

B&ESD Newsletter
October 2012

Pubs and Products

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Chakraborty, R., Borglin, S. E., Dubinsky, E. L., Andersen, G. L., and T. C. Hazen. 2012. Microbial response to the MC-252 Oil and Corexit 9500 in the Gulf of Mexico. *Front. Microbiol.* 3: 357-357.

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Czarnecki, O., Gläßer, C., Chen, J.-G., Mayer, K. F. X., and B. Grimm. 2012. Evidence for a contribution of ALA synthesis to plastid-to-nucleus signaling. *Front. Plant Sci.* Available online, DOI: 10.3389/fpls.2012.00236

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Jung, S., Foston, M., Kalluri, U. C., Tuskan, G. A., and A. J. Ragauskas. 2012. 3D chemical image using TOF-SIMS revealing biopolymer component spatial and lateral distributions in biomass. *Angew. Chem. Int. Edit.* Available online. DOI: 10.1002/anie.201205243

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Notable Achievements

Graphics from an article by Terry Hazen, *et al.*, were selected to appear as the cover art for the September 2012 issue of *Environmental Microbiology*. The graphics are associated with his article “Deep-sea bacteria enriched by oil and dispersant from the Deepwater Horizon spill”

(<http://onlinelibrary.wiley.com/doi/10.1111/j.1462-2920.2012.02780.x/abstract>). Co-authors include J. Bælum, S. Borglin, R. Chakaborty, J. L. Fortney, R. Lamendella, O. U. Mason, M. Auer, M. Zemla, M. Bill, M. E. Conrad, S. A. Malfatti, S. G. Tringe, H.-Y. Holman, and J. K. Jansson.



On September 13th Terry Hazen gave the invited presentation “Deepwater Horizon Oil Spill: Ecological Disaster, Engineering Disaster, Science of Opportunity!!!” for the Board of Advisors at the University of Tennessee, College of Engineering.

Terry Hazen gave the invited presentation “The Deepwater Horizon Oil Spill: A Systems Biology Approach to an Ecological Disaster” at the 2012 China-U.S. Joint Symposium “Land Use, Ecosystem Services, and Sustainable Development” during September 17th-19th in Shenyang, China. Terry also presented his talk at the September 19th Key Lab on Pollution Ecology & Environmental Engineering at the Institute of Applied Ecology, Chinese Academy of Sciences in Shenyang, China, and at South Central China University in Changsha, China, on September 21st.

Madhavi Martin was invited to give a talk at the Laser-Induced Breakdown Spectroscopy (LIBS) conference 2012, held in Luxor, Egypt, during September 28th-October 4th. The title of the presentation was "Differentiating soil carbon into organic and inorganic components using laser induced breakdown spectroscopy." Madhavi has shown that the LIBS technique can be used for differentiating between inorganic and organic carbon in different types of soils.

Research by Kelly Roy, Trent Jett, Mark Peterson, John Smith and Terry Mathews on mercury treatment technologies was highlighted in the October 1st issue of the "EM Technology News Flash." This is a collaborative effort with researchers at Savannah River National Laboratory. Read more online at <http://www.em.doe.gov/pdfs/EM%20Technology%20News%20Flash%20-%20Innovative%20Mercury%20Treatment%2010-01-12.pdf>.

Brennan Smith attended the National Hydropower Association meeting, held in Chattanooga, TN, during October 1st – 3rd.

Terry Hazen gave the invited talk “Dispersants and Oil, What We Learned from the Deepwater Horizon Disaster” on October 2nd at Rice University in Houston, TX.

Shih-Chieh Kao and Mike Sale went to Denver, CO, from October 2nd – 4th. They were invited by Levi Brekke (Reclamation) to introduce the 9505 research activities (climate change impact assessment on federal hydropower system) and the Oak Ridge National Laboratory (ORNL) internal Laboratory Directed Research and Development (LDRD) investment on the simulation of fine resolution hydro-climate projections. The main purpose is to build more understanding between the Department of Energy (DOE)/ORNL and Reclamation's current research on water-climate change and start preparing for the next 2016 SECURE Water Act Reports (Reclamation's Sec. 9503 Report on General Water Availability and DOE's Sec. 9505 Report on Hydropower). Reclamation is currently collaborating with the National Oceanic and Atmospheric Administration (NOAA) and the National Center for Atmospheric Research (NCAR) for research on extreme precipitation, maximum probable precipitation, downscaling techniques, and hydrologic modeling for the Reclamation watersheds. Both Mike and Shih-Chieh also met Seshu Vaddey (svaddey@usbr.gov), who will lead the next 9503 Report. It is agreed that closer collaboration and more integrated research will be needed for the next 9503/9505 reports.

Virginia Dale served as a member of the Conference Programming Committee for the "Science for Biomass Feedstock Production and Utilization National Conference" that was held in New Orleans, October 2nd-5th, and sponsored by the Sun Grant Initiative. Read more at <http://www.sungrant.org/News+and+Events/2012+Sun+Grant+National+Conference.htm>.

Terry Hazen attended the American Petroleum Institute (API) Subsea Dispersant Program Fate & Effects Workshop, October 3rd-5th, in Houston, TX.

ORNL Distributed Active Archive Center (DAAC) Lead Developer, Suresh K. SanthanaVannan attended the Earth Observing System Data and Information System (EOSDIS) Evolution and Development (EED)-DAAC Interchange meeting in Riverdale, MD, during October 3rd-4th.

Yetta Jager was invited to join the senior staff of the National Institute for Mathematical and Biological Synthesis (<http://www.nimbios.org/>).

On October 4th Maggie Davis and Keith Kline discussed options for collaboration in the application and testing of sustainability indicators for biofuels with Marcelo Galdos of the Brazilian Bioethanol Science and Technology Laboratory (CTBE).

Also on October 4th Laurence Eaton presented "Beyond the Billion-Ton: Resource Analysis Challenges and Outcomes from the Regional Partnership Resource Assessment Team" at the Sun Grant Initiative conference held in New Orleans, LA.

ORNL DAAC Manager, Chris Lenhardt, participated in a telecon of the Earth Science Information Partners (ESIP) Commons Governance activity on October 5th.

Also on October 5th Keith Kline and Maggie Davis participated in the U.S. Task Advisory Group discussion of a U.S. position and recommended actions on Committee Draft for the International Organization for Standardization (ISO) 13065, Sustainability Criteria for Bioenergy. Keith Kline shared comments on major issues for call participants. All comments will be consolidated in December and distributed for review and discussion in the January plenary meeting.

Carol Wood was an invited speaker at the annual meeting of the Southeastern Regional Chapter of the Society of Toxicology. The meeting was held October 8th-9th at the Hotel Indigo in Athens, GA, and included platform presentations and a poster session. Carol also served as a judge for the

student and postdoctoral poster awards. Participants from academia, industry, private consulting firms, and government agencies, came from several states throughout the southeast region. Carol's talk, "Oak Ridge National Laboratory: from nuclear reactors to risk assessment" presented ORNL in historical context and discussed her current work in risk assessment and human health evaluations.

On October 9th Maggie Davis (as secretariat) led and Keith Kline (as contributing expert) presented material and comments for the indirect effects working group of the ISO Project Committee on Sustainability Criteria for Bioenergy. The working group will report to the January plenary on the state of the science of indirect effects.

Terry Mathews presented a talk entitled "Mercury in Oak Ridge: from monitoring to clean-up" at the Annual Site Environmental Report workshop at Brookhaven National Laboratory, October 9th-11th.

Brennan Smith attended the NRC Public meeting in Washington, DC, from October 10th – 12th.

On October 11th, ORNL DAAC Manager, Chris Lenhardt, participated in a telecon of the ESIP Federation Executive Committee, serving in his role as interim Chair of the Constitution and By Laws Committee. He also participated in a planning telecon for the upcoming NOAA Data Archiving and Access Requirements Working Group meeting in November.

Vince Neary presented the talk "US Department of Energy National Lab Activities in Marine Hydrokinetics: Machine Performance Testing" at the 4th International Conference on Ocean Energy (ICOE 2012) in Dublin, Ireland, during October 15th – 20th. This conference was attended by a number of DOE headquarters staff, DOE laboratory researchers, and European Union researchers in tidal energy.

During October 16th-18th Virginia Dale participated in the National Environmental Observation Network (NEON) Science, Technology and Education Advisory Committee (STEAC) meeting in Washington, DC.

On October 17th at ORNL, Brennan Smith and Boualem Hadjerioua presented to the Distributed Network Protocol (DNP) Technical Committee members, a delegation from Australia, the U.K., Canada and the U.S. who are working in the field of electrical energy generation, transmission, distribution and hydro power.

Meng-Dawn Cheng represented DOE Office of International Affairs and Policy to attend a joint workshop on Arctic Black Carbon hosted by the National Academy of Sciences and Russian Academies of Sciences in Moscow from October 17th-19th. He delivered an invited talk on identifying emissions sources of black carbon in the Russian Federation and surrounding regions using a reverse engineering approach based on ambient air data taken at several monitoring sites in the Arctic Circle.

Bi-monthly FLUXNET team meetings were organized and facilitated by Bob Cook to focus activities in preparation for annual UWG reporting. The overall goal of FLUXNET activity is to compile and distribute CO₂, H₂O, and energy flux data along with site information from the global network of towers.

On October 18th Rich Norby presented a seminar at Michigan Tech University on "Carbon-nitrogen interactions in CO₂-enriched ecosystems: An experimentalist's view on model-data

integration" as part of their Distinguished Ecologist Lecture Series.

The Young Evolving Scientists Seminar Series (YESSS) held a group meeting on October 18th. Taniya Roy Chowdhury gave an update on the postgraduate feedback survey results, meetings with the ORNL postdoc program, refresher of Oak Ridge Associated Universities (ORAU) employee services and the proposed committee structure for YESSS. Several staff scientists also expressed the desire to have more staff support of YESSS and to share the feedback results with other Biosciences Division and Environmental Sciences Division (B&ESD) staff. The feedback survey results can be found on the YESSS website. Balaji Rao also presented a technical overview of the project "Applications of fluorescence spectroscopy in thiol quantification of environmental samples" at the meeting. YESSS is a professional support group for early career science professionals (at all levels) within B&ESD research programs. The meetings are held the 3rd Thursday of each month at noon in Building 1505, Room 189. If you are an ORNL staff member or guest with access to the internal network, please visit the YESSS website for more information and to join the email list: <http://home.ornl.gov/general/yesss>.

During October 18th-28th Keith Kline participated in a series of meetings in Campinas, Brazil, related to next steps in the Global Sustainable Bioenergy (GSB) and the Latin America, Caribbean and African Sustainable Biofuels (LACAF) projects, as well as collaborations with Brazil's CTBE sustainability program. Presentations include an overview of recent global crop modeling simulations using the High-Performance Computing (HPC)- Environmental Policy Integrated Climate (EPIC) model, update on land-use change (LUC) analysis, and bioenergy sustainability indicators.

On October 19th ORNL DAAC management submitted its September 2012 ORNL DAAC Status Report and accompanying statistics report to the ORNL DAAC User Working Group in preparation for the 5 November 5th telecon with the user working group (UWG).

On October 19th Yetta Jager, Latha Baskaran and Maggie Davis met with Dave Tilman (University of Minnesota) and Robert Thatcher (University of Florida) to discuss indirect land-use change and comparisons of energy options.

On October 20th Virginia Dale gave the keynote talk at the annual meeting of the Tennessee Chapter of the Sierra Club at Pickett State Park on "Environmental Effects of Climate Change in Tennessee" and discussed bioenergy and other options for reducing greenhouse gas emissions.

ORNL DAAC deputy manager, Tammy W. Beaty attended the American Society of Agronomy (ASA)/Crop Science Society of America (CSSA)/Soil Science Society of America (SSSA) International Annual Meeting during October 21st-24th in Cincinnati, OH, supporting the Earth Science Data and Information System (ESDIS) Outreach in the National Aeronautics and Space Administration (NASA) OneData booth. Tammy also participated in a "ESDIS ISO19115 Metadata Seminar Planning Committee Meeting" teleconference on Monday, October 22nd.

Sindhu Jagadamma also attended the ASA-CSSA-SSSA International Annual Meeting in Cincinnati, OH. She gave a presentation entitled "Mineral Control on Organic Carbon Decomposition from Soils of Diverse Eco-Regions." Co-authors on her presentation were Meg Steinweg and Melanie Mayes. She also co-authored another presentation given by Melanie Mayes: "Probing the Internal Structure of Layered Natural Organic Compounds on Mineral Surfaces by Neutron Reflectivity." Other co-authors of this talk were Haile Ambaye and Valeria Lauter of the Neutron Sciences Directorate and Loukas Petridis of the Biosciences Division (BSD).

ORNL DAAC Manager, Chris Lenhardt, participated in a strategic planning retreat for the Foundation for Earth Science during October 22nd -24th. This retreat was a follow-on to the ESIP Federation planning retreat held June 2011.

Erin Rose and Beth Hawkins presented at the National Community Action Foundation (NCAF) Energy & Community Economic Development Conference (St. Petersburg, FL) during October 22nd - 24th.

ORNL DAAC Geographic Information Systems (GIS) Developer, Yaxing Wei, attended the Thematic Realtime Environmental Distributed Data Service (THREDDS) Data Server (TDS) and netCDF training sessions, October 22nd-26th, held as part of the 2012 Unidata Training Workshop in Boulder, CO. Read more about THREDDS at <http://www.unidata.ucar.edu/projects/THREDDS/>.

Greg Zimmerman gave a presentation to the Environmental Protection Agency (EPA) Region 4 staff in Atlanta on October 23rd. He accompanied personnel from the U.S. Army, and his presentation focused on the technical approach to be taken in an Environmental Assessment (EA) that is being prepared on the Army's proposal to use explosive destruction technologies to dispose of chemical weapons currently being stored at the Blue Grass Army Depot in Kentucky. The ORNL team preparing the EA includes Bo Saulsbury, Mengdawn Cheng, and Neil Giffen.

Terry Hazen gave the invited presentation “Dispersants and Oil, What We Learned from the Deepwater Horizon Disaster” on October 23rd at the Earth and Planetary Sciences Seminar at the University of Tennessee, in Knoxville, TN.

Cover photos submitted for a recent article in *Applied and Environmental Microbiology* from Chris Schadt's Strategic Environmental Research and Development Program (SERDP) project will be featured on an upcoming issue (Volume 78, issue 24). The article itself, Firing Range Soils Yield a Diverse Array of Fungal Isolates Capable of Organic Acid Production and Pb Mineral Solubilization, was published in August 2012, in issue 17. Read the original article online at <http://aem.highwire.org/content/78/17/6078.full>. Co-authors include Tarah Sullivan, Neil Gottel, Nicholas Basta, and Phil Jardine.



Shih-Chieh Kao had a National Hydropower Asset Assessment Program (NHAAP) team meeting at ORNL on October 23rd to discuss priorities.

Mark Peterson, Terry Mathews, and Carrie Miller attended the South River Science Team meeting in Harrisonburg, VA, during October 23rd-25th. This annual meeting focuses on mercury remediation options and long term monitoring in the South River in Virginia.

Baohua Gu gave an invited talk on Natural Humic Substances in Biogeochemical Transformation of Mercury in the Environment at the 9th International Symposium on Persistent Toxic Substances (ISPTS), held October 23rd-26th in Miami, FL.

ORNL DAAC staff, Suresh K. SanthanaVannan, presented a poster on the ORNL DAAC data archive during an ORNL visit by DOE's Biological and Environmental Research (BER) program managers on October 24th.

Also on October 24th Keith Kline and Maggie Davis submitted detailed comments on the Committee Draft of ISO 13065 to the U.S. Task Advisory Group.

Several ORNL staff attended the University of Tennessee's 2012 Biomass: From Grow to Go Field Day on October 24th in Vonore, TN. These included Amy Wolfe and Maria Fernanda Campa. Natalie Griffiths also attended. Additionally, Virginia Dale and Matt Langholtz were guest speakers.

On October 25th Virginia Dale and Maggie Davis participated in the Sustainability Information Exchange Database (SIED) webinar led by Ethan Warner and Helena Chum of the National Renewable Energy Laboratory (NREL). The primary purpose of the webinar was to determine the appropriate role and priorities for the database to best benefit the OBP program and the biomass energy systems community.

During the American Society of Microbiology (ASM) Regional TN/KY Branch Meeting, held in Maryville, TN, held October 26th-27th, Megan Steinweg presented, "Vertical and horizontal spatial variability of peat microbial community composition, enzyme activity, and kinetics." Chris Schadt was co-author.

ORNL DAAC Metadata Specialist, Carol Sanderson, attended the American Society for Information Science and Technology Workshop during October 26th-28th in Annapolis, MD.

ORNL DAAC Chief Scientist, Bob Cook, Metadata Coordinator, Les Hook, and Deputy Manager, Tammy Beaty, hosted several discussions with data contributors from the North American Carbon Program (NACP) to define archival requirements for the NACP site and model synthesis activities. Data sets for both synthesis activities are currently being prepared for archival at ORNL DAAC by NACP staff. The interactions with the NACP team have been instrumental in identifying data set submission requirements for investigators for inclusion in an automated submission system, which is currently in development.

Work has begun on an effort to improve the accuracy of our citation statistics, which show the number of times that DAAC datasets and projects were cited or referred in academic and scientific publications. Collection of these stats began many years ago, but have been hampered by a somewhat confusing database design whose inadequacies have become more apparent with today's increasing use of Digital Object Identifiers (DOI's). We intend to go back as far as 2005 to verify and correct our stats, as well as collect additional information (e.g., DOI's) that will be useful going forward. This effort is expected to take a few months.

Bo Hadjerioua attended the International Energy Agency (IEA) Hydropower Meeting in Bilbao, Spain, during October 27th– November 1st. Annex XII Task 1 of the IEA Implementing Agreement for Hydropower Programs and Technologies is now drafting guidelines for assessing greenhouse gas (GHG) emissions from hydropower reservoirs, similar to those developed by the

International Hydropower Association (IHA). Member IEA countries (e.g., Brazil) have significant interest in demonstrating that new hydropower reservoir development is carbon neutral. Further, IEA is proposing GHG emissions modeling to predict CH₄ and CO₂ emissions. Such modeling would allow a low-cost way forward for screening reservoirs and potentially for allowing avoiding expensive monitoring requirements, in a carbon-taxed world. The U.S. (DOE) is currently participating in the IEA GHG activity as a peer reviewer for the technical reports to monitor potential economic impacts of future hydropower reservoir GHG assessments.

BESD New Arrivals

Jay Gullledge reported to work in October, working as the Deputy Division Director for ESD.

Jessy Labbé received a BSc. in Cellular Biology and Physiology at Nancy University (France, 2004), a MSc. in Molecular & Cellular Genetics (2005), a MSc. in Agronomy, Forest Ecosystems & Environment (2006), a M.D. in infectious disease of the School of Medicine of Nancy (2008) and a Ph.D. in Forest Biology, Genetics & Microbiology (2009) at Nancy University (2nd award of the 2010 Ph.D. - Thesis discerned by the Lorraine Council, France). On the medical side, under the supervision of Dr. P. Courvalin of the Pasteur Institute of Lille and Dr. P. Leblond, Jessy worked on the antibiotic resistance of the pathogen *Streptococcus pneumoniae* and on the evolution of the EPS genes in *S. pneumoniae* and in *S. thermophilus*, bacterium used as probiotic in yogurt manufacturing in Europe. During his Ph.D. under the supervision of Drs. F. Le Tacon and F. Martin, his research was focused on the development and exploitation of genomic and transcriptomic data of the symbiotic fungus *Laccaria bicolor*. During his Ph.D. he served as teaching assistant and lecturer in microbiology, molecular and cellular genetics and virology within the Department of Genetics and Microbiology at Nancy University headed by Pr. P. Leblond. Then, Jessy spent two years and nine months as Post-doctoral fellow in Jerry Tuskan's lab to extend his background in Plant Genetics. Meanwhile his research focused on the investigation of plant-microbes interacting systems and in understanding these interactions at the molecular level, notably in identifying genetic determinants controlling the symbiotic interactions between *L. bicolor* and *Populus*, a model woody plant species. Jessy joined the Biosciences Division and the Plant System Biology group in late October, as Plant-Mycologist Staff Researcher. Within the Plant-Microbe interfaces SFA project, he will investigate the mechanisms of interaction between soil bacteria, fungi and *Populus*.

Jim Lay reported to work in October, working as an Environmental Informatics Analyst with Chris Lenhardt in ESD's Environmental Data Science and Systems group.

Katherine Shubert arrived in October to work as a post-Bachelors research associate with Mitch Doktycz. Katherine's work will include establishing and maintaining interactions between Poplar and its associated microbial community.

Anthony Walker arrived in October to work as a postdoctoral research associate with Rich Norby. Anthony will work with both a team of plant physiologists and ecosystem ecologists as well as a team of terrestrial modelers who are using the Community Land Model to address climate change responses of diverse biomes.

James Robert West, a contractor with Apprise, was brought on to help support ORNL's project to evaluate DOE's Weatherization Assistance Program. He will be working closely with Beth Hawkins and Erin Rose.