Without Borders: Towards an interdisciplinary teaching and research program to analyze landscapes for ecology and conservation  
Award Amount: \$14,464  
Period of Award: July 1, 2007 through June 30, 2008  
Vierling Role: Principal Investigator with L. Waits and R. Dezzani

G33. Source of Support: National Park Service  
Project Title: NPS Socioeconomic Atlas  
Award Amount: \$29,835  
Period of Award: August 21, 2006 through August 14, 2007  
Vierling Role: Collaborator (J. McKendry, PI)

G32. Source of Support: Sub Contract: to University of North Dakota (Prime: NASA)  
Project Title: ForestPARC (Forest Public Access Resource Center)  
Award Amount: \$135,000  
Period of Award: January 1, 2007 through December 31, 2007  
Vierling Role: Co-PI (A. Smith, PI)

G31. Source of Support: University of Idaho Harold Heady Professorship  
Project Title: Improving methods for remote monitoring of rangeland ecosystem health  
Award Amount: \$105,000  
Period of Award: July 1, 2006 through June 30, 2011  
Vierling Role: Principal Investigator

G30. Source of Support: UI Research Council  
Project Title: Development and application of a novel remote sensing technique to quantify woody plant encroachment  
Award Amount: \$9,000

Period of Award: July 1, 2006 through June 30, 2007  
 Vierling Role: Principal Investigator with E. Strand (UI Graduate Student)

G29. Source of Support: USGS GAP Analysis Program  
 Project Title: Modeling GAP habitats: Integrating high spatial resolution imagery with GAP landcover to extrapolate habitat biophysical characteristics  
 Award Amount: \$132,278  
 Period of Award: July 2006 through April 2010  
 Vierling Role: Co-PI (W. Gould, USFS-IITF, Puerto Rico, PI)

G28. Source of Support: UI NSF IGERT Program  
 Project Title: Analysis of past exurban development trends to improve future landscape-level modeling in northern Idaho  
 Award Amount: \$20,000  
 Period of Award: August 2005 through May 2006  
 Vierling Role: Principal Investigator

G27. Source of Support: Center for Research on Invasive Species and Small Populations  
 Project Title: Comparison of Methods for Sampling and Analysing Spatial Structures in Landscape Genetics  
 Award Amount: \$54,950  
 Period of Award: February 2006 through May 2009  
 Vierling Role: Co-Principal Investigator (L. Waits, PI)

G26. Source of Support: David Little Endowment  
 Project Title: Hyperspectral Imaging for Range Monitoring and Management  
 Award Amount: \$26,000  
 Period of Award: January 2005 through December 2006  
 Vierling Role: Principal Investigator

G25. Source of Support: NASA  
 Project Title: Leaf Area Index for Fire Chronosequences of the Black Hills and Southern Siberia: A Comparative Study  
 Award Amount: \$820,000  
 Period of Award: September 1, 2001 through August 31, 2008  
 Vierling Role: Principal Investigator

G24. Source of Support: NSF CAREER Program  
 Project Title: CAREER: An Integrated Research/Educational Plan to Develop and Deploy a Pointable, Hyperspectral Remote Sensing Instrument on a Tethered Balloon  
 Award Amount: \$509,000 (original award and one supplement)  
 Period of Award: Sept. 1, 2000 through August 31, 2008  
 Vierling Role: Principal Investigator

G23. Source of Support: Sub Contract: to University of North Dakota (Prime: NASA)  
 Project Title: ForestPARC (Forest Public Access Resource Center)  
 Award Amount: \$110,500  
 Period of Award: December, 2005 through December, 2006  
 Vierling Role: Co-PI (P. Gessler, UI, PI)

G22. Source of Support: NSF CAREER Program  
 Project Title: REU Supplement: An Integrated Research/Educational Plan to Develop and Deploy a Pointable, Hyperspectral Remote Sensing Instrument on a Tethered Balloon  
 Award Amount: \$11,988  
 Period of Award: May 1, 2003 through August 31, 2003  
 Vierling Role: Principal Investigator

G21. Source of Support: South Dakota Center for Biocomplexity Studies (NSF EPSCoR)

Project Title: Quantification and Scaling-up of the Coupled Biogeochemical Cycles of Carbon and Water in Grassland Ecosystems of South Dakota: Synthesis of Flux Tower Measurements, Modeling, GIS, and Remote Sensing

Award Amount: \$50,207

Period of Award: February 2004 through February 2005

Vierling Role: Principal Investigator

G20. Source of Support: NASA

Project Title: Earth Systems Connections: An Integrated K-4 Science, Mathematics, and Technology Curriculum

Award Amount: \$471,100

Period of Award: Jan. 1, 1999 through September 30, 2004

Vierling Role: Principal Investigator

G19. Source of Support: Bush Foundation Faculty Development Program

Project Title: Making Undergraduate Writing Come Alive: Bringing Biography to the Classroom

Award Amount: \$5,000

Period of Award: December 2003 through July 2004

Vierling Role: Principal Investigator

G18. Source of Support: Sub Contract: to University of North Dakota (Prime: NASA)

Project Title: A Public Access Resource Center (PARC) Empowering the General Public to Use EOSDIS

Award Amount: \$110,481

Period of Award: November 15, 1996 to March 31, 2004

Vierling Role: Co-PI (S. Farwell, SDSM&T, PI)

G17. Source of Support: Sub Contract: to University of North Dakota (Prime: NASA)

Project Title: A Public Access Resource Center (PARC) Empowering the General Public to Use EOSDIS: Implementation Phase III (ESIP)

Award Amount: \$89,700

Period of Award: March 1, 1998 through February 29, 2004

Vierling Role: Co-PI (S. Farwell, SDSM&T, PI)

G16. Source of Support: Sub Contract: to University of Idaho (Prime: NASA)

Project Title: Forest Public Access Resource Center (ForestPARC)

Award Amount: \$45,000

Period of Award: July 1, 2003 through March 31, 2004

Vierling Role: Co-PI (P. Gessler, U. Idaho, PI)

G15. Source of Support: USDA Forest Service

Project Title: Lidar Remote Sensing for Precision Forest Management

Award Amount: \$12,424 (SDSM&T/UI portion)

Period of Award: August 8, 2003 through June 30, 2005

Vierling Role: Co-PI (A. Hudak, USFS, PI)

G14. Source of Support: South Dakota Space Grant Consortium

Project Title: Development of Culturally-Relevant Videos for Inclusion with National NASA Earth System Science Curriculum

Award Amount: \$2,000

Period of Award: 2002

Vierling Role: Principal Investigator

G13. Source of Support: Bush Foundation Faculty Development and SDSM&T EPSCoR Office

Project Title: JSTOR: Expanding the Electronic Wing of Devereaux Library to Enrich Undergraduate Research at SDSM&T

Award Amount: \$6,000

Period of Award: 2001-2002

Vierling Role: Principal Investigator

G12. Source of Support: EarthWatch, Inc.  
 Project Title: Geometric Calibration of the QuickBird Satellite in Western South Dakota  
 Award Amount: \$14,000  
 Period of Award: 2000  
 Vierling Role: Principal Investigator  
 Note: This contract did not reach completion due to satellite launch failure

G11. Source of Support: SDSM&T Nelson Research Grant  
 Project Title: Studying integrated impacts of environmental change on the prairie potholes region of eastern South Dakota  
 Award Amount: \$5,000  
 Period of Award: 1999-2000  
 Vierling Role: Principal Investigator

G10. Source of Support: SD Governor's Office  
 Project Title: C-Lock: A system for certifying soil carbon credits in South Dakota  
 Award Amount: \$750,000  
 Period of Award: July 1, 2000-June 30, 2003  
 Vierling Role: Co-PI (2000-2001); Collaborator (2002-2003) (P. Zimmerman, SDSM&T, PI)

G9. Source of Support: Subcontract to University of North Dakota (NASA: Prime)  
 Project Title: The Upper Midwest Aerospace Consortium Research and Applications Center (UMAC-RESAC)  
 Award Amount: \$118,800  
 Period of Award: 1999-2003  
 Vierling Role: Co-PI (S. Farwell, SDSM&T, PI)

*Awards received as a student:*

G8. Source of Support: United States Environmental Protection Agency STAR Graduate Fellowship  
 Project Title: Regionalization of trace gas flux measurements and implications for global change  
 Award Amount: \$75,000  
 Period of Award: 1996-1999

G7. Source of Support: Biosphere-Atmosphere Research Training Grant, University of Colorado (NSF funded)  
 Project Title: Regionalization of trace gas flux measurements and implications for global change  
 Award Amount: \$20,000  
 Period of Award: 1995-1996

G6. Source of Support: Grant-in-aid of Graduate Research, *Sigma Xi*  
 Project Title: Measurements of light transfer in a tropical rain forest: implications for modeling canopy-level isoprene fluxes  
 Award Amount: \$800  
 Period of Award: 1996

G5. Source of Support: Dean's Small Grant, University of Colorado  
 Project Title: Remote sensing of biogeochemical processes in the tropics  
 Award Amount: \$475  
 Period of Award: 1996

G4. Source of Support: Departmental Grant, Environmental, Population, and Organismic Biology (CU-Boulder)  
 Award Amount: \$1,000  
 Period of Award: 1996

G3. Source of Support: Venture Undergraduate Research Grant, Colorado College  
 Project Title: Reconstructing past climates of Colorado using pollen analysis  
 Award Amount: \$850  
 Period of Award: 1991

G2. Source of Support: Colorado Mountain Club Foundation Research Grant Program  
 Project Title: Reconstructing past climates of Colorado using pollen analysis  
 Award Amount: \$500  
 Period of Award: 1991

G1. Source of Support: Boettcher Foundation of Colorado  
 Award Amount: \$80,000 (full undergraduate scholarship to any college/university in Colorado; paid all expenses for my degree program at Colorado College)  
 Period of Award: 1988-1992

**Cooperative Agreements Brokered and Donations Arranged:**

- 2020. Partnered with DOE-Idaho National Lab and UI-Idaho Falls to advertise faculty position in Environmental Science (search canceled due to COVID-19 pandemic).
- 2019. Partnered with Idaho Department of Fish and Game and UI/CNR Dean to establish and hire a new joint tenure-track faculty line co-funded by IDFG and CNR/UI.
- 2011. Partnered with Decagon Devices, Inc. to develop shortwave radiometers for monitoring vegetation stress and productivity.
- 2011. Established new cooperative agreement with the RapidEye satellite image company for them to provide scores of high resolution satellite images of Costa Rica and the Washington-Idaho border. This data supported NSF-IGERT and USDA-AFRI project research initiatives and represented a monetary value over \$150,000.
- 2009. Arranged the donation of a major research scaffolding tower to the University of Idaho; a new tower of this type has a value of \$75,000.
- 2009. Established cooperative agreement with the RapidEye satellite image company for them to provide our research laboratory with several high resolution satellite images of Moscow Mountain and central New Mexico, a value of approximately \$15,000.
- 2005-2009. Assisted with attracting a gift from alumni donors Thomas and Teita Reveley to establish the UI Remote Sensing and Spatial Ecology Complex at the UI College of Natural Resources, March 2006. \$250,000. My work on the Reveley Complex, coupled with follow-up interactions with the Reveleys, later helped the UI and CNR to attract an additional \$1,000,000 donation from this generous family.
- 2000. Established cooperative agreement with Horizons Incorporated, Rapid City, SD to co-fund one graduate student and donate lidar remote sensing services for research and teaching purposes for research and development in forestry applications of lidar. ~\$80,000.
- 2000. Established cooperative agreement with Sarnoff Laboratories, Princeton NJ (Formerly RCA Labs) Pyramid Vision Technologies Subsidiary to extend the use of defense-grade computer vision technologies for natural resource monitoring applications. ~\$60,000 of equipment loaned to UI from company.
- 2000. Forged seven-year agreement between SDSM&T, US Forest Service, and NOAA Atmospheric Turbulence and Diffusion Lab, Oak Ridge, TN, to establish the Black Hills Ameriflux tower funded by NOAA.

2000. Established cooperative agreement with US Geological Survey EROS Data Center, Sioux Falls, SD to fully fund a graduate student in my laboratory as a research assistant for the interagency LANDFIRE project. ~\$40,000.

**SERVICE:**

**Major Committee, Reviewer, and Professional Society Activities:**

Search Committee co-Chair, assistant/associate/full professor of Industrial Ecology, UI-Idaho Falls and Idaho National Lab (2019-20)

Co-Chair of curriculum revision, UI Environmental Science curriculum committee (2019)

Search Committee Chair, Idaho Department of Fish and Game-University of Idaho tenure track assistant/associate/full professor of Human Dimensions of Fish and Wildlife (2019)

Reviewer, Dutch Research Council, NWO Domain Science Board, Netherlands (2019)

External Dissertation Evaluator, University of British Columbia (2013, 2019)

University of Idaho Team Leader, Kiva.org microlending team (2009-2019)

Search Committee Chair, McCall Field Campus Tenure-track faculty search in Environmental Technology (2018)

Associate Editor, *Canadian Journal of Remote Sensing* (2007-2017)

Faculty Mentoring Committee member, Beth Newingham (2009-2014); Chao Fan (2017-2020); Luigi Boschetti (2014-2018); Blair McLaughlin (2014-2017); Dan Johnson (2014-2018); Tara Hudiburg (2015-2018); Chris Caudill (2015-2018)

Core Faculty, University of Idaho Environmental Science Program (2008-2015)

Curriculum Committee, UI Environmental Science Program (2011-2015; 2019-present)

University of Idaho education liaison, Upper Midwest Aerospace Consortium (2005-2014)

Search Committee co-Chair, Conservation Social Sciences/MOSS new faculty hire (2013-2014)

Chair of Task Force to Develop Future Plan for Conservation Social Sciences Department, University of Idaho (2014)

University of Idaho Department of Conservation Social Sciences Faculty Search Committee Member (2013)

Chair, University of Idaho College of Natural Resources Geospatial Laboratory Committee (2011-2012)

Member, Scientific Committee, Silvilaser 2012 International LiDAR Conference (2011-2012)

University of Idaho College of Natural Resources Forest, Range, and Fire Sciences Department Head Search Committee (2011-2012)

University of Idaho, Martin Institute of International Studies Borah Symposium Committee (2011-2012)



External Tenure and Promotion Reviewer, University of Hawaii (2011)

University of Idaho College of Natural Resources Dean Search Committee (2009-2010)

Reviewer, Climate Change & Energy Program, *U.S. Civilian Research and Development Foundation* (2010)

Associate Editor, *Journal of Applied Remote Sensing* (2010-2011)

Member, Technical Committee, 30th Canadian Symposium on Remote Sensing (22-25 June, 2009)

Member, Scientific Committee, Silvilaser 2009 International Conference (14-16 October, 2009)

Advisory Panel Member for the Journal *Nature* (2008-2009)

Co-Lead, College of Natural Resources/University of Idaho RFI proposal (2008-2009)

University of Idaho President's Athletic Advisory Council (2007-2010)

College of Natural Resources Curriculum Committee (2006-2009)

CNR/UI Reveley Geospatial Laboratories Remodeling Design and Implementation (2005-2008)

Wildland Restoration Ecologist Faculty Search Committee, UI Department of Rangeland Ecology and Management (2007-2008)

University of Idaho College of Natural Resources Associate Dean Search Committee (2007).

Biometrician/Ecosystem Modeler Faculty Search Committee, UI Forest Resources Dept. (2006-2007)

UI/CNR Geospatial Curriculum Subcommittee co-organizer, CNR and Geography (2005-2006)

Faculty participant, University of Idaho IGERT program (2005-2007)

Chair, academic design committee to combine UI Forest Resources and Rangeland Ecology and Management departments (2005-2006)

Biogeochemical Modeler Faculty Search Committee, UI Geography Department (2005-2006)

SDSM&T education liaison, Upper Midwest Aerospace Consortium (1999-2004)

Member, SDSM&T Faculty Development Committee (2000-2004)

Member, Spearfish Canyon Foundation Ecology Subcommittee (2000-2004)

Manuscript reviewer, *Science*, *Science Advances*, *Proceedings of the National Academy of Sciences*, *Proceedings of the Royal Society-B*, *Methods in Ecology and Evolution*, *Carbon Balance and Management*, *Photosynthesis Research*, *Remote Sensing*, *Journal of Applied Ecology*, *EOS*, *Ecological Applications*, *Oecologia*, *Global Change Biology*, *Remote Sensing of Environment*, *IEEE Transactions on Geoscience and Remote Sensing*, *Journal of Geophysical Research-Biogeosciences*, *Canadian Journal of Remote Sensing*, *Atmospheric Chemistry and Physics*, *International Journal of Applied Earth Observation and Geoinformation*, *Computers and Electronics in Agriculture*, *Sensors*, *Forestry Chronicle*, *Journal of Environmental Management*, *Landscape and Urban Planning*, *Canadian Journal of Forest Research*, *Forest Ecology and Management*.

I have reviewed approximately 70 NSF proposals as a panelist reviewer (7 on-site review panels including MRI, DBI, and EPSCoR reverse site visit) and ad-hoc reviewer for the National Science Foundation (1999-present)

Member, NSF Division of Environmental Biology, Development of Biological Infrastructure Review Board (2001-2003)

I have reviewed ~50 NASA proposals, and served on five NASA proposal review panels: Terrestrial Ecology Program (three times); Cryospheric Sciences Program (twice)

I have reviewed research proposals for scientific agencies within the Canadian, Dutch, and British governments, as well as for The Nature Conservancy (2002-present)

Reviewer, *The State of the Nation's Ecosystems*, The Heinz Center (2006)

Member, South Dakota NASA EPSCoR Technical Advisory Committee (2001-2004)

Frequent contributor to Idaho and South Dakota NSF EPSCoR Program Activities (1999-2019)

**Professional and Scholarly Organizations:**

American Geophysical Union  
(Special Session co-Organizer, AGU Fall Meeting, San Francisco, CA, 2006)

Ecological Society of America  
(Special Session co-Organizer, ESA Annual Meeting, Albuquerque, NM, 2009)

Phi Beta Kappa

Society for Range Management

Sigma Xi, The Scientific Research Society

**Outreach Service:**

UI High School Dual Credit Liaison, Environmental Science (2020-present).

Member, University of Wisconsin Upham Woods Field Campus Advisory Board (2019-present).

Annual Faculty Representative at Vandal Friday/Envision Idaho/UIIdaho Bound programs (2011-present).

As Executive Director, I supported a large portfolio of outreach as Executive Director of the University of Idaho McCall Field Campus/McCall Outdoor Science School. This \$1.4M annually, self-financially-supporting suite of outreach and education programming serves ~3500 K-12 students annually and has received state, national, and international awards for excellence in community development, informal education, and economic impact (2012-2019).

Served as State Lead for External Engagement and Workforce Development for the \$20M NSF EPSCoR “Managing Idaho’s Landscapes for Ecosystem Services (MILES)” award to the State of Idaho. As part of this program I was responsible for running the statewide Adventure Science program and MILES Undergraduate Research Internships (MURI) program, meeting project targets to increase research participation by Idaho’s 2-year institutions, high school teachers, and populations that are underrepresented in the science, technology, engineering, and mathematics fields (2013-2018).

Young Scientist Mentor (mentored one new assistant professor and one Ph.D. student), NASA Carbon Cycle and Ecosystems Joint Meeting, April 2015.

Presenter and assisted in the development of “Drones for Forestry” Extension Program, University of Idaho, Coeur d’Alene, Idaho (30 foresters and landowners in attendance), February 27, 2015).

External Review Panel Member to conduct Decadal Review of Geology Department, The Colorado College (2014-2015).

Presenter, HOIST program for Native American students in the STEM fields, McCall, Idaho, June 2014.

Parker Farm Precision Agriculture Technology Demonstration Day. Moscow, ID. 6/5/2014. Media reports and interviews found here: *Capital Press*: <http://cpweb.eor.dc.publicus.com/Research/20140515/field-day-to-emphasize-precision-ag#.U63AMbFBnoE>; *The Washington Times*: <http://www.washingtontimes.com/news/2014/jun/8/precision-ag-technologies-showcased-at-moscow/?page=all>

Guest presenter to high school mathematics class on opportunities in the STEM fields, High School for Telecommunication Arts and Technology, New York Public Schools, February 2014.

Outreach/Workforce Development Lead Faculty, Idaho NSF Experimental Program to Stimulate Competitive Research (EPSCoR). (2008-present). Lead statewide workforce development and external engagement activities for State of Idaho NSF EPSCoR. Since 2013, this program has recruited 60 REU students and 90 teachers annually to engage with the research programs across the State of Idaho.

Program Planning Committee Member, Northwest Climate Science Center Climate ‘Boot Camp’ for graduate students studying climate change science and impacts (2013).

UI Honors program: Served as a guest speaker for a 2-hour evening session to advise students associated with the University Honors Program about questions they had regarding career directions, and in particular, establishing and sustaining a positive ‘work-life balance’ (2012).

UI CNR Seminar Series: Conceptualized, invited, coordinated, and hosted NASA Chief Scientist Dr. Waleed Abdalati’s 2-day campus visit to Moscow including a full itinerary including a public lecture, classroom visits, student roundtable discussions, press conference, and VIP dinner at CNR Dean’s home (2012)

UI Honors Program, ‘Fireside chat’ session faculty leader (2009, 2011, 2014)

Co-designed and co-taught 3-day geospatial and climate change workshops to K-12 teachers at McCall Outdoor Science School (twice in 2010, once in 2011)

Led vegetation map development for Tenmile Ranch Conservation Easement, Lewiston, ID, with REM 472 Remote Sensing of Environment course (2008)

Led service learning project for post-fire native grass restoration, Soulen Livestock Company, Weiser, ID, with REM 429 Landscape Ecology course (2006)

Led vegetation map development for Soulen Livestock Company, Weiser, ID, in conjunction with REM 429 Landscape Ecology course (2005)

Judge, UI Graduate Student Association Grad Expo (2005)

Presenter, Mentor, Volunteer and/or Advisor to the following groups:

Area schoolchildren (I give presentations to K-12 teachers and students ~3-5 times annually)

Upper Midwest Aerospace Consortium EdPARC (Educational Public Access Resource Center; 1999-2013)

NASA Educational Outreach Network Specialists (1999-2006)

NASA “Ask an Earth Scientist” booth during National Science Teachers Association annual meetings (2000-2004)

Federal Communications Commission Chairman Michael Powell (2003)

Black Hills Upward Bound Program participants (2002-2003)

SDSM&T Scientific Knowledge for Indian Learning and Leadership (SKILL) program (1999-2004)

Youth Engineering Adventure (YEA) participants (2001-2002)

Oglala Lakota College Biology Department (2001-2002)

NASA Space Days (2001)

South Dakota Legislators (2000-2003)

South Dakota State University Precision Agriculture Farmers Group (2000)

Mongolian Technical University students (2000)

Rapid City Children’s Science Center (1999-2003)

National Center for Atmospheric Research SOARS minority research program (1997)

The Nature Conservancy, Colorado office headquarters (1992-1993)

For many years I required students in my classes to deliver presentations to groups in the general public. Audiences have included area schoolchildren, retirement homes, business leaders, social clubs, and journalists (see Publication J27).

My work has been featured in the following articles written for lay audiences:

2020 *Science* paper featured in news outlets worldwide, 12/20

“Lasers Help Map Hard-to-Reach Spider Habitat”, *Wired Magazine* on-line: (<http://www.wired.com/wiredscience/2011/04/lasers-map-spiders/>), 4/2011.

“Space Laser Spies for Woodpeckers”, BBC World Service and BBC Website (<http://www.bbc.co.uk/news/science-environment-11867165>), 12/2010.

“Keep high-tech jobs in the Black Hills”, *Rapid City Journal*, 7/2005.

“Educator Features: Earth Systems Connections”, Special NASA on-line Earth Day Education short segment, [www.nasa.gov](http://www.nasa.gov), 4/2004.

“SWAMI predicts more accurate future for atmospheric satellites”, *Rapid City Journal*, 6/2003.

“Research team delays flight over fire area”, *Rapid City Journal*, 7/2002.

“A partnership with NASA”, *Virginia Tech Gridiron Magazine*, 9/2001.

“Studying forest from sky”, *Rapid City Journal*, 7/2001.

“Air farming to be investigated in South Dakota”, [www.cnn.com](http://www.cnn.com) news story, 2/2000.

**Community Service:**

Assistant Baseball Coach, Palouse area Cal Ripken Baseball (2018, 2019)

Vice-President (2017) and President (2018), Quad Cities Fusion Soccer Club

Soccer Coach, Moscow United Soccer Club (2013-2014)

Student Mentor, Moscow School District (2009-2010)

Director, Spearfish Canyon Foundation Board of Directors (2002-2004).

Chair, Rapid City Historic Preservation Commission (2003-2004).

Member, Rapid City Historic Preservation Commission (2000-2004).

**HONORS AND AWARDS:**

*Received on behalf of McCall Outdoor Science School as Executive Director:*

Universities Economic Development Association National Award, Talent+Place Category (2018)

North American Association for Environmental Education/Underwriter’s Laboratories Innovation in Education Award, North America (2015)

Idaho Power “Powering Lives” Award (2014)

Association of Public and Land-grant Universities Magrath Award for Excellence in Outreach, National Runner-up (2013)

W.K. Kellogg Foundation/APLU West Regional Award for Engaged Scholarship (2013)

J.A. and Kathryn Albertson Foundation ID21 Award for Excellence in Education (2012)

*Received as an individual:*

Achieved University of Idaho University Distinguished Professor Rank (2020).

University of Idaho Presidential Mid-Career Award for Faculty Excellence (2014).

University of Idaho Office of Technology Transfer, Innovation Award Certificate of Appreciation for invention disclosure (2009).

Idaho Experimental Program to Stimulate Competitive Research and McCall Outdoor Science School Certificate of Recognition for Excellence in Outreach (2009).

University of Idaho College of Natural Resources Outstanding Research Award (2007).

Harold Heady Professor of Rangeland Ecology, University of Idaho Department of Rangeland Ecology and Management. (2006-2011).

Faculty Award for Outstanding Scholarly and Professional Service, South Dakota School of Mines and Technology (2000).

National Faculty Early Career Development (CAREER) Award, National Science Foundation (2000).

STAR Graduate Fellowship, United States Environmental Protection Agency (1996).

Distinction in Geology, Geology Department, The Colorado College (1992).

Graduation with honors, *magna cum laude*, The Colorado College (1992).

Inducted into Phi Beta Kappa, The Colorado College Chapter of Phi Beta Kappa (1992).

J. Juan Reid Award of Excellence in Service, Academics, and Athletics, The Colorado College (1992).

Outstanding Student Award, Rocky Mountain Association of Geologists (1992).

Rhodes Scholarship (state finalist), Oxford University (1991).

Undergraduate Merit Award, State of Colorado (1991).

National Collegiate Athletics Association (NCAA) Academic All-America Nominee in Baseball, The Colorado College (1990, 1992).

Boettcher Full Undergraduate Scholarship, The Boettcher Foundation (1988).

## **PROFESSIONAL DEVELOPMENT NOT MENTIONED ABOVE:**

### **Teaching and Advising:**

Advising, "Advising Skills for Faculty", University of Idaho, Moscow ID (September 2008).

Teaching, "ArcGIS for Education", Education Public Access Resource Center, Las Vegas, NV. (February 17, 2006 - February 20, 2006).

Teaching, "JSTOR: Expanding the Electronic Wing of Devereaux Library to Enrich Undergraduate Research at SDSM&T", Bush Faculty Development Program, South Dakota School of Mines and Technology, Rapid City, SD. (2001 - 2002).

### **Scholarship:**

Scholarship, "Making Undergraduate Writing Come Alive: Bringing Biography to the Classroom", Bush Foundation, Rapid City, SD. (January 2004 - May 2004).

NIH IRB Training Certification Completed May 11, 2012, Certification number 919042  
(<http://phrp.nihtraining.com/users/cert.php?c=918042>)

### **Outreach and Leadership:**

LEAD-21 Leadership Training Program (application pending; planned participation in 2021-22 cohort)

Selected for UI President's Media Ambassador program and went through training for that program (May, 2013)

Leadership, “Academic Leadership: A Seminar for Faculty Considering or Continuing in Academic Leadership Roles”, Transformational Leadership and Training (TiLT) group, Washington State University and University of Idaho, Moscow, ID. (October 24, 2009).

Outreach/Leadership, “Opportunities and Challenges for Scientists in a Changing World: A Communications Workshop”, University of Idaho (nominated by CNR Dean to participate in workshop, which included national and regional-level journalists and leaders in science communications). Moscow, ID. (September 16, 2011)

## **HIGHLIGHTS AS MFC/MOSS ADMINISTRATOR:**

My leadership role as Executive Director of the UI-CNR McCall Field Campus and McCall Outdoor Science School was integrative and broad-reaching. I worked with the McCall team and Moscow-based faculty/staff/administration to strategically define and accomplish goals. Major accomplishments during my tenure from 2012-2019 included:

1. UI/CNR/MOSS was named in the Top 5 of all environmental STEM Education organizations in North America by Underwriter’s Laboratories and the North American Association for Environmental Education. MOSS was the only award recipient located west of Pennsylvania during the inaugural year of this award (2015).
2. UI/CNR/MOSS received the top national award by the Universities Economic Development Association in the category Talent + Place in 2018.
3. UI/CNR/MOSS being awarded the major W.K. Kellogg Outreach and Engagement award for the Western U.S., and we competed for the National Magrath Outreach award in the company of Pennsylvania State University, Ohio State University, and U. Texas-El Paso.
4. Authority/responsibility for \$1.4M annual budget, 97% of which is soft funded. Highlights include paying off an outstanding \$310,000 debt (which existed on the books when I became Executive Director) in three years. During my tenure as Executive Director the MOSS annual budget increased 3.3 fold.
5. Shifting from an AmeriCorps-based funding model to a more diversified funding model in order to attract 20-25 M.S. and/or M.N.R. students into the MOSS program each year. This decision paid off greatly, as soon after making this shift, the Idaho National AmeriCorps grant was declined for funding. Had we not already moved away from this funding model our graduate student class of 2013-2014 (and our ability to serve our 2500 K-12 student visitors annually) would have suffered a disastrous blow.
6. Integrating McCall-based activities with Moscow efforts. MOSS hosted the first-ever visit of the full CNR Dean’s office staff and CNR administration in February 2013. We instituted a new marketing program in collaboration with CNR marketing and recruiting. We initiated a Distinguished Scholars Program at MOSS and attracted numerous faculty to include MOSS in their grant writing activities. We hosted our first-annual Open House August 2015. President Staben attended and spoke at the McCall Field Campus 75<sup>th</sup> Anniversary celebration in September, 2014, the first of many regular visits from the UI president.
7. Developed and implemented a new funding model for schools to attend MOSS and qualify for state tax credits. This model arose out of a crisis by the Moscow School District, which suffered \$1.3M in cuts in 2013; MOSS was on the chopping block. The new model keeps costs stable for families of students, eliminates the MSD financial obligation, and creates an avenue for the UI Foundation to receive donations from a broader array of donors.
8. We worked in 2013 to develop the new McCall Field Campus Master Plan, coming on the heels of the recent UI acquisition of the Field Campus property deed. This process was led by the CNR Dean. My part in this work involved coordinating input from MOSS staff, traveling to Islandwood (MOSS peer institution on Bainbridge Island), and serving on the committee to review and select an architecture firm proposal to

develop the Master Plan, which was completed in January 2014 and served as the template for a complete redesign of the McCall Field Campus and the needed fundraising.