

ANDREW KULMATISKI

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Assistant Professor: Department of Biological Sciences. University of Alaska, Anchorage.
Adjunct Assistant Professor. University of Alaska, Fairbanks, Utah State University.

EDUCATION

Utah State University (USU), Logan, UT Ph.D., Phi Kappa Phi, 2005
Specialization: Plant-soil interactions in invaded communities; Advisor: John Stark

Dartmouth College, Hanover, NH 1999-2002, transferred to USU
Specialization: Plant-soil interactions in invaded communities.

Yale School of Forestry & Environmental Studies, M.F.S., 1999
New Haven, CT. *Specialization:* Forest soil nutrient storage; Advisor: Daniel Vogt

Colby College, Waterville, ME B.A. May 1994
Major: Biology, *Concentration:* Environmental Science, *Minor:* Chemistry

PROFESSIONAL EXPERIENCE

Assistant Professor, Department of Biological Sciences,
University of Alaska, Anchorage 2008-

Post-doctoral fellow, Department of Wildland Resources
and Ecology Center, Utah State University (USU) 2006-2008

Post-doctoral researcher, Funded through USDA-NRI Biology of Weedy
and Invasive Plants grant, Self-funded, Utah State University 2004-2006

Research Assistant, University of Washington 2003-2004

Teaching and Research Assistant (see below) 1996-2003

Project Coordinator: Carbon Storage Project, Yale University 1996-2000

Soil Scientist, Huntington Environmental, Inc. 1995-1996

Field Biologist, The Nature Conservancy 1994

PUBLICATIONS

Kulmatiski A., K.H. Beard, J. Stevens, S.M. Cobbold. 2008. Plant-soil feedbacks: a meta-analytical review. *Ecology Letters*. 11(9): 980-992

Kulmatiski A., K.H. Beard. 2008. Decoupling plant-growth from land-use legacies in soil microbial communities. *Soil Biology and Biochemistry*. 40(5): 1059-1068.

Kyle, G.P., K.H. Beard, A. Kulmatiski. 2008. Pocket gophers change plant species composition in a shrub steppe ecosystem. *Western North American Naturalist*.

Kulmatiski A., Kardol P. 2008. *Invited Submission*. Getting plant-soil feedbacks out of the greenhouse: conceptual and experimental approaches. Beyschlag W. (ed) In: Progress in Botany Vol. 69.

Kulmatiski A., Vogt K.A., Vogt D.J., Wargo, P., Tilley J.P., Siccama T.G., Sigurdardottir R. Ludwig D. 2007. Nitrogen and calcium additions increase forest growth in Northeastern USA spruce-fir forests. *Canadian Journal of Forest Research*. 37(9):1574-1585.

Kyle G.P., K.H. Beard, A. Kulmatiski. 2007. Reduced soil compaction enhances growth of non-native plant species. *Plant Ecology*. 193(2):223-232.

- Rexroad E., K.H. Beard, A. Kulmatiski. 2007. Soil, plant, and arthropod response to 35 and 55 years of native ungulate grazing in shrub-steppe communities. *Western North American Naturalist*. 67(1): 16-25.
- Kulmatiski, A., K.H. Beard, J.M. Stark. 2006. Soil history as a primary control on plant invasion in abandoned agricultural fields. *Journal of Applied Ecology*. 43:868-876.
- Kulmatiski A. 2006. Exotic plants establish persistent communities. *Plant Ecology*. 187(2):261-275.
- Kulmatiski A., K.H. Beard, J.M. Stark. 2006. Exotic plant communities shift water-use timing in a shrub-steppe ecosystem. *Plant and Soil*. 288: 271-284.
- Kulmatiski, A., K.H. Beard. 2006. Activated carbon as a restoration tool: potential for control of invasive plants in abandoned agricultural fields. *Restoration Ecology*. 14(2) 251-257.
- Kulmatiski, A. 2005. Soil-mediated controls on weed establishment and growth. Ph.D. Dissertation, Biology Department, Utah State University.
- Kulmatiski A., K.H. Beard, J.M. Stark. 2004. Finding endemic soil-based controls on weed growth. *Weed Technology* 18:115-120.
- Kulmatiski A., D.J. Vogt, T.G. Siccama, J.P. Tilley, K. Kolesinskas, T.W. Wickwire, B.C. Larson. 2004. Landscape determinants of soil carbon and nitrogen storage in Southern New England. *Soil Science Society of America Journal* 68(6) 2014-2022.
- Kulmatiski A., K.H. Beard. 2004. Reducing sampler error in soil research. *Soil Biology and Biochemistry*. 36:383-385.
- Kulmatiski A., D.J. Vogt, T.G. Siccama, K.H. Beard. 2003. Detecting nutrient pool changes in rocky forest soils. *Soil Science Society of America Journal* 67:1282-1286.
- Beard, K.H., K.A. Vogt, A. Kulmatiski. 2002. Top-down effects of a terrestrial frog on forest nutrient dynamics. *Oecologia* 133:583-593.

In revision:

Kulmatiski A.. *In revision*. Activated carbon decreases microbial abundance confounding tests for allelopathy but allowing native plant restoration. *Restoration Ecology*.

In review:

Kulmatiski, A., R.J.T. Verweij, K.H. Beard, E.C. February. *In review*. Redefining niche space in savannas: Grasses not trees use deep soil water. *Oecologia*.

Kulmatiski A., J. Heavilin. *In review*. Community-level plant-soil feedbacks. *Ecology Letters*.

Kulmatiski A., K.H. Beard, K.E. Mock, L. Ahearn-Meyerson. *In review*. Historical and current distribution of the native and non-native genotypes of *Phragmites australis* in northern Utah. *Diversity and Distributions*.

In preparation:

Kulmatiski A. (drafted) Short and long-term microbial community responses to exotic plant invasions in a shrub-steppe ecosystem. *Soil Biology and Biochemistry*.

Kulmatiski A. (data collected) Native grass seeds wait for wet years to germinate and establish in a semi-arid system. *Plant Ecology*.

TECHNICAL SKILLS

Field: Elemental analysis using laser ablation breakdown spectroscopy (LIBS); Natural abundance and pulse-chase stable isotope sampling. Minirhizotron installation and analysis. Campbell datalogger programming and use. Large-scale experimental manipulations (i.e., heavy machinery, shelter construction, irrigation systems). Allometry. Psychrometry. Porometry. Vegetation surveying. Soil nitrogen extraction.

Soil evaporation. Soil respiration. Forest and grassland productivity. Plant identification. Soil sampling. Wetlands delineation.

Laboratory techniques: Phospholipid extraction. In-line and batch extraction of soil and plant water for isotopic analyses. Glassblowing. Sequential phosphorus extraction. Microbial abundance and activity: sole carbon source utilization, chloroform fumigation extraction, hot and cold water extraction, phospholipid fatty acid extraction. Arthropod and nematode extraction and identification. Mycorrhizal staining. Soil water potential. Soil particle size analysis. Soil organic matter.

Laboratory instruments: RT100-LIBS system, WP4-T (water potential meter). LECO total CN combustion analyzer. Lachat Autoanalyzer. ICP-OES. Dissecting and compound microscopes. Muffle furnace. Glassworking Torch. Shimadzu TOC. Microwell plate reader.

Statistical/Computational: Programming: SAS, R, BASIC, Campbell CR1000. Statistical techniques: ANOVA, Mixed models, Regression trees, PCA, NMDS, Hierarchical Bayes analysis, Meta-analysis. Modelling: nutrient budgets, matrix models.

SELECTED GRANTS

A definitive water budget for a savanna system. *Grant author/PI*. Mellon Foundation. (\$239,000) (2008-11).

Individual and community plant-soil feedbacks in invaded plant communities. *Grant Author and Co-PI* National Science Foundation, Ecology Program (\$511,385)(2008-2010) *rejected*

Potential impacts of climate on the distribution of non-native invasive species in the intermountain west, U.S.A. *Co-PI*. USDA-EPA STAR (\$599,872)(2008-2010) *rejected*

Grass and tree seedling water-use in Kruger National Park, *Grant Author and Co-PI*. Mellon Foundation (\$213,000) (2006-2009)

Identifying plant-soil research needs in Kruger National Park, South Africa, *Co-PI*. Mellon Foundation (\$8,000) (2006)

Soil-mediated controls on weed establishment and growth, Agricultural Experimental Station, Utah State University, *Grant Author and Co-PI* (\$52,000, 2007-10)

An assessment of *Phragmites* invasion around the Greater Salt Lake Watershed: Phases I and II, Utah Division of Forestry, Fire and State Lands, *PI* (\$44,000) (2005-2007)

Soil-mediated controls on weed establishment and growth, Agricultural Experimental Station, Utah State University, *Grant Author and Co-PI* (\$45,000, 2004-07)

Soil-mediated controls on knapweed establishment and growth, USDA - NRICGP Biology of Weedy and Invasive Plants, *Grant Author and Co-PI* (\$221,000) (2003- 2006)

Quantifying deer grazing effects on plant community structure and function in the Pacific Northwest, Berryman Institute Grant, *Co-PI* (\$38,000) (2002-03)

Testing the taproot advantage using stable isotope analyses of plant and soil water. Sigma Xi, Grants-in-Aid of Research Program, *PI* (\$400) (2002)

Native plant restoration in invaded systems, Switzer Foundation Fellowship, *PI* (\$13,000)(2001-02)

SELECTED PRESENTATIONS

Kulmatiski, A., R.J.T. Verweij, K.H. Beard, E.C. February. Redefining niche space in savannas: Grasses not trees use deep soil water. To be given at the 2009 Ecological Society of America conference, Albuquerque.

- Kulmatiski, A.,** K.H. Beard. Why do weeds invade abandoned agricultural fields? The Methow Conservancy's first Tuesday lecture series. May 2009.
- Kulmatiski, A.,** K.H. Beard, R. Stevens, S. Cobbold. Plant-soil feedbacks: a meta-analytical review. Ecological Society of America Conference. Milwaukee, WI. August 2008.
- Kulmatiski, A.** Plants in a changing world: plant-soil feedbacks. *Invited Presentation*. University of Alaska, Anchorage. May 2008.
- Kulmatiski, A.,** K.H. Beard, R. verWeij, E. February. Water-use in a changing savannah: pulse-chase and rain manipulation experiments. Kruger National Park Networking Meeting. Skukuza, South Africa. April 2008.
- Kulmatiski, A.** Harnessing plant-soil interactions for rangeland management. *Invited Presentation*. Department of Rangeland Ecology and Management, University of Idaho, Moscow, April 2008.
- Kulmatiski, A.** Harnessing plant-soil interactions for rangeland management. *Invited Presentation*. University of Idaho, Boise; Idaho Agricultural Research Station, Idaho Department of Forestry and Wildlife. April 2008.
- Kulmatiski, A.** Plant growth in a changing world. *Invited Presentation*. Department of Geography and Environmental Studies, University of Maryland Baltimore County, January 2008.
- Kulmatiski, A.** Plant-soil feedbacks in native vs. invaded systems. *Invited Presentation*. Native Plant Group, ARS Research Group, Utah State University, September 2007
- Kulmatiski A.,** K.H. Beard. Manipulating soil microbial communities to change plant communities. Ecological Society of America Conference. San Jose, California. August 2007.
- Beard K.H., **A. Kulmatiski.** Disturbance contingent plant-soil feedback: the passenger takes the wheel. Ecological Society of America Conference. San Jose, California. August 2007.
- Kulmatiski, A.** Non-native *Phragmites australis* invasion in Utah. *Invited Presentation*. Great Salt Lake Technical Team Meeting. Salt Lake City. Utah. February 2007.
- Kulmatiski, A.,** K.A. Vogt, D.J. Vogt, P. Wargo, J.P. Tilley, T.G. Siccama, R. Sigurdardottir. Spruce-fir forest response to calcium and nitrogen addition. *Invited Presentation*. The Acidic Deposition on Forests and Forest Soils Section. Society American Foresters Conference, Pittsburgh, Pennsylvania, October 2006.
- Kulmatiski, A.** Soil-mediated controls on invasive plant growth. *Invited Presentation*. Department of Wildland Resources, Utah State University, March 2006
- Kulmatiski, A.** Beard, K.H. Water-use patterns in persistent exotic and native plant communities. Ecological Society of America conference, Memphis, Tennessee, August 2006.
- Romain-Bondi, K. **Kulmatiski, A.** Tools for restoration and noxious weed control: experimental control of diffuse knapweed using activated carbon. Okanogan Weed Board Weed Day. November 2005.
- Rexroad, E. Beard, K.H., and **Kulmatiski, A.** Ecosystem- and community-level impacts of 50 years of large ungulate grazing. Ecological Society of American, Portland, Oregon, August 2004.
- Kulmatiski, A.** The role of soil microbial communities in plant-soil interactions. Department of Soil Science, University of Wisconsin. July 2004.

Kulmatiski, A. Beard, K.H., Stark, J.N. Plants, soils, and alternative steady states in plant communities. Ecological Society of America conference, Fort Lauderdale, Florida, November 2003.

Kulmatiski, A. Beard, K.H., Stark, J.N. Plants, soils, and alternative steady states in plant communities. Ecological Society of America conference, August 2003.

TEACHING AND ACADEMIC SERVICE

Adjunct Assistant Professor, University of Alaska, Fairbanks

Adjunct Assistant Professor, Utah State University

Biogeochemistry, UAA. Undergraduate/graduate course (spring 2009, 2010)

Ecology, UAA. Undergraduate course (spring 2010)

Invasion Ecology, USU. Graduate-level seminar. (spring semester: 2006, 2008)

Invited guest lectures:

Plant Community Ecology: USU, WILD 6770	2008
Forest Service and Bureau of Land Management extension course	2005
Ecology of our Changing World: USU, FRWS 2200	2005
Disturbance Ecology (twice): USU, FRWS 5620	2005
Conservation Biology: USU, FRWS 4600	2003-2008
Advanced Conservation Biology: USU, FRWS 6750/7750	2004
Wildland Soils: USU, SOIL 5350/6350	2003
Global Biogeochemistry (three times): Dartmouth, ENVS 89	2001, 2002
Wetlands delineation for land managers: Yale	1998

Teaching Assistant positions:

Introductory Biology: USU, BIO 2010	2002, 2003
Introductory Biology: USU, BIO 2020	2002, 2003
Ecology and Evolution: Dartmouth, BIOL 14	1999-2002
Global Biogeochemistry: Dartmouth, ENVS 89	1999-2002
Problems of Population Growth: Yale University, EEB 215	1999
Diversity of Life: Yale University, EEB 160	1999
History of Life: Yale University, EEB 125	1998
Environment and Society: Yale University, F&ES	1997

Courses in education:

Teaching the sciences, Dartmouth College	2002
Working at Teaching, Yale University	1998

Seminar Coordinator: Leadership in Sciences Seminar Series, Yale University 1996-1997

Peer review: Soil Science Society of America Journal (2008), National Science Foundation (Ecosystem studies)(2008), Kearney Foundation (2008), Oikos (2007), American Midland Naturalist (2007), Journal of Applied Ecology (2006), Oecologia (2006), Annals of Forest Science (2006), Ecology Letters (2006, 2005), Restoration Ecology (2005, 2005), Journal of Water and Soil Conservation (2005)

SELECTED MENTORING

Graduate students:

Moagi Keretsetse, University of Alaska (PhD expected 2015) Pulse-labeling, plant water extraction, experimental design, precipitation manipulation, soil water potential, transpiration.

Pascale William, Utah State University (MS expected 2010) Pulse-labeling, plant water extraction, soil water potential, plant-soil feedback experimental design, transpiration.

Post-baccalaureate assistants:

Richard verWeij, University of Cape Town (2007-) Pulse-labeling, plant water extraction, experimental design, soil water potential, transpiration.

Shane Heath, Dartmouth and University of Maine (2007-2008) Water extraction for isotope analysis, scientific glass blowing, rain in/out shelter construction, data logger use.

Lauren Hierl, Dartmouth and Duke University (2007-2008) Water extraction for isotope analysis, scientific glass blowing, rain in/out shelter construction, data logger use.

Gabrielle Diamond, Utah State University (2007-2008) Experimental design, plant-soil feedback approaches, greenhouse techniques.

Melanie Pincus, Stanford University (2007) Plant-soil feedback experimental design, Porometry, vegetation survey, experimental design, vegetation sampling.

Igor Rubinov, Cornell University (2007) Plant-soil feedback experimental design, Porometry, vegetation survey, experimental design, vegetation sampling.

Hans Sin, USU (2005) Soil organic matter, soil total carbon and nitrogen, soil pH, leaf litter decomposition rates.

Parichaya Attaphongse, USU (2004–2005) Microbial phospholipid (PLFA) extraction.

Nathan Grubbs, Colby College, (2004–2005) Experimental design, Microbial biomass determination (PLFA, chloroform fumigation, hot and cold water extraction).

Echo Rexroad, USU (2003–2005) Net nitrogen mineralization, soil moisture, soil pH, manuscript preparation, vegetation sampling.

G. Page Kyle, Dartmouth (2002–2005) Experimental design, mycorrhizal infection, soil nitrogen and phosphorus determination, manuscript preparation.

Barbi Mata, USU (2005) Nematode extraction and identification.

Robert Hauff, Yale F&ES, (summer 1998) Soil sampling and preparation.

Undergraduate assistants:

Tracy Upton, USU (summer 2007-present) Experimental design, plant-soil feedback methods.

Katy Latta, USU (summer 2007-present) Experimental design, plant-soil feedback methods.

Myron Jeffs, USU (fall 2003–spring 2005) Soil organic carbon extraction and analysis.

Dixon Grant, USU (summer 2004–summer 2005) Mycorrhizal infection, soil pH.

Chad Gregg, Ball State University (summer 2003) Soil sampling and moisture.

Lila Prichard, USU (fall 2002–spring 2004) Stable isotope extraction, soil particle size.

Todd M. P. Robinson, Dartmouth (2002) Experimental design, soil nitrogen.

Dartmouth College, Women-in-Science-Program (WISP)

Between 2000 and 2002, I served as a mentor to Chelsea Lane-Miller, Nicole Sass, and Amy Wallace. As a part of this program, I helped these interns design, execute, and present results from projects associated with my research.

PERSONAL INTERESTS AND ACCOMPLISHMENTS

Mountaineering (Solo: Aconcagua, El Capitan, The Grand Teton, Mt. Whitney E. Face. Team: Kilimanjaro, 22 of the 50 Classic Climbs of N. America), Road bike racing (NY State under 18

time trial record holder; Cat. 2 racer), Skiing (Lake Placid Loppet ski marathon winner, 1995), Ceramics and sculpture (juried works shown at Colby and Dartmouth Colleges).

REFERENCES

Dr. John Stark (Ph.D. advisor)

Department of Biology
Utah State University
Logan, UT, 84322
Phone: (435) 797-3518
Lab phone: (435) 797-0060
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Dr. Ron Ryel (Post doc advisor)

Department of Wildland Resources
Utah State University
Logan, UT 84322-5230
Phone: (435) 797-8119
Email: ron.ryel@usu.edu

Dr. Brad Kropp (PhD committee member)

Department of Biology
Utah State University
Logan, UT 84322-5305
Phone: (435) 797-3738
Email: brkropp@biology.usu.edu

Dr. Daniel Vogt (M.F.S. advisor)

College of Forest Resources
University of Washington
Seattle, WA 98195-2100
Phone: (206) 685-3292
Email: dvogt@u.washington.edu

Dr. Karen Mock (Collaborator)

Department of Wildland Resources
Utah State University
Logan, UT 84322-5230
Phone: (435) 797-8119
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Dr. Kristiina Vogt (Collaborator)

College of Forest Resources
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