CURRICULUM VITAE

NAME: Lee Alexander Vierling **DATE:** April 29, 2011

RANK OR TITLE: Associate Professor

DEPARTMENT: Forest Ecology and Biogeosciences

OFFICE LOCATION AND CAMPUS ZIP: Campus Core, College of Natural Resources Bldg. Room 17E
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DATE OF FIRST EMPLOYMENT AT UI: Fall, 2004

DATE OF TENURE: July 1, 2008

DATE OF PRESENT RANK OR TITLE: July 1, 2008

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:

Academic:
Visiting Scientist, Center for Tropical Agriculture and Ecology (CATIE), Costa Rica (2010-present).
Harold Heady Endowed Professor, University of Idaho. (July 2006-present).
Associate Professor, University of Idaho, (July 2008-present).
Assistant Professor, University of Idaho. (September 2004 – June 2008).
Associate Professor, South Dakota School of Mines and Technology. (April 2004 - September 2004).
Assistant Professor, 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).

Governmental:
Research Assistant, National Center for Atmospheric Research. (May 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" 4th grade education module, Boulder, Colorado. (1998).
Government, State of Texas Oxidant Study, Boulder, Colorado. (1997).

TEACHING ACCOMPLISHMENTS:

Areas of Specialization:
Global environmental change

Environmental remote sensing
Spatial ecology
Biogeochemistry
Biosphere-atmosphere interactions
Earth system science education (ages "K-gray")

Courses Taught:

Number	Title	Enrollment	Credit Hours
Summer 1991: The Colorado College			
Geology 130 (TA)	Introductory Geology	20	4
Spring 1993: The Colorado College			
Geology 130 (TA)	Introductory Geology	25	4
Spring 1997: University of Colorado			
Env. Biol. 1040 (TA)	Biology: A Human Approach	20	2
Spring 1998: The Colorado College			
Environmental Science 310	Current Global Change Research	10	2
Spring 2000: South Dakota School of Mines and Technology			
Atmospheric Science 401	Global Environmental Change	6	3
Fall 2000: South Dakota School of Mines and Technology			
Atmospheric Science 510	Introduction to Environmental Remote Sensing	10	3
Atmospheric Science 690	Graduate Seminar in Remote Sensing	5	2
Spring 2001: South Dakota School of Mines and Technology			
Atmospheric Science 401	Global Environmental Change	29	3
Fall 2001: South Dakota School of Mines and Technology			
Atmospheric Science 690	Biosphere-Atmosphere Interactions Seminar	7	2
Spring 2002: South Dakota School of Mines and Technology			
Atmospheric Science 401	Global Environmental Change	23	3
Fall 2002: South Dakota School of Mines and Technology			
Atmospheric Science 410	Introduction to Environmental Remote Sensing	17	3
Spring 2003: South Dakota School of Mines and Technology			
Atmospheric Science 401	Global Environmental Change	20	3
Spring 2004: South Dakota School of Mines and Technology			
Atmospheric Science 401	Global Environmental Change	14	3
Spring 2005: University of Idaho			
Forest Resources 429	Landscape Ecology	29	2
Fall 2005: University of Idaho			
Range Ecology 502	IDL Programming for Natural Resources	3	2
Spring 2006: University of Idaho			
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

Fall 2006: University of Idaho

Natural Resources 101	Exploring Natural Resources	17	1
Range Ecology 504	Remote Sensing Readings	7	1

Spring 2007: University of Idaho

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

Fall 2007: University of Idaho

Forest Resources 472	Remote Sensing of the Environment	20	3

Spring 2008: University of Idaho

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 attendees	1

Fall 2008: University of Idaho

REM/FOR 472	Remote Sensing of the Environment	10	3-4

Spring 2009: University of Idaho

REM/GEOG 450	Global Environmental Change	40	3
REM 429	Landscape Ecology	29	3

Fall 2009: University of Idaho

REM/FOR 472	Remote Sensing of the Environment	23	3-4
CORE 125	The Earth and Our Place on It (Honors section)	26	4

Spring 2010: University of Idaho

CORE 175	The Earth and Our Place on It (Honors section)	17	3

Fall 2011: University of Idaho

REM/FOR 472	Remote Sensing of the Environment	40	3
NR 101	Exploring Natural Resources	20	1

Students Advised:

Undergraduate Advisees:

Ecology and Conservation Biology Program (A=academic advisor; T=thesis advisor):
Owen Baughman (A, T)
Robert Parrett (A)
Jonathan Anderson (A)

Eva Sebesta (A, T)
Nicholas Thimesch (T)
Mark Moroge (T)
Amanda Playter (T)
Rob Gibson (T)
Jeff Bengtson (T)

Forest Resources Program:
Ryan Sheridan (T)

Environmental Science Program:
Blaine Krumpe (T)
Nic Turinski (T)

Rangeland Ecology and Management Program:
Annika Levine (A)
Aubrey Woodcock (A)
Rosana Arrizubieta (A)

Undergraduate Student Clubs:

Ecology and Conservation Biology Club, lead faculty advisor (2005-2007).

Current Graduate Student Advisees (program):

Ph.D. Melanie Johnson (Environmental Science)
Patrick Adam (Environmental Science)
Adina Chain (UI/CATIE Joint Doctoral Program; Natural Resources)
Zayra Ramos (UI/CATIE Joint Doctoral Program; Natural Resources)
Troy Magney (Natural Resources)

Former Graduate Student Advisees (graduation date, university):

Ph.D. Javier Naupari (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: Professor, Universidad La Molina (Peru)

Sebastian Martinuzzi (2010, University of Idaho)
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: Post-doctoral scientist, University of Wisconsin, Madison

Steve Garrity (2010, University of Idaho, Named Outstanding CNR Graduate Student)
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: Post-doctoral scientist, Ohio State University

Eva Strand (2007, University of Idaho)
Dissertation title: "Landscape Scale Response to Woody Plant Encroachment in Western Juniper Woodlands: Effects on Spatial Patterns, Biogeochemical Cycling, and Aspen Habitats"
Current position: Research Scientist, 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 scientist, USGS EROS Data Center

M.S. 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 at UI (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)
Thomas Thompson (Natural Resources; K. Reese)
Joel Sauder (Natural Resources; J. Rachlow)
Paulina Viteri (Natural Resources; L. Waits)
Rob Keefe (Natural Resources; A. Davis)

John Wallace (Environmental Science; T. Prather)
Sandya Kesoju (Plant, Soil, and Entomological Sciences; T. Prather)
Arjan Meddens (Environmental Science; J. Hicke)
Damon Husebye (Plant, Soil, and Entomological Sciences; S. Eigenbrode)
Kate Cleary (Natural Resources, L.Waits)
Natalia Estrada (Natural Resources, A. Fremier)
Irene Shaver (Environmental Science, L. Hormel)
WSU student (Washington State University, D. Brown)

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)
Keith Bickford (Architecture; B. Haglund; 2010)
Jody Vogeler (Wildlife Resources; K. Vierling; 2011)
Jeff Lonneker (Forest Resources; P. Gessler; 2010)
Breezy Jackson (Environmental Science; A. Sowards; 2009)
Eric Herschmer (Forest Resources; T. Link; 2010)
Ben Bright (Geography; J. Hicke)
Freddy Argotty (CATIE Maestra Program, P. Imbach)

Post-Doctoral Researcher Advisees:

Alistair Smith (2004-2005; joint with P. Gessler)
Steven Sesnie (2007)
Jan Eitel (2009-2010)

Courses Developed: Current Global Change Research, Global Environmental Change, Introduction to Environmental Remote Sensing, Landscape Genetics, 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

Guest Lecturing in Educational Programs On or Off Campus:

"The Role of Remote Sensing Data in Understanding Ecological Legacies", Colorado College, Colorado Springs, CO (10/11/010).

"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 Journals (published, in press, and accepted):

ISI Researcher ID: E-6428-2010. *Current ISI citation "h-index" = 18. This indicates that 18 of the below papers have been cited at least 18 times each.*

J57. Jensen, J.R.*, Humes, K.S., Hudak, A.T., Vierling, L.A., and Delmelle, E. (accepted). Evaluation of the MODIS LAI product using independent lidar-derived LAI: a case study in mixed conifer forest. *Remote Sensing of Environment.*

J56. Goldberg, C.S.*, Pocewicz, A.*, Nielsen-Pincus, M.*, Waits, L.P., Morgan, P., Force, J.E., and Vierling, L.A. (accepted). Predicting ecological impacts of alternative development policies: conflicts and synergies in a social context. *Conservation Letters.*

J55. Eitel, J.U.H.**, Vierling, L.A., Long, D., and Hunt, E.R. (in press). Early season remote sensing of wheat nitrogen status using a green scanning laser. *Agricultural and Forest Meteorology*.

J54. Eitel, J.U.H.**, Vierling, L.A., Long, D.S., Litvak, M.E., and Eitel, K.B. (in press). Simple assessment of needleleaf and broadleaf chlorophyll content using a flatbed color scanner. *Canadian Journal of Forest Research.*

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., Bässler, 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. Calhoon, 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., Calhoon, 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-Ndembi, 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.

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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.

Refereed journals (submitted and in review):

S1. Eitel, J.U.H.**, Williams, J., Vierling, L.A., Al-Hamdan, O., and Pierson, F. Predicting rill erosion in rangelands using fine-scale surface roughness derived from terrestrial laser scanner data. *Catena. Submitted 2/24/11*

S2. Sankey, J.B., Eitel, J.U.H.**, Glenn, N.F., Germino, M.J., and Vierling, L.A. Quantifying burning effects, roughness and dust with laser altimetry at sub-meter scales. *Geomorphology.*

S3. Xu, Y.**, Vierling, L.A., Eitel, J.U.H.**, and Oldow, J.S. Measurement of Sagebrush Steppe Canopy Structure Using Terrestrial Laser Scanning and Implications for Airborne LiDAR. *Remote Sensing of Environment.*

S4. Martinuzzi, S.**, Gould, W., Vierling, L.A., Hudak, A.T., Nelson, R., and Evans, J. Classifying forest type and succession in a tropical dry forest: a LiDAR perspective. *Biotropica.*

S5. Vierling, K.T., Vierling, L.A., Linkhart, B., Adam, P., Aycrigg, J., Pollock, J., Sadoti, G., Vent, D., and Vogeler, J. Placing the keystones: elucidating interactions among woodpeckers and cavity-dependent species in North America for improved vertebrate conservation and management. *Journal of Ornithology.*

S6. Eitel, J.U.H., Vierling, L.A., Litvak, M.E., Krofcheck, D., Stocheck, L., Long, D.S., and Ager, A.A. Broadband, red-edge information from satellites improves early stress detection in a New Mexico conifer woodland. *Remote Sensing of Environment.*

S7. Rodhouse, T.J., Irvine, K.M., Vierling, K.T., and Vierling, L.A. A hierarchical model for trend in a spatially-structured wet prairie plant population following passive restoration. *Journal of Applied Ecology.*

Refereed Scholarly Media/Electronic Contributions:

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:

PP10. Aycrigg J. , G. Beauvais, T. Gotthardt, K. Boykin, S. Williams, S. Lennartz, K. T. Vierling, S. Martinuzzi*, and L. A. Vierling. 2011. Mapping species ranges and distributions models across the United States. Gap Analysis Bulletin. Vol. 18 (in press).

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.

Workshops and Symposia Organized:

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; **denotes student/postdoc I directly advised on project)

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. (abstract submitted).

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 5th 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_2 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 form 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 CO2/H2O 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 CO2 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 CO2: 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 CO2 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 (see above for "Related Publications" references):

G51. Source of Support: National Science Foundation
Project Title: University of Idaho McCall Field Campus Research Infrastructure Planning
Award Amount: $25,000
Period of Award: 2/1/11-1/31/12
Vierling Role: Co-PI (S. Hollenhorst, PI)

G50. Source of Support: National Science Foundation (Pending)
Project Title: Developing an integrated theory of plant network form and function using novel, high-throughput measurements of branches, xylem, and leaves
Award Amount: $34,472 (UI portion)
Period of Award: 1/2012-12/2014
Vierling Role: Collaborator (B. Enquist, U. Arizona, 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: $20,000
Period of Award: 7/2010-9/2011
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: 1/2011-12/2013
Vierling Role: Science Co-PI

G46. Source of Support: USDA
Project Title: Site Specific Climate Friendly Farming

Award Amount: $4.64 million (UI portion: $1,319,844.83)
Period of Award: 4/1/2011-3/31/2016
Vierling Role: Co-PI/University of Idaho PI (David Brown, WSU, PI)

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 (V. Walden, 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 Septemeber, 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: CATIE-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: PI 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)
Related Publications: J36, J38

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

Related Publications: PP8, J43

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: PI with E. Strand (UI Graduate Student)
Related Publications: J21, J25, J34, J40, J41

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 with W. Gould (USFS-IITF, Puerto Rico)
Related Publications: J32, J42

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
Related Publications: J33, J45

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)
Related Publications: J28

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
Related Publications: PP8, J39

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
Related Publications: PP4, PP6, PP7, J15, J16, J17, J19, J20, J22, J29, J30, J35

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
Related Publications: J15, J17, J19, J23, J24, J27

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 with P. Gessler
Related Publications: J22, J25

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
Related Publications: J23, J24

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
Related Publications: BC2, J18

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
Related Publications: M1, M2, PP3, PP5, J26

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)
Related Publications: J18, J27

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)
Related Publications: J18, J27

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)
Related Publications: J22, J25

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)
Related Publications: J22, J25

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
Related Publications: M1, M2, PP3, PP5, J26

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)
Related Publications: BC2, J18

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
Related Publications:	BC1, J2, J3, J7, J8, J9, J10, J22, J12, J13, J14, T2

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
Related Publications:	BC1, J1, J2, J3, J7, J8, J9, J10, J22, J12, J13, J14, T2

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
Related Publications:	J12, T2

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
Related Publications:	T2

G4. Source of Support:	Departmental Grant, Environmental, Population, and Organismic Biology (CU-Boulder)
Award Amount:	$1,000
Period of Award:	1996
Related Publications:	J4, J5, T2

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
Related Publications:	T1, J6

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
Related Publications:	T1, J6

G1. Source of Support:	Boettcher Foundation of Colorado
Award Amount:	$80,000 (full undergraduate scholarship to any college/university in Colorado)
Period of Award:	1988-1992
Related Publications:	T1, J6

Cooperative Agreements Brokered and Donations Arranged:

2011. Established new cooperative agreement with the RapidEye satellite image company for them to provide the UI and CATIE with dozens of high resolution satellite images of Costa Rica and the Washington-Idaho border. This data will support IGERT and AFRI project research initiatives and represents a monetary value over $100,000.

2009. Arranged the donation of a major research 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 currently on loan 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 currently 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:

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

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

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

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)

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)

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

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, *Proceedings of the National Academy of Sciences, Ecological Applications, Oecologia, 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.*

I have reviewed approximately 70 NSF proposals as a panelist reviewer (6 review panels) 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 15 NASA proposals and served on one NASA review panel (2003-present)

I have reviewed research proposals for scientific agencies within the Canadian 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 South Dakota NSF EPSCoR Program Activities (1999-2004)

Professional and Scholarly Organizations:

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

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

Phi Beta Kappa

Society for Range Management

Sigma Xi, The Scientific Research Society

Outreach Service:

Outreach Lead Faculty, Idaho NSF Experimental Program to Stimulate Competitive Research (EPSCoR). (2008-present). Through this activity, I coordinate scientists from around Idaho to offer outreach programming at the McCall Outdoor Science School. In 2009, I personally offered two separate outreach activities (one to a HOIST group and one to a Boys and Girls Club group) and coordinated 12 other scientists to do the same.

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-present)

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)

I require 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 (1998-present; see Publication J27).

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

"Lasers Help Map Hard-to-Reach Spider Habitat", *Wired Magazine* on-line: (http://www.wired.com/wiredscience/2011/04/lasers-map-spiders/), 4/11.

"Space Laser Spies for Woodpeckers", BBC World Service and BBC Website (http://www.bbc.co.uk/news/science-environment-11867165), 12/10.

"Keep high-tech jobs in the Black Hills", *Rapid City Journal,* 7/05.

"Educator Features: Earth Systems Connections", Special NASA on-line Earth Day Education short segment, www.nasa.gov, 4/04.

"SWAMI predicts more accurate future for atmospheric satellites", *Rapid City Journal,* 6/03.

"Research team delays flight over fire area", *Rapid City Journal,* 7/02.

"A partnership with NASA", *Virginia Tech Gridiron Magazine,* 9/01.

"Studying forest from sky", *Rapid City Journal,* 7/01.

"Air farming to be investigated in South Dakota", www.cnn.com news story, 2/00.

Community Service:

Student Mentor, Moscow School District (2009-present)

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).

I keep my children off the street (5/23/2000-present).

HONORS AND AWARDS:

University of Idaho Office of Technology Transfer, Innovation Award Certificate of Appreciation (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-present).

Nominated by students for University of Idaho/CNR Outstanding Instructor award (2005).

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, 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).

Leadership:

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).