Colorado State University

News Notes
Natural Resource Ecology Laboratory

Warner College of Natural Resources

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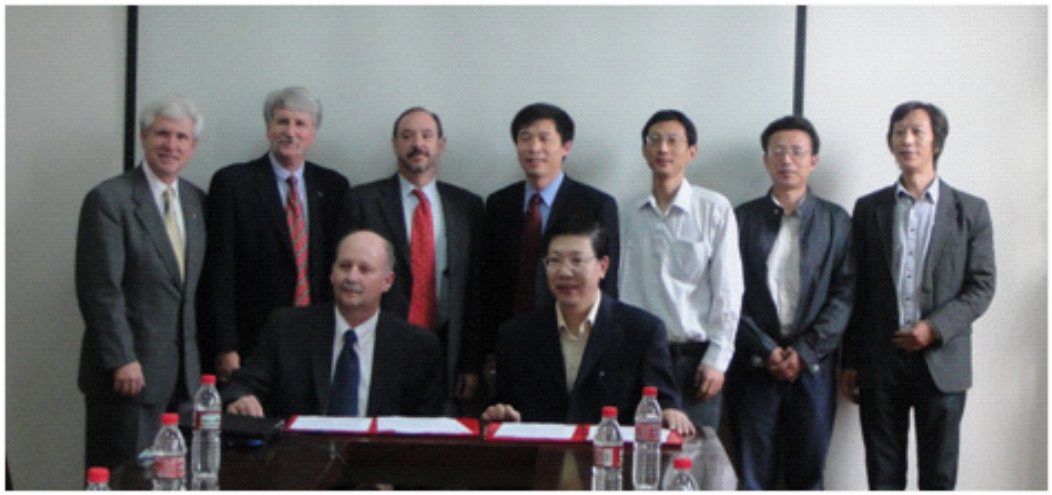
Colorado State and East China Normal University join forces to promote ecology



Dr. John Moore (Director, NREL), signing International Memorandum of Understanding at the East China Normal University in China, facilitated by Dr. Wei Gao (Director, UV-B Monitoring and Research Program). L-R: Jim Cooney, Bill Farland, Rick Miranda, Wei Gao of Colorado State University and Kai Yang, Xiaoyong Chen, and Yushan Duan of East China Normal University. Sitting: Dr. John Moore, NREL/CSU and Dr. Xiangmin Zheng, ECNU

On October 16, 2009, Dr. John Moore, Director of Natural Resource Ecology Laboratory, CSU and Dr. Xiangmin Zheng, Executive Associate Dean of the School of Resources and Environmental Science, East China Normal University, Shanghai, signed an International Memorandum of Understanding. This IMOU will promote the cooperation of research, student exchange, and training programs in the areas of environment, eco-systems, remote sensing, numerical modeling, and water resources.

Congratulations 2009-2010 NREL Scholarship Recipients

Francis Clark Soil Biology Scholarship

•Megan Steinweg

Project: Response of soil microbial community structure to climate change

Advisor: Matt Wallenstein

•Tracy Smith

Project: Impacts of increased permafrost melt on nematode depth distribution and soil physical properties in the McMurdo Dry Valleys, Antarctica

Advisor: Diana Wall

James E. Ellis Memorial Scholarship

•Gregory Wann

Project: Impacts of Climate on the Population Dynamics of White-Tailed Ptarmigan (Lagopus leucurus) in Colorado, USA

Advisors: Cam Aldridge, Tom Hobbs

Way to Go!

THANK YOU to the mentors and the NREL Scholarship Committee - Randy Boone, Sunil Kumar, Lara Prihodko and Uffe Nielson - for contributing to the continued success of our future scientists.

Research News

• The work of Dr. Jill Baron (USGS/NREL), and her colleagues, was featured in a press release issued on November 5, 2009 describing their contribution to two newly published scientific papers. The papers explain how extra nitrogen in undisturbed lakes is changing the nutrient balance available to algae, the small aquatic plants at the base of the food chain in Rocky Mountain National Park. For the full press release, visit: http://www.news.colostate.edu/release.aspx?id=4894

• Dr. Jill Baron moderated a panel on Options for Including Nitrogen Management in Climate Policy Development, one of 240 "side events" for presenting scientific work and addressing other major pertinent issues at the UN Climate Change Convention in Copenhagen, Denmark. This US State Department-sanctioned event highlighted nitrogen's role in climate processes and presented nitrogen management strategies to help mitigate climate change and minimize ecological impacts. The event is sponsored by the UN Scientific Committee on Problems in the Environment (SCOPE), an arm of the UN Environmental Programme.

• Dr. Baron also chaired a working group on the effects of atmospheric nitrogen deposition on biodiversity at a meeting in Edinburgh, Scotland in November. The meeting was sponsored by the International Nitrogen Initiative.

• Drs. John Moore and Matthew Wallenstein, and grad student Jessica Ernakovich (NREL) conducted NSF-funded research at Thule Air Force Base, Greenland in October. They sampled soils across the landscape to examine the microbes and fauna that live in this extremely cold environment. They were joined by Bob Faris, a local middle-school teacher, who shared his experiences in real-time with his students through an online blog.

• Dr. Matthew Wallenstein accepted an invitation to serve as a subject editor for Soil Biology and Biochemistry.

• Sara Simonson (NREL) participated in field work during July 2009 for a repeat survey of plant species distributions in the Senator Beck Basin Study Area in the San Juan Mountains, CO, in collaboration with Peggy Lyon and Dawson White of the Colorado Natural Heritage Program, and Chris Landry of the Center for Snow and Avalanche Studies. Vegetation plot surveys were conducted in alpine and subalpine habitats as part of an ongoing interagency effort to monitor the mountain snow system.

• Rick Shory (NREL) led a field trip on the identification of grasses as part of the Colorado Native Plant Society's Annual Meeting. The workshop was held at Lory State Park on Sunday September 13, 2009.

Publications

•Paul Evangelista (NREL) was lead author (with co-authors T.J. Stohlgren, J.T. Morisette, and S. Kumar) on an article published in the Journal of Remote Sensing entitled: "Mapping Invasive Tamarisk (Tamarix): A Comparison of Single-Scene and Time-Series Analyses of Remotely Sensed Data," Remote Sensing 2009, 1, 1-x manuscripts; doi:10.3390/rs10x000x

•Sunil Kumar and Tom Stohlgren authored a paper published in the Journal of Ecology and Natural Environment entitled "Maxent modeling for predicting suitable habitat for threatened and endangered tree Canacomyrica monticola in New Caledonia," (2009) Journal of Ecology and Natural Environment 1(4): 94-98.

•A manuscript written by Sunil Kumar (with co-authors A. Lee, D. Brightsmith, and S. Mardsen) "Parrot claylick distribution in South America: Do patterns of "where" help answer the question "why?" was published in Ecography 32: 1-11 (2009) doi: 10.1111/j.1600-0587.2009.05878.x.

Meetings and Presentations

Tom Stohlgren participated in an invited symposium on the National Ecological Observatory Network (NEON) at the Ecological Society of America meetings in Albuquerque, New Mexico, August 2-7, 2009. Stohlgren and his colleagues presented a poster entitled "Using Maximum Entropy Modeling in Site Selection."

Tom Stohlgren attended the H. J. Heinz workshop on Global Sustainability and Climate Change in Washington DC, on August 25-26, 2009. Stohlgren was one of 25 scientists invited to participate in the interagency effort to develop a cross-cutting research agenda for the country.

Tom Stohlgren attended the National Map Science Workshop in Lakewood, Colorado, on September 2-3, 2009. This was an interagency approach to developing a national strategy for displaying, viewing, and sharing important GIS themes and spatio-temporal research results on the web.

Greg Newman, Jim Graham, Alycia Crall, and the Stohlgren NREL research team conducted a training workshop on field data collection for invasive species entitled "NIISS Citizen Science Workshop and Data Quality Experiment." The workshop was held July 11-12, 2009 at the Colorado State University Environmental Learning Center in Fort Collins.

Sunil Kumar (NREL) was one of several experts on Aquatic Invasive Species (AIS) who convened at the AMK Ranch in Grand Teton National Park, WY June 9-10, 2009, to develop an AIS inventory and monitoring plan for the Greater Yellowstone Area.

Dr. Matthew Wallenstein (NREL) received funding from the NSF Enzymes in the Environment Research Coordination Network to support The First International Workshop on Environmental Proteomics, which was held at the Keystone Resort Conference Center in Keystone, Colorado from January 18-22, 2010. Leading scientists from around the world convened to assess the current state of this emerging field and identify its challenges, and to then develop a roadmap enabling the use of proteomic tools to environmental and ecological applications. For more information, visit http://enzymes.nrel.colostate.edu/index.php/Conferences-Workshops/environmental-proteomics-workshop.html

Funding Updates

• Dr. Tom Hobbs (NREL) will lead an interdisciplinary research team from CSU on a $2.5 million grant funded by the National Science Foundation. Other team members include Mike Miller (Colorado Division of Wildlife), Randy Boone (NREL); Mike Antolin (Biology), Jennifer Hoeting (Statistics), and Simon Tavener (Math). The purpose of this grant is to study the transmission of chronic wasting disease (CWD), which affects members of the deer family. CWD is caused by misfolded proteins that resist breakdown by enzymes within cells. These proteins cause fatal, neurological damage. Understanding and managing CWD depends on developing predictive models that track how the disease spreads. CWD remains an important challenge for managing wildlife resources in Colorado. As quoted by Tom Hobbs in CSU Today@ColoState "An important goal for disease ecologists is to predict how diseases change in populations. This study will enhance our ability to predict the dynamics of CWD but also will improve models of all types of diseases. Predicting the spread of disease is similar to forecasting the weather. It is crucial to understand all of the sources of uncertainty in model predictions. If you don't do that, you will probably make forecasts that are falsely optimistic. Our contribution will be to increase the reliability of disease models using sophisticated methods for bring together mathematics, statistics and data." Read the full story at: http://www.news.colostate.edu/Release/4781.

• Francesca Cotrufo (Soil and Crop/NREL), Bill Parton (NREL), and Diana Wall (Director of SOGES/Biology/NREL) received National Science Foundation funding for a four-year project entitled "A novel experimental and modeling study of C and N dynamics between litter, soil and the atmosphere as affected by soil fauna and litter quality." The research will be conducted at the LTER Konza Prairie site.

• Rich Conant (NREL) and Keith Paustian (Soil and Crop/NREL) received funding from the State of Colorado to conduct verification for an agricultural CO2 emission offset pilot study. Rich, along with Michelle Haddix, Horton Nash, and Amy Swan (NREL Research Associates), collected preliminary soil samples from Baca County in late May. This work will soon be featured in a story on Colorado Public Radio.

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• Rich Conant and Keith Paustian received funding from the Environmental Protection Agency to investigate how pasture land management in the Southeastern U.S. has influenced soil carbon stocks. They will revisit sites in Mississippi, Tennessee, and Virginia where sampling was originally conducted nearly a decade ago.

• Randall Boone (NREL), PI, and Co-PIs Robin Reid (Director of the Center for Collaborative Conservation), NREL alumnus Jeffrey Worden (now with the African Conservation Centre), and Rob Lilieholm (University of Maine) received funding from the National Science Foundation to study effects of landscape fragmentation and increased frequency of drought associated with climate change on wildebeest forage acquisition. Wildebeest in three conservation areas in southwest Kenya will be GPS-collared to track their movements, future fragmentation will be modeled, and a multi-agent model will be constructed that simulates wildebeest migratory patterns. Levels of fragmentation and the frequency of drought will be varied in simulations to quantify effects on wildebeest populations.

• John Moore (NREL), PI, has received funding from the CSREES USDA Agriculture and Food Research Initiative, Soil Processes program for a collaborative effort with faculty from the NREL, the Department of Soil and Crop Sciences, and SoGES, for "Summer Soil Institute: Addressing Environmental Challenges with Current and Emerging Techniques." The first course will be held from July 12-24, 2010. An international group of graduate students and K-12 teachers will spend two weeks at CSU to learn both fundamental and applied aspects of soil biology, chemistry, and physics. Students will gain field experience at the Shortgrass Steppe and Pingree Park, and will be trained in state-of-the-art analytical techniques. Students will gain an integrated perspective on the need to apply fundamental scientific knowledge to sustainably manage our soil resources.

• The NSF Office of Polar Programs has awarded a collaborative grant to John Moore, Matthew Wallenstein, and Bill Parton (NREL, CSU, PI and Co-PIs, respectively) and to Laura Gough at the University of Texas to examine the potential for a 'biotic awakening' of soil biota as the Arctic warms. The study will examine whether soil fauna, microbes, and plant roots increase their activity into deeper and deeper soils as these soils warm. A food web model will be integrated with a biogeochemistry model to examine the ecosystem consequences of this biological response to climate change.

• The NSF Office of Polar Programs has also awarded a grant to Heidi Steltzer (previously NREL, now at Fort Lewis College), PI, and Matthew Wallenstein (NREL sub-contract PI) to examine the effects of changes in the timing of seasonal events in the Arctic. As the length of the Arctic winter shortens due to climate change, plants and soil microbes may respond differently, resulting in asychrony in their phenology and altered nutrient cycling. This project will utilize a novel approach to manipulating snowmelt, a topic on which Steltzer and others recently published in Proceedings of the National Academy of Sciences. This project is collaborative with the University of Toledo; University of Alaska, Anchorage; University of California, Santa Barbara; and the Marine Biological Laboratory at Woods Hole, Massachusetts.

Student and Staff News

Jessica Ernakovich (Dr. Matt Wallenstein, advisor) was Jennifer Soong started in August as a GDPE graduate student with a USDA NNF fellowship under the supervision of Francesca Cotrufo (Soil and Crop Sciences/NREL).

Hannah Birge has joined NREL and will be working with NREL Research Scientists Rich Conant, Matt Wallenstein, and Eldor Paul a National Science Foundation funded project.

Eric Bowen also recently joined NREL and will be working with Rich Conant and Keith Paustian (Soil and Crop Sciences/NREL) on their EPA-funded project investigating how pasture land management in the Southeastern U.S. has influenced soil Carbon stocks.

Holly Hamilton, a senior Microbiology major, working with Shawna McMahon and Matt Wallenstein (NREL), was awarded third place for her poster presentation at the regional meeting of the American Society of Microbiology. The presentation featured results from her studies of microbial physiology in Arctic permafrost soils.