

Natural Resource Ecology Laboratory

Warner College of Natural Resources

Colorado State University



<http://www.nrel.colostate.edu>

Table of Contents

Overview	1
Scientific Staff	3
Central Staff.....	19
Scientific Support Staff	22
Grad Students.....	23
Indirect Cost Recovery and Return, 1995-2005	25
Awards, 2000-2005.....	26
Proposals, 2000-2005.....	27
Facilities and Resources	29

NREL Overview

The Natural Resource Ecology Laboratory exemplifies the land grant mission of Colorado State University (CSU). Our mission is “to ensure the sustainability of the Earth’s ecosystems through the generation and application of new knowledge.” Our interdisciplinary, ecosystem research promotes collaborations among disciplines and across fields of expertise at CSU and throughout the world. This mission motivates our research to address complex environmental problems facing society, and focuses on understanding how human activities impact local, regional, and global environments.

The NREL as a research and teaching unit at Colorado State University was founded around 1968 in response to the International Biological Program (IBP) initiative and the need for more integrated and interdisciplinary understanding of how ecosystems function. Originally focused on understanding the grassland biome of eastern Colorado and around the world, the ecosystems research of the NREL has since expanded to include research on all 7 continents, across scales of investigation that span molecular to global, incorporating field, laboratory and model-based studies. The common theme of NREL research is to understand the physical, chemical and biological linkages and interactions of humans with ecosystems, linkages that underpin ecosystem function and the provision of ecosystem goods and services. NREL research aims to provide solutions that enhance human stewardship of the earth’s natural resources and thus long-term economic and ecological sustainability.

The Natural Resource Ecology Laboratory (NREL) has approximately 68 Research Scientists, consisting of 34 NREL Research Faculty and 34 Affiliate Scientists. Of the NREL Research Faculty, 8 are partially or fully supported by the University, 2 are Federal Scientists, and the rest are soft-money researchers. The NREL website details NREL personnel and research interests (see www.nrel.colostate.edu/who/researchers). NREL’s total funding from external research in the 1998-2003 period was more than \$42 million, an increase of 60% from the preceding 5-year period. The majority of NREL research funding comes from NSF, but significant support is received from other Federal Agencies, including DOE, DOI, EPA, NASA, NOAA, USDA, and a range of State, regional and local sources.

The research scientist community at NREL represents one of the most distinguished collections of ecosystem scientists in the world. Among our members we include former presidents of the Ecological Society of America and the American Institute of Biological Sciences, program officers at the National Science Foundation (NSF), chairs and panel members of numerous National Academy of Sciences committees, four Aldo Leopold Leadership Fellows, fellows of scientific societies, and panelists for funding agencies. NREL Research Scientists contribute to multidisciplinary intellectual interactions; lead or participate nationally and internationally on complex, integrated research collaborations; publish multi-authored papers resulting from NREL’s atmosphere of trust and collegiality; mentor and provide hands-on training for young scientists (post docs), graduate students, and undergraduates from Colorado, the nation, and countries around the globe. Most NREL Research Scientists use the NREL facilities daily and call NREL their primary administrative home. NREL scientific members serve as principal investigators on collaborative research involving other scientists from CSU, other universities, and federal, state, and non-governmental agencies and scientific staff. The NREL employs an average of 100 people. Research Faculty, through their competitive grant funding, currently support and house a professional support staff of approximately 60 research associates (including a full-time lab manager, computer support personnel, post-doctoral fellows), approximately 40 graduate students, and many undergraduate research assistants.

Our interdisciplinary ecosystem approach leads to educational programs that promote intellectual engagement in a cross-disciplinary fashion not expressed in standard departmental courses. This

approach also provides the opportunity for teamwork among students and researchers at the NREL, and in so doing, fosters interdisciplinary interactions. We believe this working style is fundamental in solving complex environmental problems. Our students gain practical skills and learn theory through the use of state-of-the-art instrumentation and analytical tools used in ecosystem research. We mentor outstanding students and launch them successfully into careers of research, education, and public service. The knowledge gained in our research is shared among many user communities that extend from K-12 education in northern Colorado, to state and federal agencies, and to governments and non-governmental organizations worldwide. This outreach and extension service benefits NREL and CSU by enhancing linkages between society and the fundamental research studies being conducted by our students and faculty. Insights related to societal needs, ecological and environmental questions, have been translated into successful research studies, and complete the valuable circle of enquiry we seek among our students and staff.

NREL Research Foci

The mission of the Natural Resource Ecology Laboratory centers on interdisciplinary research in ecosystem science to improve our understanding of the complex interactions between humans, management activities, and ecosystems. NREL scientists are engaged in a great diversity of research in Colorado, North America and around the world in ecosystems spanning the cold deserts of the arctic and Antarctic, through agro-ecosystems in north America and worldwide, to tropical forests and savannas. Within the larger body of research at NREL, four concentrated research programs have been identified that focus on the following strategic areas:

1. The Rocky Mountain Environment and Society Program

The goals of this program are to understand and quantify the influence of natural and human-induced change on Rocky Mountain ecosystems from the mountains to the plains, to understand and quantify the influence of mountain ecological change on regional society and economics, to reach out to people from mountain regions around the world who are facing similar challenges, and to effectively communicate knowledge to decision-makers, managers, students, and the public.

2. The African Ecosystems Program

Aims to improve the understanding and conservation of biodiversity, ecosystem function, and human well-being on the African continent through state of the art ecosystem and social science research, and develop solutions to environmental problems in which people are integral components of the landscape.

3. Program for Greenhouse Gas Mitigation through Natural Resource Management

The mission of this program is to facilitate the adoption of improved land management practices to mitigate greenhouse gas emissions in an economically and environmentally sustainable fashion.

4. Program for Global Environmental Sustainability

Aims to provide feasible strategies to maintain or improve quality of life (access to clean water and air, adequate food and fiber, reduce risks from harmful invasive species and infectious diseases, and maintenance of soil fertility) while reducing human disruption of natural processes.

The NREL website (www.nrel.colostate.edu) provides details of these and other research programs at NREL.

NREL Scientific Staff

SENIOR RESEARCH SCIENTISTS



Baron, Jill S.

Dr. Jill S. Baron is an ecosystem ecologist with the U.S. Geological Survey, and a Senior Research Ecologist with the Natural Resource Ecology Laboratory at Colorado State University. Her recent interests include applying ecosystem concepts to management of human-dominated regions, and understanding the biogeochemical and ecological effects of climate change and atmospheric nitrogen deposition to mountain ecosystems. Baron has edited two books: *Rocky Mountain Futures: an ecological perspective* (Island Press 2002), which addresses the past present, and possible future human influences on ecosystems of the Rocky Mountains, and *Biogeochemistry of a Subalpine Ecosystem* (Springer-Verlag 1992)

which summarized the first 10 years of long-term research to the Loch Vale Watershed in Rocky Mountain National Park. Dr. Baron received her Ph.D. from Colorado State University in 1991, and has undergraduate and master's degrees from Cornell University and the University of Wisconsin.

Research Summary (Last 5 Years)

Total Award: \$983,808.00; 9 projects from DOI and EPA.

Project Titles: Monitoring Effects Of Atmospheric Deposition In Loch Vale; Survey Of The Impacts Of Fish Introduction And Removal On Zooplankton Of Alpine Lakes In Rocky Mountain National Park, USA; Long-Term Ecological Measurements I N Loch Vale Watershed, Rocky Mountain National Park; Assessing Ecological And Biogeochemical Responses To Changing Atmospheric Nitrogen And Sulfur Deposition In Rocky; Responses Of Hydrologic & Aquatic Ecosystem Processes To Potential Climate Change; Modeling The Timeline For Acidification From Excess Nitrogen Deposition In Rocky Mountain National Park; Modeling The Timeline For Acidification From Excess Nitrogen Deposition In Rocky Mountain National Park; Vulnerability Of South Platte River Basin Aquatic Ecosystems And Water Quality To Severe Sustained Drought; Assessing Ecosystem Response To Atmospheric Deposition In Western U.S. Mountains And Select LTER Sites



Coughenour, Michael B

Dr. Coughenour received his B.S. and M.S. degrees in Biological Sciences from the University of Illinois - Urbana in 1973 and 1974, and his PhD. from Colorado State University in 1978, specializing in systems ecology. His PhD. research was a systems analysis of a southern Montana grassland. Dr. Coughenour spent several years as a post-doctoral research associate studying the Serengeti grazing ecosystem of Tanzania, while based at Syracuse University. In this research he used simulation modeling and experimental studies to determine how the plants and ecosystems support grazing by some of the world's largest ungulate herds. He has developed 3 ecosystem models that have enjoyed wide success: GRASS-CSOM, GEMTM, and SAVANNA. He has been

involved in research on pastoral and grazing ecosystems in Tanzania, Kenya, S. Africa, Australia, Inner Mongolia, Kazakstan, Venezuela, Canada, and has consulted on grazing ecosystem ecology in

many other locations around the world. He has carried out ecosystem modeling studies of grassland responses to atmospheric change and has worked with atmospheric scientists to develop one of the first linked ecosystem-atmosphere models (RAMS-GEMTM). His current research thrusts include: ecosystem modeling studies of ungulates and ungulate carrying capacity in grazing ecosystems; pastoral ecology; interactions between wildlife and domestic herbivores especially in E. Africa; linked models of biogeochemistry, vegetation dynamics, herbivores and predators; biocomplexity of savanna tree-grass dynamics as affected by climate, fire, and herbivory; biocomplexity of coupled human-natural systems in African savannas; and model-based studies of interactions between terrestrial ecosystems and climatic systems.

Research Summary (Last 5 Years)

Total Award: \$869,087.00; 4 projects from NSF

Project Titles: Planning A Study Of Biodiversity And Ecosystem Function In Livestock And Wildlife Dominated Savannas Of E. Africa Using Genomic, Molecular, Species, And Ecosystem Approaches; Landscape Mosaics, & The Spatial Patterning Of Vegetation & Wildlife In East African Savannas; Modeling Spatial Plant-Herbivore Interactions In The Yukon Delta; Biocomplexity Of The Greater Serengeti - Humans In A Biologically Diverse Ecosystem



Detling, James K.

James K. Detling is a professor in the Department of Biology and a senior research scientist in the Natural Resource Ecology Laboratory, where he has worked since 1975. He received his B.A. in biology from the University of California at Berkeley (1963), his M.S. in Botany from Ohio State University (1966), and his Ph.D. in Biology from the University of Utah (1969). Much of his research in grassland ecology has involved determining direct and indirect effects that herbivores have on individual plants, plant communities, and nutrient cycling processes. It has included: (1) laboratory, greenhouse, and field studies of individual plant responses to grazing by aboveground and belowground herbivores, (2) examination of changes in plant species composition, productivity, and nutrient cycling along grazing gradients in the field, (3) controlled field experiments to examine the effects of defoliation, competition, landscape position, and long-term grazing history on plant productivity and nutrient uptake, and (4) field studies of how disturbance by one group of herbivores affects the abundance and grazing behavior of other species. Much of this research has involved prairie dogs and native or domesticated herbivores that utilize prairie dog towns. A second avenue of research has centered on evaluating the potential effects of global climate change on grassland ecosystems.



Galvin, Kathleen A

Dr. Kathleen Galvin is Senior Research Scientist at the Natural Resource Ecology Laboratory and is Professor and Chair of the Department of Anthropology, Colorado State University. Trained as a biological anthropologist (Ph.D., State University of New York-Binghamton; MA, BA Colorado State University) she has conducted interdisciplinary human ecological research in Africa for over 20 years. She is interested in issues of African pastoral land use and issues of resilience and adaptation and strategies of coping with climate variability. Her current research explores looking at the dynamics of the

coupled natural and human system of the Greater Serengeti Ecosystem. She is also looking at the importance of spatial complexity and the costs of fragmentation of pastoral ecosystems around the world. In another project, she recently completed investigations on how pastoralists in Kazakhstan, Kyrgyzstan, and Tajekistan can gain more value from their livestock through improved marketing of wool and fiber products. Finally, she is currently leading a group to investigate household decision-making under uncertainty across sites around the world.

Research Summary (Last 5 Years)

Total Award: \$841,370.00; 5 projects from NSF and US-AID

Project Titles: Household Decision Making Under Uncertainty; Decision-Making in Rangeland Systems: An Integrated Ecosystem-Agent-Based Modeling Approach To Resilience and Change (DREAMAR; Livestock Herders' Access To Markets In Kazakhstan; Integrated Assessment of Pastoral- Wildlife Interactions In East Africa



Hobbs, N Thompson

Dr. Thompson Hobbs studies population dynamics and nutritional ecology of wildlife. After receiving his Ph.D. from Colorado State University in 1979, he worked as a Life Scientist for the Colorado Division of Wildlife. He held a joint appointment as a Research Scientist at the Natural Resource Ecology Laboratory, Colorado State University, during 1995-2001. Since 2001, Dr. Hobbs has been a Senior Research Scientist at Colorado State and since fall 2005 is the Chair of the Forestry, Rangeland, and Watershed Stewardship Department of the Warner College of Natural Resources. His work on characteristics of plants that determine eating rate of mammalian herbivores provides the foundation for contemporary thinking on how herbivores respond to changes in

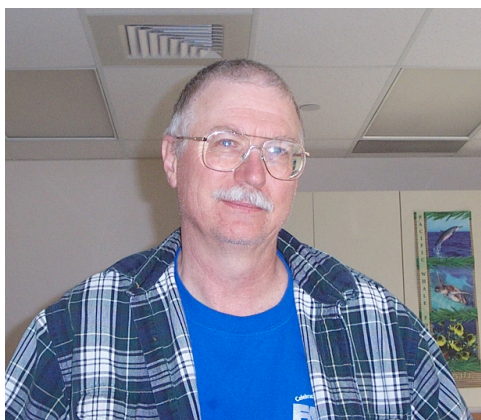
the abundance, structure, and spatial distribution of vegetation. His current work includes projects on the dynamics of mule deer populations infected with chronic wasting diseases, impacts of habitat fragmentation on the ecology and economies of arid land grazing systems worldwide, and implications of heterogeneity in plants for regulating herbivore populations. He teaches a course in Systems Ecology, which introduces graduate students to modern techniques for building and evaluating ecological models.

Research Summary (Last 5 Years)

Total Award: \$7,624,862.00; 23 projects from CO-DOW; DOI, EPA, and NSF

Project Titles: Support And Maintenance Of Natural Diversity Information Systems; The Role Of Habitat In The Decline Of Mule Deer In Colorado; Support And Maintenance Of Natural Diversity Information Systems - Regional Gap Analysis Program; Support And Maintenance Of Natural Diversity Information Systems - Habitat Protection Program; Support And Maintenance Of Natural Diversity Information Systems; Support And Maintenance Of Natural Diversity Information Systems - Regional Gap Analysis Program; Support And Maintenance Of Natural Diversity Information Systems - Habitat Protection Program; Support And Maintenance Of Natural Diversity Information Systems; Support And Maintenance Of Natural Diversity Information Systems - Regional Gap Analysis Program; Support And Maintenance Of Natural Diversity Information Systems - Habitat Protection Program; Field Trials With Immunocontraceptives To Reduce Fertility In Wild Horses On Lands Administered By The BLM; Willow Persistence In Yellowstone National Park; Estimation Of Mule Deer Population Size, Survival, And A Description Of Mule Deer Movements In Rocky

Mountain National Park; Willow Persistence In Yellowstone National Park And Survey Of Height Release In Willows; Field Trials With Immunocontraceptives To Reduce Fertility In Wild Horses On Lands Administered By The BLM; Biocomplexity, Spatial Scale, And Fragmentation: Implications For Arid And Semi-Arid Ecosystems/On Campus; Biocomplexity, Spatial Scale, And Fragmentation: Implications For Arid And Semi-Arid Ecosystems/Off-Campus; Collaborative Research: Responses Of Mammalian Herbivores To Spatial Heterogeneity Expressed At Multiple Scales; Effects Of Habitat Fragmentation On Consumer-Resource Dynamics In Environments Varying In Space And Time; Spatial & Temporal Dynamics Of Prion Disease In Wildlife: Responses To Changing Land Use; Development Of Technology For Remote Monitoring Of Contact Processes In Animal Populations And Communities; Institutional Allowance For 533350 (Bilyeu); Assessing The Consequences Of Climate Change For A National Park & Its Gateway: Interactions Of Multiple Stressors.



Hunt, H William

Bill Hunt was trained in zoology, genetics, and population biology. He came to NREL in 1971 as a modeler on a large NFS funded grasslands project. He spent three years at West Virginia University. From 1989 to 1997, he held a part time appointment in the Rangeland Ecosystem Science Department, teaching simulation modeling, rangeland ecosystem function, and introductory environmental science. His work has focused on decomposition, belowground food webs, nutrient cycling, and the effects of elevated CO₂ in grasslands and agricultural systems. His current research includes the relationships between biodiversity and ecosystem level processes, and the ecology of Antarctic dry valley systems.



Ojima, Dennis S

Dr. Dennis Ojima is a senior research scientist at the Natural Resource Ecology Laboratory (NREL) at Colorado State University. Dr. Ojima received his BA and Masters Degree in Botany from Pomona College (1975) and the University of Florida (1978), and his PhD from the Rangeland Ecosystem Science Department at Colorado State University in 1987. His research areas include global change effects on ecosystem dynamics. Recent research activities have been aimed at better integration of social science research in the study of environmental sciences, especially in the area of evaluation of changes in ecosystem services and land use decision making. This research is being carried out in funded projects in Central Asia, Mongolia, and China to study the linkage between the pastoral land use and environmental changes related to recent social, economic, and political conditions of the region. Currently, he is the co-chair of the Global Land Project, the new Core Project which integrates human dimensions and ecological sciences for the study of land processes under the auspices of the IGBP and the International Human Dimensions Programme (IHDP). Dr. Ojima is also contributing to the North American Carbon Project, U.S. National SCOPE Committee, and board member of the Ecological Society of America.

Research Summary (Last 5 Years)

Total Award: \$6,358,009.00; 13 projects from DOI, EPA, NASA, NSF, US-AID, USDA

Project Titles: Cows And Climate On Western Soils; Assessing Ecological And Biogeochemical Responses To Changing Atmospheric Nitrogen And Sulfur Deposition At Local To Regional Scale; Land-Use Change In Temperate East Asia; Carbon Data Assimilation Modeling: Remote Sensing And Field Observational Constraints Of Earth System Carbon Analysis; Northern Eurasian C-Land Use-Climate Interactions In The Semi-Arid Regions; Climate Ecosystem Interaction On East Asian Steppes: Implications Of Climate Change & Land Use Intensity: Biocomplexity: Carbonshed Studies Of Carbon Sequestration In Complex Terrain; Biological Controls Of Terrestrial Carbon Fluxes; Thresholds Of Vegetation Change Following N Deposition In Southern California Ecosystems; IGBP Secretariat Dennis Ojima Services To IGBP Secretariat; Daycent Analysis Of Nitrous Oxide Emission Mitigation Options For Non-Rice Croplands Daycent Analysis Of Nitrous Oxide Emission Mitigation Options For Non-Rice Croplands; Co-Benefits Of Grassland Regeneration Of Abandoned Wheat Areas For Carbon Sequestration, Livestock Productivity, Biological Conservation, And Social-Economic Development



Parton, William J

Bill Parton, an ecosystem ecologist for more than 30 years, has focused his research on the development of ecosystem models and the study of biogeochemical processes. He is one of the primary authors of the widely used CENTURY and DAYCENT plant-soil ecosystems models which simulate plant production, soil organic matter dynamics, nutrient cycling, and trace gas fluxes at both regional and global scales. He has considerable experience with modelling and experimental studies that evaluate the impact of land use change, fire, grazing, atmospheric CO₂ levels, as

well as climate change on grasslands, savanna, and agroecosystems.

Research Summary (Last 5 Years)

Total Award: \$718,497.00; 5 Projects from NIH, NSF, and USDA

Project Titles: Agriculture And Forestry Greenhouse Gas Inventory; Long-Term Impact Of Elevated Co₂ On The Shortgrass Steppe; Continental Drying And Carbon Sequestration Along A Subambient To Elevated Co₂ Gradient; Century Model Services For The University Of Michigan; Population & Environment In The U.S. Great Plains



Paul, Eldor A

Eldor Paul during his teaching, research and administration career at the University of Saskatchewan, University of California-Berkeley and Michigan State University published extensively on soil microbiology including molecular measurements of biodiversity. His soil organic matter work on the dynamics of carbon and nitrogen cycling was related to studies in ecosystem sustainability, soil nutrients and global change. This involved studies long-term experiments on agriculture, grasslands and forests in the USA and Canada. The use of ¹⁴C, ¹³C, ¹⁵N and analytical fractionations such as acid hydrolysis and long term C mineralization determined the amounts of and controls on carbon and nitrogen transformations. His textbooks on Soil

Microbiology and Biochemistry, together with F.E. Clark, are widely read and translated into Chinese, Farsi and Korean. He now works on the controls on soil organic matter dynamics related to

C sequestration and the responses of different fractions of soil organic matter to changes in temperature.

Research Summary (Last 5 Years)

Total Award: \$959,780.00; 2 Projects from DOE

Project Titles: Ecosystem Controls On C and N Sequestration Following Afforestation of Agricultural Lands; Ecosystem Controls on C And N Sequestration Following Afforestation of Agricultural Lands



Paustian, Keith H

Keith Paustian is Professor of Soil Ecology in the Department of Soil and Crop Sciences and Senior Research Scientist at the Natural Resource Ecology Laboratory. He received his bachelor's and master's degrees at Colorado State University and his PhD in Systems Ecology at the Swedish University of Agricultural Sciences in Uppsala. His main fields of interest include agroecosystem ecology, soil organic matter dynamics, global change and greenhouse gas mitigation. He is currently leading projects to elucidate the factors and processes controlling soil organic matter dynamics and to develop better methods to measure and predict changes in soil carbon as a function of management and environmental variables. His research also involves development of ecosystem and economic assessments to advise policy makers on climate change mitigation. He is currently leading research in 11 developing countries to elucidate the factors and processes controlling soil carbon dynamics and soil greenhouse gas emissions and to develop better methods to measure and predict changes in soil carbon as a function of management and environmental variables. He is serving as Coordinating Lead Author for the 2006 Revised IPCC Guidelines for National Greenhouse Gas Inventory Methods and is a member of the Scientific Steering Committee for the US Carbon Cycle Science Program.

Research Summary (Last 5 Years)

Total Award: \$2,827,537.90; 10 Projects from DOE, EPA, NSF, and USDA

Project Titles: Quantifying The Change In Greenhouse Gas Emissions Due To Natural Resource Conservation Practice Application; Quantifying The Change In Greenhouse Gas Emissions Due To Nr Conservation; Aggregate Turnover Controls On Soil Organic Matter: The Influence Of Management & Mineralogy; Economically Optimal Spatial Scales For Integrated Assessment Of Agricultural Production Systems; Collaborative Research With Department Of Energy's Center For Research On Enhancing Carbon Sequestration In Terrestrial; Soil C Saturation & Steady State Level Determine C Sequestration Rate & Capacity; Imperial Young Farmers And Ranchers Farm Biomass Removal; Improved Agricultural Soil Greenhouse Gas Inventories For Central American Countries; Improved Agricultural Soil Greenhouse Gas Inventories For Central American Countries; Close Coupling Of Ecosystem And Economic Models: Adaptation Of Central U.S. Agriculture To Climate Change

**Slusser, James R**

James Slusser received his B.S. and M.A. in physics at Western Michigan University. He got lab experience with the van de Graaf accelerator to study atomic physics. He received his Ph.D in 1994 and studied atmospheric spectroscopy in Lauder, New Zealand. His dissertation dealt ozone chemistry using radiative transfer modeling and trace gas spectroscopy of nitrogen dioxide, a crucial catalyst in the balance of ozone production and destruction. In 1996 he took a job with the USDA UV-B Monitoring Program at Colorado State University. In 1999 he became its Director and has seen its budget double since he started to manage the program. He is active in SPIE, AGU, and AMS and has co-chaired 7 national and international meetings leading to a number of publications. His research interests include: aerosol optical properties; the atmospheric correction for satellite imagery; response of plants to increased UV and other climate stressors; and remote sensing of plant stress.

Research Summary (Last 5 Years)

Total Award: \$7,246,640.30; 4 Projects from NSF and USDA

Project Titles: Development And Management Of A USDA-UVB Monitoring Program; Development & Management Of A USDA-UVB Monitoring Program; Development And Management Of A USDA-UVB Monitoring Program; Collaborative Research: Impact Of Aerosols On The Photochemistry During Megacity Impacts On Regional And Global Environment

**Stohlgren, Thomas J**

The costs of biological invasions in the U.S. exceed \$120 Billion/year – that's more than flood, earthquakes, hurricanes, and wildfires combined. The NREL, in partnership with the USGS, NASA, and several agencies and non-government organizations, is developing the capabilities to model species distribution and abundance in space and time – ecological forecasting – by linking remote sensing and high performance computing to field data from many sources. With new partnerships with National Geographic and Sea Studios, we are initiating “citizen science” initiatives at the national scale to detect, map, and model the worst invaders in the U.S. Our extended research team involves 10 people at NREL, 8 at NASA Goddard Space Flight Center, 6 people at the USGS

– and more than 100 colleagues from around the US. Our new virtual institute, the National Institute of Invasive Species Science, serves as a hub of a distributed network of invasion ecologists. Team science is fun.

Research Summary (Last 5 Years)

Total Award: \$1,273,423.00; 6 Projects from DOI, IAEA, Heinz Center

Project Titles: Perform Field Evaluations Of Various Remote Sensing Techniques In Identifying Tamarisk; Invasive Species Survey And Report; Landscape Assessment Of Native & Exotic Plant Diversity & Cryptobiotic Crusts In The Grand Staircase-Escalante; Support For Global Change Research Program; Preparation Of A Cactus Moth Impact Assessment; A National Indicator And Monitoring Strategy For Non-Native Species In Us Ecosystems

**Swift, David M**

Dr. Dave Swift is a systems ecologist with a background and interest in the nutrition and ecology of large grazing animals and the dynamics of semi arid systems inhabited by pastoral people. He has worked extensively in East Africa and to a lesser extent in China, Pakistan and Morocco. He is currently the PI on CSU's GK12 program "Human impacts along the Front Range." He is also the NREL faculty liaison to the Lab's IT group. He is "semi-retired," but is also teaching two courses this coming semester - "Vertebrate Nutrition" and "Principles of Watershed Management." He describes himself as a "utility infielder" of teaching.

Research Summary (Last 5 Years)

Total Award: \$2,562,321.80; 11 Projects from NSF and US-AID

Project Titles: Graduate Teaching Fellows In K-12 Education; Graduate Teaching Fellows In K-12 Education; Track 2, Gk-12: Human Impact Along The Front Range Of Colorado; Track 2, Gk-12: Human Impact Along The Front Range Of Colorado; Graduate Teaching Fellows In K-12 Education; Institutional Allowance For 533449; Integrated Assessment Of Pastoral- Wildlife Interactions In East Africa; Integrated Assessment Of Pastoral- Wildlife Interactions In East Africa; Jim Ellis Scholarship - Finding Balance In A Changing System; Jim Ellis Scholarship - Costs & Benefits Of Wildlife Conservation & Attitudes; Integrated Assessment Of Pastoral- Wildlife Interactions In East Africa

**Wall, Diana H**

Dr. Diana Wall is actively engaged in research to explore how soil biodiversity contributes to healthy, productive soils and thus to society, and the consequences of human activities on soil sustainability. She chaired the SCOPE Committee on Soil and Sediment Biodiversity and Ecosystem Functioning and edited the volume, "Sustaining Biodiversity and Ecosystem Services in Soils and Sediments" (2004, Island Press). Her research from the tropics to the Antarctic Dry Valleys examines how soil biodiversity and ecosystem processes interact. She serves as a member of the US Commission of UNESCO. Diana is a member of the Advisory Committee, Tropical Soil Biology and Fertility-CIAT Project on Conservation and Sustainable Management of Belowground Biodiversity; and is on the

Advisory Board for the UK Population Biology Network. Diana is Chair of the Aldo Leopold Leadership Program, a program training academic scientists to effectively communicate their research in environmental science to a variety of audiences. She has been President of the Ecological Society of America, the American Institute of Biological Sciences, the Intersociety Consortium for Plant Protection, Association of Ecosystem Research Centers, the Society of Nematologists and Chair, Council of Scientific Society Presidents.

Research Summary (Last 5 Years)

Total Award: \$3,772,467.00; 14 Projects from NSF, Packard, and Winslow Foundation

Project Titles: Synthesis Of Soil Biodiversity And Ecosystem Functioning In Victoria Land, Antarctica: A Workshop; Soil Biodiversity & Litter Decomposition Network; Collaborative

Research: Global Patterns Of Soil Biodiversity: Implications For Ecosystem Function; Collaborative Research: Ecological Circuitry Collaboratory; Soil Biodiversity And Response To Climate Change: A Regional Comparison Of Cape Hallett And Taylor Valley, Antarctica; McMurdo Long Term Ecological Research; Nematode-Destroying Fungi Of Costa Rica; McMurdo Long Term Ecological Research – REU; The Role Of Resource Legacy On Contemporary Linkages Between Biodiversity And Ecosystem Processes In A Cold Desert Ecosystem: The McMurdo Dry Valley LTER Program; Identifying Ecosystem Controls On Biodiversity: A US & UK Project (Collaborative Research); Identifying Ecosystem Controls On Biodiversity: A US & UK Project (Collaborative Research); Integrating Soil Biodiversity And An Ecosystem Process: Analysis Of A Global Experiment; International Workshop On Soil And Sediment Biodiversity And Ecosystem Functioning; Aldo Leopold Leadership Program

RESEARCH SCIENTIST III



Gao, Wei

Dr. Wei Gao is a Research Scientist III in the USDA UV-B Monitoring and Research Program, NREL, CSU. He received his Ph.D from Purdue University and had his Postdoctoral training at National Center for Atmospheric Research. His research interests include UV radiation and modeling, remote sensing application in ecosystems, regional climate/ecosystem modeling, UV radiation and other climate stress factors influences on ecosystems, total ozone interactions with other atmospheric parameters, and impact of climate change. He has published numerous academic papers and edited a dozen of books proceedings, and journal special issues. He is a fellow of the International Society for Optical Engineering.



Hanan, Niall P

Dr. Hanan's research centers on the ecology and biogeochemistry of semi-arid savanna, grasslands, and croplands in Africa and North America. His research includes the study of the ecological determinants and dynamics of tree-grass interactions and coexistence in savanna systems, measurement of biosphere-atmosphere exchange of water and carbon, analysis of the impacts of land use change in semi-arid systems on long-term carbon and water dynamics, and investigation of the vegetation dynamics and greenhouse gas implications of herbivore grazing systems. His research focuses on the ways in which individual plants and plant communities interact within the complex ecological and physical environment in which they find themselves and to which they are adapted. Dr. Hanan received a BSc in

Biology from Liverpool Polytechnic in 1985 and PhD in Biology from Univ. of London in 1990.

Research Summary (Last 5 Years)

Total Award: \$2,650,438.00; 9 projects from DOE, NSF and CEI

Project Titles: The Role Of Africa In Terrestrial Carbon Exchange And Atmospheric CO₂: Reducing Regional And Global Carbon Cycle Uncertainty; Biocomplexity In African Savannas; Carbon And Water Management In Conservation Reserve Program Lands Of The Shortgrass Prairie; Carbon

Modeling And Land Surface-Atmosphere Model Applications; Carbon And Water Management In Conservation Reserve Program Lands Of The Shortgrass Prairie; Carbon, Water, And Land-Use In Conservation Reserve Program Lands Of The Shortgrass Prairie; Century Model Support; Century Model Support



Theobald, David M

David Theobald studies land use change and its effects on ecological processes at the landscape-level. He received his Ph.D. from University of Colorado in 1995, after which he has worked at Colorado State University until the present. He holds a joint appointment as a Research Scientist at the Natural Resource Ecology Lab and an Assistant Professor at the Natural Resource Recreation & Tourism Department. He has been a Smith Fellow for Conservation Science with The Nature Conservancy (2000-2002). He has made contributions to understanding the dynamics and patterns of exurban land use change and protected areas in the Rocky Mountain West, and many of his products have been used by governmental and conservation organizations. His current work is in

developing approaches to bridge understanding about landscape connectivity among freshwater, terrestrial, and marine ecosystems, including development of several tools that incorporate functional connectivity into GIS-based analyses. He teaches courses on Ecosystem Management, Applications in Landscape Ecology, and Spatial Analysis of Protected Areas. He has published a GIS textbook used nationally and internationally.

Research Summary (Last 5 Years)

Total Award: \$489,485.00; 8 Projects from CO-DOW, DOI, GOCO, TNC, and USDA

Project Titles: GIAM: Mapping Protected Areas And Threats Assessment Of The Colorado Shortgrass Prairie For The Colorado; Mapping Open Space In Colorado; Maximizing Protection Of Ecological, Agricultural, And Community Values At The Rural-Urban Fringe; Fire Learning Network; Gap Analysis; Landscape Approaches To Preserving Genetic Diversity In Fragmented Habitats; Southern Rockies Ecosystem Project GIAM Services To SREP; Mapping Ponderosa Pine Ecosystem In The Laramie Foothills

RESEARCH SCIENTIST II



Boone, Randall B

Randall Boone is a Research Scientist II within the Natural Resource Ecology Laboratory, where he has worked for more than seven years. Randall is a wildlife ecologist with training from Oregon State University and the University of Maine. His experience is diverse, with research in spatial analyses and GIS, ecosystem modeling, landscape ecology, database management, biogeographical relationships of birds and plants, species/habitat relationships, wildlife and pastoral livestock mobility, spectroscopy, cluster analysis, and telemetry techniques. Randall's current research includes analysis of how landscape fragmentation can alter the numbers of livestock and wildlife that

can be supported on an area, and its affects upon the communities that rely upon them; a landscape-scale forage allocation project, to evaluate the appropriate balance of numbers of livestock and wild ungulates across Colorado; and is a Co-PI on a new project led by Dr. Kathleen Galvin, where we will merge an agent-based model of pastoral households with the SAVANNA and DAYCENT models to explore how uncertainty in decision making in rangeland systems affects their resiliency.

Research Summary (Last 5 Years)

Total Award: \$38,497.00; Project from EPA

Project Titles: Effects of Forest Fragmentation on Community Structure & Metapopulation Dynamics of Amphibians



Conant, Richard T

Dr. Richard Conant is an ecosystem ecologist at the Natural Resource Ecology Laboratory at Colorado State University. His research focuses on understanding the feedbacks between human activities and ecosystem biogeochemistry. Specifically, he is interested in how land use and land management practices impact on carbon and nitrogen cycling in agricultural and grassland ecosystems. One of his professional goals is to understand how human activities are affecting the capacity of ecosystems to continue to supply goods and services. He believes that knowledge

about the relationship between human activities and ecosystem ecology can empower policy makers to make wise decisions with respect to biogeochemistry. He is a participant in national and international efforts to quantify human impacts on carbon cycling and is involved in an effort to develop indicators of ecological condition for ecosystems close to home too. Dr. Conant has been at the Natural Resource Ecology Laboratory since earning his Ph.D at Arizona State University in 1997.

Research Summary (Last 5 Years)

Total Award: \$1,123,705.00; 8 projects from DOI, NASA, NSF, and USDA.

Project Titles: Integrated Global Observing Strategy: Land; An Integrated Multi-Scale Investigation Of Grassland Management: Implications For Carbon Cycling; Characterizing Key Resource Areas In Kenya By Remote Sensing; Preparation Of Greenhouse Gases Chapter Of National Engineering Handbook, Part 629, Agricultural Air Quality; Taking America's Pulse: Development And Application Of Human And Environmental Indicators Using An Analytical Problem-Solving Tool; Vulnerability Of SOM To Temperature Changes: Exploring Constraints Due To Substrate Decomposability And Microbial Community Structure; Vulnerability Of Soil Organic Matter To Temperature Changes: Exploring Constraints Due To Substrate Decomposability; DMUU: Science Policy Assessment & Research On Climate (SPARC) For Decision-Making Under Uncertainty



Hicke, Jeffrey A

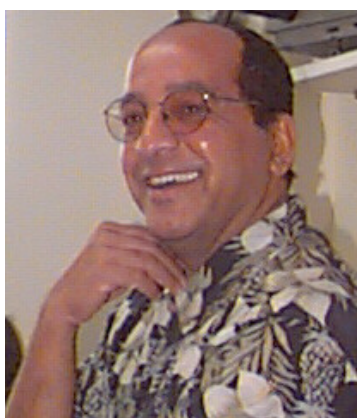
Dr. Jeffrey A. Hicke studies the impact of global environmental change on ecosystems across a broad range of spatial and temporal scales. He received his Ph.D. from the University of Colorado at Boulder in 2000, and is currently a research scientist at the Natural Resource Ecology Laboratory at Colorado State University. Dr. Hicke investigates how mechanisms such as climate change, land use change, and pollution drive biogeochemical dynamics, emphasizing the carbon cycle. He uses a variety of tools and data sources in his research, from biological and geophysical models to remotely sensed imagery to field

measurements. Significant past research includes attributing longer term changes in satellite-derived vegetation production in North America to several factors, including climate, land use, and disturbance; quantifying trends in nationwide cropland productivity; estimating carbon accumulation associated with pine encroachment into grasslands; and studying postfire recovery rates in boreal forests. His current work includes assessing drivers of plant productivity change in Eurasian and mountain ecosystems; studying the influence of insect outbreaks on landscape dynamics; and investigating trends in surface ultraviolet radiation.

Research Summary (Last 5 Years)

Total Award: \$387,775.00; 3 projects from DOI and USDA

Project Titles: Western Mountain Initiative: Response Of Western Mountain Ecosystems To Climatic Variability & Change; Biomass And NPP In The Delaware River Basin; Interfacing Forest Pest Models Global Climate Models To Evaluate Climate Change Interactions Between Forest Pest



Kalkhan, Mohammed

Dr. Mohammed A. Kalkhan is a Research Scientist - Faculty at the Natural Resource Ecology Laboratory (NREL) and an Assistant Professor of Forest Biometrics in the Forest, Rangeland, Watershed, and Stewardship Department and Geosciences, at Colorado State University (Affiliate Faculty positions). Dr. Kalkhan received his BSc in Forestry from College of Agriculture and Forestry (1973), Masters Degree in Forest Mensuration from the University of Mosul, Iraq (1980), and his PhD in Forest Biometrics- Remote Sensing Applications from the Department of Forest Sciences at Colorado State University in 1994. Dr. Kalkhan's research activities include Biometrics (natural resource applications), landscape (structure-analysis-modeling), remote sensing, GIS, biodiversity assessment, ecological modeling, wetland ecosystems,

spatial statistics, sampling methods and designs, determination of uncertainty, mapping accuracy assessment, agricultural ecology (cropping, health monitoring, assessment, precision farming, water resources, soils), fire ecology characteristics-behavior and modeling, environmental, and health-clinical studies.

Research Summary (Last 5 Years)

Total Award: \$3,107,925.00; 12 projects from DOI, NASA and NSF

Project Titles: A Plan To Develop Invasive Plant Species Sampling And Management Tools: Kenai National Wildlife Refuge, An Alaska; Fire Severity & Fuels/Vegetation Map Updates In Burned Areas; Invasive Species Survey And Report; ISS Tamarisk And Emerald Ash Borer Mapping Research; Documenting, Mapping, And Predicting The Invasion Of Non-Native Plants, Animals, And Diseases In The Us ("One If By Land, Two If By Sea..."); Development Of The NBII: Invasive Species Information Node (ISIN); Fingerprinting Native And Non-Native Biodiversity In The United States; Fuel Mapping Of Grand Teton National Park: Integration Of Geostatistics, Spacial Information, And Field Pixel Mapping; Geo-Spatial Statistics Modeling-Mapping Support For National Park Service; Carbon Cycle Science And Related Opportunities In Biology & Biogeochemistry; Determining Present And Future Impacts Of Coal Bed Methane (CBM) Development In Powder River Basin, WY And MT: Potential Impacts On Vegetation Diversity; Development & Comparative Analysis Of Fuel Loading Disease/Disturbance Models

**Ogle, Stephen M**

Dr. Stephen M. Ogle is ecosystem research scientist at the internationally-recognized Natural Resource Ecology Laboratory, specializing in modeling of biogeochemical processes. He attended Emory University graduating in 1992 with a B.S., and then continued his education in graduate school at the University of Wyoming, earning a M.S. in 1995 and Ph.D. in 2000. He has become a leader in conducting large-scale assessments of land use and management impacts on biogeochemical processes. Currently, he is a principle investigator on the U.S. assessment of agricultural land use and management impacts on greenhouse gas emissions, which is used for both national and international policy purposes. Dr. Ogle has worked on syntheses and reports through the Intergovernmental Panel on Climate Change, including a recent selection as a lead author for development of the

2006 IPCC Guidelines for National Greenhouse Gas Inventories. He serves on the scientific steering group for the North American Carbon Program and is co-coordinating an intensive campaign evaluating carbon fluxes between land surfaces and atmosphere in the mid-continent region of North America. He has also worked on international projects, such as providing expertise and inventory tools to scientists in Central America, which is enabling them to conduct large-scale assessments addressing greenhouse gas emissions and removals associated with land use and management in their region. Overall, his efforts and collaborations with other leaders in the field is working towards a better understanding of how to apply basic science in relevant ways to address critical policy issues, particularly those related to climate change.

Research Summary (Last 5 Years)

Total Award: \$2,063,044.00; 6 projects from EPA, NASA and USDA

Project Titles: Emissions Trading Through Agricultural C Sequestration: Adopting Conservation Practices, Leakage, And Non-CO₂ Greenhouse Gases; CO₂ Fluxes Between Agricultural Lands And The Atmosphere: Towards More Complete Accounting By Integrating Remote Sensing With Simulation Modeling; National Greenhouse Gas Inventory Tasks For 2003; Agricultural Land Use And Management Impacts On Agricultural Soil Organic C: National Inventory Reporting And IPCC Inventory Guidelines; National Agricultural Greenhouse Gas Inventory Reporting Of Soil Organic C And N₂O Emissions; CO₂ Fluxes Between Agricultural Lands And The Atmosphere: Towards More Complete Accounting By Integrating Remote Sensing With Simulation Modeling

**Wang, Guiming**

Dr. Guiming Wang has studied the population ecology of small mammals since 1990. In the past five years, Dr. Wang has studied the impacts of climate change on the dynamics of ungulate populations through time series analysis and population modeling. His ongoing research focuses on assessing the nonlinearity and estimating latent variables (unobserved states) of long-term ecological time series using Bayesian linear and nonlinear state space models, autocorrelative threshold model, and Bayesian semi-parametric B-spline regressions. Applications of these advanced statistical techniques have potentials to decompose the complex and nonlinear dynamics of animal populations

into fixed and time-varying components for a better understanding. As a trained small mammal population ecologist, Dr. Wang has been fascinated by arvicoline rodents and their mysterious nature of population dynamics. Recently his research interests have expanded to the roles of subterranean social arvicoline species in the nitrogen cycling and formation of vegetation heterogeneity through biopedturbation process in Inner Mongolian grassland ecosystems.

RESEARCH SCIENTIST I



Ayres, Edward

Edward Ayres studies the interactions between plants, soil organisms and soil properties. He received his PhD from Lancaster University, UK, in 2003 and went on to undertake two post-doctoral positions based jointly at Lancaster University and the Center for Ecology and Hydrology between 2003 and 2005. Ed is currently a Research Scientist at the Natural Resource and Ecology Laboratory where he is investigating global patterns of soil biodiversity from the Arctic to the Antarctic. His previous research focused on rising atmospheric CO₂ concentrations, plant species traits, above- and below-ground herbivory, soil biogeochemistry and carbon sequestration.



Christensen, Lindsey

Lindsey Christensen is a Research Scientist at the Natural Resource Ecology Laboratory (NREL), studying the primary and secondary effects of global change on mountain hydro-ecological systems. Previously, Dr. Christensen was a Sustainability Systems Research Postdoctoral Fellow at the Center for Environmental Science and Policy at Stanford University. For the Research and Assessment Systems for Sustainability Program, Christensen used an integrated approach to understand the vulnerability of systems in relation to ecosystem function, and the role natural variability plays in their sustainability. Dr. Christensen received her Ph.D. in Ecology in 2001 at NREL, CSU, where she studied the dynamics and sustainability of the Inner Mongolia grasslands, focusing on ecosystem responses to grazing and climate change. Her current research continues to examine natural variability, now focusing on mountain ecosystems. She is part of the Western Mountain Initiative, where she uses models to examine the interactions of climate anomalies, fire, C sequestration, and vegetation change in high elevation mountain ecosystems. This research is conducted at both site and regional scales, with information used for research, prediction, and decision support efforts.



Ratnam, Jayashree

Dr. Jayashree Ratnam is a research scientist in the Natural Resource Ecology Laboratories. She received her master's degree in Ecology (1993) from Pondicherry University in India and her Ph.D in Biology from Syracuse University (2002) in New York. Her research interests span a range from behavioral and population ecology to community and ecosystems ecology, with a focus on field research in tropical regions. Her past research has explored the ecological and social correlates of foraging behavior in group-living

primates in the semi-tropical forests of southern India, and the natural history and conservation status of the endangered bay gecko in the Andaman and Nicobar islands of India. Her current research is in the area of savanna ecology, including tree-grass interactions in savannas, nutrient stoichiometry of savanna ecosystems and how vegetation dynamics in savannas relate to the movements of forager populations.



Sankaran, Mahesh

My research interests span two broad areas of ecology: plant-herbivore-soil interactions and biodiversity-ecosystem function relationships. Within this overarching context, my research addresses questions of ecological and evolutionary significance, employing both theoretical and empirical approaches. Wherever possible, it is my goal to design the empirical part of my research such that it leads to insights into strategies for the conservation of biodiversity and the ecosystems in which it is conducted. Within the context of plant-herbivore-soil interactions, I am particularly interested in tropical savanna-grassland systems where large mammals are important regulators of community structure and function.



Steltzer, Heidi

Dr. Heidi Steltzer is an ecosystem ecologist with experience studying the nitrogen and carbon cycles in Arctic and alpine ecosystems. Her current research in the Rocky Mountains aims to characterize the influence of plants on snow accumulation and nutrient dynamics under the snow in mountain environments. In the Arctic, her current research is focused on improving the remote estimation of biophysical variables as vegetation cover and composition changes and developing spatially explicit models of carbon exchange that utilize remotely sensed data. Heidi's areas of specialization are the following: 1) Element interactions – linking the dynamics of the carbon, water, and nitrogen cycles, 2) Vegetation dynamics – the effects of climate change on species composition and thus the state variables that regulate ecosystem processes in treeline and tundra ecosystems, 3) Plant-soil interactions – plant species effects on ecosystem function, and 4) Remote sensing – developing models that link multispectral imagery to biophysical variables and to ecosystem processes and using information theoretics to select among the competing models. Over the past three years, Heidi has also been involved in community outreach including serving on Larimer County's Environmental Advisory Board and has participated in a leadership forum to learn more about the current natural resource issues in the state of Colorado. Issues connected to energy are of particular interest. She received her B.S. in Biology from Duke University and her Ph.D. in ecosystem ecology from the University of Colorado at Boulder.

Research Summary (Last 5 Years)

Total Award: \$67,320.00; Project from UNIV of Alaska, Anchorage



von Fischer, Joseph C

Joe von Fischer studies how the function of ecosystems is structured by the interactions among plants, the soil, and soil microbes. As compared to the ecological interactions observed on the macroscopic scale, soil processes are particularly fragile (e.g., the delicate relationship between root hair and soil mineral surface, gel-like biofilms feeding on root exudates, or the soil pores that conduct water and gases through the soil matrix). Most broadly, Joe's

research seeks to (1) characterize the soil as a landscape composed of diverse micro-habitats, and (2) understand the processes by which diversity in microhabitats affects the function of ecosystems.

Dr. von Fischer is especially interested in the greenhouse gas methane, in part because the metabolism of methane in soil is conducted by two groups of microbes with radically different ecologies: methane is produced by strictly anaerobic archaeobacteria and consumed by aerobic bacteria. Conversely, Joe is also interested in understanding how the activities of these groups provide information about the mix of oxic and anoxic microhabitats in the soil. Such measures have important direct implications for understanding the role of methane in climate change while simultaneously contributing toward a more detailed view of soil ecology.

Research Summary (Last 5 Years)

Total Award: \$500,000.00; Project from NSF

Project Titles: Additions Of Physical And Biogeochemical Tracers To Wetland Soils Can Reveal Mechanisms Underlying The Productivity-Methane Emission Relationship



Williams, Christopher A

Christopher Williams is a land surface hydrologist and ecosystem scientist at the Natural Resource Ecology Laboratory of Colorado State University. Chris is actively engaged in research that addresses how earth's terrestrial environment responds to natural and human perturbations. He investigates coupled physical and biological processes that regulate energy, water, and carbon exchanges between the land surface and the atmosphere, focusing on how these processes are influenced by climate change and disturbance. Chris's involvement in numerous international research projects in Botswana, Italy, the United States, and South Africa, has led to an extensive publication list and many presentations. Chris received recognition for Outstanding Service at Bucknell, and was granted a Knight Research Fellowship, awarded a Dean's Reserve Fellowship, and honored with the Robert Ellison Award for Interdisciplinary Research at the University of Virginia. Chris was awarded a

B.A. in Biology, Bucknell University, M.S. in Watershed Science, Colorado State University, and Ph.D. in Environmental Science from the Nicholas School of the Environment and Earth Sciences, Duke University.

POSTDOCTORAL FELLOWS



Aldridge, Cameron

Cameron recently completed his Ph.D. in Environmental Biology and Ecology in the Department of Biological Sciences at the University of Alberta. He is currently working on a Post-Doc with the USGS out of Colorado State University (NREL) where he is addressing a variety of sagebrush-steppe conservation issues.



Grant, Jacqueline B

Dr. Jacqueline Grant is a post-doc working at NREL with **Dr. David Theobald** on landscape connectivity models that incorporate genetic data from leopard frogs in the Black Hills ecoregion. She received her Ph.D. from the Dept. of Neurobiology and Behavior at Cornell Univ., NY working on chemical and behavioral ecology of caterpillars. She spent the summer of 2005 in Honduras working with Operation Wallace on butterfly diversity in disturbed and recovering tropical forests. Dr. Grant is a fellow with the David H. Smith Conservation Research Fellowship Program administered by the Society for Conservation Biology (formerly The Nature Conservancy-TNC Smith Fellowship).



Klein, Julia A

Dr. Julia A. Klein is an ecosystem ecologist who uses a suite of tools, from field-based experimental manipulations to ecosystem modeling, to examine how human activities are altering the structure and function of ecological systems. Her work thus far has focused on alpine, pastoral regions of the world. Dr. Klein received her B.A. from Cornell University, with honors, her M.S. in Wildland Resource Science and PhD in Ecosystem Science from the University of California at Berkeley. Dr. Klein was the lead author of an NSF grant which funded her PhD research, "Climate warming and pastoral land use change: implications for carbon cycling, biodiversity and rangeland quality on the northeastern Tibetan Plateau." During graduate school, Dr. Klein spent several semesters teaching field-based, semester-long ecology

programs to U.S. undergraduates in different regions of Nepal. Dr. Klein is currently at NREL as a NOAA Postdoctoral Fellow in Climate and Global Change through the UCAR Visiting Scientist Program. She is working with Dr. Dennis Ojima to scale up her experimental findings of climate and grazing effects on carbon cycling and rangeland quality using a combination of space-for-time field sampling and ecosystem modeling. She is also working with members of the Strategic and Technical Advisory Panel and the United Nations Environment Program to write a synthesis paper on Best Practices for Dryland Restoration and Rehabilitation. Her scientific interests include: carbon dynamics, climate change, land use change, biogeochemistry, sustainability science, pastoral systems, grazing ecology, montane and alpine ecology, cross-disciplinary research, biodiversity, ecosystem goods and services.

NREL Central Staff



Dennis Ojima

Dennis is a long-time NREL Senior Scientist with a distinguished record of research accomplishments and extramural funding. He is currently the Interim Director of the NREL. He provides scientific guidance to the lab as well as overall management of all lab functions.



Neil Shropshire

Neil is a veteran Senior Research Administrator with 14 years experience in the CSU Sponsored Programs office. He came to NREL in 2000 and currently serves as NREL's Assistant Director, with oversight responsibility for financial and administrative functions.



Nancy Gus

Nancy is a senior Accounting Technician with 22 years of experience in various CSU offices. She has been with NREL since 1992, and currently serves as the Head of NREL's Accounting Office.



Laurie Richards

Laurie came to NREL in 1999. Since then she has become an integral part of the lab, assuming progressively greater responsibilities. She currently serves as NREL's Proposal and Publication Coordinator, as well as performing special duties on behalf of the Director.



Jonathan Straube

Jonathan has been with NREL since 1997. He is NREL's PC Network Administrator.



Ty Boyack

Ty has been with NREL since 2000. He is NREL's UNIX System Administrator.



Dan Reuss

Dan has been with NREL since 1990. He is NREL's Analytical Laboratory Manager, known far and wide for his knowledge and helpfulness.



Colin Pinney

Colin joined NREL just this year as the Assistant Analytical Laboratory Manager.



Paula Wagner

Paula came to NREL from UNC in Greeley in 2000. She is an Accounting Technician handling travel and lab billings.



Jenny Williams

Jenny has been with NREL since 2001. She is an Accounting Technician with responsibility for hourly employees and account reconciliation.



Karen Adleman

Karen came to NREL from the Department of Fishery and Wildlife Biology in 2004. She is an Accounting Technician with responsibility for purchasing.



Veronica Hoffman

Roni came to NREL this past June from the College of Natural Sciences. She is NREL's Office Manager and primary support person for the Director.



Lily Hoffman

Lily has been a Research Associate at NREL since 2000. In addition to her responsibilities in Dr. Diana Wall's research group, she is NREL's half-time webmaster.

NREL Scientific Support Staff

Senior Research Associate

Casuto, Lee
Davis, John
Shory, Rick
Simmons, Carol
Temirbekov, Sayat

Research Associate IV

Bearly, Tamara Lynette
Boyack, Ty
Durham, William
Easter, Mark
Hartman, Melannie
Janson, George
Killian, Kendrick
Lubow, Bruce
McKeown, Rebecca
Olson, Elizabeth
Reuss, Daniel
Spotts, Deborah
Wockner, Gary

Research Associate III

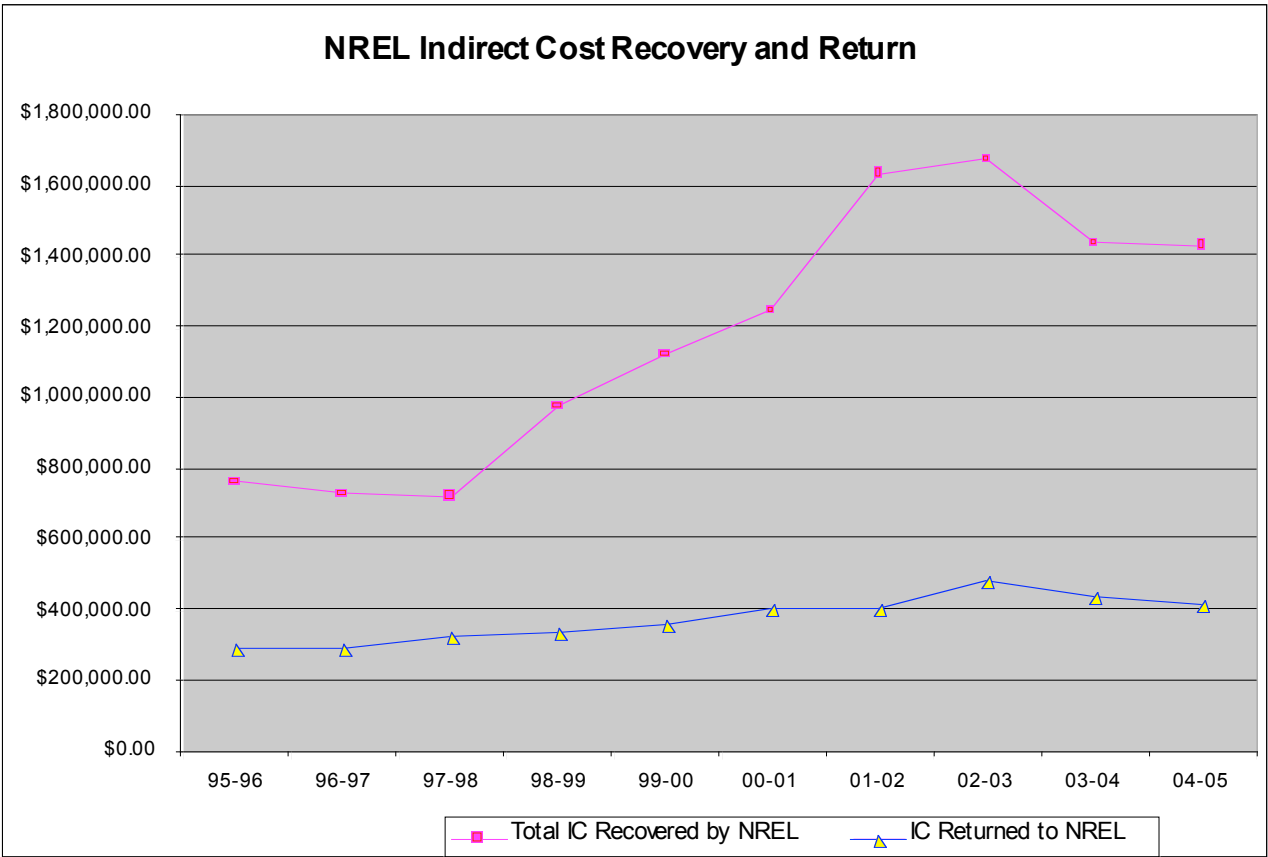
Barnett, David
Evangelista, Paul
Feng, Ting
Hilinski, Thomas
Janssen, Scott
Kear, Anita
Keough, Cynthia
Knox, Steve
Lackett, Jill
Li, Grace Fumin
Lutz, Susan
Newman, Gregory
Norman, John
Peterson, Thomas
Simonson, Sara
Sunderland, Jennifer
Tree, Roger
Williams, Stephen

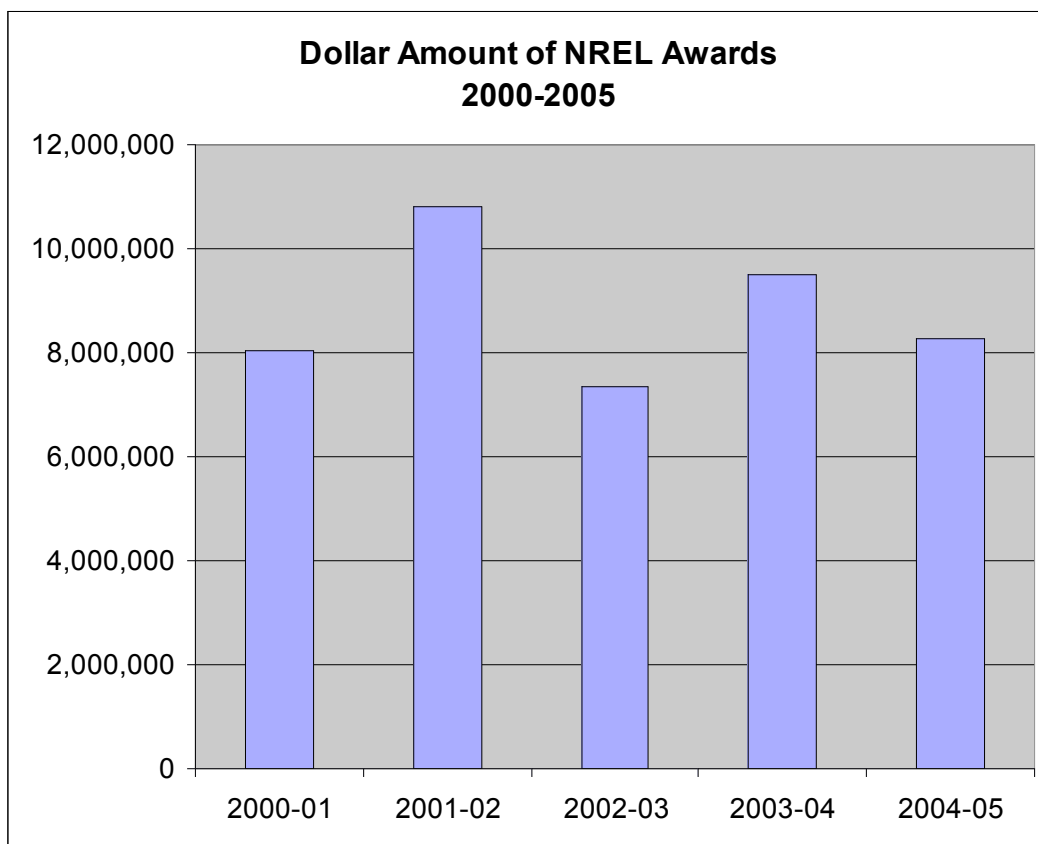
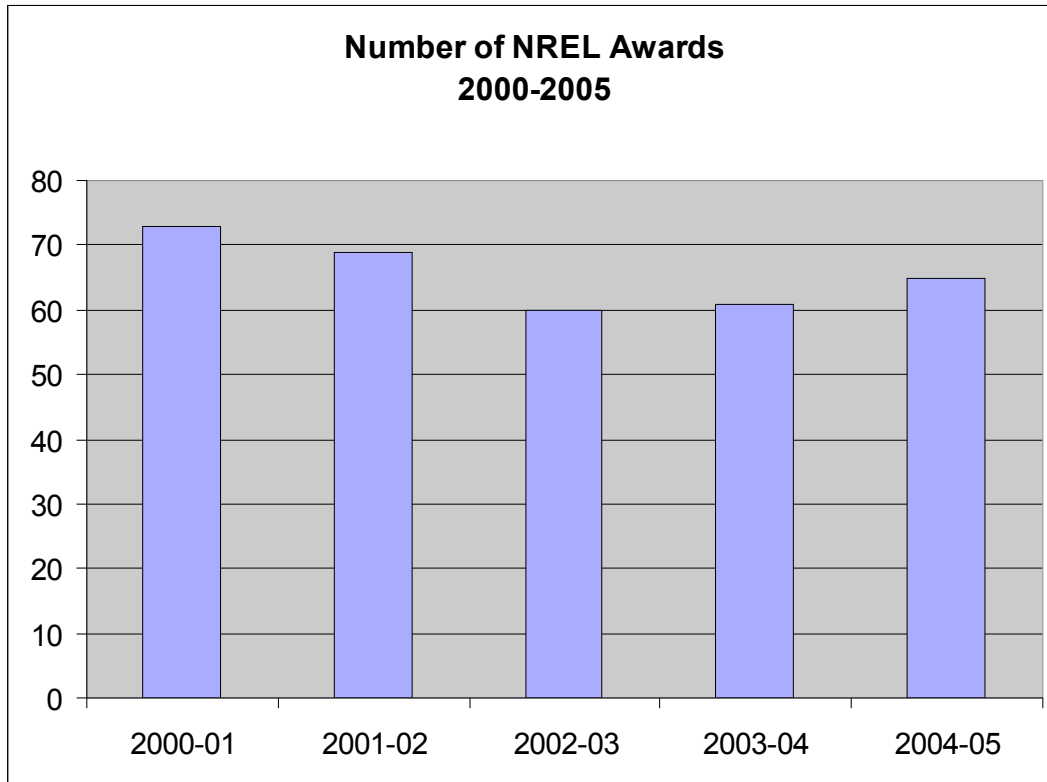
Research Associate II

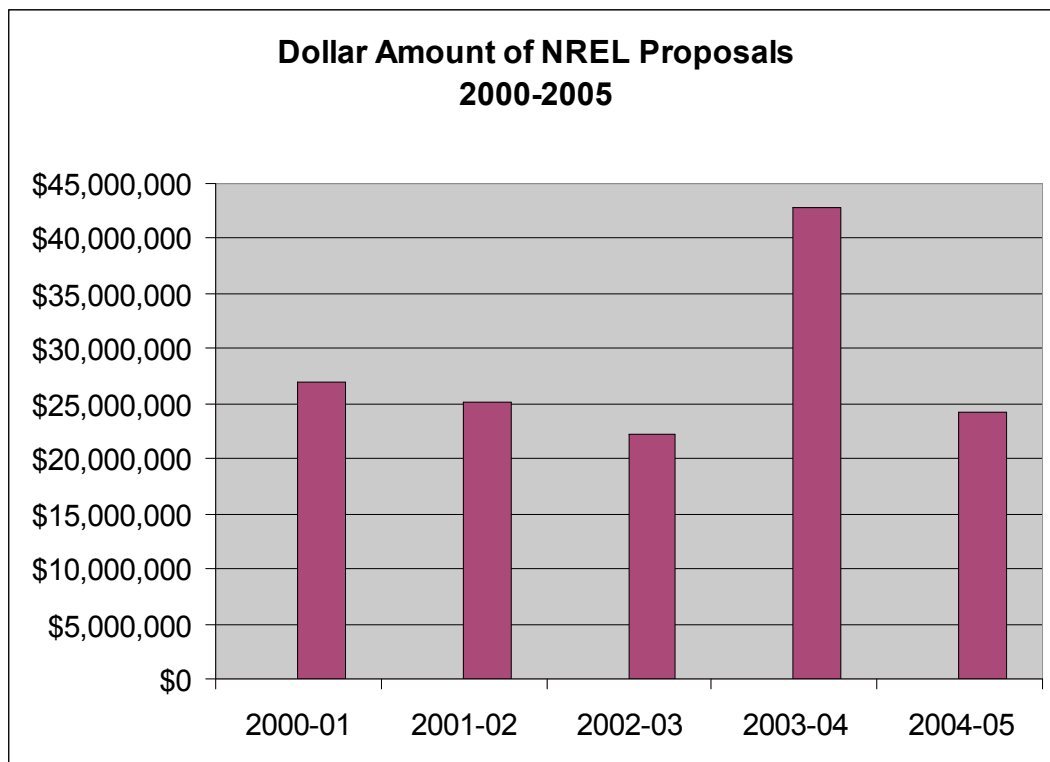
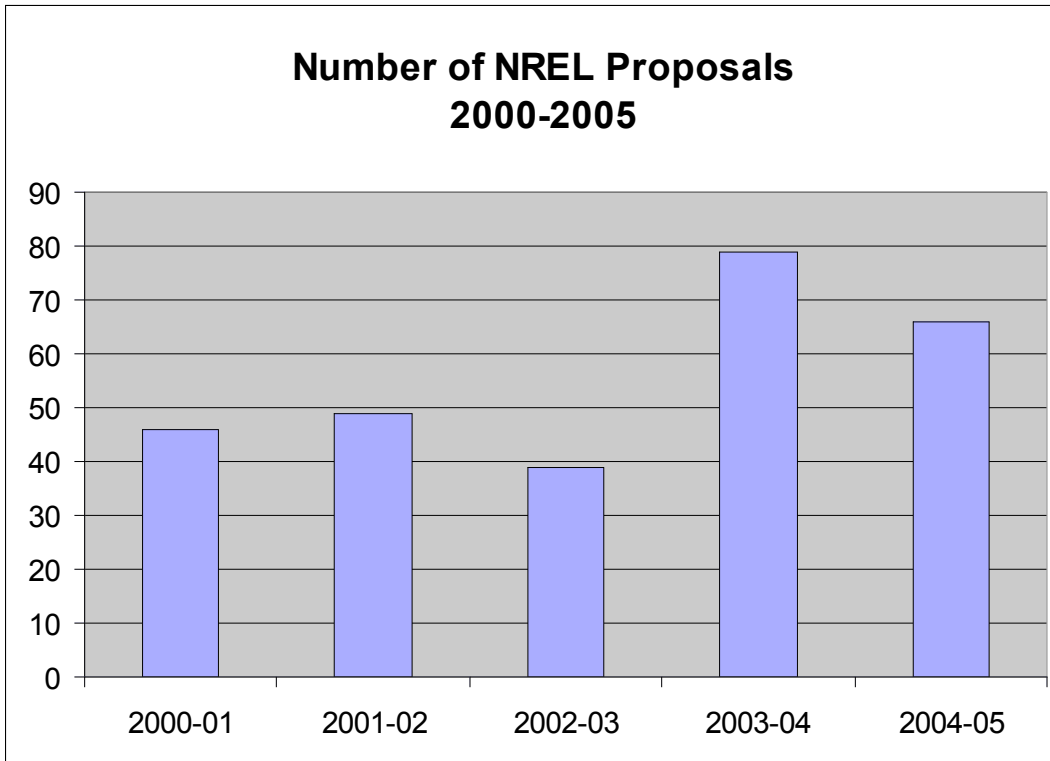
Advani, Sanjay
Hoffman, Lily
Riley, Thomas
Sherburne, Melissa
Stafford, Evan
Swan, Amy
Waters, Alycia
Wilcox, Grant

**2005 NREL Graduate Students
(NREL Appointment and/or NREL Project Support)**

<u>Student</u>	<u>Degree</u>	<u>Advisor</u>
Joyce Achen	PhD	Mike Coughenour
Diana Abendroth	MS	Mohammed Kalkhan
Mary Adams	PhD	Boris Kondratieff
Erin Bergquist	MS	Tom Stohlgren
Danielle Bilyeu	PhD	Tom Hobbs
Heather Blackburn	PhD	Tom Hobbs
Cory Bolen	MS	Mohammed Kalkhan
Ginger Bradshaw	MS	Tom Stohlgren
Gabriela Bucini	PhD	Niall Hanan
Greg Buis	MS	Dave Swift
Shauna Burnsilver	PhD	Kathy Galvin
Tracy Davern	PhD	Tom Stohlgren
Jon Freeman	MS	Tom Stohlgren
Michelle Haddix	MS	Richard Conant
Khishig Jamiyansharav	PhD	Dennis Ojima
Eli Knapp	PhD	Kathy Galvin
Sunil Kumar	PhD	Tom Stohlgren
Erandi Lokupitya	PhD	Keith Paustian
Stacy Lynn	PhD	Dave Swift
Nate Mellor	MS	Eldor Paul
Angela Moline	PhD	Leroy Poff
Moffatt Ngugi	PhD	Niall Hanan
Gabe Olchin	PhD	Ketih Paustian
Jill Oropeza	MS	Dave Swift
JoAna Pinho	PhD	Kathy Galvin
Lindsey Reynolds	PhD	Tom Hobbs
Bill Sea	PhD	Niall Hanan
Jee Shim	PhD	Dennis Ojima
Shannon Spencer	PhD	Steve Ogle
Jessica Steinweg	MS	Richard Conant
Catherine Stewart	PhD	Keith Paustian
Jeff Worden	PhD	Kathy Galvin







NREL Facilities and Resources

Location

NREL occupies the second floor of the Natural and Environmental Sciences Building (NESB) on the Colorado State University main campus. The address for regular mail is: NREL, Campus Delivery 1499, Colorado State University, Fort Collins, CO 80523-1499. For overnight delivery, the address is: NREL, Campus Delivery 1499, Colorado State University, 200 W. Lake St., Fort Collins, CO 80523-1499.

Office Space

NREL is physically comprised of a mix of office, meeting, and analytical laboratory space. Office space consists of approximately 20 modern, well-equipped, single offices housing the NREL Research Faculty, and approximately 22 two-to-four person offices housing the Research Support Staff. The administrative and accounting staff is housed in 5 offices and the computing staff in 2 offices. There are 22 desk spaces for graduate students and 6 desk spaces for visiting scientists.

Conference Rooms

NREL has two conference rooms – The Francis Clark Conference Room and the Electronic Conference Room. Each room is furnished with a conference phone and projector. These projectors are internet ready and have both cable and wireless capabilities. The Electronic Conference Room also has an interactive smart board with the capability to annotate presentations.

Laboratory Resources

The NREL analytical laboratory is a well-equipped, modern facility containing ample bench space and a variety of chemical instrumentation. It is managed by a full-time lab manager and a full-time assistant. The CSU Stable Isotope Laboratory housed at NREL is an analytical facility dedicated to understanding the processes that govern organismic biology, community ecology, ecosystem processes, biosphere-atmosphere interactions, and hydrological processes. The facility provides two mass spectrometer instruments that are capable of measuring the ratio of the natural abundance of the heavy and light isotopes of key elements that are the building blocks of the biosphere, lithosphere, and the atmosphere: carbon ($^{13}\text{C}/^{12}\text{C}$), nitrogen ($^{15}\text{N}/^{14}\text{N}$), oxygen ($^{18}\text{O}/^{16}\text{O}$), and sulfur ($^{35}\text{S}/^{34}\text{S}$). One instrument is dedicated to analyzing solid samples such as plants, soils, animals, insects and other organic material. The second instrument is used primarily for liquid samples, such as precipitation, and gas samples, like CO_2 collected in plant canopies. The NREL laboratory also contains numerous other chemical instruments: Infrared Gas Analyzer (IRGA), total C and N analyzers (Leco CHN-1000, and Carlo Erba NA 1500 CN), dissolved organic C and N analyzer (Shimadzu DOC/DON), dissolved inorganic N and P analyzer (Alpkem autoanalyzer). The laboratory contains a range of traditional soil preparation equipment such as sieves, balances, shakers, various centrifuges (3 different-capacity centrifuges, 1 high speed centrifuge), grinders (ball mill, Wiley mill, Retsch grinder), vacuum pumps, soil and plant drying ovens, muffle furnaces, and incubators, and an ultrasonic generator and disruptor horn (Branson Sonifier S-450D).

In addition, the Colorado State University Soil, Water and Plant Testing Laboratory is housed on the floor above NREL, allowing ready access to additional facilities for the cation exchange and specific surface area analyses, as well as particle size analysis by traditional methods (pipette or hydrometer).

Computing Resources

The Natural Resource Ecology Laboratory has a large and expanding computer facility including numerous SUN servers and workstations, Windows-based computers, Apple Macintosh computers, and Linux servers and workstations. Available software includes data management (including ORACLE, SQL), programming language compilers (including C, C++, Fortran), statistical software (including SAS, SPSS, and Splus), in-house specialty software (e.g., Century Model), GIS and remote sensing

applications, and additional miscellaneous software to serve a wide variety of data analysis, word processing, graphical, database, spreadsheet and delivery needs. Our computing facilities connect to Colorado State University's network backbone, which gives us high bandwidth connections to the Internet and Internet-2 (I2). Wireless networking is also in place for convenience of NREL employees as well as guests and visiting scientists. Much of the NREL network is protected by multiple levels of firewalls, yet world-wide access is provided to NREL scientists by secure protocols and Virtual Private Networking (VPN). Common computer and network services are available, including e-mail, web-mail, web hosting, secure data transfers, printing (black and white, color, and large format), and network storage. Storage for data includes over 2.5 TB of network disk storage, which is backed up to Digital Linear Tape (DLT) or using Disk-To-Disk (D2D) backup technologies. In addition to the traditional workstations and servers, scientists at NREL have a computation cluster with peak performance of 28 Gflops. This will soon be upgraded to approximately 110 Gflops. This cluster has an additional 1.6 TB of dedicated storage. The investigators on this project have access to an HP- S2000 Exemplar mini-super computer. The HP Exemplar S2000 is currently configured with 8 PA-8000 processors, 2 Gbytes of memory, and 94 Gbytes of disks. This computer is currently shared with several large projects.