BESD Newsletter
December 2010

Pubs and Products

Beaulieu, J. J., Tank, J. L., Hamilton, S. K., Wollheim, W. M., Hall, R. O., Mulholland, P. J., Peterson, B. J., Ashkenas, L. R., Cooper, L. W., Dahm, C. N., Dodds, W. K., Grimm, N. B., Johnson, S. L., McDowell, W. H., Poole, G. C., Valett, H. M., Arango, C. P., Bernot, M. J., Burgin, A. J., Crenshaw, C., Helton, A. M., Johnson, L., O'Brien, J. M., Potter, J. D., Sheibley, R. W., Sobota, D. J., and S. M. Thomas. 2010. Nitrous oxide emission from denitrification in stream and river networks. *P. Natl. Acad. Sci. USA.* Available online. DOI: 10.1073/pnas.1011464108

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Kardol, P., Reynolds, W. N., Norby, R. J., and A. T. Classen. 2011. Climate change effects on soil microarthropod abundance and community structure. *Appl. Soil Ecol.* 47: 37-44.

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Notable Achievements

Scott Brooks and Carrie Miller hosted Rich Landis and Jim Dyer from DuPont the week of November 8th. Rich and Jim are collaborators on the Mercury Science Focus Area (SFA) project and work on similar problems at a mercury-contaminated river in Virginia. While here, they discussed collaborative work and participated in experiments on East Fork Poplar Creek.

The Mercury SFA held a mini research workshop on subcellular processes with visitors from University of Georgia Athens, University of California, San Francisco, and University Tennessee, Knoxville, on November 8th-10th at Oak Ridge National Laboratory (ORNL). The ORNL participants were: Hao-Bo Guo, Alex Johs, Liyuan Liang, Jerry Parks, Jeremy Smith, and Steve Tomanicek. Beth Bailey helped with the logistics of the workshop.

On November 29th-December 6th ORNL and Idaho National Laboratory (INL) organized a study tour for approximately 30 representatives of the China National Energy Administration and Chinese bioenergy companies. Tour stops included bioenergy related sites in Nebraska, Iowa, and Tennessee and meetings with the Department of Energy (DOE) and the United States Department of Agriculture (USDA) in Washington, D.C. Yun Wu of ORNL served as an official host and translator throughout the duration of the tour; Erin Webb co-led organization of the study tour; Becky Bowman assisted with coordination of the tour and organized Tennessee events; Robin Graham, Brian Davison, Keith Kline, and Laurence Eaton gave technical presentations highlighting ORNL bioenergy research. Other Tennessee activities for the China delegation included a tour of the DuPont Danisco biorefinery and Genera Energy switchgrass production sites in Vonore.

On December 1st Feng He gave a poster presentation in Washington, D.C., entitled "Carboxymethyl Cellulose (CMC) Stabilized Iron Nanoparticles for Remediation of Chlorinated Solvents: from Laboratory to the Field" at the Partners in Environmental Technology Technical Symposium & Workshop 2010, sponsored by the Strategic Environmental Research and Development Program (SERDP) and the Environmental Security Technology Certification Program (ESTCP).

Effective December 1st, Chris Lenhardt is the Manager for the ORNL Distributed Active Archive Center (DAAC), stepping up from his role as the Deputy Manager. Tammy Walker (formerly Tammy Walker Beaty) is taking on the Deputy Manager role, in addition to continuing to lead User Operations for the ORNL DAAC. Bob Cook continues as the ORNL DAAC Scientist and Ben McMurry continues as the ORNL DAAC Systems Engineer. Bruce Wilson, outgoing DAAC Manager, is moving to another directorate within ORNL to serve as the Group Lead for Client and Collaboration Services.

A multi-disciplinary team of ORNL researchers – Rekha Pillai, Stuart Daw, Sirisha Nukala, Charles Finney, and Erin Webb - presented results of an FY10 project to model the feedstock supply and process operations of the biomass steam plant currently under construction to the leadership of the Facilities and Operations (F&O) Directorate who supported the project. The team has also received support from F&O for FY11 to further explore alternative feedstocks, biomass moisture and storage.

ORNL DAAC Staff attended the National Biological Information Infrastructure (NBII) Annual Metadata Review Meeting, December 1st-2nd, Oak Ridge, TN, including Giri Palanisamy, and Ranjeet Devarakonda. Development of Drupal-based metadata management tools including a dashboard was proposed.

Amy Wolfe and Elizabeth Malone (Pacific Northwest National Laboratory [PNNL]) gave a presentation entitled “Institutionalizing Federal Sector Energy- and GHG-Related Behavior Change” to *You Have the Power* Agency Coordinators at their December 2nd meeting in Washington, D.C. The presentation was based on a DOE Federal Energy Management Program-funded multi-laboratory project whose aim is to develop effective, evidence-based guidance for

federal agencies seeking to incorporate behavioral changes to achieve persistent energy savings and greenhouse gas (GHG) reductions. Wolfe leads the ORNL-PNNL-Laurence Berkeley National Laboratory (LBNL) project team.

On December 3rd ORNL made substantive contributions to the 1st Webinar of Working Group 2 (WG2) for the International Standards Organization Project Committee 248 (ISO PC 248) to develop a standard for "Sustainable Criteria for Bioenergy." Members of WG2 approved resolutions that accepted definitions proposed by ORNL for "direct" and "indirect" effects and "science-based" methods for data sources. A series of webinars and meetings are scheduled to generate initial draft criteria for greenhouse gas emission accounting by March 2011.

On December 3rd-4th Virginia Dale participated in the meeting of the National Academy of Sciences Committee on Economic and Environmental Impacts of Increasing Biofuel Production in Washington.

On December 6th-9th Laurence Eaton attended the meeting of A Community in Ecosystem Services (ACES) in Phoenix, AZ, and presented a talk on "Economic impacts to gamefish production associated with biofuel feedstock production" (coauthored by Peter Schweizer and Yetta Jager). Betsy Smith (Environmental Protection Agency) presented the paper prepared by Virginia Dale, Richard Lowrance, Pat Mulholland, and Phil Robertson titled "Regional changes in water quality associated with switchgrass feedstock production."

Shahab Sokhansanj participated in a retreat organized for the Bioenergy Group. The event was held in Oak Ridge on Tuesday, December 7th. The focus of the retreat was on Resource Analysis Projects (Tasks). Shahab participated in a focus discussion on Systems Logistics on December 9th. Other participants in this discussion were Robin Graham, Mark Downing, and Erin Webb. The Group reviewed past and current activities of the logistics. A list of specific follow up actions was developed. The progress will be reviewed early to mid January, 2011.

On December 7th ORNL scientists working on bioenergy resource analysis and sustainability research supported by DOE's Office of the Biomass Program (OBP) participated in an off-site retreat on strategic planning.

Shahab Sokhansanj participated in a video conference on Integrated Biomass Supply and Logistics (IBSAL) from 9:00 to 12:00 (PST) on December 7th. The purpose of the meeting was to update the current status of IBSAL and share experiences in using IBSAL. Participants in the meeting were**,**

ORNL	Shahab Sokhansanj
University of British Columbia (UBC)	Mahmood Ebadian, Mahdi Mobini
University of Arkansas	Mike Popp, Jim Smart
Texas A&M (TAMU)	Steve Searcy, Heungjo An, John Gibson

The following agenda was followed

Current status of IBSAL including update to ExtendSim 8.0 – ORNL
Discussion of previously identified IBSAL issues – ORNL-UBC
Recent experiences in using IBSAL – TAMU
Recent experiences in using IBSAL – University of Arkansas
Development plans and next meeting.

Shahab Sokhansanj described the new version of IBSAL that includes moisture relations and dry matter loss. Shahab will provide the new version with a technical note describing the new version by December 31, 2011. A follow up meeting is planned for mid-March 2011.

Anthony Palumbo presented work on "BioSITES: Biological Signature Identification and Threat Evaluation System" by Bob Cottingham, Tom Brettin, Steve Brown, and Daniel Quest at the Fourth National Bio-Threat Conference, December 7th-9th in New Orleans. The conference provided a forum for dialogue between government, industry, academia, and first responders to address critical issues in environmental sampling and bio-detection as well as special focus sessions on biosurveillance and microbial forensics.

On December 8th Yetta Jager participated in a quarterly USDA project PI meeting with Dr. Indrajeet Chaubey and other researchers from Purdue University. Purdue has asked ORNL to contribute to an informal collaboration in a comparison among Tennessee, Arkansas, and Indiana watersheds. Latha Baskaran will share Soil and Water Assessment Tool (SWAT) inputs for Vonore, Tennessee, which were originally created as part of an ORNL/Laboratory Directed Research and Development (LDRD) program (V. Dale, *et al.*), and these will be used with the National Agricultural Pesticide Risk Analysis (NAPRA) model.

Rebecca Efroymson has been appointed to serve on the new National Research Committee: Sustainable Development of Algal Biofuels. Rebecca's expertise in risk assessment, sustainability and biofuels will be an important contribution to this effort**.**

Shahab Sokhansanj with Kevin Caffrey (Post Graduate student - ORNL) visited the Biomass Steam Plant construction site on the ORNL campus on December 8th. Elliott Barnet, engineer in charge of the construction, provided a guided tour of the facilities. Shahab also participated in a video meeting with Nexterra and the Steam plant research and engineering group at ORNL on December 8th. Stuart Daw of ORNL and Darcy Quinn of Nexterra organized the meeting. Dejan Sparca presented a detailed description of Nexterra's gasification system. A follow up meeting is planned for January 12th.

On December 8th-9th Keith Kline presented, "Land Use Research at ORNL" and Virginia Dale presented "Bioenergy Sustainability Research at ORNL" for the participants in the Joint U.S.-U.K. Biofuels Sustainability Workshop at the National Renewable Energy Laboratory (NREL). Dale and Kline discussed bioenergy sustainability research with visitors from the U.K., DOE-Golden (Steve Thomas), and NREL (Andy Aden, Danny Inman, Garvin Heath, Helena Chum etc.) to identify potential areas for future collaborations, including methods for greenhouse gas emission accounting.

ORNL DAAC Manager, Chris Lenhardt, attended a meeting of the National Oceanic and Atmospheric Administration's (NOAA) Data Access and Archiving Working Group (DAARWG), December 8th-10th, Silver Spring, MD.

Steve Brown has been invited to serve on the editorial board of *Frontiers in MicroBiotechnology and Industrial Biotechnology*.

David Bader gave a presentation at the National Climate Assessment Modeling and Scaling Workshop, December 8th-10th in Arlington, VA, titled "Climate Modeling in the Post-AR4 Era."

A team including Jeff Riggs, Jeff Warren and Chris Schadt conducted some mid winter fieldwork December 8th-10th in Marcell, MN, at the future site of the Spruce and Peatland Responses Under

Climatic and Environmental Change (SPRUCE) experiment. It was learned by all that successfully installing and repairing data loggers, taking cores, and conducting other field measurements can be a challenge, but doable, in conditions including 2 feet of snow and temperatures of 5 below.

On December 9th Keith Kline and Virginia Dale contributed information to the Council on Sustainable Biomass Production (CSBP) during a Task Force conference call on accounting for greenhouse gas emissions under proposed approaches for certifying sustainable forest biomass production systems.

ORNL DAAC Scientist, Bob Cook, attended the December 9th-10th DataONE User Working Group Meeting (Chicago). The purpose of the meeting was to discuss adding additional sources of Earth science data to the DataONE cluster of Member Nodes. Currently the ORNL DAAC will be one of the first three Member Nodes.

Several members in the Earth and Aquatic Sciences Group attended the Strategic Environmental Research and Development Program (SERDP) symposium in Washington, D.C., in December. They were M.-D. Cheng, B. Gu, F. He, and M. Mayes. SERDP PIs are required to make a presentation in the symposium and more than $1M per year of SERDP project works are executed by the members of this group. The scope of work covers topics in the areas of sustainable infrastructure to weapons platforms and systems.

ORNL staff members played leading roles in two workshops organized by the Office of Science and Technology Policy (OSTP) as a part of the process of scoping and organizing the third U.S. national assessment of impacts of climate change (NCA). Tom Wilbanks made two presentations and led a breakout group at a workshop on scenarios in NCA, December 6th-8th; and David Bader made a presentation at a workshop on modeling in NCA, December 9th-10th.

Dale Kaiser and Suresh SanthanaVannan gave a presentation on ORNL's Wind ENergy Data and Information (WENDI) Gateway (http://windenergy.ornl.gov) via conference call with the Illinois Wind Working Group (http://renewableenergy.illinoisstate.edu/wind/).

Jonathan Mielenz chaired a session at the Pacific Rim Summit in December 11th -14th on Bioprocessing of Grasses and Canes, and presented a talk in his session titled "Genetic manipulation of switchgrass lignin biosynthesis significantly reduces recalcitrance and improves biomass ethanol production."

December 12th-17th at the American Geophysical Union (AGU) 2010 Meeting in San Francisco, CA, Liyuan Liang gave an invited talk, "Challenges and opportunities of mercury remediation in East Fork Poplar Creek, Oak Ridge, Tennessee," in the session "Metal and radionuclide transformation and remediation in biogeochemically dynamic subsurface environments." Coauthors for the talk were Baohua Gu, Scott C. Brooks, Carrie L. Miller, Feng He, Dwayne Elias, David B. Watson, and Mark J. Peterson.

At the Fall AGU meeting, San Francisco, CA, DAAC participants included Yaxing Wei, GIS developer; Ranjeet Devarakonda, developer; Suresh SanthanaVannan, developer; Bruce Wilson, outgoing DAAC manager; Bob Cook, DAAC scientist; and Jerry Pan, developer. Suresh SanthanaVannan gave an invited talk on "Increasing availability and usability of data for terrestrial ecology." Suresh also gave two talks at the National Aeronautics and Space Administration (NASA) booth and had a poster on ORNL DAAC Moderate Resolution Imaging Spectroradiometer (MODIS) tools.

Bob Andres attended the Fall 2010 American Geophysical Union meeting in San Francisco, CA, from 13-17 December 13th-17th. Andres was the lead or co-author on five presentations.

At the AGU meeting in San Francisco, December 13th-17th, a session was organized to present the findings of four panels of the National Academy of Sciences (NAS)/National Research Council (NRC) study of America's Climate Choices. As its chair, Tom Wilbanks presented the findings of the panel on Adapting to Impacts of Climate Change.

Members of BESD also gave the following presentations at AGU:

- Hanson, P. J., Kolka, R. K., Norby, R. J., Palik, B., Wullschleger, S. D., Garten, C. T., Jr., Sebestyen, S. D., Thornton, P. E., Bradford, J., Mulholland, P. J., Todd, D. E., Iversen, C., and J. Warren. 2010. Evaluating spruce peatland responses under climatic and environmental change using a replicated in situ field manipulation. Abstract : B21A-0293 presented at 2010 Fall Meeting, AGU, San Francisco, CA, December 13th-17th.
- Mulholland, P. J., Sebestyen, S. D., Hanson, P. J., Warren, J., R. K. Kolka. 2010. Water research within the spruce experiment, a large-scale study of climate change effects on a northern peatland. Abstract H41G-1178 presented at 2010 Fall Meeting, AGU, San Francisco, CA, December 13th-17th.
- Roberts, B. J., and P. J. Mulholland. 2010. Ecosystem metabolism and nutrient cycling linkages in stream ecosystems: a synthesis from studies at multiple temporal and spatial scales. Abstract H52D-01 presented at 2010 Fall Meeting, AGU, San Francisco, CA, December 13th-17th.
- Vargas, R., Baldocchi, D. D., Bahn, M., Hanson, P. J., Hosman, K., Kulmala, L., Pumpanen, J., and B. Yang. 2010. On the temporal correlation between photosynthesis and soil respiration: reconciling lags and observations. Abstract B11D-0383 presented at 2010 Fall Meeting, AGU, San Francisco, CA, December 13th-17th.

Yaxing Wei and Bruce Wilson presented a poster at the Fall Meeting of the American Geophysical Union on ORNL's Wind ENergy Data and Information (WENDI) Gateway (http://windenergy.ornl.gov) - "The Wind ENergy Data and Information (WENDI) Gateway: New Information and Analysis Tools for Wind Energy Stakeholders." The poster was part of the Wind Power Meteorology session, with authors also including the Environmental Science's Division's (ESD) Dale Kaiser, Giri Palanisamy, Suresh SanthanaVannan, Jerry Pan, and Ranjeet Devarakonda, and the Energy & Transportation Science Division's (ETSD) Travis Smith and Michael Starke. Dale Kaiser thanks Yaxing and Bruce for "standing in" for him as he was recovering from a broken ankle and could not make the trip.

On December 14th in San Francisco, CA, the Earth Science Information Partners [ESIP] and the National Oceanic and Atmospheric Administration sponsored a workshop at AGU on Preparing your Data Management Plan (http://esipfed.org/DataManagement). Bob Cook (ORNL DAAC), Ruth Duerr (National Snow and Ice Data Center [NSIDC]), Carol Meyer (ESIP), and Ron Weaver (NSIDC) serve on the Advisory Team.

Liyuan Liang delivered an invited talk at the 2010 AGU annual meeting in San Francisco, on December 17th. The title of the talk: Challenges and opportunities of mercury remediation in East Fork Poplar Creek, Oak Ridge Tennessee, and the coauthors: Liyuan Liang, Baohua Gu, Scott Brooks Carrie Miller, Feng He, Dwayne Elias David Watson, Mark Peterson.

Jeremy Smith, Xiaolin Chang, and Loukas Petridis have won a DOE Incite award of 30 million processor hours on the ORNL Cray XT "Jaguar" supercomputer for their project, Cellulosic

Ethanol: Simulation of Multicomponent Biomass System. The proposed research aims to provide simulation models of biomass and biomass:enzyme interactions. These will aid in the understanding of the physical origins of biomass recalcitrance using atomic-detail computer simulation of biomolecular systems with the molecular dynamics (MD) method involving stepwise integration of the equations of motion. The detailed multiscale structure revealed by these simulations will assist in understanding biomass recalcitrance to hydrolysis and aid in engineering efforts to improve second-generation biofuel yield.

On December 19th Virginia Dale was interviewed on the radio show, Garden Guys (96.9 FM out of Boston http://www.garden-guys.com/). She discussed the role of agriculture in hypoxic zones that occur in the Gulf of Mexico.

Dali Wang, Shih-Lung Shaw (University of Tennessee), and Chris Lenhardt have received funding for their collaborative Laboratory Directed Research and Development (LDRD) project: Integration of Space-Time GIS with Climate Informatics for Climate Change Research.

Aloke Kumar (ORNL Wigner Fellow), Leonidas Ocola, Alexandra Joshi-Imre, and Daniel Schabacker (all three of Argonne National Laboratory [ANL]) have had a user proposal accepted for use of the Center for Nanoscale Materials at ANL. Their proposal is entitled, "Protein Biosensing in Nanofluidic Channels using a Novel Nanofluid-DEP Biochip."

BESD New Arrivals

Kelsey Yee arrived in December to work as a postdoctoral research associate with Jonathan Mielenz. Kelsey will perform biotechnology research with multiple microbial systems, using fermentation and bioconversion approaches with the goal of providing bioconversion data for analysis with genomic, transcriptomic, and proteomic tools.

HR Information Flash

Do you know. . . what qualifies for Personal Leave with Pay?

In order to qualify as personal time, the absence must meet the following criteria:

Personal time off with pay is provided for salaried employees to permit them to attend to matters that cannot reasonably be accommodated outside scheduled working hours and, in most instances, cannot be anticipated too far in advance. Such absences should normally result from a need and not merely a convenience.
Non-exempt employees are eligible to reschedule up to 20 hours within the work week (Employee Convenience Time) with supervisor approval, in accordance with Work Schedules https://sbms.ornl.gov/sbms/sbmsearch/subjarea/WorkSchedules/sa.cfm

Examples of what qualifies:

1. Severe illness in the immediate family when the employee's presence is needed.
   Note: Personal time to care for a spouse, child, or parent who is ill or injured may qualify as leave under the Family and Medical Leave Act (FMLA). A description of FMLA leave is contained in Family Medical Leave and Personal Time Away Business Rules (https://sbms.ornl.gov/sbms/sbmsearch/SubjArea/taw/Exhibit8.cfm), and in the Guidelines on FMLA for Supervisors and Employees

(http://portal.ornl.gov/sites/hrd/benefits/additional/Pages/FMLAGuidelines.aspx), available on the ORNL Internal Web Server and from the Benefit Plans office.

2. Medical or dental appointments that cannot be scheduled outside scheduled working hours.
3. Legal procedures requiring the presence of the employee, including appearances as a witness or as a party in a court case. If an employee is required to serve as a witness for the Company or DOE in legal matters, the time away will be recorded as Absence Code "Paid Witness for the Company or DOE" and should be recorded appropriately in PALS.
4. Emergencies at home or in the immediate family that occur during the regular shift.
5. Parent and teacher conferences during the school day.
6. Officers or directors of the United Way or officers or delegates of the credit unions to attend key meetings where their presence is required.
7. Absence from work caused by severe weather (e.g., ice, heavy snow), provided that the employee has made reasonable advance preparation and every reasonable effort to report on time. Payment for such absence is made on the following basis:
   (1) Nonexempt (weekly) employees will be paid for hours worked, and a reasonable amount of time missed because of inclement weather will be considered as personal time with pay. If a whole day absence results from inclement weather, it will be counted as personal time without pay or as vacation, at the employee's option.
   Nonexempt employees, with supervisor approval, may choose to use Employee Convenience time to reschedule the hours missed caused by severe weather, in accordance with Work Schedules
   https://sbms.ornl.gov/sbms/sbmsearch/subjarea/WorkSchedules/sa.cfm
   (2) Exempt (monthly) employees are not paid on an hourly basis, and any absence will be with pay. If an exempt employee makes a genuine effort to report to work but is unable to do so because of weather conditions and is absent a whole day, the day will be counted as personal time with pay. However, if the employee elects to remain off work for a whole day and makes no effort to report to work, the day will be counted as vacation.

Examples of things that do *NOT* qualify for paid personal leave:

1. Conducting another business, occupation, or vocation.
2. Attending conventions or meetings not authorized for business reasons.
3. Extended civic and community services, such as scout camping, church conventions, and municipal conventions for which employees should schedule vacation time.
4. Recreation.
5. Performing other than emergency repair work at home or elsewhere.
6. Baby-sitting (other than in an emergency).
7. Birthdays, anniversaries, marriages, graduations, or other days of special personal significance.
8. Delivering or picking up a child at school (other than in an emergency).

For occurrences that fall into this category, you may use – ***with prior supervisor approval*** – vacation, EC time, use the Business Month to adjust your schedule, or personal without pay (this should be the last resort in order to avoid impact to the work of your organization).

Quality Counts *(a message from your BESD Quality Manager, Karen Sabo, 1505/252, 574-4398)*

Instead of New Year resolutions (research concludes only 6% who make them manage to keep them) consider this short list of 2011 Opportunities for Improvement . . .

1. Make an effort to increase your working network. The Energy and Environmental Sciences Directorate (EESD) re-organization is a great opportunity to meet new people, find out what others are doing, and collaborate.
2. Join a Lab-wide task force or committee. Offer suggestions and become part of the solution.
3. Perfect your presentation skills. Is too much or too little data putting your audience to sleep? There's always room for improvement.
4. Develop PTS consistency. Set a re-occurring calendar reminder to check for updates and accuracy.
5. Get organized. If your phone is buried then it's time to clean up your desk. Take control, stay organized and de-clutter at the end of each day.
6. Clean out your email in-box. Work towards eliminating the scroll bar.

Managing work time is challenging. One small Quality change can improve daily efficiency, reduce stress and pay off with big rewards in the New Year.