



Summer 2006

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IN THE NEWS



Dennis Ojima, Diana Wall, Ed Ayres, and Breana Simmons were invited by the British Consulate to a special presentation and reception for Professor Chris Rapley, Director of the British Antarctic Survey at the Denver Museum of Nature and Science. The presentation given by Professor Rapley provided an update on what recent observations of climate change impacts on the Antarctic ice sheets. Picture includes Rapley and NREL folks.

The USGS Fort Collins Science Center is spotlighting Jill Baron and colleagues' atmospheric nitrogen deposition research on their web site <http://www.fort.usgs.gov/ItsInTheAir/NREL.htm> .



Jill Baron prepares to extract water from a soil lysimeter, a sampling device that captures soil water.

Jill has been studying ecosystem processes in Rocky Mountain National Park for over 24 years. In that time, she and her team at NREL have found that changes due to atmospheric deposition, particularly of nitrogen, are affecting the Park's physical and living resources.

You can read the entire article at: [It's in the Air: The Ecological Effects of Nitrogen Deposition in Rocky Mountain National Park](#) .

In response to recent Colorado State legislation, Keith Paustian (Soil and Crop Sciences/NREL), Dennis Ojima, and Rich Conant (NREL) will provide soil C sequestration estimates for the entire state of Colorado. This is part of a larger effort by the state to establish the Colorado Renewable Energy Authority and will include among the consortium CSU, University of Colorado, Colorado School of Mines, and the National Renewable Energy Laboratory.

RESEARCH

The National Oceanic and Atmospheric Administration (NOAA) and National Aeronautics and Space Administration (NASA) are CO 2 and Eddy Flux Measurement Systems in the



Sahel of northern Mali (with Mount ombori in the background).

funding a study of the African continental carbon cycle led by Niall anan at NREL. The study is entitled African Carbon Exchange (ACE). As part of the ACE project Niall has recently re established old research collaborations in Mali, West Africa, where instrumentation were installed to make very precise measurements of

atmospheric carbon dioxide concentration and stable isotope ratios. The new instruments were installed at an intensive research site operated by collaborators from CESBIO, Toulouse, France, and the Institute d'Economie Rurale, Bamako. A similar instrument system has been installed at Niall's research site in South Africa, and a third system is planned for a Central Africa location. During the Mali trip, Niall reali ed a long held ambition to climb Mount ombori, the highest point in Mali, first climbed in the Os.



Geneva Chong (USGS/NREL) spent most of July and August studying sage grouse winter habitat in Grand Teton National Park, the National Elk Refuge and the Gros Ventre River area of the Bridger Teton National Forest, Wyoming. Sage grouse populations have been declining in that area, and it has been suggested that loss of winter habitat is an important factor. She worked with another botanist (Nate Pope, College of the Atlantic) and two Student Conservation Association (SCA) interns (William Wet el and Stacie Lawrence) to measure plant species composition and structure as it relates to sage grouse habitat needs. Rick Shory (NREL) provided botanical assistance and Don Carpenter (USGS/CSU) provided field methods and data management training. The team also conducted field verification of areas predicted to provide suitable winter habitat based on winter Landsat TM data. The results of this research will help wildlife managers understand the patterns of winter habitat locations to support sage grouse management in Teton County, Wyoming. The work was funded by the state of Wyoming through the Jackson ole Sage Grouse Working Group and the Teton Science Schools. Visiting scientist Yanlin Liu (with Mike Coughenour) joined us for several days in July to learn about our research methods and get a view of the Greater Yellowstone Ecosystem as he prepared to study a gra ing system in Tibet.

A

Dr. Diana Wall has been appointed as a member of the Board of Directors of the World Resources Institute (WRI). WRI is an environmental think tank that strives to use ecological research towards its mission of moving "human society to live in a way that protects Earth's environment and its capacity to provide for the needs of current and future generations."

Dr. Diana Wall was invited to sit on the newly established U.S. National Committee for the International ydrological Programme (I P). The Committee will be a subgroup of the I P, the core program for UNESCO's work on fresh water issues, advising the U.S. National Commission for UNESCO.

Dr. Stephen Ogle was appointed to serve on the Steering Committee for the

200 All Investigator Meeting of the North American Carbon Program (NACP), which will be held on 22-24 January 200 in Colorado Springs. The steering committee is developing a meeting structure and agenda in collaboration with program leaders for the federal agencies that fund the NACP, and is also reviewing abstracts.

Researcher Award

Ed Ayres and Heidi Steltzer were awarded \$46,000 for an Early Career Project Grant by the British Ecological Society. They will study the relationship between soil biota and litter decomposition under three tree species in the Rocky Mountains. Diana Wall (Biology/NREL) is also involved in the study.

Dr. Stephen Ogle was awarded \$1,000,000 from the Environmental Protection Agency for the project "National Agricultural Greenhouse Gas Inventory Reporting of Soil Organic C and N₂O Emissions: 2000-2010," along with collaborators Steve Del Grosso (USDA ARS), Keith Paustian (Soil and Crop/NREL) and Bill Parton (NREL). They will provide national greenhouse gas emission and removal estimates for soil C and N₂O in support of US reporting to the United Nations Framework Convention on Climate Change, and will implement improvements to existing inventory framework during the process.

Field Trip



On June 22, Diana Wall, Jill Baron, Sanjay Advani, Ed Ayres, and Breana Simmons led a field trip in Rocky Mountain National Park for the Consultative Group on Biodiversity—a consortium of foundations that fund biodiversity projects. Members of the CGB learned about the critical role of soils and aquatic ecosystems, and the biodiversity found within these systems.

MEETINGS AND PRESENTATIONS

Dennis Ojima was invited to give a presentation and chair a working session at an NSF sponsored workshop held in Tucson, Arizona in May on Modeling Issues in Support of Environmental Observatories: NEON, OOI, WATERS Network. His presentation was entitled "Ecological Observation Modelling: Data Model Fusion."

Dennis Ojima was invited by the USGS to provide a keynote presentation entitled "Current Scientific Achievements, Uncertainties, and Future Challenges and Directions to Global Change Research" for their Global Change Workshop held in Denver on June 26. Jill Baron (USGS/NREL) and Carol Simmons (NREL) participated in this workshop which was organized to refine the USGS Global Change research agenda for the coming decade. Dr. Ojima's presentation highlighted some of the recent findings of climate change effects on the earth's system and their implications on natural resources around the world.

Also in June, Dennis Ojima participated in the GOFCC/GOLD Conference in Ulaanbaatar, Mongolia to discuss development strategies for an Asian network to support activities of the GOFCC/GOLD efforts. Dennis presented "Integrated analysis of Northern Eurasian C land use climate interactions in the semi arid regions." He also had the privilege of being introduced to the US Ambassador, the honorable Pamela Slutz, after her presentation

to the American Center for Mongolian Studies (ACMS) by Jayne Belnap (USGS, Moab, UT/NREL affiliate scientist).

Dennis Ojima was invited by the National Wildlife Federation and the Arkansas Wildlife Federation to provide a public lecture on "Global Warming: Current Scientific Understanding, Impacts, and Future Challenges" at the Northwest Arkansas Community College, Bentonville, AR, August 2 . The public lecture was attended by about 100 members of the Bentonville community and high school students enrolled in an environmental and outdoor recreation course.

Dennis Ojima presented a paper on "Integrated Regional Carbon Budgets from Anthropogenic and Biospheric Sources and Sinks: A Holistic Framework to Evaluate Mitigation and Adaptive Management Approaches" at the International Conference on Regional Carbon Budgets, Beijing, China, 6 August. Dennis was a member of the Scientific Committee for the conference which covered topics related to strategies and approaches to develop regional carbon budgets from plot scale to regional scale observations and analysis. The conference was attended by approximately 200 attendees with about 50 international participants.

Dennis Ojima co chaired the First International Conference on Carbon Management at Urban and Regional Levels: Connecting Development Decisions to Global Issues held in Mexico City, September 4 , 2006 and also presented a paper on "Integrated Regional Carbon Analysis from Anthropogenic and Biospheric Sources and Sinks: a Colorado Application of a holistic framework to evaluate the Urban Rural interface." The conference was attended by approximately 100 scientists from around the world and represented a trans disciplinary view on urban regional perspectives on carbon emissions.

Diana presented a poster at the 2006 World Congress of Soil Science in Philadelphia entitled "Soil Fauna and Decomposition: A Global Litter Experiment" and a talk entitled "Soils, Biodiversity and the Millennium Ecosystem Assessment."

Stephen Ogle was an invited speaker at the IV Congress of the AAPRESID agricultural no till organization in Rosario, Argentina. Dr. Ogle's presentation was entitled "Soil structure, C sequestration, and greenhouse gas mitigation potential of no till." He also served as a panelist in a carbon modeling workshop held during the meeting.

WORKSHOPS

NREL scientists Tom Hobbs (FRWS/NREL), Kathy Galvin (Anthropology/NREL), and Randy Boone were joined in July in Jackson, Wyoming by NREL affiliate scientist Robin Reid of the International Livestock Research Institute (ILRI), Nairobi, Kenya, Philip Thornton of ILRI and the University of Edinburgh, and Andrew Ash and Chris Stokes of CSIRO, Australia. NREL Research Associate Jill Lockett organized and participated in this productive week long writing workshop. The group summarized results from the NSF Biocomplexity SCALE project, Tom Hobbs PI, in a manuscript to be submitted to BioScience, and brainstormed other outlets for their results. In the manuscript, causes and effects of landscape fragmentation in arid and semi arid landscapes are reviewed, and policy recommendations are provided to land managers and policy makers.

Dennis Ojima attended the NASA Joint Biodiversity, Terrestrial Ecology, and Applied Sciences Workshop at the University of Maryland Conference

Center, 2 2 August. The goals of the workshop were to: a) encourage information exchange b) foster future research collaborations c) expose funded researchers to NASA's program activities and future plans and d) receive input from workshop participants on program content and future plans. Dennis co chaired the working group session on modeling goals and objectives/future directions.

ISITORS

Mike Coughenour hosted two visiting scholars this summer. Yanlin Liu, from Peking University, is carrying out a research project on interactions between livestock and wildlife on the Tibetan Plateau. This project is funded by the Wildlife Conservation Society and led by the famous wildlife biologist George Schaller. Mike, in conjunction with Geneva Chong, Rick Shory, Dan Milchunas, and Terry Booth, provided training and experience in various research protocols. Mike also hosted enyo Knegt from Wageningen University, The Netherlands. Training was provided in the theory and application of the SAVANNA ecosystem model, which will be used for research on elephants and ecosystems in South Africa.

RAATE STATEMENT INFORMATION

NREL welcomes new graduate students:

- Sam Prentice will be working with Jill Baron. Sam comes from the University of California Davis, where he obtained a degree in International Agricultural Development with a minor in Soil Science.
- Karl Wyant is working with John Moore as his advisor. e received his BS in Biology from the Univ. of Northern Colorado (UNC) in 200 . During his undergraduate career, he was associated with several different labs on campus. e studied bat fetal development under Dr. Rick A. Adams in the Chiropteran Research Laboratory at UNC. e was also employed as a research tech in the Soil Ecology Research Laboratory under the direction of Dr. John Moore. In the spring of 2006, he started a Master's Degree program at UNC with Dr. Moore as my advisor. is thesis focuses on how simulated climate change influences arctic spider and beetle communities in dry heath tundra habitat.
- Chang Kuo sien (called Michael for ease) comes to CSU from Taiwan to pursue a Ph.D. in the Graduate Degree Program in Ecology (GDPE) and NREL (Dr. Dennis Ojima, advisor). Since 2000, his focus has been on the interrelationship between climate change, socioeconomic impact, and policy from multi aspects of government, residential, and industrial communities. Michael would like to utilize Geographical Information Systems (GIS), Remote Sensing (RS), and an air pollution model into a land use project focused on climate change and environmental assessment and management. See Michael's website:
<http://www.warnercncr.colostate.edu/changks/>
- Kate Schoenecker has recently joined NREL as an incoming PhD student (Dr. Tom obbs, FRWS/NREL advisor). Kate is an Ungulate Ecologist with the US Geological Survey, Biological Resources Discipline at the Fort Collins Science Center and collaborated for several years with Dr. Francis Singer (deceased USGS/NREL Sr. Research Scientist). er current research projects include "Elk and Bison Gra ing Ecology in Great Sand Dunes National Park, Colorado" and "Fire and Gra ing Treatment Effects on Sagebrush

Steppe at the Stratton Study Area, Wyoming." Juggling a full schedule is challenging, but she states that kids are truly her toughest boss.

Congratulations to the 2006 200 Francis Clark Soil Biology and James E. Ellis Memorial Graduate Scholarship Recipients

The Francis Clark Soil Biology Scholarship Recipients are:

Chelsea Roan Diana Wall, Biology/NREL, Advisor Project: "The survival mechanisms of nematodes and their vulnerability to UV B radiation."

Chelsea is presently pursuing her undergraduate degrees in Biochemistry and Chemistry. She has worked in cell signaling research, and is presently collaborating with Drs. Diana Wall (Biology/NREL) and Jim Slusser (UVB/NREL) on a project involving the penetration of UV B radiation in soils and its' effects on nematodes in Antarctica. Chelsea is a married and mother of a 1 year old son, Jaxon.

Shannon Spencer Stephen Ogle, NREL, advisor Project: "An investigation of soil spectral properties for the purpose of finding a correlate to the soil carbon stock of soil samples."

Shannon's research emphasis is assessing soil carbon model uncertainty for agricultural lands in the US by incorporating remotely sensed data to improve soil carbon estimates. She has a B.S. in Forestry from the University of Florida (2004), and an M.S. in Forestry/Natural Resources from the University of New Hampshire. Shannon previously worked at the University of New Hampshire as a research scientist and coordinator of a science education outreach program and with the Florida Fish & Wildlife Conservation Commission as a plant biologist, assisting in the development of a state wide habitat monitoring program for Commission controlled land areas.

The Francis Clark Soil Biology Scholarship will enable Shannon to collaborate with Dr. Barrett Rock at Complex Systems Research Center, University of New Hampshire and his NREL advisor, Dr. Ogle, to spectrally characterize soil samples with the hope of determining the efficacy of using a lab or field based spectral analysis approach for determining soil carbon which could be used in a large scale, national soil monitoring program.

Megan Jessica Steinweg Richard Conant, NREL, advisor Project: "The impacts of temperature change on soil organic matter."

Megan Steinweg is a second year GDPE MS student at NREL (Dr. Richard Conant and Dr. Eldor Paul, advisors). She received her B.S. in Biology from Appalachian State University, North Carolina. During her undergraduate studies she worked on research pertaining to the effects of freeze thaw cycles on soil aggregate stability in the Northeastern United States. Megan's current research focuses on how the response of soil microbial communities changes with temperature. She is looking at how microbial carbon utilization is affected by different temperatures, along with using enzymes as indicators of substrate change over time and temperatures.

Megan expects to graduate May 2006 and hopefully continue on with a PhD program.

The James E. Ellis Memorial Graduate Scholarship Recipient is:

□ Linda Knapp Kathleen Galvin, Anthropology/NREL, advisor
Project: "Food systems of the Serengeti District, Tanzania:
Examining the drivers and outcomes of food insecurity"

Linda Knapp would like to acknowledge what a great honor it is to receive a scholarship in memory of a person who accomplished so much good for the study of human ecosystems, particularly for pastoralist systems. She feels that it is humbling to receive an award in the memory of Jim a person she unfortunately didn't get to meet or know, but who is greatly loved and greatly missed in this community and around the world.

Linda is a 2003 graduate of Oughton College. She studied Intercultural Studies and Music for her undergrad degree, but is currently enrolled full time as a Master's student in Anthropology. She spent 10 months (2004-05) in Tanzania, East Africa as a field assistant with the Serengeti Biocomplexity Project, an NSF funded project in which several universities around the country (including CSU) are collaborating to better understand the interactions of the coupled human natural Serengeti system. Her husband, Eli Knapp, is a CSU GDPE PhD student and was her link to this project as she became his field assistant in gathering socio economic data through interviews with villagers living adjacent to Serengeti National Park. Through her work with Eli, Kathy Galvin, and Mike Coughenour, she became interested in pursuing her own graduate work in anthropology and in studying the food systems of people groups in the Western Serengeti particularly drivers and outcomes of food insecurity along the national park. During the 2005 field season in Tanzania, she hopes to gather and analyze anthropometric measurements of peoples from different ethnic groups and also from different spatial scales in relation to the national park to ascertain what variables are correlated with (mal)nutrition levels.

The scholarship recipients will be honored at the College Awards Banquet on Thursday, October 12, 2006, at 7 p.m. in the Lory Student Center West Ballroom.

The NREL would like to give a special thank you to the mentors and the scholarship committee for contributing to the continued success of our future scientists.

□□□□ICATIONS

NREL scientists (Ojima et al.) were published in a Science Letter "Don't Sell Social Science Short," June 2, 2006, Vol. 32, no. 11, p. 40 DOI: 10.26/science.112140b. This article stems from concern over Senator Kay Bailey Hutchison (R-TX) questioning the need to fund social science research at the National Science Foundation which is felt to be alarming and shortsighted ("Senate panel chair asks why NSF funds social sciences," 2 May, p. 2). "Twenty years of direct and jointly funded social and ecosystem science research at Colorado State University's Natural Resource Ecology Laboratory has produced deep insights into

environmental and societal impacts of political upheaval, land use, and climate change in parts of Africa, Asia, and the Americas. Beyond greatly advancing our understanding of the coupled human environmental system, the partnership of social and ecosystem science has brought scientists and decision makers together to begin to develop solutions to difficult problems. Failure to fund ecosystem science will further hinder U.S. competitiveness in the future and will slow transfer of knowledge and usefulness to the public." You can read the entire article at <http://www.sciencemag.org/cgi/reprint/327/5974/40b.pdf>.

A special issue of *Soil Biology and Biochemistry*, resulting from the NSF OPP Workshop on Victoria Land, Antarctica Biodiversity and Ecosystem Functioning held at Jekyll Island last year has now been published and is available online (<http://www.nrel.colostate.edu/projects/soil/jekyll/index.html>). This workshop was organized by Diana Wall (Biology/NREL), Byron Adams, Jeb Barrett, David Hopkins, and Ross Virginia, was supported by Polly Penhale of NSF OPP, and hosted by David Coleman. This is a first ever, volume on these terrestrial ecosystems and given the enthusiasm of the participants, as well as their concern for changes occurring to Victoria Land ecosystems, this volume becomes the basis for future assessments and experiments.

A paper entitled "Assessing Exotic Plant Species Invasions and Associated Soil Characteristics: A Case Study in Eastern Rocky Mountain National Park, Colorado, USA, Using the Pixel Nested Plot Design," written by Mohammed A. Kalkhan, Evan J. Stafford, Peter J. Woodly, and Thomas J. Stohlgren has been accepted for publication in *Applied Soil Ecology*.

Thomas J. Stohlgren, Invasive Species Science Branch Chief, USGS/Senior Research Scientist, NREL, has written the book "Measuring Plant Diversity, Lessons from the Field" published by Oxford University Press. This book offers alternatives to the approaches, designs, and techniques of the past that were chiefly designed for dominant species and other purposes. Tom focuses on field techniques that move beyond classifying, mapping, and measuring plant diversity for relatively homogeneous communities. This book complements methods for measuring the biomass and cover of dominant plant species. It empowers the reader to take an experimental approach in the science of plant diversity to better understand the distributions of common and rare species, native and non native species, and long lived and short lived species.



Dr. Ed Ayres (NREL) and colleagues have shown that mosses take up significant amounts of nitrogen from the soil (Ayres et al. 2006 *Biology Letters* doi: 10.1098/rsbl.2006.0411). Because mosses do not have roots, they were thought to acquire nutrients solely from the atmosphere. Mosses are a highly diverse group of plants that occur globally, and often dominate montane and polar ecosystems. Since plant growth is often limited by nitrogen availability, nitrogen uptake by mosses may have implications for plant communities. In addition, soil nitrogen uptake by mosses may render some species more vulnerable to nitrogen pollution than previously suspected. Photo: RD Bardgett.

St. John, M. G., D. J. Wall and J. W. Hunt. Are soil mite assemblages structured by the identity of native and invasive alien grasses? *Ecology*, 2004, 85(1): 42-54.

Nkem, J. N., R. A. Virginia, J. E. Barrett, D. . Wall and G. Li. 2006. Salt tolerance and survival thresholds for two species of Antarctic soil nematodes. *Polar Biology* 2 : 64-6 .

PERSONNEL CHANGES

NREL wants to congratulate the following Research Scientists who have received positions in other departments and/or universities.

Dr. Dave Theobald received an appointment as a tenure track Assistant Professor in the [Department of Natural Resource Recreation and Tourism](#) at CSU. Dave will continue his role as an NREL Research Scientist.

Dr. Jeff icke is now an Assistant Professor in the Department of Geography at the University of Idaho, Moscow.

Dr. Guiming Wang is now an Assistant Professor in the Department of Wildlife and Fisheries at Mississippi State University.

In June, Drs. Jayashree Ratnam and Mahesh Sankaran left the NREL for the green pastures of northern England. Mahesh Sankaran has accepted a faculty position in the Biology Department at the University of Leeds, beginning in September. e plans to continue his research in savanna ecology and biodiversity ecosystem function. Jayashree plans to develop new research collaborations in Leeds. Both Mahesh and Jayashree plan to maintain their links and continue ongoing collaborations with the NREL as affiliated scientists. Jayashree, Mahesh, and their son Siddharth spent the summer months at home in India visiting family and exploring potential research opportunities.

Dr. Julia Klein is now an Assistant Professor in the Department of Forest, Rangeland, and Watershed Stewardship at CSU.

Dr. Jackie Grant will be an assistant professor of wildlife ecology, in the School of Forest Resources and Environmental Science at Michigan Technological University.

Dr. Johnson Nkem now works for the Center for International Forestry Research in Ouagadougou, Burkina Faso.

Replacing Johnson is Dr. Breana Simmons. She is currently working with Dr. Diana Wall on her McMurdo Dry Valleys LTER project in Antarctica, to understand the soil biodiversity and ecosystem functioning in this extreme polar desert environment. Breana received her MS in entomology from Michigan State University and her PhD in ecology from The University of Georgia. While at UGA, she worked under the direction of Dr. David Coleman, studying the effects of land management and soil type on soil ecology of cotton fields. Working with Dr. Coleman and Dr. DAC Crossley, Dr. Simmons became interested in soil microarthropods and their effects on ecosystem function. She also worked for Drs. Peter Vitousek and David Rothstein at the Magma Lab in awaii, studying litter invertebrates beneath native and non native tree species. Dr. Simmons is never happier than when peering down the microscope, and is extremely familiar with most soil invertebrate groups, specializing in Collembola and Acari. With the help of Dr. Wall and her lab group, Dr. Simmons has added nematodes to her lengthy list of favorite soil animals.

NEWS

On June , 2006 at :00 AM, parents Sanjay (NREL) and Rachel Advani and big brother Alok were proud to welcome Manoj Sanjay into the world.

Stacy Lynn gave birth to a beautiful baby girl, Talia Estella Lynn Martinson, on September at :0 a.m. at home (as planned). She weighed in at lbs and was . inches long.

Jackie Grant and her husband, Matt Weeg, welcomed the arrival of their son, Benjamin, on August , 2006.

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