

B&ESD Newsletter **September 2011**

Pubs and Products

Akob, D. M., Kerkhof, L., Küsel, K., Watson, D. B., Palumbo, A. V., and J. E. Kostka. 2011. Linking specific heterotrophic bacterial populations to bioreduction of uranium and nitrate using stable isotope probing in contaminated subsurface sediments. *Appl. Environ. Microbiol.* Available online. DOI: 10.1128/AEM.05247-11

Bevelhimer, M., Hanrahan, T. (Pacific Northwest Laboratory), Hayse, J. (Argonne National Laboratory), and B. O'Connor (Argonne National Laboratory). "Tools and Method Development for Environmental Flow Determination: FY2011 Annual Progress Report" – September 2011.

Cada, G. F., and P. Schweizer. "The Application of Traits-Based Assessment Approaches to Estimate the Effects of Hydroelectric Turbine Passage on Fish Populations" – September 2011. Oak Ridge National Laboratory.

Cada, G. F., and M. C. Richmond. "Can Fish Morphological Characteristics be Used to Re-Design Hydroelectric Turbines?" - September, 2011. Oak Ridge National Laboratory.

Cada, G. F., Schweizer, P., and M. Bevelhimer. "Laboratory Experiments on the Effects of Blade Strike on Larval and Juvenile Freshwater Fishes" – September 2011. Oak Ridge National Laboratory.

Cada, G. F., Bevelhimer, M., Fortner, A., Riemer, K., and P. Schweizer. "Laboratory Studies of the Effects of Static and Variable Magnetic Fields on Freshwater Organisms" – September 2011. Oak Ridge National Laboratory.

Cada, G. F. "The Potential of Technological Innovations to Cope with Threats to Biodiversity" - August, 2011. Oak Ridge National Laboratory.

Cada, G. F., and M. Richmond. "Using Fish Morphological Characteristics to Improve Hydroelectric Turbine Designs. International Conference on the Status and Future of the World's Large Rivers" – April 2011. Oak Ridge National Laboratory.

Garten, C. T., Jr. 2011. Review and model-based analysis of factors influencing soil carbon sequestration beneath switchgrass (*Panicum virgatum*). *Bioenergy Res.* Available online. DOI:10.1007/s12155-011-9154-2.

Guo, H. B., Parks, J. M., Johs, A., and J. C. Smith. 2011. Mercury detoxification by bacteria: Simulations of transcription activation and mercury-carbon bond cleavage. In P. Comba (Ed.), *Modeling of Molecular Properties*. Germany: Wiley-VCH Verlag GmbH & Co. KGaA.

Hadjerioua, B., Martinez, R., Shanafield, H., III, Wei, Y., McCulla, J., Alsharif, A. M., and B. Smith. "National Resource Assessment of Pumped Storage Hydropower (PSH)" – September 2011. Oak Ridge National Laboratory.

Hadjerioua, B., Wei, Y., Kao, S., and B. Smith. “An Assessment of Energy Potential at Non-Powered Dams in the United States” – September 2011 Final Report. Oak Ridge National Laboratory.

Hemme, C. L., Fields, M. W., He, Q., Deng, Y., Lin, L., Tu, Q., Mouttaki, H., Zhou, A., Feng, X., Zuo, Z., Ramsay, B. D., He, Z., Wu, L., Van Nostrand, J., Xu, J., Tang, Y. J., Wiegel, J., Phelps, T. J., and J. Zhou. 2011. Correlation of genomic and physiological traits to biofuel yields in *Thermoanaerobacter* species. *Appl. Environ. Microbiol.* Available online. DOI: 10.1128/AEM.05677-11

Iversen, C. M., Murphy, M. T., Allen, M. F., Childs, J., Eissenstat, D. M., Lilleskov, E. A., Sarjala, T. M., Sloan, V. L., and P. D. Sullivan. 2011. Advancing the use of minirhizotrons in wetlands. *Plant Soil.* Available online. DOI 10.1007/s11104-011-0953-1. This paper is the product of an international workshop ("Advancing minirhizotron use to examine ephemeral root dynamics in peatland and high carbon ecosystems") organized by Colleen Iversen and held at ORNL in October, 2010.

Kline, K. L., Oladosu, G. A., Dale, V. H., and A. C. McBride. 2011. Scientific analysis is essential to assess biofuel policy effects: In response to the paper by Kim and Dale on “Indirect land-use change for biofuels: Testing predictions and improving analytical methodologies,” *Biomass Bioenerg.* 35: 4488-4491.

Kloppfleisch, K., Phan, N., Augustin, K., Bayne, R. S., Booker, S., Botella, J. R., Carpita, N. C., Carr, T., Chen, J. G., Cooke, T. R., Frick-Cheng, A., Friedman, E. J., Fulk, B., Hahn, M. G., Jiang, K., Jorda, L., Kruppe, L., Liu, C., Lorek, J., McCann, M. C., Molina, A., Moriyama, E. N., Mukhtar, M. S., Mudgil, Y., Pattathil, S., Schwarz, J., Seta, S., Tan, M., Temp, U., Trusov, Y., Urano, D., Welter, B., Yang, J., Panstruga, R., Uhrig, J. F., and A. M. Jones. 2011. Arabidopsis G-protein interactome reveals connections to cell wall carbohydrates and morphogenesis. *Mol. Syst. Biol.* 7: 532.

Allen McBride wrote two sections for Chapter 1 of the newly available Fourth Edition of the Biomass Energy Data Book (<http://cta.ornl.gov/bedb/index.shtml>): “Biomass Energy Sustainability” and “Indirect Land Use Change.”

Moon, J.-W., Cho, K.-S., Moberly, J. G., Roh, Y., and T. J. Phelps. 2011. Simultaneous leaching and carbon sequestration in constrained aqueous solutions. *Environ. Geochem. Hlth.* 33: 543-557.

Neary, V. “Reference Inflow Characterization for River Resource Reference Model: Reference Model 2 (RM2)” – September 2011. Oak Ridge National Laboratory.

Neary, V., and K. Stewart. “Validation of the Georgia Tech Regional Tidal Current Resource Assessment Model and GIS-web Tool” - May 2011. Oak Ridge National Laboratory.

Nichols, J., Kang, S., Post, W., Wang, D., Bandaru, P., Manowitz, D., Zhang, X., and C. Izaurrealde. 2011. HPC-EPIC for High Resolution Simulations of Environmental and Sustainability Assessment. *Comput. Electron. Agri.* 79: 112-115.

Richmond, M., Serkowski, J., Carlson, T., Ebner, L., Sick, M., and G. Cada. “Computational Fluid Dynamics Framework for Turbine Biological Performance Assessment” - May 2011. Oak Ridge National Laboratory.

Schweizer, P. E., and H. I. Jager. 2011. Modeling regional variation in riverine fish biodiversity in the Arkansas–White–Red River Basin. *T. Am. Fish. Soc.* 140: 1227-1239.

Stewart, A., Mosher, J., Mulholland, P., Fortner, A., Phillips, J., and M. Bevelhimer. “Greenhouse Gas Emissions from U.S. Hydropower Reservoirs: FY2011 Annual Progress Report” - September 2011. Oak Ridge National Laboratory.

Yang, S., Keller, M., and S. D. Brown. 2011. Genomics on Pretreatment Inhibitor Tolerance of *Zymomonas mobilis*. In A. Steinbüchel and Z. L. Liu (Eds.), *Microbiology Monographs 22: Microbial Stress Tolerance for Biofuels – Systems Biology*, (pp. 161-175). New York, NY: Springer.

Notable Achievements

Keith Kline was quoted by science journalist Maggie Koerth-Baker in the popular blog BoingBoing in an article entitled, “3 things you need to know about biofuels” (<http://boingboing.net/2011/08/05/3-things-you-need-to-know-about-biofuels.html>). Keith emphasized the importance of local social and cultural factors in land clearing and land use in developing countries.

Scott Brooks visited the Department of Energy (DOE) on August 30th to present the annual report for the Oak Ridge Integrated Field-Research Challenge (IFRC) to program managers and other DOE staff.

Liyuan Liang visited DOE on August 30th to present the annual report for the Mercury Science Focus Area (Hg SFA) to program managers and other DOE staff.

Rich Norby presented an invited lecture at an international symposium on "The Role of Ecological Institute: Ecological Approach to Prepare Adaptive Strategy Against Climate Change" in Seoul, South Korea, on September 1st. The symposium was organized by the Korean National Ecological Institute Planning Office, which is developing a National Ecological Institute (Ecoplex) as an entity that predicts and responds to changes in the ecosystem resulting from climate change.

Yetta Jager, Mark Bevelhimer, and Mike Sale attended the Annual Meeting of the American Fisheries Society 2011 in Seattle, WA, on September 4th-8th. Mike presented a paper entitled “Development of Environmentally-Advanced Turbines in the U.S.” at the “Fish Passage through Turbines Session.” Mark presented on “Behavioral Responses of Paddlefish, Lake Sturgeon, and Fathead Minnows to Electromagnetic Fields.” Peter Schweizer presented “Modeling Probability of Encounter of Freshwater and Marine Organisms with Hydrokinetic Devices in Riverine and Ocean Currents,” a presentation co-authored with Glenn Cada and Mark Bevelhimer. Yetta presented “A Scientific Paradigm for Shaping Seasonal Flows to Favor Salmon and Energy Production Symposium on Science and Strategies for Conservation of Land and Stream Flows through Acquisition, Exchange and other Financial Incentives.”

The presentation “Biodiversity and Biogeography of Bacteria in Polar and Alpine Environments” was given at the 4th International Conference on Polar and Alpine Microbiology (PAM 2011) in Ljubljana, Slovenia, September 4th-8th. Tanya Vishnivetskaya and D. A. Gilichinski were coauthors of this talk.

Yetta Jager and Peter Schweizer met with Mike Meador of the U.S. Geological Survey (USGS), Reston, VA, office. They discussed Mike's research to identify indicator species known to be sensitive or tolerant to agricultural and urban water quality influences using data collected as part of the national-scale USGS National Water-Quality Assessment (AWQA) Program. Yetta and Peter plan to build on Mike's approach in their research to anticipate fish diversity responses to bioenergy crop production.

Oak Ridge National Laboratory (ORNL) Distributed Active Archive Center (DAAC) Scientist, Bob Cook, was an invited participant at the September 6th-8th International Geosphere-Biosphere Program (IGBP) Integrated Observing Strategy Meeting in Oxford, United Kingdom. A description of the workshop is as follows: "The IGBP Integrated Observing Strategy will play a critical role in defining how we seek to overcome the challenges of integrating diverse environmental and human and socio-economic observations in the future. The purpose of this workshop is to update the IGBP Earth Observing Strategy in order to: (1) begin to frame a coordinated strategy for future activities and objectives for this IGBP Earth Observations initiative; and (2) discuss how to implement the plan with support from international and national agencies. Of particular note is that the community has recognized that further advancements in global change research requires the integration of diverse streams of Earth observations, for advanced analysis and synthesis, for assimilating observational data into Earth System and Integrated Assessment Models, and for evaluating model performance."

On September 7th Shahab Sokhansanj participated in a conference call with the Genera Project. Participants in this call were Dr. Al Womac and Dr. Kelly Tiller. The conversation was on the scope of ORNL involvement in the DOE logistics project "Development of a Bulk-Format System to Harvest, Handle, Store, and Deliver High-Tonnage Low-Moisture Switchgrass Feedstock." ORNL's involvement would be on the modeling efforts to develop simulations of the base baling and the proposed bulk flow options. The Integrated Biomass Supply and Logistics Model (IBSAL) will model the complete cycle of baling using the data input from the project. For the bulk flow, data obtained from experiments in the lab and in the field and the available data and experiences on similar systems elsewhere (handling and processing grasses for transport and feeding) will be used. IBSAL will analyze switchgrass production, options for collecting and harvesting, sizing and organizing in-field storage depots, preprocessing, and optimum management strategies for just-in-time delivery of feedstock to the DuPont-Danisco Cellulosic Ethanol plant in Vonore, TN.

On September 7th-8th Robin Graham traveled to the University of Illinois in Champaign to give an invited seminar "Estimating future US biomass feedstock supplies – the history of the Billion Ton Update" as part of their Distinguished Scientists speaker series. The seminar was well attended. Robin met with Han Blaschek, the director of the Center for Advanced Bioenergy Research (CABER). The CABER serves as an umbrella center for the integration of bioenergy research and development by various University of Illinois colleges and the Institute of Genomic Biology <http://bioenergy.illinois.edu/index.html>. They discussed the U. of I. Masters in Bioenergy and the fact that the students have an internship. This program has graduated two classes thus far and might be a good venue for accessing talented interested students and post-Masters. Robin also talked with some of the researchers associated with Energy Bioscience Institute (EBI), the large project supported by petroleum company, BP.

On September 7th-9th Liyuan Liang was invited by DOE to travel to Pacific Northwest National Laboratory (PNNL) and participate in a peer review of the PNNL Genomic Sciences SFA.

On September 8th Laurence Eaton gave a presentation via conference call entitled “Overview of the Billion-ton Report” to the Advanced Engine Cross-cut Team of the U.S. Council for Automotive Research at the request of Ron Graves, ORNL Director of the Sustainable Transportation Program.

Stemming from her presentation during an August 25th U.S. DOE Technical Assistance Program (TAP) webcast, Amy Wolfe was a presenter on a TAP-sponsored Energy Efficiency Community Block Grant (EECBG) Northwest Regional Peer Exchange webcast on September 8th, and the technical expert on the first TAP-sponsored Commercial and Government Sector Energy Efficiency Behavioral Change Peer Exchange Group call on September 21st. Wolfe represented a multi-laboratory team (Rick Diamond and Christopher Payne from Lawrence Berkeley National Laboratory and Elizabeth Malone and Tom Sanquist from Pacific Northwest National Laboratory), funded by DOE's Federal Energy Management Program (Jerry Dion) to help federal agencies achieve significant, permanent changes in energy use and greenhouse gas reduction through evidence-based approaches to institutional change.

During September 7th-9th Keith Kline participated in a workshop in San Diego, CA, on the “Role of Commodity Roundtables & Avoided Forest Conversion in Subnational REDD+” focusing on agriculture, food security and greenhouse gas accounting organized by the National Wildlife Federation and the Roundtable on Sustainable Biofuels (RSB). On September 9th Keith presented a review of opportunities and synergies between food security and reduced greenhouse gas emissions for the workshop.

Madhavi Martin was an invited speaker as a subject-matter expert at the European Mediterranean Symposium on Laser-Induced Breakdown Spectroscopy (EMSLIBS2011) in Izmir, Turkey, September 11th-15th. The title of her talk was “3-D Elemental Mapping of Biological and Non-Biological Materials Using Laser-Induced Breakdown Spectroscopy.”

Yaxing Wei and Suresh K. SanthanaVannan attended the Free and Open Source Software for Geospatial (FOSS4G) 2011 Conference in Denver, CO, September 12th-16th.

During September 12th-15th Keith Kline and Maggie Stevens contributed to the development of a draft report on how to handle indirect effects for a proposed International Organization for Standardization (ISO) standard on sustainability criteria for bioenergy, in a Project Committee 248 Working Group 4 meeting hosted in Buenos Aires, Argentina. On September 15th Keith presented “The Standards Process and the Importance of Participation: A review of the work of WG4 and the Indirect Land Use Change Issue” and Maggie presented “Standards and Indirect Land Use Change: A brief review of the decomposition analysis paper by ‘Debo Oladosu and the importance to the bioenergy industry” in a multi-sector forum hosted by the Instituto Argentino de Normalización y Certificación (IRAM) in Buenos Aires, Argentina.

On September 13th-14th the Oak Ridge Integrated Field-Research Challenge (IFRC) held its annual all-hands meeting, organized by Scott Brooks and including external collaborators.

Tammy Beaty and Jim Lay attended the annual Earth Observing System Data and Information System (EOSDIS) User Services Working Group (USWG) meeting at Goddard Space Flight Center (Greenbelt, MD) during September 13th-15th. The agenda included presentations and discussions on Reverb, Land and Atmosphere Near-real-time Capability for EOS (LANCE), Coherent Web, the User Registration System (URS), metrics, and outreach, as well as a meeting to discuss how the data centers can leverage National Aeronautics and Space Administration (NASA) EOSDIS data and imagery for the NASA Earth Observations (NEO) tool on Science on

a Sphere (<http://sos.noaa.gov/>). On September 14th EOSDIS sponsored a “Meet and Greet” with the NASA EOSDIS Data Center User Services Staff, who shared information about user-friendly tools, data access tips, and the types of data sets distributed by each data center.

On September 15th-16th Shahab Sokhansanj attended the Council of Forest Industries Annual Meeting in Prince George, British Columbia. The meeting focused on forest products utilization including Bioenergy. A site visit was organized to see the operation of a wood pellet hot water production system for an experimental greenhouse and the 18 million Btu gasification plant at the University of Northern British Columbia. The core gasification plant is Nexterra, the same Company that supplied the gasification units at ORNL.

On September 16th Allen McBride presented "Indicators to Support Environmental Sustainability of Bioenergy Systems" at the U.S.-China Advanced Biofuels Forum at Idaho National Laboratory.

Also on September 16th Shahab Sokhansanj visited the pellet production operations in Prince George (Pacific Bio) and Meadow Bank (Pinnacle). These plants are relatively large, each producing 120-150 thousand tons of pellets annually. The pellets are exported to Europe and Pacific Rim countries for the production of electric power. The uniqueness of these plants is in their use of biomass for all of the internal heat requirements. Highly experienced operators in these plants blend a range of biomass species and from various parts of the wood to make pellets. The feedstock comes from sawmills, logging residues, hog fuel, and a range of other biomass. Another plant in Princeton, B.C., receives its sawmill residue and shavings from Mountain Pine Beetle Killed wood. The quality of pellets produced is as good as pellets produced from non-infected wood.

On September 19th Dr. Stefan Pelz of the University of Applied Sciences Rottenberg, Germany, visited Shahab Sokhansanj at the University of British Columbia (UBC). The Bioenergy specialization of the University focuses on optimizing the wood supply and conversion chain, process engineering production and supply of biomass analyses, inventory of biomass potentials, forest access, efficient low impact harvesting, optimizing process interfaces, monitoring and control of international biomass and combustion flows, quality assessment/control of biomass combustibles, strategies of increasing resource- and energy-efficiency (quality of combustibles, low emission combustion technology, life cycle assessment) and assessment of impacts of technology. Marius Wohler, a post-graduate student at Rotenberg spent 6 months at UBC conducting experiments on blending and producing pellets as part of his M.Sc. thesis requirements. Marius returned to Germany at the end of September.

On September 19th-20th Liyuan Liang, Dwayne Elias and Baohua Gu visited Princeton University and Rutgers University to exchange information on the scopes of the ORNL Hg SFA and the university projects with an aim to find common interests, strengthen collaboration, and minimize duplication. Discussions at Princeton with F. Morel and J. Schaefer and then with S. Myneni and B. Mishra (Skype link from Argonne) occurred on September 19th. On September 20th they met with Professor T. Barkay's research group including her co-PIs, N. Yee and J. Reinfeld, and provided an overview of the ORNL SFA. Separate meetings were held with L. Kerkoff and others at Rutgers University.

On September 19th-21th ORNL scientists made four presentations at the International Energy Agency (IEA) Joint Task 38/40/43 Workshop on "Quantifying and managing land use impacts of bioenergy" in Campinas, Brazil.

- Keith Kline presented “Top Ten Steps to Improve Quantification of Land-Use Change

- Effects of Bioenergy Systems”
- Virginia Dale presented “Indicators to Support Environmental Sustainability of Bioenergy”
 - Maggie Stevens presented a paper by ‘Debo Oladosu and colleagues titled “Empirical Analysis of the Sources of Corn Used for Ethanol Production in the United States: 2001-2009”
 - Keith Kline presented “Moving Forward: Policies to Improve Land Use & Address Social Concerns” and a plenary comment summarizing “Challenges to Certifying Sustainable Bioenergy Production”

ORNL DAAC lead developer Suresh K. SanthanaVannan visited the Alaska Satellite Facility (ASF) on September 20th and 21st. Discussions between ORNL and ASF centered on Open Geospatial Consortium (OGC) technologies for geospatial data distribution. Suresh demonstrated the Spatial Data Access Tool (SDAT) and WebGIS tools to ASF staff and also discussed the technical details of installation and implementation of these OGC tools. ASF illustrated their data flow and the technologies underlying their system architecture. Mercury tools and services were also explored.

Glenn Cada participated in the HydroVision Brazil 2011 conference (Rio de Janeiro, September 20th-22nd) and gave an invited presentation on research he is doing for the DOE Wind & Water Power Program. The talk was titled "Can Fish Morphological Characteristics be used to Re-Design Hydroelectric Turbines?"

On September 21st-22nd Mike Hilliard and Paul Leiby presented “Integrating Biofuels Supply-Demand Chain Modeling at Local and National Levels for Strategic Analysis” at a workshop on Biofuel Supply Chain Modeling at the National Renewable Energy Laboratory (NREL) in Golden, CO.

Brennan Smith attended the Small Hydro Workshop in Bend, OR, on September 21st-23rd. Brennan participated in a panel discussion on National Resource Assessment on Thursday, September 22nd, following the opening session. His presentation included details on recently conducted assessments of hydropower potential, presented a summary of the project analyses and discussed future planning and implementation efforts.

On September 22nd at the Bioethanol Technology Center (CTBE, Campinas, Brazil), Virginia Dale and Keith Kline met with Luis Cortez and a dozen researchers from four institutions involved in the development of the Latin America, Caribbean and African (LACAF) bioenergy project to discuss opportunities for collaboration and building linkages among Office of the Biomass Program (OBP) sustainability research, the Global Sustainable Bioenergy initiative, and LACAF.

On September 22nd the team including Ji-Won Moon and Tommy Phelps received the Best Seed Money Fund Poster Award at the 6th Annual Laboratory Directed Research and Development (LDRD) poster session. Co-authors on the poster were Jae Hong Park, Chad Duty, Jong Su Kim, Pooran Joshi, George Jia, Gerald Jellison, Jr., and Lonnie Love.

Following the updates to BER sponsors on FY11 activities, members of the Climate Change Science Institute (CCSI) held the 2011 CCSI Computer Modeling Expo. Presentations and presenters from CCSI included:

- Ultra High Resolution Global Simulation to Explore and Quantify Predictive Skill for Climate Means, Variability and Extremes (Jim Hack)
- Mean state and global characteristics of the 1 degree spectral Community Atmosphere Model (Kate Evans)
- Direct and Semi-direct Effects of Aerosols on the Climate System (Salil Mahajan)
- Progress Towards Accelerating CAM-SE on Hybrid Multi-Core Systems (Rick Archibald)
- Reducing uncertainties associated with terrestrial carbon cycle-climate system feedbacks: Improved Earth System Model process representations for arctic, tropical, and temperate systems (Peter Thornton)
- Project Spotlight: Development and Early Results from an Integrated Earth System Model (Peter Thornton)
- Future hydrological predictions: Does dynamical downscaling add any value? (Moet Ash-faq)
- Monthly fossil fuels CO₂ fluxes: Impact on atmospheric CO₂ seasonal cycles and implications for models of the terrestrial biosphere (David Erickson)
- Impact of Increasing CO₂ Concentrations on Ocean pH, Ocean Mixed Layer Depth and the Sulfur Cycle Using the Community Earth System Model (Marcia Branstetter)
- Issues in the Integrated Analysis of Interactions Among Energy, Other Built Infrastructure, and Urban Systems (Tom Wilbanks)
- *Unable to attend the Expo but presented to BER*—The Carbon-Land Modeling Intercomparison Project (C-LAMP) and the International Land Model Benchmarking (I-LAMB) Project for the IPCC AR5 (Forrest Hoffman)
- Using Eddy-Flux Site Measurements to Examine the Performance of CLM-CN at High Latitudes (Jeff Nichols for Mac Post; poster)
- Development and analysis of a high-resolution spectral Community Atmosphere Model (CAM4) (Kate Evans; poster)
- Computer Performance of the Community Earth System Model (Pat Worley; poster)
- Data Workflow in Support of the Ultra High Resolution Global Climate Simulation Project (Valentine Anantharaj; poster)

On September 22nd and 23rd Greg Zimmerman, Leader of the Environmental Sciences Division (ESD) Human Health Risk & Environmental Analysis Group, attended a workshop at Pacific Northwest National Laboratory (PNNL) with staff from the U.S. Nuclear Regulatory Commission (NRC). The subject of the workshop was an in-depth review of the licensing activities that are being undertaken by the NRC for new nuclear power reactors in the United States. During the workshop, Greg gave a presentation on the successful completion of an environmental impact statement by the ORNL staff on two proposed new reactors at the Comanche Peak site in Texas.

Dan Hayes was highlighted in the August/September issue of the CCSI Newsletter. Learn more about the CCSI at <http://www.climatechangescience.ornl.gov/>.

The Carbon Dioxide Information Analysis Center (CDIAC) has added to its holdings the database "Global, Hemispheric, and Zonal Temperature Deviations From a 54-Station Radiosonde Network," compiled by Jim Angell of the National Oceanic and Atmospheric Administration (NOAA) Air Resources Laboratory. These time series extend from 1958 through 2010 and are an updated subset of Angell's historic 63-station globally distributed network, also distributed by CDIAC. Both databases can be accessed from http://cdiac.ornl.gov/climate/temp/temp_table.html. CDIAC has also updated through 2010 the daily and monthly data contained in NOAA's United States Historical Climatology Network

(USHCN). CDIAC provides full database documentation and a graphical user interface (GUI) for obtaining these data at <http://cdiac.ornl.gov/epubs/ndp/ushcn/ushcn.html>.

Steven Brown gave two presentations to the 2011 Annual China-U.S. Joint Symposium, September 25th-28th, at Purdue University in West Lafayette, IN. The theme of this year's workshop was Global Sustainability Issues in Energy, Climate, Water, and Environment. On behalf of Paul Gilna, ORNL BioEnergy Science Center (BESC), Steven presented "Strategies to Generate Economically Viable Biofuels from Cellulosic Biomass: Approaches from the Bioenergy Science Center." Steven also presented "Clostridium thermocellum Ethanol Stress Responses and Tolerance Mechanisms." Read more about the China-U.S. Joint Symposium at <http://www.purdue.edu/discoverypark/sustainability/symposium/index.php>.

The U.S. Army Chemical Materials Agency has published a report supporting its Record of Environmental Consideration (REC) for the continued operation of the Anniston Chemical Agent Disposal Facility (ANCDF), located at the Anniston Army Depot in Alabama. Greg Zimmerman and Harry Quarles authored the report that updates information about the existing environmental conditions near the ANCDF and evaluates the potential environmental impacts of continued ANCDF operations. The mission of the ANCDF is to destroy the depot's inventory of lethal chemical weapons, and the mission is expected to be completed by the end of this calendar year. To date, the Army's Chemical Stockpile Disposal Program has successfully destroyed 90% of the 31,000 tons of lethal chemical warfare agents in the U.S. inventory. The environmental reviews conducted by ESD staff have allowed the Army to execute the destruction operations with the appropriate level of environmental protection and in concert with the provisions of the *National Environmental Policy Act*.

Rich Norby organized and chaired the 27th New Phytologist Symposium, "Stoichiometric flexibility in terrestrial ecosystems under global change" at Biosphere2, Oracle, AZ, during September 25th-28th. Colleen Iversen presented an invited talk and Xiaojuan Yang presented a poster at the symposium.

Postdoctoral Fellow Xiaojuan Yang received honors for her poster at the 27th New Phytologist Symposium, "Stoichiometric flexibility in terrestrial ecosystems under global change," held at Biosphere 2, Oracle, AZ. The title of her poster was "C:N:P stoichiometry in soil organic matter: A synthesis of soil phosphorus data using Hedley fractionation method."

During September 26th-27th Esther Parish gave a talk at the China-U.S. 2011 Joint Symposium on Global Sustainability Issues in Energy, Climate, Water and Environment at Purdue University on "Landscape Design for Bioenergy Cropping Systems" and made good contacts with other researchers interested in sustainability of bioenergy systems (e.g., Purdue Prof. Indrajeet Chaubey).

Bob Cook presented "ORNL DAAC User Working Group (UWG) Orientation" to new UWG members Erica Smithwick (Penn State) and Bruce Cook (NASA Goddard Space Flight Center [GSFC]).

Amy Wolfe, Dave Bjornstad, Chris Lenhardt, Barry Shumpert, and Stephanie Wang (intern) hosted a Science for Society Workshop at ORNL's Clinch River Cabin on September 27th in association with their Ethical, Legal, and Social Issues Scientific Focus Area, sponsored by the DOE Office of Science (DOE-SC) Office of Biological and Environmental Research. The workshop focused on moving Laboratory science and technology (S&T) toward use. Participants sought to identify (a) what works and what doesn't work; (b) what is needed; and (c)

recommendations that cut across different kinds of S&T and different spheres of application (e.g., energy and environment). Over 25 participants represented ORNL's diverse science and technology arenas (materials science, neutron science, supercomputing and computational science, national security, energy, and climate change science) along with intellectual property, technology transfer, and partnerships activities. Biosciences Division and Environmental Sciences Division (BESD) participants included Martin Keller, who provided the welcome, and lunch speaker Shaun Gleason, as well as Youngsun Baek, Mitch Doktycz, Gary Jacobs, Johny Green, Patrick Hughes, Tom King, Betty Mansfield, and Tony Palumbo.

During September 27th-30th Shahab Sokhansanj attended the 2011 International Conference on Thermochemical Biomass Conversion Science in Chicago, IL. The 3-day scientific forum covered fundamental and applied research to technology in feedstock preprocessing, torrefaction, pyrolysis, gasification, and upgrading for production of drop in fuels. The conference was sponsored by the Gas Technology Institute (GTI). Shahab presented the following posters at the conference:

- Shahab Sokhansanj, Jianghong Peng, Xiao Tao Bi, C. Jim Lim, Cong Wang. Pelletization of torrefied biomass. (Poster 107)
- Shahab Sokhansanj, Jaya Shankar Tumuluru, Richard Boardman, Christopher Wright, Xiao Tao Bi, C. Jim Lim, Cong Wang, Jianghong Peng. Development of design equations for scaling continuous torrefaction of biomass feedstock for pyrolysis. (Poster 110)

A number of members of B&ESD will be recognized at the upcoming 2011 UT-Battelle Awards Night, scheduled to be held on November 11th. Pat Mulholland will be recognized as Distinguished Scientist "for a distinguished career in environmental science that has made critical contributions to our understanding of forested watersheds and their response to environmental stressors, including acid precipitation, nitrogen deposition, and climatic variability and change." In the Team Accomplishment category, specifically for Laboratory Operations and Administrative Support, Jennifer Seiber will be recognized with the team, "for transforming, automating, and improving the Oak Ridge Institute for Science and Education (ORISE) educational appointment hiring process, thereby promoting outstanding customer satisfaction, significant time reductions, and substantial cost savings." Also in the Team Accomplishment category, specifically for Community Leadership, Tommy Phelps will be recognized with the team "for outstanding dedication in the mentoring of young people, through a complex engineering challenge, to be science and technology leaders."

Harold Shanafield, Yaxing Wei, and Suresh K. SanthanaVannan presented posters at the Environmental Information Management (EIM) Annual Meeting, September 28th-29th, in Santa Barbara, CA.

During September 28th-30th a workshop on "The Billion Ton Study: What can be Learned about Bioenergy Sustainability?" was held at ORNL. An all day field trip on the 28th featured demonstration of forest residue collection, the National Transportation Research Center, switchgrass fields, and the Genera Energy LLC Biomass Innovation Park. Sixty participants in total attended the workshop. Thirteen people attended the workshop session via Live Meeting. Presentations and other information about the workshop can be found at <http://www.ornl.gov/sci/ees/cbes/workshop.shtml>.

Boualem Hadjerioua met with contacts at Vanderbilt University in Nashville, TN, on September 30th to discuss simulation and optimization of large-scale controlled reservoir systems.

BESD New Arrivals

Ranjita Biswas arrived in September to work as a postdoctoral research associate with Adam Guss. Ranjita will join an international team of investigators focused on understanding how plant matter can be converted into renewable fuels by thermophilic, cellulolytic *Clostridia*.

Abdoul Oubeidillah also arrived in September to work as a postdoctoral research associate with Brennan Smith and Shih-Chieh Kao. His tasks include developing a computational hydrologic framework to estimate the available runoff for hydropower generation. The results will be included in the DOE national hydropower asset assessment. Abdoul will also assist in activities including the collection and management of hydropower equipment data and the analysis of hydrologic observation and hydropower generation data.

Ami Riscassi arrived in September to work as a postdoctoral research associate with Scott Brooks. Ami's work will include design and execution of independent experiments, working independently and in a cooperative team setting in the field collecting, processing and preserving samples.