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### NREL IN THE LIMELIGHT

#### **SPECIAL RECOGNITION**

CSU welcomed a new president this fall - Dr. Larry Penley. Upon taking his new position, Dr. Penley toured many departments at CSU, including NREL. In his welcoming letter to the University, he stated: "Over the last several weeks, I've been touring colleges and departments, talking with faculty and students and staff and gaining a deeper understanding of the institution as a whole. These conversations have only confirmed the perceptions that drew me to Colorado State in the first place: This is a great university, with the critical characteristics necessary to address the challenges that are ahead for higher education and our global environment. ...I've been impressed by the entrepreneurial spirit of our faculty; by faculty's strong commitment to first-rate teaching and a quality undergraduate experience; by the extent of interdisciplinary research and studies (e.g., the Natural Resource Ecology Laboratory and the Colorado Water Resources Research Institute); and by the enduring sense of responsibility to the greater community, a hallmark of the land-grant tradition." We thank Dr. Penley for his recognition of NREL, both in his letter and in his Fall Address to the University.

#### **SPECIAL AWARDS**

The NREL Audit Resource Committee received the annual Environmental Stewardship Award from the Larimer County Board of Commissioners and the Environmental Advisory Board. Last year, the committee wrote a report which reviewed NREL's environmental footprint, and made recommendations to improve recycling, paper use, water use, and energy (see <http://www.nrel.colostate.edu/reports/NREL-Environmental-Review.pdf>) This recognition for NREL, shows our continuing commitment to contributing to environmental sustainability. We congratulate the NREL Audit Resource Committee, **Gina Adams, Jill Baron, Geneva Chong, Steve Del Grosso, Nancy Gus, Kristen Howerton, Dan Manier, Andy Parsons**, and chaired by **Mark Easter**. Mark was presented the award on behalf of the NREL committee on December 15 at the Larimer County Courthouse Offices.

**Diana Wall** received the Soil Ecology Society's highest honor "The Professional Achievement Award for 2003" in Palm Springs, California from President Edie Allen and President Elect Jayne Belnap. Diana was honored (and roasted) by David Coleman, Walt Whitford, **Johan Six** (NREL and UC-Davis) and former NREL grad students: Amy Treonis (Creighton Univ.) and Serita Frey (Univ. of NH), and current: **Mark St. John, Kathy Stewart, Emma Broos** and **Johnson Nkem** from Diana Wall's lab at NREL were also present.

### Jim Gibson Receives SPIE Excellence Award

The SPIE International Society for Optical Engineering awarded **Jim Gibson**, previous NREL Director (1993 -1994), the prestigious Career of Excellence Award in Network Design and Instrument Development in U Radiation. The award was presented to Gibson by SPIE President Anthony J. DeMaria at the 4th annual meeting held in San Diego, CA, August 3- which recognized Gibson's efforts in designing and directing the USDA UB Monitoring and Research Program as well as leading the development of the U instrumentation so successfully used in the program. In his remarks to the president and attendees, Gibson pointed to the excellent quality and dedication of the members of the staff who made the program's success possible. Congrats from all of us at NREL



### Meeting Honors Jim Ellis

A session "Fragmentation of Rangelands: Ecological and Economic Implications - A Tribute to Jim Ellis," was held honoring Jim Ellis (NREL Senior Research Scientist who died tragically in an avalanche in March 2002) at the International Rangeland Congress in Durban, South Africa on August 1, 2003. The session was organized by **Tom Hobbs** and Jim's wife, **Kathy Galvin**, (NREL/Anthropology). Speakers included: Andrew Ash (Commonwealth Scientific and Industrial Research Organisation, Australia) who discussed an exciting new study in northwest Australia that will help answer questions about the importance of animals accessing heterogeneous pastures; **Randy Boone** (NREL) who reviewed the effects of fencing on livestock, wildlife, and carrying capacities; Carol Erven (MLURI, Scotland) who explored the relation between drought-induced dynamics of African pastoral systems and biotic-induced dynamics of the Asian areas she now studies; **Athy Alvin** who reviewed the effects of a two-year drought on Maasai pastoralists in Ngongoro Conservation Area; **Robin Reid** (ILRI, Kenya and NREL) who discussed the balance between fragmentation of rangeland landscapes, effects on pastoralists, and the potential of alternate land uses; and **Mike Coughenour** (NREL) who concluded the session by reviewing the many contributions Jim Ellis made to rangeland ecology, anthropology, policy development, interdisciplinary research, and to the students and others he has mentored.

### SPECIAL EVENTS

The UN Foundation, its president, Timothy Wirth, and partners, organized a series of debates entitled "The People Speak - America Debates its Role in the World," across the USA. NREL led a debate entitled, "Should the U.S. use preemptive military force to stop the spread of weapons of mass destruction" The panel, which included CSU faculty and distinguished guests, was held on October 14, 2003. For results of the debate visit our website at <http://www.nrel.colostate.edu/events/debate.html>.

### NREL Seminar Series

**Niall Hanan** and **Wei Gao** organized an informative Fall and Spring Seminar Series which have been well-attended by many staff members and students from across campus. The current schedule for the Spring Seminar Series can be seen at <http://www.nrel.colostate.edu/events/seminar.html>.

### NREL AND THE MEDIA

#### PBS Television

In October, **Tom Hobbs** and **Jill Baron** were filmed as part of an upcoming PBS two-hour special on climate change. The show, entitled "End of Eden," will air in September 2004. NREL graduate students, **Sanjay Advani** and **Jill Oropeza**, will also appear, as director, Mike Taylor of Stonehaven Productions, Toronto, wanted to portray the busy life of a typical graduate student involved in environmental research. Baron's segment takes place in both Fort Collins and Loch Vale. Tom Hobbs'

part was filmed in the Fort Collins and Estes Park areas as he discussed his EPA STAR project, which involves research on climate change in natural resources, and its economic and behavioral consequences.

### **National Geographic News**

A story posted on The National Geographic News web site

<http://news.nationalgeographic.com/news/2003/09/0912030912tvmcmurdo.html>. entitled "Polar Worms May Warn of Global Warming, Experts Say," details **Diana Wall's** research in Antarctica. The story involves observing how nematodes react to warmer global temperatures, thus determining the possible effect climate change may have on the soil's food web.

### **NREL Well Represented at NSF Biocomplexity Workshop**

Three NREL scientists, PIs and a Co-PI of NSF-funded Biocomplexity grants, attended the "NSF Biocomplexity in the Environment (BE) Workshop" in September in Washington DC. The workshop addressed biocomplexity issues, updates, and sharing of research findings. Presentations were made by Dr. Colwell, Director of NSF and other NSF administrators as well as invited guests. NREL's grants are: 1) Biocomplexity in the High Arctic- **Jeff Welker**, PI; 2) Biocomplexity in African Savannas- **Niall Hanan**, PI; 3) Biocomplexity, Spatial Scale, and Fragmentation: Implications for Arid and Semi-arid Ecosystems- **Tom Hobbs**, PI; and 4) Biocomplexity of the Greater Serengeti - Humans in a Biologically Diverse Ecosystem - Univ. of Minnesota- **Mike Coughenor**, Co-PI. **NREL was the only institution represented by four BE projects.**

### **NREL ACROSS THE GLOBE**

**Diana Wall**, with **Eldor Paul** (NREL) and A. Fitter (York University), gave the Invited Plenary Address, entitled "Developing New Ecological Perspectives from Advances in Soil Biodiversity Research," at the British Ecological Society Annual Symposium on Soil Biodiversity and Ecosystem Functioning, Lancaster, U, in March.

**Diana Wall** and **Holley Madeh** organized the Global Litter Invertebrate Decomposition Experiment (LIDE) Data Synthesis Workshop, hosted by Dr. Volkmar Wolters in Jena, Germany in March. **Emma Broos** (NREL) was a participant.

**Dennis Ojima** presented a talk entitled: "vulnerability of Steppe Ecosystems of Mongolia and Kazakhstan to Climate and Land Use Changes under Transitional Social Pressures" at the Northern Eurasian Ecosystems Science Partnership Initiative (NEESPI) Science Plan Workshop, Suzdal, Russia in April. The purpose of this workshop was to develop a network of research activities to better understand the role of the Northern Eurasian region in global change dynamics. This region has been noted for a high rate of climate warming resulting in rapid glacier melting, dramatic permafrost thawing, and extended droughts. In addition, the recent social and economic upheavals have affected the human dimensions of the region and contributed to changes in land use affecting the vulnerability of people to global change and the feedback to the earth's system. An international partnership between countries of Northern Eurasia with the US, EU, China, Mongolia, and Japan is being developed.

In October 2003, a meeting of African and international researchers with interest in the study of African ecosystem dynamics using micrometeorological methods was held following the IBP - International Land Ecosystem Atmosphere Pilot Study (ILEAPS) meeting in Helsinki, Finland. The workshop, funded in part by an IBP -START grant to **Niall Hanan** and Robert Scholes, discussed plans to form a new network called "Afriflux" as a resource for collaboration among researchers in Africa and to promote synthetic and integrative studies across African systems. The IBP -START funds will support participation of researchers from several African countries in a flux-measurement training workshop to be held in South Africa in April 2004.

**Keith Paustian** and **Mark Easter** are collaborating with scientists from the U, Netherlands, Austria, France, Brail, Jordan, enya, and India to develop advanced methods for soil carbon and greenhouse gas inventories in developing countries. eith and Mark attended a proect meeting in Aquas de Sao Pedro, Brail in April to review country -level databases and modeling methodologies. Together, with U scientists, they hosted a modeling training session at NREL in July to train post - doctoral scientists from Brail, Jordan, and enya in using soil carbon and ecosystem simulation models. **Ken Killian** and **Steve Williams** (NREL) also contributed to the modeling instruction. eith also attended a proect PI planning meeting in Ues, France in July.

**Keith Paustian** served on a panel with scientists from Brail, India, Australia, and enya, at a meeting in Igausu Falls, Brail in August, to develop a new research program on Conservation Agriculture for the International Atomic Energy Agency in ienna, Austria. The IAEA sponsors research involving the use of stable and radioactive isotopes for ecological investigations. The new program will be launched in 2004.

**Dennis Oīma** presented talks entitled: "Interactions Between Models and Data (including Data Uncertainty Issues)" and "Data Integration at Different Scales in Support of Biogeochemical Analysis" at the Terrestrial Carbon Observation-lobal Carbon Proect Workshop on Terrestrial Carbon Observations and Model-Data Fusion in Sheffield, U in June. The purpose of this workshop was to develop methods of integrating observations of terrestrial ecosystem and model calculations to better estimate carbon stocks and fluxes around the world. The sponsors of the meeting included FAO and the llobal Carbon Proect.

**Tom Hobbs, Kathy Galvin, Mike Coughenour, Randy Boone** , and **Shauna BurnSilver** attended a pre-International Rangeland Congress workshop on nonequilibrium in rangeland systems in July in Durban, South Africa. **Dennis Oīma** and **Chuluun Togtohyn** also presented posters entitled "Climate Change Impact on Rangeland Productivity in Mongolia" from their research conducted in Mongolia. Immediately following was a SCALE (Biocomplexity, Spatial Scale and Fragmentation: Implications for Arid and Semi-arid Ecosystems) proect meeting held at the Ithala ame Reserve in South Africa. Other attendees to that meeting were **Jill Lackett** (NREL) and proect collaborators from Australia, enya, aakstan, Scotland, and the U.

**Bill Parton** and **Keith Paustian** were invited lecturers at the Summer School for the Swiss National Science Foundation Climate Change Research Program, August/September, in rindelwald, Switerland. Sessions on climate science, climate change impacts, and climate change mitigation were attended by 65 students from many different countries.

**Heidi Steltēer** and **JeēWelker** made a presentation to the military and civilian personnel at Thule Air Base in late August on the nature and early results from their NSF Biocomplexity proect.

**Stephen Ogle** was an invited participant of the CarboEurope-H Meeting in Clermont -Ferrand, France in September. The purpose of this meeting was to deal with the synthesis of the European reenhouse as Budget. Steve presented an update on the U.S. agricultural soil C inventory, which is an assessment of land use and management impacts on soil C storage and is used for reporting purposes under the United Nations Framework Convention on Climate Change. While there, he also participated in a COST Action 62 meeting which focused on carbon sequestration opportunities in European grasslands. He presented results from a literature review of grassland management impacts on soil C storage. This research (collaborated with **Keith Paustian** and **Richard Conant** ) was incorporated into the IPCC LUCF ood Practice uidelines of which eith is a coordinating lead author. eith also attended IPCC meetings in Washington D.C. in April and in Sydney, Australia in July and August.

**Randy Boone** attended a workshop in Wageningen, the Netherlands, in November. An international group of scientists presented results related to effects of landscape fragmentation on large herbivores.

A book from Wageningen University and Research Centre is in production that will include a chapter by Boone, **Shauna BurnSilver**, **Je Worden**, **Kathy Galvin**, and **Tom Hobbs**.

**Diana Wall** is co-chair, with Dr. Rudy Rabbinge, The Netherlands, of the Millennium Development Goals Committee of the Millennium Assessment. She attended their 3rd Global Scenarios Biodiversity Workshop in San Jose, Costa Rica.

**Tom Hobbs** was an international opponent for the dissertation defense of Inga-Lill Person in the Department of Animal Ecology, Swedish Agricultural University, Umea, Sweden.

**Jill Baron** attended a meeting to plan future climate research in mountain ecosystems in Entlebuch Switzerland in November 2003.

### NREL ACROSS THE NATION

**Jill Baron** was one of three invited plenary speakers at St. Olaf College Science Day in May in Northfield, MN. The topic of the 2003 event was Global Change.

**Rich Conant** and **Keith Paustian** attended a Principal Investigators meeting on the Implementation Plan for the North American Carbon Program (NACP) in Washington, D.C. in May sponsored by NSF and the US Carbon Cycle Interagency Working Group. Rich gave three poster presentations. Keith is presently working on the writing team charged with revising the NACP Implementation Plan.

**Dennis Ojima** presented "Is There a Dust Bowl in Our Future Projections for the Eastern Rockies and Central Great Plains: Lessons Learned from the Great Plains Assessment" at the Symposium on Water, Climate, and Uncertainty: Implications for Western Water Law, Policy, and Management at the University of Colorado in June. Dennis was also part of the organizing committee for the Chapman Conference on Ecosystem Interactions with Land Use Change, in Santa Fe, NM in June where he presented a talk on "Land Use Impacts on Rangeland Productivity in Mongolia." Other NREL scientists present at the Chapman Conference included **Jill Baron** and **Jeff Hicke**. An AU Monograph is in preparation from the conference.

**Jim Slusser** and **Wei Gao** (NREL, UB), along with Jay Hermann of NASA, were co-chairs of the conference session on Ultraviolet Radiation and Space-based Measurements, Models, and Effects. III held in San Diego in August. Slusser and Gao presented papers at the session along with George Janson and Dan Milchunas.

**Diana Wall** is co-chair of Leopold Leadership Program Steering Committee, funded by the Packard Foundation, with Jane Lubchenco, Oregon State Univ. The LL Program selects and trains 20 academic, environmental scientists to communicate their work effectively to media policy, business leaders, and other non-scientists.

**Dave Swift** visited Andres Cibils (faculty member of the Department of Range and Animal Science, New Mexico State Univ. and former NREL graduate student) at the NMSU research ranch near Corona, NM. They reviewed current, and considered the direction of future, research. Much of the past research in this area has focused on uniper control to improve forage production. Questions regarding the interactions between the trees and the herbaceous species remain to be answered.

**Diana Wall** presented a talk on Antarctica to the Estes Park Rotary Club in August.

**Todd Wotowic** (NREL grad student), and **Nicole DeCrappeo** (former NREL grad student, now at USS in Oregon) attended a class on nematode identification at UC Riverside in August.

(NREL), and Bill Lauenroth (Forest Rangeland Watershed Stewardship), and (New Mexico State University, NREL) attended the biennial Long Term Ecological Research (LTER) All Scientist Meeting, "Embarking on a Decade of Synthesis," in Seattle, WA in September. Scientists from the ILTER (International LTER) were also in attendance to discuss findings from individual LTER sites and to determine future directions with an emphasis on synthesis. Diana Wall, Emma Broos, and Johnson Nkem also attended the McMurdo LTER Meeting in Chicago, IL in June.

In November, , and attended the last of three annual workshops held at the National Center for Ecological Analysis and Synthesis in Santa Barbara, California. In the workshop, the team from NREL worked to relate environmental differences in areas around the world to changes in large herbivore populations available from long-term surveys.

The NREL Agroecosystems group made a strong showing at the American Society of Agronomy and Soil Science Society of America Meeting in Denver, November 2-6. presented a symposium paper entitled "Carbon Sequestration and Sustainability - The Role of Conservation Agriculture." (with co-authors eith Paustian and ) presented a poster entitled "Carbon Sequestration Assessment for U.S. Croplands, Pasturelands and Rangelands based on Land Resource Regions." A Soil Carbon Management session was dominated by the NREL group with presentations by (presented by and co-authored with eith Paustian and Roel Merckx); "Carbon Sequestration at the Microaggregate Level within No-tillage Soils with Different Clay Mineralogy," by (co-authored with Johan Six and eith Paustian); "Modeling Measureable Soil Carbon Fractions: Field and Incubation Evaluation of the Soil Carbon Saturation Hypothesis," by (co-authored with , Johan Six, Rich Conant and eith Paustian); "Impact of Soil Texture on the Distribution of Soil Organic C in Modelable Physical Fractions," by Cathy Stewart (co-authored with Alain Plante, Rich Conant, eith Paustian and Johan Six); and "Determining Rates and Limits of Carbon Sequestration in Soil: Tracing C Additions."

gave a talk, "Sustainability of Agriculture in Eastern Colorado" for the Colorado County Commissioner's Winter Meeting in December. He was the only speaker from CSU.

and Jerry Olson (past ORNL scientist) organied an invited contributed session at this summer's Ecological Society of America (ESA) and International Society for Ecological Modeling (ISEM) meetings in Savannah, eorgia. The session dealt with different biome -ecosystem modeling approaches recently developed using new advances in observational technologies related to flux tower techniques, isotope studies, and remote sensing. Following the meeting, a field excursion was arranged by Jerry Olson exploring the ecosystem dynamics from the Sea Island coast to the Blue Ridge and reat Smoky Mountains, relating rapid ecological changes and patterns for ecosystem modeling. This was followed by a series of discussions with research groups at University of Tennessee and Oak Ridge National Laboratory. gave a presentation at ESA entitled "rassland Management and Light Use Efficiency: Implications for Remote Sensing" in August.

(Conant's grad student) also gave a presentation entitled "Remote Sensing of raing Intensity: Case Studies in the Short- and Mid-grass Steppes Using MODIS Data." Many other NREL scientists and students also participated in this event.

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and contributed the estimates for CO<sub>2</sub> emissions and sinks from agricultural soils to the U.S. national greenhouse gas inventory compiled annually by EPA. The inventory estimates included a revised methodology and statistical uncertainty estimates, indicating that agricultural soils are presently acting as a small sink for atmospheric CO<sub>2</sub>, due to improved agricultural practices and the Conservation Reserve Program, but cultivated organic soils remain a

significant source of CO<sub>2</sub>. They also contributed to a forthcoming USDA compilation of greenhouse gas emissions from agriculture. The methodology and results are also being published in a forthcoming issue of *Global Change Biology*.

and gave presentations in April on findings of their multi-year EPA-funded study on global climate change entitled "Effects of Climate Change on Rocky Mountain National Park and Estes Park" to citizens of Estes Park and the staff of Rocky Mountain National Park. John Loomis and Stephan Weiler of CSU also presented economic research findings based on the EPA study. Tom Hobbs gave a presentation from this study in May to the Rocky Mountain National Park Lyceum Society.

In April, the Global Change Forum, Fort Collins, Colorado Community College, invited to give an overview of global change science and the impact assessment carried for the Great Plains. He was also invited by the Olden Wyanis Club to provide a lecture on the scientific basis of global warming at the Fort Collins Senior Center. The lecture was organized by long-time NREL friend, John Reuss, who wanted an alternate perspective given in contrast to a skeptical presentation earlier in the year.

A three-day course "Land C Data Model Fusion Short Course for PRIMES," organized by and (NREL), (NCAR, NREL), Don Estep (Mathematics Dept., CSU), Richard Smith (Statistics Dept., CSU), and Scott Denning (Dept. of Atmospheric Science, CSU) was held at CSU in June. The course was attended by 30 students who took part in lectures on carbon science, modeling techniques, time series analysis, and numeric approaches to error analysis. Hands-on tutorials were given in addition to the lectures. A half-day field excursion and barbecue provided students and faculty the opportunity to visit the SS-LTER field site and to observe an eddy-covariance tower installation run by (NREL). Niall kindly gave of his time to describe the intricacies of eddy-covariance tower equipment and the objective of his study of ecosystem fluxes in grassland and croplands in the region.

gave a talk in July to the Western Regional Air Partnership (WRAP), a branch of the Western Council of Governors (WC), on ecological effects of atmospheric deposition. The WC was headed by Mike Leavitt, former governor of Utah and incumbent EPA administrator. The WRAP is a group of agency, industry, and non-governmental organizations who meet on a regular basis to work on possible resolutions for damaging air quality effects on humans, ecosystems, and visibility, etc.

led a workshop sponsored by NSF on the "Alternatives to statistical hypothesis testing for the analysis of ecological data" in Jackson, Wyoming, Dec 3-6.

is in the process of forming a group of researchers at NREL, initially called the Eospatial Information, Analysis, and Modeling (IAM) group. A couple of important points to note:

- IAM is not intended to be a Center or a Program (à la DPE). Rather, the intent is to initially stimulate the coordinated efforts of a group of researchers at NREL.
- IAM differs from COSAM (Center of Eospatial Science and Modeling) in that it is based around ecosystems and biodiversity issues, and it relies on a core of actively-engaged researchers at NREL, rather than a loose assemblage of individual researchers across campus.

Land Science Plan for IBP and IHDP: The Land Transition Team (co-chaired by ) met at NREL in April to develop a draft of the science plan for the IBP Science Congress held later in June. This plan describes the new direction of "land-based" global change research for ecosystem and human dimension sciences. The Land Team presented the material and made further refinements

at the Third IBP Congress held in Banff, Canada. The next step for the Land Proect was the Open Science Conference in Morelia, Mexico in December hosted by \_\_\_\_\_, former NREL graduate student.

The lobal Land Proect held its first Open Science Conference in Morelia, Mexico December 1 -5. NREL alum \_\_\_\_\_ hosted the meeting which was chaired by \_\_\_\_\_, one of the co-chairs for the IBP -IHDP Land Transition Team. The conference was attended by approximately 150 scientists from 20 countries covering disciplines from anthropology to oology. A number of NREL scientists and alums participated including \_\_\_\_\_ and \_\_\_\_\_ (NCAR, NREL) who provided plenary presentations. \_\_\_\_\_ and \_\_\_\_\_ participated as discussion leaders and authors of the science plan. ictor Jaramillo provided excellent conference logistics and proved the city of Morelia to be an excellent place to hold a meeting. The blend of social and biophysical scientists provided useful input on the development of the lobal Land Science Plan which is now being reviewed and can be obtained at <http://www.glp.colostate.edu/>.

In November, \_\_\_\_\_ hosted a NSF-sponsored workshop to develop a US coordinated effort to study changes associated with the Nitrogen Cycle. \_\_\_\_\_ and \_\_\_\_\_ were participants. Three main themes developed for the initial phase include: 1) Human-Atmosphere-Biosphere Exchanges; 2) Biotic Response to Human Perturbation of the N cycle; and 3) Atmospheric-Terrestrial-Human Exchanges of Reactive Nitrogen. The US Nitrogen Science Plan will identify critical research needs and coordinate efforts among research groups and agencies to ensure these biogeochemical studies will be conducted. For further information, contact Beth Holland at [eholland@acd.ucar.edu](mailto:eholland@acd.ucar.edu).

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\_\_\_\_\_, PI, with M.W. Miller (CDOW) and B.A. Wunder (Dept. of Biology, CSU), co-PIs, received a grant from the National Science Foundation, Small rants in Exploratory Research for "Development of Technology for Remote Monitoring of Contact Processes in Animal Populations and Communities," for \$49,964 to develop technology for measuring contact rates between animals in the field.

\_\_\_\_\_ was awarded two grants from NSF. One as PI, with \_\_\_\_\_ as Co-PI, for one year for \$49,921 entitled "FIBR: Planning a Study of Biodiversity and Ecosystem Function in Livestock and Wildlife Dominated Savannas of East Africa - Using enomic, Molecular, Species, and Ecosystem Approaches." The second was as a three-year NSF Biocomplexity sub-contract with Univ. of Minnesota for \$59,133 entitled "Biocomplexity of the reater Serengeti - Humans in a Biologically Diverse Ecosystem."

\_\_\_\_\_ was awarded a one-year grant from EPA for \$24,949 entitled "National reenhouse as Inventory Tasks for 2003."

\_\_\_\_\_ and collaborators at CSU and other universities in the USA and Africa received oint funding from NASA and NOAA for a proect investigating the carbon dynamics of the African continent. The three-year proect will include site -based measurements of carbon, water and stable isotope fluxes, models of the carbon cycle using satellite data, and inversion of atmospheric CO<sub>2</sub> and <sup>13</sup>C concentration measurements to estimate the spatial and temporal variability in carbon uptake and release for the whole of Africa.

\_\_\_\_\_ and \_\_\_\_\_ are recipients of a five-year grant from the USS lobal Change Program to explore the response of high elevation western ecosystems to climate variation. They are co-PIs along with scientists from four other institutions for the proect, called the Western Mountain

Initiative.

, PI, received funding for a four-year project from NSF DEB Ecosystems, "Collaborative Research: Global Patterns of Soil Biodiversity: Implications for Ecosystem Function" for \$1.22 M. Collaborators on the project are Jim Carey, Univ. South Florida and Richard Bardgett, Lancaster Univ

has also been awarded one year of funding for \$51,600 as PI from NSF -OPP for "Synthesis of Soil Biodiversity and Ecosystem Functioning in Victoria Land, Antarctica: A Workshop." Co -PIs are Bryan Adams, Brigham Young Univ. and Ross Virginia, Dartmouth College.

is Co-Investigator, with W. Berry Lyons (Ohio State University) as PI for an NSF OPP funded project, "Soil Biodiversity and Response to Climate Change: A Regional Comparison of Cape Hallett and Taylor Valley, Antarctica."

NASA has awarded three years of funding to , and to conduct research on improving estimates of carbon biogeochemistry of terrestrial ecosystems of the continental US. The proposal builds upon the efforts of the past four years developing a new version of the Century model, the IRC model funded by NSF, and will incorporate data assimilation and data fusion techniques into ecosystem modeling framework. This effort is augmented by the NSF-funded biocomplexity effort spearheaded by David Schimel and Russ Monson (University of Colorado, Boulder). The NSF project is aimed to better understand how we estimate carbon fluxes in complex terrain such as the Rocky Mountain Front Range. The project blends field measurement, tower flux technology, aircraft, satellite data, and modeling to observe and estimate carbon fluxes from different aged ecosystems in the mountains. Other researchers involved include Tomi Kukic (CIRA) and Don Estep (Mathematics Department) from CSU as well as the University of Montana, NCAR, UC-Boulder, and University of New Hampshire.

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and L. Poff. *Issues in Ecology* 10 Sustaining Healthy Freshwater Ecosystems. Now available in Spanish: Número 10, Invierno 2003, Ecosistemas de Agua Dulce Sustentables and can be downloaded at <http://www.esa.org/sbi/sbiissues/indexSP.php>.

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NREL has recently recruited two new Research Scientists II positions, the most recent being Dr. . He will collaborate with in the investigation of vegetation responses to land use and climate change in Mongolia. He is currently researching the changes in Eurasian vegetation derived from satellite imagery and U.S. cropland production during the past several decades. Jeff received his PhD in atmospheric science from Univ. of Colorado, Boulder and worked as a Post-Doc at CU and the Carnegie Institution of Washington, Stanford, CA.

has returned to NREL as a Research Scientist II working with on the modeling of the dynamics of ungulate populations and with to assess the impact of elevated atmospheric CO<sub>2</sub> levels on the biogeochemical cycling and production of the short-grass prairie using ecosystem model DACENT. Wang, originally from China, received his B.S. in biology from Naning Normal Univ., China, in 1993, his M.S. in ecology from the Chinese Academy of Sciences in 1990, and his Ph.D. in wildlife science from Oregon State University in 2000. He has worked at the Institute of Zoology, Chinese Academy of Sciences, as an Assistant Professor doing research on the population and community ecology of small mammals in Inner Mongolian grasslands. He originally came to NREL to work with Tom on his EPA project to assess the impact of climate change on the dynamics of elk and white-tailed ptarmigan populations in Rocky Mountain National Park. He left NREL for a brief time to accept an Assistant Professor position in Wildlife Biology at Arkansas Tech Univ.

is working as a research associate on several projects with and on the International LAND project with and . Patti has lived in Fort Collins for 13 years and received a B.S. and M.S. in Wildlife Biology from CSU. She has a background in conservation biology and landscape ecology, information transfer, and threatened and endangered species policy.

was recently hired as a research associate working with on Wildland Fire Interface issues in Colorado. They produced the Colorado vegetation Model, which has one hectare resolution and detailed vegetation classification for the entire state. They are currently working on a land ownership, management, and protection data set for Colorado and on the development of the Fire Learning Network, a cooperative effort between the Nature Conservancy and the U.S. Forest Service to model current and historical forest conditions in the Cache la Poudre watershed. Nate completed his B.S. in Forestry at CSU in 1999, and his M.S. in IS/Remote Sensing at CSU this fall. His Masters work focused on using eospacial sciences to predict potential Mexican spotted owl habitat at Fort Carson Military Reservation. Nate has now received an Admin-Pro/Academic joint appointment as an assistant professor in the Dept. of Forest, Rangeland, and Watershed Stewardship.



is a Doctoral Candidate in the Graduate Degree Program in Ecology, and the Forest, Rangeland, and Watershed Stewardship Department. and are her advisors. DeAna's research focuses on interactions of residential development with landscape structure, and implications of that interaction for ecological integrity in the Pikes Peak region of Colorado. In July 2003, she presented the first phase of

her research in a poster at the International Association of Landscape Ecologists World Congress in Darwin, Australia. DeAna holds a M.S. in Environmental Biology from Baylor University and a B.S. degree in Wildlife and Fisheries Sciences from Texas A&M University. She is a "non-traditional" student, married, mother of two teenagers and three dogs, and commutes to CSU from her home in Colorado Springs. DeAna is flexible about her post-Ph.D. plans, but is dedicated to continuing her participation in ecological research and applications.



is a PhD candidate in the Forest, Rangeland, and Watershed Stewardship Department at CSU, and Elise Pendall, advisors. She began her doctoral training in August 1999 after obtaining her M.S. from Seoul National Univ., Korea. Jee feels she has been provided excellent opportunities through classes, seminars, and the communication of academic ideas with a circle of scholars, both on and off campus, who possess great talent in teaching and research. Her interaction with scientists and students at NREL has been particularly stimulating and supportive of her research, academic, and career goals. Jee's interests focus on trace gas biogeochemistry, application of stable isotopes to ecosystem ecology, nutrient cycling, and ecological modeling. Her research has been funded by NIEC and NASA EOS projects. She plans to graduate in May 2004 and then pursue an academic career, first in a postdoctoral position, and then as a research scientist.



Moffat Ngugi, Francis Clark, Sanay Advani

is a part of the CSU graduate Degree Program in Ecology, advisor, owing to his interests in ecosystem level dynamics and function of nature. His current research area involves the use of remote sensing of rangelands/grasslands to better understand the role land management plays on the structure and function of these ecosystems. Moffatt received a B.S. in Range Management at the Univ. of Nairobi, Kenya followed by a M.S. in Physical Land Resources from Ghent Univ., Belgium. He plans to pursue a career as an ecosystems scientist. He is particularly interested in studying and exploring solutions to landscape level concerns of the terrestrial environment, especially those due to human impacts. Moffatt is also presently one of NREL's graduate student representatives.

(MS grad student, advisor) is using his scholarship award to set up equipment in six nitrogen fertilized plots and six controls in the Loch Vale Watershed in Rocky Mountain National Park and Fraser Experimental Forest. He will be measuring CO<sub>2</sub> flux out of these forested plots and asking how increased nitrogen affects the flux of microbially-mediated CO<sub>2</sub>. Sanay received his B.S. in Biology at Middlebury College, Middlebury VT in 1996. He has been at NREL since 2001. His wife, Rachel Advani, is a special education teacher in the Poudre School District.

NREL's other graduate student representative is . Tracy received her undergraduate degree in Biology from Augustana College, Rock Island, Illinois. She then worked on biological control issues in the Southeastern United States with Americorps in Ft. Lauderdale, Florida. Traci then traveled around the world absorbing new cultures and experiences for a year before coming to CSU where she is a master's student at NREL. Her current research attempts to pinpoint the potential habitat of the invasive shrub *Tamarix sp.* using spatial statistical modeling, working with

, Ph.D. student, , advisor, defended April 16, "Nitrogen Dynamics of Biological Soil Crusts in a Semi-arid Ecosystem." Nichole is now a post-doc at CU National Park Fellowship supporting some of her research. She and her husband, (former NREL scientist and now assistant professor, CU) have become the proud parents of a baby girl, Sophia.

, a USDA/NRCS cooperation scientist at NREL completed his MSc thesis on "Integration of Soil C modeling to Estimate Carbon Sequestration on Agricultural Croplands in Iowa, Indiana and Nebraska." eith Paustian acted as maor advisor. John continues working with NREL staff integrating research into NRCS conservation activities.

, from enueela, completed his PhD dissertation, "Soil -Plant Dynamics Related to N Uptake and Soil N Availability," under the direction of eith Paustian. He continues to work for the enueelan government in agricultural research.

, MS student, , advisor, defended August 20, "A Hydrologic and Nitrogen Mass Balance for Embryo Pond, Rocky Mountain National Park, Colorado."

Jorge Alvero, visiting PhD student from ¶aragoa, Spain, spent August -October at NREL learning and applying soil aggregate and organic matter fractionation techniques with and

, MS student, Tom Stohlgren, advisor, defended June 1, "Productivity and Disturbance as Indicators of Non-Native Species Richness: A Case Study in rand Staircase - Escalante National Monument, Utah." Alycia is presently working for Tom writing technical reports based on field work, summary data analysis, and management implications for his rand Staircase - Escalante National Monument and global change proects. Her main interests are in invasive species science and the preservation of natural areas.

, MS student, Dennis Oima advisor, defended July 1, "Early Error Detection in Ecology Model Simulations Using Pattern Recognition."

NREL graduate students and along with conducted dissemination meetings with Maasai pastoralists, sponsored by the lobal Livestock CRSP. In a series of six meetings, more than 500 Maasai learned how fragmentation of their communally shared lands into individually owned parcels could have negative effects on livestock production and wildlife conservation. Ways of reducing these negative



effects were presented.

( grad student) will begin a Post-Doc appointment this fall with PRIMES, a new interdisciplinary program at CSU which focuses on training PhD students in quantitative ecology ([www.primes.colostate.edu](http://www.primes.colostate.edu)). She will be responsible for leading a special recitation for math and statistic students making the transition to ecology, as well as leading research-based labs and exercises for a mixture of math, statistics, and ecology students next spring. ericke will spend the rest of her time researching remote sensing and carbon cycling of different landuse types in the shortgrass steppe, in collaboration with Bill Lauenroth (FRWS, CSU), Alexander oet (CU Boulder), (NREL), and Jack Morgan (USDA-ARS).

, former PhD grad student of , is now working with the Dept. of Environmental Resource Management at the Univ. College of Dublin in November.

NREL welcomes M.S. graduate student ( , advisor). She is a -12 fellow focusing her research on the effects of nitrogen deposition on soil chemistry and soil invertebrate communities. In 199, she received a B.S. in Environmental Science from the Univ. of ansas. She worked for two years as an environmental consultant on soil and groundwater remediation proects on the Front Range. She also spent time working as a biological technician in the Resource Management Division at Rocky Mountain National Park and the Rocky Mountain Research Station here in Fort Collins.

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Wycliff Mutero, Head of IS at the enya Wildlife Service, spent five months at NREL working with and others learning how integrated assessments have been conducted in East African pastoral areas and how the tools used in a proect supported by the lobal Livestock CRSP may aid the WS in managing their conservation lands.

The following were visitors to lab and NREL:  
 Dr. James arey, Associate Professor, Dept. of Biology, Univ. of South Florida; Dr. Richard Bardgett, Dept. of Biological Sciences, Institute of Environmental and Natural Sciences, Univ. of Lancaster, U; Dr. Byron Adams, Brigham oung Univ., Provo, UT; Dr. Scott Johnson, Univ. of Reading, U; Dr. David Walter, a former NREL Post -Doc and his wife, Dr. Heather Proctor, Univ. of Alberta, Canada.

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This seems to be the year for NREL weddings. We want to congratulate:

and (both past NREL grad students of, and now working with, ) were married on August 16th in a gorgeous outdoor ceremony overlooking the rand Tetons in Jackson, Wyoming where they now reside. Many NREL co-workers were able to help them celebrate their special day. smoked 5 lbs. of bison meat for the reception and Bluegrass band ictor Barnes, including NREL's own , played at the reception.

Two weeks later, on August 30th, (of Diana Wall's lab) married Brian ardel in a beautiful, yet somewhat damp, outdoor wedding held in Red Feather with many out-of-town family

and friends attending. from NREL was part of the wedding party.

(Research Scientist working with ) and Mike Doerfler were married on Sept. th at the Snow Mountain Ranch (MCA of the Rockies) in Tabernash, CO (ust outside of Winter Park). The weather was again quite damp, yet it did not spoil the ceremony held in spectacular surroundings at a spot called Columbine Point. and Rachel Advani, and were in attendance from NREL.

Another wedding united two NRELians on September 2 th . NREL graduate student, and past research associate, were married at Loch Haven near Salt Lake City.

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