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Job Number:	Job Title:	Date:
44727	**Assistant or Associate Professor**	**Mar 9 2010 5:27PM**

Personal Information

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David Schimel	**National Ecological Observatory Network (NEON), Inc.**	**5340 Airport Boulevard, Boulder, CO 80301**	**Chief Executive Officer**	**720-746-4844**	**dschimel@neoninc.org**
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Other Information

Are you legally authorized to work in the U.S.?
Yes
What is your current employment status with the University of Arizona?

Not a University of Arizona employee

If you are a current employee enter your Employee Identification Number (EID) in the space to the right. If you never worked for the University, worked as a student, or terminated your employment prior to July of 2001 enter N/A. Note: Please do not enter hyphens in the EID field. Your 9-digit EID number (Ex: 120001234) may be found by logging into the Employee Link website. Your EID number is located in the "Current Employment" tab. You may also find your EID number on your pay stub. Note: Your Employee ID number is NOT your Social Security Number.

N/A

Supplemental Questions

Where did you first learn about this position?

Referred by UA Employee

Enter the specific name of any referral source, or the code printed on the business card you received from The University of Arizona career fair booth:

Have you ever been convicted of or plea bargained to a misdemeanor offense?

No

If yes, you must provide criminal conviction information and dates: (*You are responsible for knowing if traffic violations or other citations received were classified as a misdemeanor*).

Have you ever been convicted of or plea bargained to a felony offense?

No

If yes, you must provide criminal conviction information and dates: (*You are responsible for knowing if traffic violations or other citations received were classified as a felony*).

By indicating 'Yes' below, I affirm that my responses above are true, complete and accurate. I understand that if I accept a job offer, I will be asked to give my written consent for the University of Arizona to conduct a check of my criminal conviction history, motor vehicle record, educational credentials and work history.

I further understand that a 'yes' response will not automatically disqualify me from consideration. However, falsifying, misrepresenting, or omitting criminal conviction information on any application document will likely result in a withdrawal of any job offer and termination of any subsequent employment with the University.

Yes, I affirm that my responses above are true, accurate and complete to the best of my knowledge.

Can you perform the essential functions (job duties) of this position with or without accommodation?

Yes

What is your current employment status with The University of Arizona?

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If you have never worked for the University or terminated your employment prior to July 2001, please enter N/A in the space to the right. If you are a current, former, or retired UA employee and were issued an EmplID please enter your number in the space to the right. Your EmplID can be found by logging in to UAccess Employee and viewing your paycheck. Please do not enter hyphens in the EmplID field. Note: Your EmplID is not your Social Security Number.

N/A

Agreement

I certify the statements made by me in this application are true and complete to the best of my knowledge and belief and are made in good faith. I understand that any false statement made herein will void this application and any actions based upon it, and I agree to revise this application should any of the information change. I understand that this application and all attachments are the property of The University of Arizona. I authorize The University of Arizona or any of its agents to make reference checks relating to my employment and I also authorize all prior employers to provide full details concerning my past employment. I authorize the University of Arizona to request and obtain records to determine the accuracy of my responses. I understand that employment in certain positions may be conditional upon a background verification including but not limited to criminal records. I certify that I am or will be legally authorized to work in the United States at the time of hire.

BY SIGNING BELOW, I certify that I have read and agree with these statements.

Kiona Ogle		
Applicant's Name	Applicant's Signature	Date

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RESEARCH STATEMENT

Kiona Ogle

RESEARCH SUMMARY

In my research, I seek to improve our ability to understand and predict how plants, plant communities, and ecosystems are affected by environmental perturbations such as those associated with climate change. Towards this goal, I employ an integrative approach that merges ecology, mathematics, and statistics, and my research can be summarized by four major themes.

1. Linking form and function of individual trees to forest dynamics. A principal goal of this project is to develop a general scaling framework for predicting large-scale forest dynamics from individual- and species-level tree traits. Towards developing this framework, we are addressing three key questions: How variable are tree functional trait? Do species matter for understanding forest dynamics? How do biological processes scale? Our approach to addressing these questions combines tools from informatics (large datasets, computational methods, Bayesian statistics) with a process-based understanding of tree physiology, growth, and survival.

2. Plant and ecosystem carbon and water dynamics in arid systems. I maintain strong interests in arid and semiarid systems, and questions of particular interest include: How does the timing and magnitude of annual, seasonal, and pulse precipitation affect the physiology and growth of plants in arid and semiarid? How is the "ecological memory" of different plant and ecosystem processes affected by the timing and magnitude of water availability? How do multiple global change factors interact to affect the functioning of arid and semiarid ecosystems? I am involved in two major synthesis projects that utilize large, existing datasets to address these and related questions.

3. Deconvolution of belowground plant and ecosystem processes. This work is aimed at understanding how plants, soil microbes, and the soil matrix interact to affect soil carbon and water cycling. The types of questions we are addressing include: How responsive is root activity for water uptake to precipitation inputs? Does root activity for water uptake reflect root respiration? What is the relative importance of plants and soil microbes to soil carbon cycling? How do aboveground processes "control" belowground carbon and water dynamics? We are addressing these questions in arid and semi-arid ecosystems in the Southwest and Wyoming using a combination of stable isotopes, field and laboratory experiments, and modeling techniques.

4. Statistical analysis of ecological data. In general, I employ cutting-edge mathematical and statistical methods for analyzing ecological data. I am particularly interested in developing statistical modeling techniques for analyzing "messy" ecological data in the context of process-based models that lend insight into underlying mechanisms. In addition to (1)-(3), other examples include developing Bayesian methods for (i) analyzing incomplete literature information, (ii) analyzing isotope data by linking isotope mixing models and process-based models, and (ii) dealing with issues such as missing data, unwanted data-model feedbacks, combining multiple data sources that may be misaligned in time or space, and other issues relevant to ecological data.

With my formal training in biology, math, and statistics, I am equipped to address the above problems by melding field experiments, observational studies, large and diverse data sources, and statistical and mathematical modeling to tease-apart complex ecological interactions. Below I provide a detailed account of my work associated with themes (1)-(3). Theme (4) encompasses a potpourri of projects that I am actively involved in, but I refrain from elaborating on them here.

LINKING FORM AND FUNCTION OF INDIVIDUAL TREES TO FOREST DYNAMICS

Forest ecosystems cover ~50% of the Earth's land area and contain ~90% of the global vegetation carbon. Thus, climate change impacts on forests will ultimately affect biodiversity,

productivity, and carbon cycling of the terrestrial biosphere. This study is developing a scaling framework for understanding forest diversity and productivity, a necessary step in our continuing effort to forecast impacts of climate change on forests. This project evolved out of my postdoc with Dr. Steve Pacala at Princeton and is funded by an NSF Advances in Biological Informatics grant. This project involves an interdisciplinary team, including myself, Co-PI Dr. Jarrett Barber (statistics, Univ. Wyoming), Dr. Jeremy Lichstein (forest ecology, Pacala lab), a statistics PhD student, an ecology PhD student, a post-doc with expertise in ecology, evolutionary biology, and mathematical biology, a technician with expertise in modeling and physiological ecology, and a botany undergrad.

Questions. We are addressing three questions paramount to constructing general theories of how the form and function of individual trees affect large-scale forest dynamics. (1) How variable are tree functional traits? How do species differ in key traits related to tree form (e.g., allometries, morphology) and function (e.g., physiology, growth, allocation, mortality)? Which traits are relatively independent of species identity? To what degree does evolutionary history versus environmental factors affect trait variability? Are certain traits correlated with others, and can such correlations be explained by inherent biophysical constraints? (2) Do species matter? How important is variability in species' traits? Is a species-specific representation of tree form and function necessary for accurately describing forest diversity, succession, and productivity? (3) How do biological processes scale? How do individual and species-specific traits affect broader-scale forest patterns and processes? Can we develop a general and computationally efficient scaling framework for predicting forest dynamics that includes key physiological mechanisms, satisfies mass-balance constraints, and acknowledges species-specific variability? Our approach to addressing these questions necessarily involves integration of large and disparate datasets with detailed process models.

Approaches. We are developing and testing statistical and computational methods for achieving this integration. Our approach involves three primary elements. (1) Process modeling. We are refining a modeling framework for predicting forest dynamics from individual-tree and speciesspecific
functional traits. The individual-based model is formulated to include parameters that are directly related to key tree functional traits. The model is capable of describing a range of physiological conditions consistent with real tree behavior (i.e., healthy, static, shrinking, recovering, recovered, dead). Two important components allow for this realistic behavior. The first is a simple rule governing tree mortality that depends on a tree's carbon status: if labile carbon (sugars, starch) stores are depleted, the tree dies because it lacks "fuel" to support basic metabolic function. The second is a carbon allocation scheme that ensures trees acquire labile carbon (via photosynthesis), allocate labile carbon, and grow according to allometric rules. That is, allocation of "excess" labile carbon to different functions (e.g., growth vs. maintenance) and tissues (roots, shoots, etc.) occurs in such as way that the tree grows according to observed allometries. We are also developing methods for scaling-up the individual-based model to forest stands, thereby reducing the computational burden required to implement an individual-based model at broader spatial and temporal scales.
(2) Diverse data sources. We are compiling four major sources of information representing different, yet complimentary, temporal, spatial, and biological scales. These data will be used to estimate species-specific parameters (traits) in the process model and to evaluate the model. The first is the *USFS's Forest Inventory and Analysis (FIA) dataset* that provides measurements of, for example,

tree height, diameter, and status (living, dead) for millions of individuals representing 305 different species, spread across hundreds of thousands of study plots established in multiple forest types in the US. The second is a *tree-ring width dataset* from the International Tree Ring Data Bank, which
provides over 100 million measurements of tree-ring widths from 43 thousand individual tree cores, representing 68 species occurring in ~1300 locations in the US. The third is a database that my lab is actively populating that contains species-specific information obtained from the literature on a variety of tree allometric and functional traits, important covariates, and meta-data. The *literature*

database currently houses over 7,000 records from more than 500 publications. The fourth source is a
collection of *published phylogenies* for the 305 species and 86 genera identified by the FIA.
(3) Data-model integration. We are synthesizing the diverse data sources and process model within a hierarchical Bayesian framework that incorporates phylogenetic relationships and important sources of uncertainty such as those introduced by scaling-up from individual trees to forest stands. We are also developing new meta-analysis methods for analyzing trait information obtained from the literature, thus overcoming major limitations of traditional meta-analysis procedures (e.g., incomplete reporting, non-independence issues). We are extending our meta-analysis methodologies to simultaneously analyze all data sources in the context of the process-based model to obtain realistic estimates for model parameters (traits). We will evaluate the data-model products to explore the importance of species-specific trait variability for understanding and predicting forest dynamics.

Future directions. Our long-term goals are to provide a scaling framework for forecasting forest diversity, productivity, and carbon cycling based on allometric and physiological properties of individual trees. We expect that such scaling of tree traits will be important to predicting impacts of climate change on US forests. We are currently developing the framework for 19 focal species in the eastern US; we will extend this to 305 species spanning the US, allowing us to apply our scaling framework to broader regions and larger datasets. (In particular, I wish to apply the modeling framework to semi-arid woodlands in the Southwest to learn how precipitation variability and severe droughts may impact woodland community and ecosystem dynamics.) Once we have a working data-informed process model for a large number of species on a regional scale, then we can begin to address how forest dynamics will be affected by climate change. This will require that we drive our data-model with climate model outputs, and future work will address scaling between the datamodel (which we are developing) and climate model(s). We envision this to occur via a combination of up-scaling and down-scaling of climate model drivers to sub-grid cell scales. The experience gained from up-scaling the process model and fine-scale weather data will help us determine appropriate statistical characteristics for down-scaled climate model drivers.

PLANT AND ECOSYSTEM CARBON AND WATER DYNAMICS IN ARID SYSTEMS

This theme encompasses several projects and reflects my long-held interests in the ecology of arid and semiarid systems. My interests began as an undergraduate at NAU where I quantified patterns of pinyon pine (*Pinus edulis*) mortality in northern Arizona in response to the 1995-96 drought. I employed dendrochronology methods to quantify growth patterns of trees that died during the drought, and this work motivated me to explore the physiological mechanisms underlying plant responses to variable water availability. Along these lines, my dissertation work evaluated the physiological and growth responses of a common desert shrub (*Larrea tridentata*) to precipitation variability. I conducted field experiments in southern New Mexico and developed semi-mechanistic models of stomatal behavior and root water uptake to evaluate *Larrea*'s physiological responses to

precipitation pulses. I incorporated the data and models into a whole-plant growth model that I developed for *Larrea* to infer its short- and long-term growth responses to annual, seasonal, and pulse precipitation. Simulations suggested that greater winter relative to summer rainfall will enhance *Larrea*'s performance, and the distribution of individual storms within a season is critical to predicting its carbon and biomass dynamics. In the past several years, I have expanded my interests in desert plant ecophysiology to understanding desert ecosystems. Two major collaborative projects highlight my current research interests.

Four-desert synthesis. This is a collaborative project with Drs. Travis Huxman (UA), David Tissue (Univ. Western Sydney), Michael Loik (Univ. California, Santa Cruz), and Stan Smith (Univ. Nevada, Las Vegas). This study is motivated by the potential for altered precipitation regimes to greatly impact water-limited ecosystems of the Southwest. We are synthesizing datasets from five

extensively-studied sites in the Sonoran, Chihuahuan, Mojave, and Great Basin deserts. Studies conducted at each site manipulated water inputs and provided data on carbon and water dynamics of soils, plants, and whole ecosystems, accompanied by soil physicochemical and micro-meteorological data. There is significant overlap in the types of data collected, facilitating cross-site syntheses that are addressing a series of questions, including: How are C and H_2O cycles affected by changes in pulse, seasonal, and annual precipitation? What ecological components appear critical to ecosystem C and H_2O exchange, and which are most sensitive to precipitation changes? With respect to C and H_2O, how do the four deserts differ in their responses to altered precipitation? To address these questions, we are synthesizing data from the sites within a hierarchical Bayesian (HB) framework that couples the diverse data sources and mechanistic models, thereby providing important insights into the factors controlling C and H_2O dynamics at different scales.

This work has revealed several interesting aspects of Southwest desert ecosystems. For example, we found that C3 and C4 plants (10+ species) keep their stomata open at night, when there is no opportunity for carbon gain. The implications for ecosystem water balance are huge: nighttime transpiration can account for up to 30% of the total water loss from these deserts. We also found that soil CO_2 efflux (or soil respiration) in deserts cannot be describe by mesic analogs. In particular, water availability exerts major controls on the temperature sensitivity and the magnitude of soil respiration in these deserts. We also found that previous (antecedent) moisture conditions are critical to predicting soil respiration in deserts, and the antecedent effect appears to reflect aboveground plant factors that differ across deserts (e.g., rooting distributions, phenology, species composition). We are extending these analyses to quantify the importance of aboveground processes to soil respiration, and are asking the questions: How do plant carbon assimilation and allocation affect soil respiration in deserts? At what time scales are these processes coupled? Can soil respiration models be improved by incorporating aboveground controls? To address these questions, we are extending our HB approach to accommodate physical-based models of soil respiration, which will be coupled to biochemical models of leaf gas exchange, semi-mechanistic models of carbon allocation, and physical-based models of soil water. This work is expected to enhance our understanding of how below- and aboveground processes interact to control soil carbon loss in water-limited ecosystems.

Long-term impacts of elevated CO_2. This is a new, collaborative project with Drs. Dave Evans (Washington State Univ.), Bob Nowak (Univ. Nevada, Reno), and Stan Smith (Univ. Nevada, Las Vegas). Here, we are analyzing over 10-years of data from the Free Air CO_2 Enrichment (FACE) site in the Mojave Desert. I am a Co-PI on this project, and I am leading the components related to the modeling and HB synthesis. The synthesis methods that we are applying are the same as those used in the "four-desert synthesis" project. Our objective is to develop and apply HB modeling

methods for synthesizing existing ecosystem process data from 10 years of the FACE experiment with new data from the final harvest (which occurred in 2008-2009) within the context of processbased
models. The goal of the analysis is infer the impacts of elevated CO_2—in combination with natural precipitation variability—on multiple, interconnected ecosystem processes related to carbon, water, and nutrient cycling across a range of time scales.

Ecological memory. The above synthesis projects lead me explore the ecological memory of different plant and ecosystem processes. We are asking: "how far back in time do we have to go to learn about processes operating now?" We are developing quantitative methods for explicitly determining the ecological memory of different processes with respect to environmental drivers. Our approach provides a method for integrating (or "averaging") over past environmental conditions, and the length of the integration period provides an index of the ecological memory. We are applying the approach to understand the memory of different processes in arid and semiarid systems, and we are currently exploring this for time-series of tree-ring widths, annual net primary production (NPP), monthly fine-root production, total daily soil respiration, and "instantaneous"

soil respiration, photosynthesis, and stomatal conductance. Initial results are very intriguing. For example, for *Pinus edulis* near Montrose, CO, ring widths appear to be strongly coupled to the current year's and the past two years' monthly and annual precipitation, but going further into the past provides little additional information. Moreover, snowfall in January and February appears to be very important across all three years, but it is only the current year's summer rainfall that is important for the current year's growth. Very similar results are emerging for NPP in the short-grass steppe. The carbon flux results are also interesting: it appears that long-term changes in total annual precipitation alters the memory of photosynthesis, and soil respiration is coupled to net daily photosynthesis (Anet) over the past week or so, with the importance of Anet peaking about 2-4 days prior to the soil respiration measurement of interest, indicating a potential lag effect associated with phloem transport. This is a relatively new project, and I am eager to continue this work and to explore how the ecological memory differs across processes that differ in their temporal frequencies and that integrate over different levels of biological organization.

Future directions. Much of my aforementioned current work involves synthesis of existing datasets—most of which were collected by other labs—to improve our predictive understanding of arid and semiarid ecosystems. As a faculty member in LTRR in the SEES at the UA, I would welcome the opportunity to establish new field studies—or expand upon existing experiments of my UA colleagues—to tease-apart the above- and belowground factors affecting whole-ecosystem carbon and water cycling in desert ecosystems (e.g., the Sonoran Desert) and semi-arid woodlands (e.g., pinyon-juniper ecosystems in northern Arizona). I envision setting-up experiments aimed at quantifying the ecological memory of different ecosystem processes and testing the results produced from the aforementioned syntheses. For example, some processes may have a short memory with respect to the importance of past precipitation events (e.g., maybe a portion of the variation in leaflevel
fluxes can be explained by the amount of water received during the past five days), while others may have a longer memory (e.g., the temperature sensitivity of soil respiration may be correlated with the amount of rain received over the past two weeks, reflecting changes in microbial populations and root activity). Thus, different processes affecting ecosystem dynamics (e.g., net carbon exchange) may be coupled to differing degrees to past events, and it's not clear how this differential "coupling" mediates interactions between the processes. To address these questions, I

would combine existing data sources, field studies, and process-based modeling approaches.

DECONVOLUTION OF BELOWGROUND PLANT AND ECOSYSTEM PROCESSES

This work is closely related to the research described in theme (2), but is specifically aimed at unraveling belowground processes related to soil carbon fluxes, plant water uptake, and their interactions. My interest in this topic started during my dissertation work, where I developed the RAPID (Root Area Profile & Isotopic Deconvolution) algorithm to overcome challenges associated with quantifying plant belowground responses. I measured stable isotopes of hydrogen and oxygen in plant and soil water to infer how quickly roots utilize rains, and to determine water sources accessed by *Larrea* (e.g., deep vs. surface soil water). The approach employs a Bayesian deconvolution framework that couples the isotope and field data, literature information, and a biophysical model for water uptake. The result is a method for deducing water uptake and root area profiles, and I found that *Larrea* has a bimodal root distribution that allows it to rapidly use surface water from small rains and it to access deeper (more stable) water during extended rain-free periods. I also modified the algorithm to infer temporal dynamics of *Larrea*'s rooting profile, which appeared
to exhibit a threshold type response, primarily reflecting the onset of the summer monsoon season. My lab and I are significantly expanding upon the RAPID approach to address a variety of problems. All involve the collection of stable isotope data and complimentary field data (e.g., flux data, soil water, etc.) that are analyzed in the context of relevant process models. In collaboration

with one of my postdocs (Dr. Jessie Cable, NSF fellow), we are modifying the algorithm to infer the importance of permafrost-derived water to plant transpiration in the Alaskan tundra. We are finding that more deeply rooted woody species have access to this "old" water, which is becoming more available due to the impacts of global warming on permafrost degradation. This differential access to permafrost water may partially explain the recent phenomena of woody plant expansion in these systems. As part of a larger, collaborative project, Jessie and I are also developing a Bayesian deconvolution approach for partitioning the components of soil respiration in desert ecosystems. In particular, we are quantifying the importance of microbial decomposition and plant root respiration to soil respiration. We would like to know: From where in the soil is soil-respired CO_2 coming from? And, how do the contributions of different depths and biological components change over time in response to environmental variation? The deconvolution approach to addressing these questions involves integration of a physical-based, differential equation model of soil CO_2 production and diffusion within the soil profile. A statistics PhD student and I have developed a computationally efficient, hierarchical Bayesian approach for fitting differential equation models to field data, and I will apply this approach to data that Jessie collected from the Sonoran Desert.

My lab has also initiated new field and modeling projects in Wyoming ecosystems. One of my PhD students and I are exploring the importance of wintertime soil processes to ecosystem carbon dynamics in a subalpine system in the Snowy Range, WY. This area is covered by snow during the winter season, and we are quantifying soil activity beneath the snow in meadow and forested areas. In particular, it appears that soil microbes, and potentially plant roots, are active during the wintertime, and we are coupling models of CO_2 diffusion through the snowpack and microbial decomposition with data on soil and snow CO_2 fluxes, concentrations, and isotopes to infer the magnitude of wintertime soil respiration and its potential importance to annual carbon exchange. We are also applying these methods and similar models to understand the coupling of ecosystem carbon and water dynamics in semiarid grasslands and shrublands in southeastern Wyoming. These studies are aimed at understanding the potential impacts of climate change factors (e.g., altered

snowpack, warming) on the timing, magnitude, and coupling of plant, soil, and ecosystem processes in cold, semi-arid ecosystems.

Future directions. The projects related to the deconvolution of soil carbon dynamics and wintertime soil processes are relatively new, and I envision expanding upon these themes over the next 5-10 years. My near future plans are to produce a working deconvolution framework that will allow us to infer belowground mechanisms and dynamics from aboveground data and limited belowground observations. Thus far, most of the work that we have done has been with respect to developing the theoretical basis for the deconvolution approach. We are acquiring more data for developing and testing the framework, and I wish to implement field experiments (e.g., involving isotope tracers, automated flux, soil environment, and micrometeorological measurements) that would enable us to learn about the temporal dynamics of plant root and soil microbial behavior. The belowground system is often treated in a highly simplified manner in many ecosystem studies and models, and I aim to develop a more mechanistic understanding of belowground dynamics. This improved understanding is particularly important to predicting whole-ecosystem behavior in arid and semiarid ecosystems, which are often viewed as being "belowground dominated."

SUMMARY & LINKS TO "FORESTS IN THE EARTH SYSTEM"

Much of my research is motivated by the need to understand and predict the potential impacts of climate change on terrestrial ecosystems. For example, one of my long-term goals associated with research theme (1) is to couple the process models of tree growth and forest dynamics with downscaled future climate predictions to infer the potential impacts of climate change on US forests. My collaborator (Barber) and I have begun dialog with scientists at the National Center for

Atmospheric Research (NCAR) about collaborating on this project. NCAR scientists would provide the downscaled climate data and would contribute to ideas on scaling and linking the process-based forest model to the climate data. This work necessarily involves sophisticated statistical and computational techniques to deal with processes and data that are spatially and temporally variable, and I would bring such skills to the UA. Additionally, tree-ring data are a major and important source of information to this project. We are using existing tree-ring data in novel ways, including helping to parameterize the individual-based model for 100's of species. The ecological memory work also utilizes tree-ring data, and I am eager to extend this work to other species and sites. For example, based on my mechanistic, individual-based modeling work, I suspect that species differences in their ecological memory (with respect to annual growth or ring width) will align with their labile carbon strategies: species with a high capacity to store carbon (e.g., most shade-tolerant species) will likely exhibit a longer memory (compared to those with a lower storage capacity) because the buffering capacity of their carbon stores will be linked to past environmental conditions.

My research in arid and semiarid ecosystems is also strongly motivated by my desire to learn how these systems may be impacted by climate change. This work focuses on how climate change, and especially precipitation change, will impact carbon (and water) cycling in arid and semiarid ecosystems. The synthesis and modeling approaches that I employ necessarily involve development and application of spatial and/or temporal modeling tools. Additionally, I am keen to expand my forest work to semiarid woodlands by incorporating the belowground and fast time-scale processes explored in my desert work with the aboveground and slower time-scale processes that are the focus of my forest work. I believe that this coupling of projects, approaches, and processes would be greatly facilitated at the UA, where I would have the opportunity to (1) conduct field studies in the Southwest and (2) collaborate with scientists in the LTRR, SEES, the School of Natural Resources and the Environment, the Department of Ecology and Evolutionary Biology, the Office of Arid Lands Research, the USA National Phenology Network, and many other departments and programs.

I believe, in-turn, that my unique perspectives and experiences in forest, plant, and ecosystem ecology, statistical and mathematical modeling, computational tools, and working with large and messy datasets would benefit the LTRR, SEES, and the campus-wide focus on "the environment."

TEACHING STATEMENT

Kiona Ogle

TEACHING EXPERIENCES

My teaching experiences over the past 15 years are diverse. I have had the opportunity to work with students at all levels (middle school to postdocs) and to teach a variety of subjects spanning biology, ecology, statistics, and modeling. I thoroughly enjoy teaching and interacting with students, and even as an undergraduate, I sought out opportunities to develop my teaching and mentoring skills. As an undergraduate at Northern Arizona University (NAU), I was invited to participate in an NSF-funded program dedicated to introducing students to real-life mathematical applications in biology. I developed teaching modules for middle school, high school, and undergraduate students, and I guest lectured in two high school classes. I also worked for the Learning Assistance Center and tutored undergraduate and graduate students in statistics, math, and biology.

I participated in a variety of teaching activities as a Ph.D. student at Duke. I taught two semesters of introductory biology lab and seminar sections, and I was a teaching assistant (TA) for the graduate-level class in *Biogeochemisty* (Prof. Bill Schlesinger). I was also a TA for *Applied Regression* (Prof. Merlise Clyde), a statistics course that served ~100 graduate students, mostly from the environmental sciences. I also had the opportunity to co-instruct and co-develop a graduate course on *Modeling Plant & Ecosystem Responses to Global Change* with Prof. Jim Reynolds, and I have incorporated aspects of the course material into the current class I teach on *Ecological Systems Modeling* at the University of Wyoming (UW). As a postdoc at Princeton, I volunteered to assist Prof. Simon Levin with his course in *Theorectical Biology*, which was aimed at graduate and advanced undergraduate students. I mentored a team of four outstanding undergrads on a modeling project that implemented a state-and-transition model to explore the long-term impacts of grazing on vegetation composition in semi-arid systems in the Southwest. I provided the students with the basic project idea, directed them to the on-line data sources, and helped guide them through some of the mathematical and statistical analyses.

As an assistant professor at UW, I have only taught graduate-level courses (this was the initial expectation of my position). I have taught four different courses at UW: *Bayesian Data Analysis* (offered every year), *Ecological System Modeling* (offered every other year), *Hierarchical Bayesian Modeling in Ecology* (offered once as a seminar), and *Inverse Analysis in Isotope Ecology* (offered once as a seminar).

All of these classes are "quantitative," and I expect the students to have a solid understanding of calculus, probability, distribution functions, and regression analysis. The *Bayesian Data Analysis* course has been particularly popular—and it is my favorite to teach—and has served students and postdocs from a variety of fields (e.g., ecology, zoology, botany, geology, economics, bioinformatics, statistics). In the two regular courses, I combine lectures, readings and discussions, and hands-on computing sessions, and give challenging homework assignments to facilitate student learning. The seminar courses are more laid-back, and generally involve student-run discussions. Although these

classes provided little opportunity to interact with undergraduates, I have provided over 10 UW undergrads with hands-on research experiences and have mentored two on independent research projects (one, Brenda Thompson, is a co-author on a publication). I have found great satisfaction in working directly with these undergrads.

I also actively participate in other teaching activities outside of UW. For example, I have organized a daylong workshop on *Bayesian Modeling in Ecology* for the Ecological Society of America

(ESA) meetings. My co-organizers and I have offered the workshop four times (2006-2009), and plan to offer it yearly for at least the next five or so years. This is one of ESA's most popular

workshops; it fills-up with a few days of preregistration and we are always asked to increase the enrollment cap. Upon invitation, I also organized this workshop for the Spanish Ecological Society (2009), and I have been invited by the Society officers to organize a weeklong short-course that provides more in-depth training. I have received excellent feedback about the workshops and I really enjoy organizing them and interacting with the participants. I also regularly participant in the annual, 2-week summer course on *Flux Measurements and Modeling* that was initiated in 2008 by Dr. Russ

Monson at the University of Colorado; I spend a day introducing participants to process-based Bayesian approaches to analyzing flux data. These workshops offer a unique training opportunity for ecologists given that Bayesian modeling methods are absent from most university curricula.

TEACHING INTERESTS

As evidenced by my teaching evaluations, I believe that I am developing into a successful and popular teacher, while demanding a rigorous standard of excellence. I am excited to offer courses that employ integrative and quantitative approaches, which I believe would compliment new undergraduate and graduate programs that may be developed through SEES, or existing programs that are offered in conjunction with affiliated departments. I also believe that these courses would benefit others across the UA campus, including, but not limited to, the programs in Ecology and Evolutionary Biology (EEB), Rangeland Ecology and Management (in SNRE), Watershed Management and Ecohydrology (in SNRE), and Graduate Interdisciplinary Programs in Statistics, Soil, Water, and Environmental Sciences (SWES), Arid Lands Resource Sciences (ALRS), Global Change (GC), and Applied Mathematics. Below I give examples of three potential courses that I would like to teach at UA: *Bayesian Data Analysis, Hierarchical Bayesian Modeling in Ecology*, and *Modeling*

Forest Ecosystems. These are quantitative courses that I have developed at UW, or that I would modify

from courses that I have developed. They are primarily geared towards graduate students. I would also be interested in developing (1) an undergraduate course that would provide a survey and introduction to forecasting climate change impacts on ecological systems, with an emphasis on forest ecosystems; this class might be called *Forests in a Changing World* and (2) a seminar course in

Bayesian Analysis of Tree-Ring Data that would introduce Bayesian method for dealing with such timeseries

data that may be collected across space. Below I provide descriptions of the three aforementioned graduate-level courses.

Bayesian Data Analysis

It appears that UA offers a graduate-course in *Bayesian Statistical Theory and Applications* through
the Department of Economics. It is not clear how much my course would overlap with this one, and I would potentially work with the instructor to reduce overlap. If the overlap is too great, then I may not offer this course, in which case, I would place my efforts towards expanding upon *Hierarchical Modeling in Ecology*.

Course description. This is a 4-credit hour, applied course in Bayesian data analysis. Some basic theory, essential to Bayesian data analysis, will be presented. The vast majority of examples, assignments, and exam problems will be based on environmental, ecological, and biological problems. The course will cover a range of statistical models that are typically encountered in data analysis, and it will show how these models can be accommodated within a Bayesian framework (maximum likelihood approaches and frequentist methods will be compared when appropriate). Such models include: single- and multiple-parameter models, simple linear regression, hierarchical models (e.g., random and mixed effects models), generalized linear models, nonlinear models, measurement error models, and multivariate models. Issues related to model specification and implementation will be covered such as choosing priors and basic computational approaches. Other potential topics reflecting modern Bayesian approaches may be discussed depending on time and

class interests, including: hierarchical Bayesian modeling that couples process models and data; Bayesian approaches to the simultaneous analysis of multiple data sources; Bayesian approaches to dealing with missing data and latent variables; and, computational tricks.

Learning objectives. By the end of the semester, students should be able to conduct a variety of Bayesian analyses of data using OpenBUGS (free software), including being able to (1) choose appropriate prior distributions, (2) evaluate the sensitivity of posterior estimates to prior specifications, (3) evaluate numerical (MCMC) results, (4) specify appropriate models, and (5) implement a variety of models to analyze data.

Teaching and learning activities. The course involves regularly scheduled class meetings that include lectures, occasional in-class demonstrations using OpenBUGS, and weekly lab sessions that involve hands-on computing and programming. A variety of activities will take-place to help students learn about Bayesian data analysis methods. Out-of-class activities will include regularly scheduled assignments (~weekly), occasional readings from the primary literature or other textbooks, and readings from chapters from various texts. Assignments will often require the use of OpenBUGS for implementation of different types of Bayesian data analyses. In-class and take-home mid-term and final exam will be given.

Hierarchical Modeling in Ecology

Course description. This is a 2-credit hour, graduate-level course (or 3-credit hour course if I do not teach my version of *Bayesian Data Analysis*) that would focus on Bayesian analysis of ecological
data in the context of process-based models. This course would draw-upon some of the topics presented in Jim Clark's book on *Models for Ecological Data* (2007, Princeton University Press), but I
would also incorporate recent literature. The emphasis of this course is on analyzing hierarchically structured data (e.g., data sets that span different temporal and spatial scales and/or different levels of biological organization). Hierarchical Bayesian analysis in ecology is an emerging and exciting topic, offering powerful methods for fitting (often messy) data to complex models that would otherwise be exceptionally difficult to achieve via classical approaches. The course would illustrate

how Bayesian statistics and hierarchical modeling can be applied to parameterize models ranging from fairly simple empirical to mechanistic (process-based) formulations. Topics also include incorporation of existing knowledge from previous studies or literature and quantification of uncertainties regarding models, data, and the natural system.

Learning objectives. By the end of the semester, students should be able to 1) develop and evaluate appropriate process models, 2) conduct hierarchical Bayesian analyses of ecological data in the context of the process models using OpenBUGS, 3) program code for a Markov chain Monte Carlo (MCMC) sampling routine (e.g., Metropolis-Hastings or Gibbs) in, for example, Matlab or R, 4) evaluate the sensitivity of posterior estimates to prior specifications and model structure, 5) simultaneously analyze data from multiple sources within the context of the process models, and 5) conduct formal model comparisons and model selection.

Teaching and learning activities. The course would include lectures, discussions, readings from the
primary literature and relevant texts (e.g., Clark, 2007), demonstrations using OpenBUGS, Matlab, and potentially R, and hands-on computing sessions. Students would be given regularly scheduled assignments, and would complete an independent project that uses hierarchical Bayesian modeling techniques to analyze data from their own research or other sources (e.g., literature, internet).

Modeling Forest Ecosystems

I have developed a similar course at UW titled *Modeling of Ecological Systems* that is not specifically focused on forested ecosystems. But, I would like to modify this course to explicitly focus on modeling of forest, woodland, and savannah ecosystems. This course would also be

motivated by issues associated with predicting how these systems may be impacted by global change factors such as altered climate, changes in fire frequency and severity, plant invasions, land-use changes, etc. The course description provided below is primarily based on the *Modeling of Ecological*
Systems class that I currently teach, and the modeling methods that I would introduce are similar, but
the applications and papers that we would discuss for this new course would focus explicitly on modeling and forecasting of forest ecosystems.

Course description. Due to the synthetic nature and inherent complexities of systems ecology, models play a key role in organizing and explicitly quantifying our understanding of how ecological systems behave. This course will introduce students to ecological systems modeling as a discipline that is central to synthesizing ecological information (data), formalizing our ecological understanding (theory), and developing hypotheses and informing "empirical" experiments. The main focus is on empirical (data-driven) and mechanistic models for understanding temporal dynamics in ecological systems. Although the course touches on historical aspects, it will emphasize modern methodologies and approaches. Topics will include: model construction, model evaluation and analysis, model parameterization and parameter estimation, model validation, model uncertainty and forecasting, and a variety of newer topics in ecological systems modeling (e.g., via the recent literature). The course will also include a survey and evaluation of published models.

Learning objectives. This course will provide students with the background and tools that will allow them to critically evaluate models and to become better-informed users of models. By the end of the semester, students should be able to (i) comfortably and critically evaluate existing models and studies employing models, (ii) formulate their conceptual ideas into mathematical models, (iii) conduct analytical and numerical analyses of models such as sensitivity analyses, (iv) carry-out

deterministic and stochastic simulations, (v) parameterize a model with data, and (vi) "validate" or recognize how to validate a model. Students will become familiar with a variety of software packages for conducting analytical evaluation of models and numerical simulations (e.g., STELLA, Matlab, OpenBUGS, and Mathematica or Maple). Students will develop programming skills associated with learning and using these packages.

Teaching and learning activities. The course will include regularly scheduled class meetings and a separate computer lab session. Class meetings will primarily be devoted to lectures, but some portion of the class period will include discussions centered on assigned readings. Students will lead biweekly discussions of the literature, and all students are expected to participate. The lectures will include a variety of approaches such as traditional lectures via overheads and chalk/white board, illustrative examples and presentations, and discussion sessions. The computer labs will familiarize students with the software packages and will provide an opportunity for students to ask questions related to previous lectures, labs, and assignments. A variety of activities will take-place to help students learn. Out-of-class activities will include assigned readings from the literature, weekly or biweekly homework assignments, and an independent modeling project. In-class activities include discussions of assigned readings, hands-on computing sessions associated with the computer lab, and student presentations of modeling projects.

March 9, 2010

Dr. Connie Woodhouse, Forests in the Earth System Search Chair
School of Geography and Development
The University of Arizona
Tucson, AZ 85721

Dear Dr. Woodhouse,

I wish to apply for the tenure-track faculty position related to "forests in the Earth System," which is based in the Laboratory of Tree-Ring Research (LTRR) and the new School of Earth and Environmental Sciences (SEES) at the University of Arizona (UA). I believe my credentials in plant, forest, ecosystem, and quantitative ecology make me well suited for this position.

Why do I apply for this position while holding a tenure-track position at the University of Wyoming (UW)? First, a significant component of my research program focuses on plants and ecosystems in the Southwest, and I would benefit from the proximity to potential field sites. Second, I have enjoyed my many visits to UA, often to meet with close colleagues, and I feel "at home" at UA. In fact, my first "research visit" to UA was as an undergrad, where I spent about one week in the LTRR learning dendrochronology methods. Third, though I am relatively content with my joint appointment in the Departments of Botany (75%) and Statistics (25%) at UW, I look forward to the enhanced research and teaching opportunities that the LTRR, SEES, and UA would offer. Fourth, I am excited about the possibility of living in the Southwest and being closer to family; I own property near Snowflake, where I grew-up and where my parents continue to call home. Lastly, I am very fond of the Sonoran Desert and its climate, and I look forward to leaving the long, cold winters behind.

Relevant to this position, my background in mathematics, statistics, and ecology has enabled me to address important questions in plant, forest, ecosystem, and global change ecology. My interest in these fields began as an undergraduate at Northern Arizona University (NAU), where I completed a dual major in biology and mathematics. I was intrigued by the variety of ways that math and statistics could be applied to help us answer important ecological questions. My first venture into coupling these fields was as an undergrad; I used longitudinal data analysis to evaluate if drought-susceptible trees exhibit different tree-ring width patterns than drought-tolerant trees. I completed this project, and my B.S., eager to pursue a graduate degree that would enable me to rigorously expand upon and merge the fields of ecology and math/statistics.

I was drawn to the Ph.D. program in biology at Duke because of the ample opportunities to further develop my integrative skills. As part of my program, I took several classes in applied math and statistics, including Bayesian statistics. I saw great potential in the Bayesian approach for analysis of complicated ecological data, which inspired me to simultaneously pursue an M.S. in statistics at Duke. My graduate research applied these tools to quantify physiological and growth responses of a desert shrub to variations in annual, seasonal, and pulse precipitation. While at Duke, I became fascinated by the question of how plant- and species-level traits affect population, community, and ecosystem properties.

My desire to address this question and to extend my quantitative skills led me to a postdoctoral position with Dr. Steve Pacala at Princeton, the first two years of which were funded by an NSF Biological Informatics Fellowship. Also, I wanted to expand my biological emphasis beyond arid systems, and I focused on forests because they are widespread and play a significant role in the global carbon cycle. My primary project at Princeton developed an initial framework for linking individual tree traits (e.g., growth, carbon allocation, allometry, physiology) to forest dynamics (e.g., succession,

biodiversity, carbon dynamics), and I have expanded upon this work in my current research program.

In general, my current and future research goals focus on developing a mechanistic and predictive understanding of how temperate forests and other ecosystems (e.g., deserts) are affected by environmental perturbation. My goal is to use this mechanistic understanding to learn how ecosystems are impacted by climate change factors. My approach often involves synthesis of large and diverse datasets within the context of process-based models. Since arriving at UW in fall 2006, I have served as PI or Co-PI on grant proposals resulting in more than $2.4 million to support my program. One of my major research avenues is funded by an $808K grant from the NSF's program in Advances in Biological Informatics. This project is developing a general scaling framework for inferring large-scale forest dynamics from individual- and species-specific physiological, allometric, and morphological traits. We are developing and testing individual-based models of tree growth and mortality, informed by large datasets (forest inventories, tree-ring databases, literature data) and scaled up to larger regions; the spatial and temporal scaling component is an important and necessary step towards coupling our models with climate predictions to forecast impacts of climate change on US forests.

In addition to the forest project, I am leading a large synthesis project (in collaboration with Travis Huxman at UA and other colleagues) aimed at quantifying the effects of altered precipitation on arid and semi-arid plants and ecosystems. We are developing and applying process-based modeling and modern statistical techniques to analyze the factors driving plant and ecosystem carbon and water cycling. This involves understanding how aboveground processes (e.g., related to plant carbon gain and allocation) and belowground processes (e.g., related to root-microbial-soil interactions) interact to affect whole-ecosystem behavior. We are addressing these questions in deserts of the Southwest via synthesis of existing data related to soil, plant, and ecosystem carbon and water pools and fluxes. I have also initiated projects in cold, semi-arid ecosystems in Wyoming, where we are combining field studies, isotopes, and modeling to learn about the impacts of altered snowpack on below- and aboveground processes related to ecosystem carbon and water dynamics.

My teaching interests also embrace an integrative/quantitative approach. I have had numerous opportunities to teach and mentor students in a variety of capacities. As an undergraduate at NAU, I worked as a tutor and helped my peers learn mathematics, statistics, and biology. As a Ph.D. student at Duke, I assisted in teaching courses in biology, biogeochemistry, regression analysis, and ecological modeling. At Princeton, I interacted with students in a mentoring capacity and offered informal short courses on topics such as Bayesian modeling in ecology. At UW, I have taught four different graduate courses related to Bayesian analysis and ecological modeling. These courses serve students from a variety of backgrounds (e.g., zoology, botany, ecology, economics, geology, hydrology, statistics), providing them with a unique opportunity to learn modern quantitative methods. I also offer training opportunities outside of UW and have organized workshops on Bayesian analysis in ecology for five

Ecological Society of America meetings (2006-10) and the Spanish Ecological Society meeting (2009).
I truly enjoy teaching these courses and workshops, and I believe similar courses would benefit the graduate and undergraduate programs in SEES and other interdisciplinary graduate programs at UA.
I am very excited about this position and the prospect of joining the LTRR, SEES, and UA. My research could benefit from interactions with LTRR scientists, and climatologists, hydrologists, forest
scientists, and ecosystem ecologists across campus. I also expect my unique combination of expertise
to benefit the LTRR, SEES, and interdisciplinary programs and activities at the UA. I welcome the opportunity to help grow the "environmental" focus at the UA. If you have any questions regarding my application, feel free to contact me by e-mail (kogle@uwyo.edu) or telephone (cell: 307-399-7758).
Sincerely,
Kiona Ogle
(1)

Curriculum Vitae

KIONA OGLE

University of Wyoming, Departments of Botany and Statistics, Laramie, WY 82070
Tel: (307) 766 - 3219, Email: kogle@uwyo.edu, Web page: www.uwyo.edu/oglelab
Updated March 9, 2010

EDUCATION

2003 Ph.D., Biology, Duke University, Durham, NC.
Title of Ph.D. Thesis: Desert dogma revisited: Physiological and growth responses of *Larrea tridentata* (creosotebush) to annual, seasonal, and pulse precipitation
2003 M.S., Statistics, Duke University, Durham, NC.
1997 B.S., Biology and Mathematics (dual major), Northern Arizona University, Flagstaff, AZ.

ACADEMIC POSITIONS

2006- Assistant Professor, Departments of Botany (75%) and Statistics (25%), University of Wyoming, Laramie, WY.
2005-2006 Research Associate, Department of Ecology and Evolutionary Biology, Princeton University, Princeton, NJ.
2003-2005 National Science Foundation (NSF) Interdisciplinary Informatics Postdoctoral Fellow, Department of Ecology and Evolutionary Biology, Princeton University, Princeton, NJ.

OTHER POSITIONS

2009 Visiting Scientist, National Center for Atmospheric Research (NCAR), Boulder, CO (by invitation, June 2009).
2000-2003 National Aeronautics and Space Administration (NASA) Earth Systems Science Graduate Fellow, Department of Biology, Duke University, Durham, NC.
2001 Graduate Teaching Assistant, Institute of Statistics and Decision Sciences, Duke University, Durham, NC.
2000 Graduate Teaching Assistant, Department of Biology, Duke University, Durham, NC.
1999-2000 Graduate Research Assistant, Department of Biology, Duke University, Durham, NC.

1997-1998 Graduate Teaching Assistant, Department of Biology, Duke University, Durham, NC.

1996-1997 NSF Research Experience for Undergraduates, Pinyon Ecology Lab, Department of Biological Sciences, Northern Arizona University, Flagstaff, AZ.
1995-1997 Tutor, Learning Assistance Center, Northern Arizona University, Flagstaff, AZ.
1993-1996 Biological Technician, United States Forest Service, Rocky Mountain Research Station, Flagstaff, AZ.

COURSE DEVELOPMENT & TEACHING

University of Wyoming

University of Wyoming –Ecological Systems Modeling, Bayesian Data Analysis, Hierarchical Bayesian Modeling in Ecology, Inverse Analysis in Isotope Ecology

Other

Modeling Plant and Ecosystem Responses to Global Change (Duke)

PUBLICATIONS

*Indicates publications with my students and postdoctoral associates (*italics*).

Accepted with Revision (expected to appear in 2010)

***Cable J.*, K. Ogle**, *R.W. Lucas*, T.N. Charlet, M. Cleary, B.E. Ewers, A. Griffith, T.E. Huxman, M.E. Loik, R.S. Nowak, E. Pendall, M. Rogers, S.D. Smith, H. Steltzer, P.F. Sullivan, D.T. Tissue, N.C. van Gestel, and J.M. Welker. The unique responses of desert soil respiration to temperature: a seven desert synthesis. Submitted to *Biogeochemistry.*

***Cable, J.*, K. Ogle**, and D. Williams. Application of isotopic measurements and a Bayesian mixing model to determine the contribution of glaciermelt water to streamflow in the Wind River Range, Wyoming. Submitted to *Hydrological Processes.*

Hobbs, N.T. and **K. Ogle**. Introducing data-model assimilation to students of ecology. Submitted to *Ecological Applications.*

In Press (to appear in 2010)

Lichstein, J.W., J. Dushoff, **K. Ogle**, A. Chen, D.W. Purves, J.P. Caspersen, and S.W. Pacala. Unlocking the forest inventory data: relating individual-tree performance to unmeasured environmental factors. *Ecological Applications*.

Journal Articles in Print

Ogle, K., T.G. Whitham, and N.S. Cobb. (2000) Tree-ring variation in pinyon predicts the likelihood of death following severe drought. *Ecology* 81:3237-3243.

Norby, R.J., **K. Ogle**, P.S. Curtis, F.-W. Badeck, A. Huth, G.C. Hurtt, T. Kohyama, and J. Peñuelas. (2001) Aboveground growth and competition in forest gap models: an analysis for studies of climatic change. *Climatic Change* 51:415-447.

Bugmann, H.K.M, S.D. Wullschleger, D.T. Price, **K. Ogle**, D.F. Clark, and A.M. Solomon. (2001) Comparing the performance of forest gap models in North America. *Climatic Change* 51:349-388.

Ogle, K. and J.F. Reynolds. (2002) Desert dogma revisited: coupling of stomatal conductance and photosynthesis in the desert shrub, *Larrea tridentata*. *Plant, Cell and Environment* 25:909-921.

Ogle, K. (2003) Implications of interveinal distance for quantum yield in C4 grasses: a modeling

and meta-analysis. *Oecologia* 136:532-542.
Ogle, K., R.L. Wolpert, and J.F. Reynolds. (2004) Reconstructing plant root area and water uptake profiles. *Ecology* 85:1967-1978.
Ogle, K. and J.F. Reynolds. (2004) Plant responses to precipitation in desert ecosystems: Integrating functional types, pulses, thresholds, and delays. *Oecologia* 141:282-294.
Reynolds, J.F., P.R. Kemp, **K. Ogle**, and R.J. Fernández. (2004) Modifying the 'pulse-reserve' paradigm for deserts of North America: Precipitation pulses, soil water, and plant responses. *Oecologia* 141:194-210.
Huxman, T.E., K.A. Snyder, D. Tissue, A.J. Leffler, **K. Ogle**, W.T. Pockman, D.R. Sandquist, D.L. Potts, and S. Schwinning. (2004) Precipitation pulses and carbon fluxes in semi-arid and arid systems. *Oecologia* 141:254-268.
Weitz, J.S., **K. Ogle**, and H.S. Horn (2006). Ontogenetically stable hydraulic design in woody plants. *Functional Ecology* 20:191-199.
Purves, D.W., M.A. Zavala, **K. Ogle**, F. Prieto, and J.M. Rey-Benayas (2007). Coupling environmental forcing, metapopulations dynamics, and dispersal of *Quercus* species in central Spain. *Ecological Monographs* 77:77-97.
Ogle, K. and J.J. Barber (2008). Bayesian data-model integration in plant physiological and ecosystem ecology. *Progress In Botany* 69:281-311.
Hui, D.F., Y.Q. Luo, D. Schimel, J.S. Clark, A. Hastings, **K. Ogle**, and M. Williams. (2008) Converting raw data into ecologically meaningful products: A meeting report on data-model assimilation in ecology: Techniques and applications, Norman, Oklahoma, 22-24 October 2007. *EOS, Transactions, American Geophysical Union*, Jan 25, 2008.
Cable, J.M.*, **K. Ogle, D.G. Williams, J. Weltzin, and T.E. Huxman. (2008) Soil texture drives responses of soil respiration to precipitation pulses in the Sonoran Desert: Implications for climate change. *Ecosystems* 11:961-979.
Ogle, K. (2009) Hierarchical Bayesian statistics: Merging experimental and modeling approaches in ecology. *Ecological Applications* 19:577-581.
Ogle, K. and S.W. Pacala. (2009) A modeling framework for inferring tree growth and allocation from physiological, morphological, and allometric traits. *Tree Physiology* 29:578-605.
Patrick, L.D.*, **K. Ogle, D. Tissue, C.W. Bell, and J. Zak. (2009) Physiological responses of two contrasting desert plant species to precipitation variability are differentially regulated by soil moisture and nitrogen dynamics. *Global Change Biology* 15:1214-1229.
***Ogle, K.**, J.J. Barber, C.J. Willson, and *B. Thompson*. (2009) Hierarchical statistical modeling of xylem vulnerability to cavitation. *New Phytologist* 182:541-554.

Cable, J.M.*, **K. Ogle, A.P. Tyler, M.A. Pavao-Zuckerman, and T.E. Huxman. (2009) Woody plant encroachment impacts on soil carbon and microbial processes: Results from a hierarchical Bayesian analysis of soil incubation data. *Plant and Soil* 320:153-167.
Price, C.A., **K. Ogle**, E.P. White, and J. Weitz. (2009) Evaluating scaling models in biology using hierarchical Bayesian approaches. *Ecology Letters* 12:641-651.
Patrick, L.D., **K. Ogle**, and D.T. Tissue. (2009) A hierarchical Bayesian approach for estimation of photosynthetic parameters of C_3 plants. *Plant, Cell and Environment* 32:1695-1709.

Chapters in Books

Reynolds, J.F., P.R. Kemp, **K. Ogle**, R.J. Fernández, Q. Gao, and J. Wu (2006). Modeling the

unique attributes of desert ecosystems: Potentials and limitations based on lessons from the Jornada Basin. In: L.F. Huenneke, K.M. Havstad, W.H. Schlesinger (Eds.). *Structure and Function of a Chihuahuan Desert Ecosystem: Long-term Ecological Research in the Jornada Basin, New Mexico*. Oxford University Press, Oxford, UK.

Ogle, K., M. Uriarte, J. Thompson, J. Johnstone, A. Jones, Y. Lin, E. McIntire, and J. Zimmerman (2006). Implications of vulnerability to hurricane damage for long-term survival of tropical tree species: A Bayesian hierarchical analysis. In: J.S. Clark and A.E. Gelfand (Eds.) *Hierarchical Modeling for the Environmental Sciences: Statistical Methods and Applications*. Oxford University Press, Oxford, UK.

Book Reviews

Ogle, K. (2007) A Collection of computer-intensive methods. Book Review. *BioScience* 57:886-887.

*In Review or In Revision***

Cable*, *J.M.*, **K. Ogle, and E.A.G. Schuur. Use of deep water by tundra plants: potential for permafrost degradation to impact ecosystem water fluxes. Submitted to *Ecology*.

Lucas R.W.*, **K. Ogle, *L.D. Patrick*, *J.M. Cable*, G. Barron-Gafford, A. Griffith, D. Ignace, G.D. Jenerette, A. Tyler, T.E. Huxman, M.E. Loik, S.D. Smith, and D.T. Tissue. Substantial nighttime water loss in desert plants. In revision for *New Phytologist.*

*Luo, Y., **K. Ogle**, *C. Tucker*, S. Fei, C. Gao, S. LaDeau, J. Clark, and D. Schimel. Ecological forecasting and data assimilation in a data-rich era. Submitted to *Ecological Applications.*

Kattge, J., **K. Ogle**, G. Boenisch, S. Díaz, S. Lavorel, J. Madin, K. Nadrowski, S. Noellert, K. Sartor, and C. Wirth. A generic structure for plant trait databases. In revision for *Journal of Vegetation Science*.

Resco, V., M.L. Goulden, **K. Ogle**, A.D. Richardson, E.A. Davidson, D.Y. Hollinger, J.G. Alday, A.S. Kowalski, A. Carrara, B.R. Reverter, W.C. Oechel, R.L. Scott, R.K. Varner, G.A. Barron-Gafford, and J.M. Moreno. Endogenous plant rhythms drive daily fluctuations of terrestrial CO_2 exchange. Submitted to *Science*.

**Nine other manuscripts are in preparation, and most will likely be submitted by May 2010.

CONTRACTS & GRANTS

*Grants awarded since arriving at University of Wyoming in August 2006 exceed $2.4 million (over $1.4 million as PI and over $1.0 million as Co-PI).

Funded Projects as PI

2010-2011 NICCR Focus 4: Quantifying the importance of aboveground controls on soil carbon efflux in deserts of the Southwest. National Institute for Climate Change Research (NICCR), US Department of Energy (DOE), $125,909 (1 year).

2009-2012 A theoretical and computational framework for linking tree form and function to forest diversity and productivity. CoPI: Jarrett Barber (University of Wyoming). NSF Advances in Biological Informatics, $808,673 (3 years).

2009-2010 Unlocking the mysteries of belowground plant form and function. UW Faculty Grand-in-Aid Program, $7,050 (1 year).

2008-2009 Understanding forest responses to climate change: Developing a mechanistic

framework of tree and forest carbon dynamics. Wyoming NASA Space Grant Consortium, $20,000 (1 year).
2006-2009 NICCR Focus 4: Synthesis of existing datasets to explore the implications of altered precipitation for carbon and water dynamics in desert ecosystems of the southwestern US. CoPIs: Travis Huxman (University of Arizona), Michael Loik (University of California, Santa Cruz), Stan Smith (University of Nevada, Las Vegas), and David Tissue (Texas Tech). National Institute for Climate Change Research (NICCR), US Department of Energy (DOE), $405,871 (3 years).
2006-2007 Bioinformatics Starter Grant: Species-specific traits controlling forest and woodland dynamics revealed by Bayesian melding of diverse data and process models. National Science Foundation (NSF), $50,000 (1 year).
2003-2005 Bayesian melding of ecological models and data: Linking plant physiology and population processes. NSF Interdisciplinary Informatics Postdoctoral Fellowship, $100,000 (2 years).

Funded Projects as CoPI

2009-2013 RCN: Forecasts Of Resource and Environmental Changes: data Assimilation Science and Technology (FORECAST). CoPIs: Yiqi Luo (PI) (University of Oklahoma), Shannon LaDeau (Cary Institute of Ecosystem Science), James Clark (Duke Univesity), David Schimel (NCAR). NSF Research Coordination Networks, $500,000 (4 years).
2009-2011 Biotic processes regulating the carbon balance of desert ecosystems. CoPIs: Bob Nowak (PI) (Univ Nevada, Reno), Dave Evans (Washington State Univ), Kiona Ogle (Univ Wyoming), Stan Smith (Univ Nevada, Las Vegas), Lynn Fenstermaker (Desert Research Institute). Department of Energy (DOE), $530,260 (2 years).

Funded Projects as Postdoctoral Sponsor

Kiona Ogle's CV
(6)
2009-2011 The consequences of permafrost degradation on plant water-use. PI/Fellow: Jessica Cable (University of Wyoming). Primary Sponsor: Jeff Welker (University of Alaska), Secondary Sponsor: Kiona Ogle. NSF Postdoctoral Fellowships in Polar Regions Research, 2-year fellowship.
2009-2011 Linking scaling and physiological models to estimate carbon and water fluxes of diverse plant species. PI/Fellow: Lisa Patrick (University of Arizona). Primary Sponsor: Brian Enquist (University of Arizona), Secondary Sponsor: Kiona Ogle. NSF Postdoctoral Fellowships in Biological Informatics, 2-year fellowship.

PROFESSIONAL AFFILIATIONS & ACTIVITIES

Memberships in Professional Societies

Ecological Society of America (ESA)
American Geophysical Union (AGU)

Offices held in Professional Societies

Secretary, Physiological Ecology Section, ESA (Jan 2008 – Dec 2009)

Grant Review Panels

2006 National Science Foundation (NSF), Biological Informatics Postdoctoral Fellowships
2008 NSF, Biological Informatics Postdoctoral Fellowships; NSF, Ecosystems
2009 NSF, Biological Informatics Postdoctoral Fellowships; NSF, Ecosystems
Invitations declined: NSF, Cyber-Enabled Discovery and Innovation (2008); NSF, Ecosystems (fall 2008; fall 2009; spring 2010); NSF, Advances in Biological Informatics (fall 2009)

Grant Refereeing

2005 NSF-QEIB (1)
2006 NSF-DEB Ecological Biology Cluster (1), NSF-DEB Ecology (1), NSF-DEB Ecosystems (2), US Department of Energy-NICCR (6)
2007 US Department of Energy-NICCR (7)
2008 US Department of Energy-NICCR (1)
2009 US Department of Energy-NICCR (4)
2010 NSF-DEB Ecosystems (3)

Manuscript Refereeing

2004 *Journal of Theoretical Biology* (1), *Tree Physiology* (1)
2005 *Ecology* (1), *Journal of Arid Environments* (1), *Journal of Theoretical Biology* (1), *Plant Ecology* (2)
2006 *Annals of Botany* (1), *Journal of Arid Environments* (2), *Journal of Geophysical Research* (1)
2007 *Ecological Applications* (2), *Ecology* (1), *Journal of Geophysical Research* (1), *Journal of Mathematical Biology* (1)
2008 *Ecology* (1), *Oecologia* (1), *New Phytologist* (2)

2009 *Ecology* (2), *Functional Ecology* (1), *Functional Plant Biology* (1), book chapter on meta-analysis
2010 *Ecology* (1), *New Phytologist* (1), *Limnology & Oceanography* (1)

HONORS & AWARDS

2000-2003 Graduate Fellow, NASA Earth Systems Science Fellowship, Department of Biology, Duke University, Durham, NC
2002 Forrest Shreve Desert Research Award, Ecological Society of America, Department of Biology, Duke University, Durham, NC
2001 Grants-in-Aid-of-Research, Department of Biology, Duke University, Durham, NC
2000 Forrest Shreve Desert Research Award, Ecological Society of America, Department of Biology, Duke University, Durham, NC
1999 Grants-in-Aid-of-Research, Sigma Xi, Department of Biology, Duke University, Durham, NC
1999 Keever Award for Field Research, Department of Botany, Duke University, Durham, NC
1999 Giles Award for Phytotron Research, Department of Botany, Duke University, Durham, NC
1997 Bayless Research Award for Outstanding Undergraduate Research, Northern Arizona University (NAU), Flagstaff, AZ
1997 Outstanding Senior (valedictorian) in the College of Arts and Sciences and in the Departments of Mathematics and Biological Sciences, NAU, Flagstaff, AZ
1997 Honor Society of Phi Kappa Phi, NAU, Flagstaff, AZ
1996 Meritorious Award, Mathematical Modeling Contest, The Consortium for Mathematics and Its Applications (COMAP), NAU, Flagstaff, AZ
1995, 1996 Outstanding Achievement Award, Rocky Mountain Research Station, U.S. Forest Service, Flagstaff, AZ
1995, 1996 Invited participant of the William Lowell Putnam Mathematical Competition, Department of Mathematics, NAU, Flagstaff, AZ

1992-1996 Northern Arizona University General Academic Scholarship, NAU, Flagstaff, AZ

PAPERS PRESENTED, SYMPOSIA & INVITED SEMINARS

*Indicates presentation/posters with my students and postdoctoral associates (*italicized*).

Presentations and Posters

2010 Mailloux, J.M., **K. Ogle**, and C.D. Frost. *Using a Bayesian statistical model to determine the amount of coalbed natural gas co-produced water in the Powder River, WY and MT*, Goldschmidt Earth, Energy, and the Environment Conference, Knoxville, TN, June 2010

Cable, J.M., **K. Ogle**, and J. M. Welker. *Ecohydrological feedbacks from permafrost degradation: quantifying subarctic plant water use strategies using stable isotope and Bayesian analysis techniques*,

Stable Isotope and Biogeochemical Cycles in Terrestrial Ecosystems Conference, Ascona, Switzerland, March 21-26, 2010

K. Ogle and *S. Pathikonda*. *The importance of functional trait variability for tree growth and mortality: Implications for forest dynamics*, the Ecological Society of America 95th Annual Meeting, Pittsburgh, PA (invited, organized oral session)

S. Pathikonda, **K. Ogle**, J. DeNoyer, J. Lichstein, and K. Sartor. *Meta-analysis of wood density: The roles of evolutionary history and environmental influences*, the Ecological Society of America 95th Annual Meeting, Pittsburgh, PA (abstract submitted)

*D.L. Sonderegger, **K. Ogle**, R.S. Nowak, and S. Ferguson. *Temporal dynamics of root growth under long-term exposure to elevated CO_2 in the Mojave Desert*, the Ecological Society of America 95th Annual Meeting, Pittsburgh, PA (invited, organized oral session)

C. Tucker, *J.M. Cable*, and **K. Ogle**. *Determining drivers of winter soil respiration using carbon isotope flux gradients and laboratory incubations*, the Ecological Society of America 95th Annual Meeting, Pittsburgh, PA (abstract submitted)

L. Patrick-Bentley*, **K. Ogle, *J.M. Cable*, G. Barron-Gafford, T.E. Huxman, M. Loik, S. Smith, and D. Tissue. *Quantifying the precipitation "memory" of plant photosynthesis in deserts*, the Ecological Society of America 95th Annual Meeting, Pittsburgh, PA (abstract submitted)

J.M. Cable, **K. Ogle**, T.E. Huxman, R.L. Scott, and D.G. Williams. *Shrub encroachment does not alter the direct and indirect contributions of grasses to soil respiration*, the Ecological Society of America 95th Annual Meeting, Pittsburgh, PA (abstract submitted)

2009 **K. Ogle**. *Application of mechanistic isotope mixing models for partitioning plant and ecosystem fluxes*,

Spanish Ecological Society, keynote speaker for the symposium on Stable Isotopes as Early Indicators of Global Change, Úbeda, Spain

K. Ogle. *Data-model integration for understanding belowground ecosystems*, the International Biometric Society, Eastern North American Region (ENAR) 2009 Spring Meeting, invited presenter in the symposium on Model Specification and Uncertainty in Ecological Analyses, San Antonio, TX

Lucas, R.W., **K. Ogle**, *L.D. Patrick*, J.*M. Cable*, G. Barron-Gafford, A. Griffith, D. Ignace, G.D. Jenerette, A. Tyler, T.E. Huxman, M.E. Loik, S.D. Smith, and D.T. Tissue. *Nighttime water loss in desert plants: a call for revisiting theories of optimal stomatal behavior*, the Ecological Society of America 94th Annual Meeting, Albuquerque, NM

Gemoets, D.E., **K. Ogle**, and J.J. Barber. *Bayesian parameter estimation for partial differential equation models*, Joint Statistical Meetings, Washington, DC

*Barber, J.J., *D.E. Gemoets*, and **K. Ogle**. *Reversible jump MCMC for inference in a deterministic individual-tree-based growth model for studying forest dynamics*, Joint Statistical Meetings, Washington, DC

Cable, J.M., **K. Ogle**, and J. Welker. *Ecohydrological feedbacks in subarctic and arctic ecosystems: deep soil water buffers ecosystems from climate variability*, AGU Chapman Conference on Examining Ecohydrological Feedbacks of Landscape Change Along Elevation Gradients in Semiarid Regions, Boise and Sun Valley, Idaho

2008 ***K. Ogle** and *J.M. Cable*. *Data-model integration for partitioning belowground ecosystem processes*, the Ecological Society of America 93nd Annual Meeting, symposium presenter, Milwaukee, WI

Lucas, R.W., **K. Ogle**, *J.M. Cable*, T.E. Huxman, M.E. Loik, S.D. Smith, and D.T. Tissue. *Soil respiration in arid ecosystems and the role of antecedent soil moisture*, the Ecological Society of America 93nd Annual Meeting, Milwaukee, WI

Price, C.A., E.P. White, J.S. Weitz, and **K. Ogle**. *Evaluating scaling models in biology using a hierarchical Bayesian framework*, the Ecological Society of America 93nd Annual Meeting, Milwaukee, WI

Patrick, L., **K. Ogle**, and D. Tissue. *The use of Bayesian modeling to estimate photosynthesis parameters in C3 and C4 desert plants*. Gordon Research Conference: CO_2 Assimilation in Plants: Gene to Biome, Biddeford, ME

2007 **K. Ogle**. *Bayesian meta-analysis of tree functional traits*, the Ecological Society of America 92nd Annual Meeting, presenter, San Jose, CA

Cable, J.M., **K. Ogle**, and D.G. Williams. *Subniveal Carbon Flux in a Wyoming Subalpine Ecosystem*, the American Geophysical Union (AGU) 2007 Fall Meeting, San Francisco,

CA
*Patrick, L., **K. Ogle**, D. Tissue, and *J.M. Cable*. *The use of Bayesian modeling to assess the*
impact of altered precipitation on leaf-level carbon exchange in four desert savanna ecosystems, the AGU
2007 Fall Meeting, San Francisco, CA
2006 **K. Ogle**, S. Pacala, J.J. Barber, J. Lichstein, and D. Purves. *Species-specific traits controlling*
forest dynamics revealed by Bayesian melding of diverse data sources and mechanistic tree growth models,
the Ecological Society of America (ESA) 91st Annual Meeting, poster presenter,
Memphis, TN
Purves, D., J. Lichstein, **K. Ogle**, N. Strigul, S. Bohlman, and S. Pacala. *Building a mechanistic theory of forest biogeography*, the ESA 91st Annual Meeting, Memphis, TN
Lichstein, J., S. Pacala, D. Purves, J. Dushoff, and **K. Ogle**, *A resource-based neighborhood competition model of sapling growth*, the ESA 91st Annual Meeting, Memphis, TN
*K. Ogle, *J.M. Cable*, and T.E. Huxman. *A Bayesian deconvolution approach to partitioning soil*
respiration: Coupling carbon flux and isotope data with process-based flux and mixing models, the
American Geophysical Union (AGU) 2006 Fall Meeting, presenter, San Francisco, CA
Cable J.M.*, W. Sun, **K. Ogle, D.G. Williams, D.L. Potts, R.L. Scott, and T. E. Huxman. *Non-linear responses to precipitation and shrub encroachment in semi-arid grassland: isotopes and CO_2*
fluxes reveal soil microsite alteration as explanation, the AGU 2006 Fall Meeting, San Francisco,
CA
2005 **K. Ogle** and S. Pacala. *Inferring tree growth and allocation from physiological, starvation, and*
allometric traits, the Ecological Society of America (ESA) 90th Annual Meeting, presenter,
Montréal, Canada
Pacala, S., D. Purves, **K. Ogle**, J. Lichstein, C. Wirth, A. Chen, E. Shevliakova, S.
Malyshev, and N. Strigul. *Towards a global individual-based model of forest dynamics*, the ESA
90th Annual Meeting, Montréal, Canada

2004 **K. Ogle** and S. Pacala. *Melding of tree growth models and data: Understanding forest dynamics*, the
6th International Symposium on Plant Responses to Air Pollution and Global Changes,
invited presenter, Tsukuba, Japan
K. Ogle. *Inverse analysis of plant-soil-water interactions: Unraveling plasticity in root activity and*
water sources, the Ecological Society of America (ESA) 89th Annual Meeting, symposium:
Ecohydrology, invited presenter, Portland, OR

Lichstein, J., S. Pacala, D. Purves, J. Caspersen, and **K. Ogle**. *Parameterizing sapling growthlight models from forest inventory data*, the ESA 89th Annual Meeting, Portland, OR

Weitz, J. **K. Ogle**, and H. Horn. *Scaling of plant hydraulic architecture*, Gordon Research Conference, Metabolica Basis of Ecology, Lewiston, NE

2003 **K. Ogle** and J.F. Reynolds. *The importance of precipitation seasonality to the growth dynamics of a desert shrub*, the Ecological Society of America 88th Annual Meeting, presenter, Savannah, GA

2002 **K. Ogle**, R. Wolpert, and J.F. Reynolds. *Reconstructing plant water uptake and root area profiles*, the Ecological Society of America 87th Annual Meeting, presenter, Tucson, AZ

K. Ogle and J.F. Reynolds. *The importance of precipitation seasonality to the growth of the desert shrub* Larrea tridentata *(creosotebush)*, Workshop on Resource Pulse Use in Arid Ecosystems, invited poster, Tucson, AZ

2001 **K. Ogle** and J.F. Reynolds. *Nonlinear responses of desert shrubs to episodic rainfall events*, American Geophysical Union 2001 Fall Meeting, special session: Nonlinearity and Complexity in the Biogeosciences I, invited presenter, San Francisco, CA

K. Ogle, N.S. Cobb, and T. Whitham. *The importance of facilitation to pinyon- juniper woodland dynamics*, the 6th Biennial Conference of Research on the Colorado Plateau, presenter, Flagstaff, AZ

K. Ogle and J.F. Reynolds. *Desert dogma revisited: coupling stomatal conductance and photosynthesis in a desert shrub*, the Ecological Society of America 86th Annual Meeting, presenter, Madison, WI

K. Ogle, T. Whitham, and N.S. Cobb. *Drought-induced pinyon mortality: the role of environmental stress, tree age, and recent growth*, Workshop on Biocomplexity in Pinyon-Juniper Woodlands, invited presenter, Flagstaff, AZ

2000 **K. Ogle**, N.S. Cobb, and T. Whitham. *Physiological responses of the desert shrub* Larrea tridentata *to short-term variation in summer rainfall*, the Ecological Society of America 85th Annual Meeting, presenter, Snowbird, UT

1997 **K. Ogle**, T. Whitham, and N.S. Cobb. *A severe drought resulted in differential pinyon mortality providing a mechanism for a shift in species distribution*, the Ecological Society of America 82nd Annual Meeting, undergraduate presenter, Albuquerque, NM

Invited Seminars and Lectures

2010 *Hierarchical Bayesian Analysis in Plant and Ecosystem Ecology: Understanding Carbon-Water Dynamics in Deserts of the Southwest*, Division of Biology, Kansas State University, Manhattan, KS

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2009 *Hierarchical Bayesian Analysis in Plant and Ecosystem Ecology: Understanding Carbon-Water Dynamics in Deserts of the Southwestern US*, Max Planck Institute for Biogeochemistry, Jena, Germany

Learning about Ecological Systems through Multiple Data Sources and Process-based Models, seminar and round table discussion with National Science Foundation (NSF) program directors in the Biosciences Directorate, Arlington, VA

Flux Measurements and Modeling, day-long lecture and hands-on modeling exercises on "Deconvolution of belowground fluxes and Bayesian statistical approaches to analyzing plant, soil, and ecosystem flux data," University of Colorado Mountain Research Station near Nederland, CO

Bayesian meta-analysis of literature information: estimating species-specific tree functional traits, Department of Statistics, Colorado State University, Fort Collins, CO

Hierarchical Bayesian synthesis of soil respiration across seven desert ecosystems, National Center for Atmospheric Research (NCAR), Institute for Mathematics Applied to Geosciences (IMAGe) "brown bag lunch" seminar, Boulder, CO

2008 *Flux Measurements and Modeling*, day-long lecture and hands-on modeling exercises on "Deconvolution of belowground fluxes and Bayesian statistical approaches to analyzing plant, soil, and ecosystem flux data," University of Colorado Mountain Research Station near Nederland, CO

Data-model integration for understanding belowground ecosystem carbon dynamics, Oak Ridge National Laboratory, Biological& Environmental Sciences Directorate, Invited Seminar Series, Oak Ridge, TN

Data-model integration: Examples from belowground ecosystem ecology, Statistical and Applied Mathematical Sciences Institute, Program on Environmental Sensor Networks, Research Triangle Park, NC

2007 *Bayesian meta-analysis of tree functional traits with implications for tree growth and forest dynamics*, Department of Botany, University of Wyoming, Laramie, WY

A Bayesian deconvolution approach to partitioning soil respiration, Natural Resource Ecology Laboratory, Seminar Series on "Emerging Approaches in Ecology," Colorado State University, Ft. Collins, CO

Bayesian meta-analysis of tree functional traits, Department of Statistics, University of Wyoming, Laramie, WY

2005 *Bayesian melding of models and data: A potpourri of plant ecology examples*, A Showcase of Promising Scientists in Natural Resources sponsored by the School of Natural Resources, selected as 1 of 6 (out of 100+ nominations) "promising scientists," University of Arizona, Tucson, AZ

Linking species-specific physiological, starvation, and structural allometries to forest dynamics,
Department of Ecology, Montana State University, Bozeman, MT
2004 *Linking root, shoot, whole-plant, population and community processes: A mechanistic framework for*
studying vegetation dynamics, Department of Ecology and Evolutionary Biology, University of Arizona, Tucson, AZ

2003 *Pulse precipitation use by a desert shrub: A Bayesian inverse analysis of root and water uptake profiles*,
University Program in Ecology, Duke University, Durham, NC
An integrated view of the responses of a desert shrub to seasonal rainfall, Center for Population
Biology, University of California, Davis, CA
An integrated view of the responses of a desert shrub to seasonal rainfall. Department of Ecology,
Montana State University, Bozeman, MT
2001 *Desert dogma revisited: how important is summer rainfall to* Larrea tridentata *(creosotebush) growth*
and physiology? Department of Biological Sciences, Northern Arizona University, Flagstaff, AZ
Desert dogma revisited: the link between stomatal conductance and photosynthesis in the desert shrub
Larrea tridentate, University Program in Ecology, Duke University, Durham, NC
1997 *Drought induced pinyon mortality: long-term studies of those who live and die*, Department of
Botany, Duke University, Durham, NC

ORGANIZED & INVITED WORKSHOPS

Organized Workshops

2010 *A Brief Introduction to Bayesian and Hierarchical Bayesian Modeling in Ecology*, the Ecological
Society of America 95th Annual Meeting, Pre-meeting Workshop, organizer, Pittsburg, PA
2009 *A Brief Introduction to Bayesian Modeling in Ecology*, the Spanish Ecological Society, Invited
Pre-meeting Workshop, organizer, Úbeda, Spain
A Brief Introduction to Bayesian and Hierarchical Bayesian Modeling in Ecology, the Ecological
Society of America 94th Annual Meeting, Pre-meeting Workshop, organizer, Albuquerque, NM
Hierarchical Bayesian Modeling in Plant and Ecosystem Ecology, Max-Plank Institute for Biogeochemistry, organizer, Jena, Germany
2008 *A Brief Introduction to Bayesian and Hierarchical Bayesian Modeling in Ecology*, the Ecological
Society of America 93rd Annual Meeting, Pre-meeting Workshop, organizer, Milwaukee,

WI
2007 *Data-model Assimilation in Ecology: Techniques and Applications*, NSF-sponsored workshop,
organizing committee: Yiqi Luo (Univ of Okalahoma), David Schimel (NCAR), Jim Clark (Duke), Alan Hastings (UC Davis), Kiona Ogle, Matthew Williams (Univ of Edinburgh), October, University of Okalahoma, Norman, OK
A Brief Introduction to Bayesian and Hierarchical Bayesian Modeling in Ecology, the Ecological
Society of America 92nd Annual Meeting, Pre-meeting Workshop, organizer, San Jose, CA
2006 *A Brief Introduction to Hierarchical Bayesian Modeling in Ecology*, the Ecological Society of
America 91st Annual Meeting, Pre-meeting Workshop, organizer, Memphis, TN
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Invited Workshops

2010 Working group on *Linking Decomposability of Leaves and Stems to their Traits: a Global Metaanalysis*,
organizers: Christian Wirth (Max-Planck) and Hans Cornelissen (Vrije Universiteit Amsterdam), participant, Akaroa, New Zealand
2008 *Program on Environmental Sensor Networks: Tutorials and Opening Workshop*, Statistical and
Applied Mathematical Sciences Institute, participant and presenter, Research Triangle Park, NC
2006 *Uncertainty in Ecological Analysis*, Mathematical Biosciences Institute, the Ohio State University, participant and presenter, Columbus, OH
2003 *Resiliency and Change in Ecological Systems*, Santa Fe Institute, participant, Santa Fe, NM
2002 *Resource Pulse Use in Arid Ecosystems*, University of Arizona, participant, Tucson, AZ
2001 *Nonlinear Responses to Global Environmental Change: Critical Thresholds and Feedbacks,* Duke
University, participant, Durham, NC
Workshop on Biocomplexity in Pinyon-Juniper Woodlands, Northern Arizona University, participant and presenter, Flagstaff, AZ
1999 *Intercomparison of Gap Models and Examination of How Much Physiology is Needed in Them*,
GCTE Focus 1/Focus 2, participant, Pingree Park, CO

Advanced Training/Short - Courses

2004 *Uncertainty and Variability in Ecological Inference, Forecasting, and Decision Making: An*
Introduction to Modern Statistical Computation, Center on Global Change and the Nicholas School of the Environment and Earth Sciences (Duke), National Science Foundation, and the Ecological Society of America, Duke University, invited participant, Durham, NC
Ecoinformatics Training for Ecologists, Long Term Ecological Research Network (UNM), San Diego Supercomputer Center (UCSD), Natural History Museum and Biodiversity Research Center (KU), and National Center for Ecological Analysis and Synthesis

(UCSB), University of New Mexico, invited participant, Albuquerque, NM
2003 *Pathways to the Professoriate: Developing the Teaching Skills of Graduate Students*, Academic
Support Programs, Duke University Graduate School, participant, Durham, NC
2002 *Inverse Problem Methodology in Complex Stochastic Models*, Statistical and Applied Mathematical
Sciences Institute, participant, Research Triangle Park, NC
2000 *Stable Isotope Ecology*, Department of Biology, University of Utah, invited participant, Salt Lake City, UT

STUDENT ADVISING/GRADUATE SUPERVISION

Highschool Students

2 – previous: Arla Mystica, Wheatland, WY (2007) and Alex Treskov, Denver, CO (2008), both part of the UW EPSCoR Summer Research Apprentice Program (SRAP)
2 – future: will host two high school students participating in the SRAP program (summer 2010)

Undergraduate Students

1 – current (all University of Wyoming): Matthew Schreiner, lab tech (fall 2008-)
8 – previous (all University of Wyoming): Cassie Hurley, lab tech (spring 2007); Jessica Strickert, lab tech (fall 2007); Jacob Arvizu, internship and lab tech (summer 2007-spring 2008); Patrick Juancorena, lab tech (spring 2008); Brenda Thompson, independent study in Statistics (spring 2008); Corbin Haugen, work-study lab tech (spring 2008-fall 2008); Nikalous Tolman, work-study lab tech (fall 2008-spring 2009); Levi Davis, independent study/research project in statistical ecology (spring 2009-summer 2009)

Graduate Students

1 – Masters: Kimberly Garvie, University of Wyoming, Botany
2 – Ph.D.: Colin Tucker and Michael Fell, University of Wyoming, Program in Ecology

Graduate Committee Memberships (excluding those chaired)

2 – Ph.D.: Yao Liu (Ecology & Botany), Darren Gemoets (Statistics; co-chair), Zach Gompertz (Ecology & Botany)

Past Graduate Committee Memberships (excluding those chaired)

3 – Ph.D.: Wei Sun (Renewable Resources), Victor Resco de Dios (Renewable Resources), Arunendu Chatterjee (Statistics), University of Wyoming

Postdoctoral Students/Research Associates

Current Postdocs

Jessica Cable (Ph.D. University of Arizona): University of Wyoming (2006-2009); University of Alaska (primary host) and University of Wyoming (co-host) (NSF postdoc fellow, 2009-2011)
Sharmila Pathikonda (Ph.D. University of Louisiana): University of Wyoming
Lisa Patrick (Ph.D. Texas Tech University): University of Arizona (primary host) and University of Wyoming (co-host) (NSF postdoc fellow, 2010-2012)
Derek Sonderegger (Ph.D. Colorado State University): University of Wyoming and Washington State University

Current Technicians/Research Associates

Karla Sartor (M.S. Montana State University), University of Wyoming
Joshua Uebelherr (M.S. Duke University), University of Wyoming

Past 5 years

Sarah Bachman (M.S.), University of Wyoming, Temporary Research Associate
Ekaterina (Katya) Belykh (M.S.), Princeton University, Research Associate
William Cable (B.S.), University of Wyoming, Research Associate, currently Research Associate for the USGS in Fairbanks, AK
Kimberly Garvie (M.S.), University of Wyoming, Research Associate

Darren Gemoets (M.S.), University of Wyoming, Research Associate, currently PhD student in Statistics at UW
Richard Lucas (Ph.D.), University of Wyoming, Postdoc, currently faculty at the Swedish University of Agricultural Sciences
Lisa Patrick (Ph.D.), University of Wyoming & Texas Tech, Visiting PhD student and Post-doc
Brenda Thompson (B.S.), University of Wyoming, Research Associate and UW graduate, currently an Actuarial Analyst at Blue Cross and Blue Shield of Nebraska

UNIVERSITY OF WYOMING SERVICE ACTIVITIES

Interdepartmental/University Committees

Program in Ecology: Vision committee
Program in Ecology: Seminar committee
Department of Mathematics, Department of Zoology and Physiology, and Program in Ecology: search committee for faculty position in Mathematical Biology
University of Wyoming EPSCoR: steering committee
University of Wyoming Stable Isotope Facility Advisory Committee

Departmental Committees

Department of Botany: publicity
Department of Botany: Curriculum committee, Web site committee

Three references that have agreed to provide letters

David (Dave) Schimel, Chief Executive Officer
National Ecological Observatory Network (NEON), Inc.
Boulder, CO 80301
Tele: (720) 746-4844
E-mail: dschimel@neoninc.org
N. Thompson (Tom) Hobbs, Professor
Department of Forest, Rangeland, and Watershed Stewardship
Colorado State University
Fort Collins, CO 80523-1472
Tele: (970) 491-4994
E-mail: nthobbs@warnercnr.colostate.edu
Dave Evans, Professor
School of Biological Sciences
Washington State University
Pullman, WA 99164-4236
Tele: (509) 335-7466
E-mail: rdevans@wsu.edu

Additional references that have agreed to provide letters

Travis Huxman, Associate Professor
Department of Ecology & Evolutionary Biology
University of Arizona

Tucson, AZ 85721
Tele: (520) 626-4092
E-mail: huxman@email.arizona.edu
Yiqi Luo, Professor
Department of Botany & Microbiology
University of Oklahoma
Norman, OK 73019
Tele: (405) 325-1651
E-mail: yluo@ou.edu
Christian Wirth, Group Leader
Max-Planck-Institute for Biogeochemistry
Jena, Germany
Tele: 49-3641-576225
E-mail: cwirth@bgc-jena.mpg.de
Stephen (Steve) Pacala, Professor*
Department of Ecology and Evolutionary Biology
Princeton University
Princeton, NJ 08544-201
Tele: (609) 258-6885
E-mail: pacala@princeton.edu
** Dr. Pacala did not respond to my request to provide a letter for this position because he is out-of-town until March 13, but he has provided letters in the past, so feel free to contact him regarding a letter.*

SEPARATE LIST OF PUBLICATIONS

Kiona Ogle

*Indicates publications with my students and/or postdoctoral associates (*italics*).

Accepted with Revision (expected to appear in 2010)

*Cable J., **K. Ogle**, R.W. Lucas, T.N. Charlet, M. Cleary, B.E. Ewers, A. Griffith, T.E. Huxman, M.E. Loik, R.S. Nowak, E. Pendall, M. Rogers, S.D. Smith, H. Steltzer, P.F. Sullivan, D.T. Tissue, N.C. van Gestel, and J.M. Welker. The unique responses of desert soil respiration to temperature: a seven desert synthesis. Submitted to *Biogeochemistry.*

Cable, J., **K. Ogle**, and D. Williams. Application of isotopic measurements and a Bayesian mixing model to determine the contribution of glaciermelt water to streamflow in the Wind River Range, Wyoming. Submitted to *Hydrological Processes.*

Hobbs, N.T. and **K. Ogle**. Introducing data-model assimilation to students of ecology. Submitted to *Ecological Applications.*

In Press (to appear in 2010)

Lichstein, J.W., J. Dushoff, **K. Ogle**, A. Chen, D.W. Purves, J.P. Caspersen, and S.W. Pacala. Unlocking the forest inventory data: relating individual-tree performance to unmeasured environmental factors. *Ecological Applications*.

Journal Articles in Print

Ogle, K., T.G. Whitham, and N.S. Cobb. (2000) Tree-ring variation in pinyon predicts the likelihood of death following severe drought. *Ecology* 81:3237-3243.

Norby, R.J., **K. Ogle**, P.S. Curtis, F.-W. Badeck, A. Huth, G.C. Hurtt, T. Kohyama, and J. Peñuelas. (2001) Aboveground growth and competition in forest gap models: an analysis for studies of climatic change. *Climatic Change* 51:415-447.

Bugmann, H.K.M, S.D. Wullschleger, D.T. Price, **K. Ogle**, D.F. Clark, and A.M. Solomon. (2001) Comparing the performance of forest gap models in North America. *Climatic Change* 51:349-388.

Ogle, K. and J.F. Reynolds. (2002) Desert dogma revisited: coupling of stomatal conductance and photosynthesis in the desert shrub, *Larrea tridentata*. *Plant, Cell and Environment* 25:909-921.

Ogle, K. (2003) Implications of interveinal distance for quantum yield in C4 grasses: a modeling and meta-analysis. *Oecologia* 136:532-542.

Ogle, K., R.L. Wolpert, and J.F. Reynolds. (2004) Reconstructing plant root area and water uptake profiles. *Ecology* 85:1967-1978.

Ogle, K. and J.F. Reynolds. (2004) Plant responses to precipitation in desert ecosystems: Integrating functional types, pulses, thresholds, and delays. *Oecologia* 141:282-294.

Reynolds, J.F., P.R. Kemp, **K. Ogle**, and R.J. Fernández. (2004) Modifying the 'pulse-reserve' paradigm for deserts of North America: Precipitation pulses, soil water, and plant responses. *Oecologia* 141:194-210.

Huxman, T.E., K.A. Snyder, D. Tissue, A.J. Leffler, **K. Ogle**, W.T. Pockman, D.R. Sandquist, D.L. Potts, and S. Schwinning. (2004) Precipitation pulses and carbon fluxes in semi-arid and arid systems. *Oecologia* 141:254-268.

Weitz, J.S., **K. Ogle**, and H.S. Horn (2006). Ontogenetically stable hydraulic design in woody plants. *Functional Ecology* 20:191-199.

Purves, D.W., M.A. Zavala, **K. Ogle**, F. Prieto, and J.M. Rey-Benayas (2007). Coupling environmental forcing, metapopulations dynamics, and dispersal of *Quercus* species in central Spain. *Ecological Monographs* 77:77-97.

Ogle, K. and J.J. Barber (2008). Bayesian data-model integration in plant physiological and ecosystem ecology. *Progress In Botany* 69:281-311.

Hui, D.F., Y.Q. Luo, D. Schimel, J.S. Clark, A. Hastings, **K. Ogle**, and M. Williams. (2008) Converting raw data into ecologically meaningful products: A meeting report on data-model assimilation in ecology: Techniques and applications, Norman, Oklahoma, 22-24 October 2007. *EOS, Transactions, American Geophysical Union*, Jan 25, 2008.

Cable, J.M.*, **K. Ogle, D.G. Williams, J. Weltzin, and T.E. Huxman. (2008) Soil texture drives responses of soil respiration to precipitation pulses in the Sonoran Desert: Implications for climate change. *Ecosystems* 11:961-979.

Ogle, K. (2009) Hierarchical Bayesian statistics: Merging experimental and modeling approaches in ecology. *Ecological Applications* 19:577-581.

Ogle, K. and S.W. Pacala. (2009) A modeling framework for inferring tree growth and allocation from physiological, morphological, and allometric traits. *Tree Physiology* 29:578-605.

Patrick, L.D.*, **K. Ogle, D. Tissue, C.W. Bell, and J. Zak. (2009) Physiological responses of two contrasting desert plant species to precipitation variability are differentially regulated by soil moisture and nitrogen dynamics. *Global Change Biology* 15:1214-1229.

***Ogle, K.**, J.J. Barber, C.J. Willson, and *B. Thompson*. (2009) Hierarchical statistical modeling of xylem vulnerability to cavitation. *New Phytologist* 182:541-554.

Cable, J.M.*, **K. Ogle, A.P. Tyler, M.A. Pavao-Zuckerman, and T.E. Huxman. (2009) Woody plant encroachment impacts on soil carbon and microbial processes: Results from a

hierarchical Bayesian analysis of soil incubation data. ***Plant and Soil*** 320:153-167.
Price, C.A., **K. Ogle**, E.P. White, and J. Weitz. (2009) Evaluating scaling models in biology using hierarchical Bayesian approaches. ***Ecology Letters*** 12:641-651.
Patrick, L.D., **K. Ogle**, and D.T. Tissue. (2009) A hierarchical Bayesian approach for estimation of photosynthetic parameters of C_3 plants. ***Plant, Cell and Environment*** 32:1695-1709.

Chapters in Books

Reynolds, J.F., P.R. Kemp, **K. Ogle**, R.J. Fernández, Q. Gao, and J. Wu (2006). Modeling the unique attributes of desert ecosystems: Potentials and limitations based on lessons from the

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