

B&ESD Newsletter
September 2012

Pubs and Products

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Karve, A. A., Jawdy, S. S., Gunter, L. E., Allen, S. M., Yang, X., Tuskan, G. A., Wullschleger, S. D., and D. L. Weston. 2012. Initial characterization of shade avoidance response suggests functional diversity between *Populus* phytochrome B genes. *New Phytol.* Available online. DOI: 10.1111/j.1469-8137.2012.04288.x

Langan, P., Evans, B. R., Foston, M., Heller, W. T., O'Neill, H., Petridis, L., Pingali, S. V., Ragauskas, A. J., Smith, J. C., Urban, V. S., and B. H. Davison. 2012. Neutron technologies for Bioenergy Research. *Ind. Biotechnol.* 8: 209-216.

Otter, R. R., Bailey, F. C., Fortner, A. M., and S. M. Adams. 2012. Trophic status and metal bioaccumulation differences in multiple fish species exposed to coal ash-associated metals. *Ecotox. Environ. Safe.* Available online. DOI: 10.1016/j.ecoenv.2012.08.022

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Tschapinski, T. J., Standaert, R. F., Engle, N. L., Martin, M. Z., Sangha, A. K., Parks, J. M., Smith, J. C., Samuel, R., Pu, Y., Ragauskas, A. J., Hamilton, C. Y., Fu, C., Wang, Z.-Y., Davison, B. H., Dixon, R. A., and J. R. Mielenz. 2012. Down-regulation of the caffeic acid O-methyltransferase gene in switchgrass reveals a novel monolignol analog. *Biotechnol. Biofuel.* 5: 71.

Wang, D., Kang, S., Nichols, J., Post, W., Liu, S., and Z. Zhao. 2012. A computational framework for spatially explicit agroecosystem modeling: application to regional simulation. *J. Comput. Sci.* DOI: 10.1016/j.jocs.2012.08.018

Wang, G., and W. M. Post. 2012. A note on the reverse Michaelis-Menten kinetics. *Soil Biol. Biochem.* Available online. DOI: 10.1016/j.soilbio.2012.08.028

Notable Achievements

During the American Crystallographic Association annual meeting, July 28th-August 1st in Boston, MA, Steve Tomanicek gave the invited talk “X-ray crystallographic structural studies of the metallochaperone-like N-terminal domain NmerA” with co-authors A. Johs, M. S. Sawhney, K. W. Rush, R. E. Nauss, S. M. Miller and L. Liang.

On September 5th Keith Kline, Virginia Dale, and Maggie Davis participated in a meeting with an visitor to Oak Ridge National Laboratory (ORNL) from “Fibria S.A.,” the largest cellulose producer in Brazil and supplier of “sustainable” fiber to U.S. multi-nationals such as Kimberly-Clark and Proctor & Gamble. Fibria S.A. is interested in collaboration on Eucalyptus sustainability, cellulosic fuels, and metrics for tracking carbon change in forest ecosystems.

On September 5th and 27th Oak Ridge National Laboratory (ORNL) and Distributed Active Archive Center (DAAC) Deputy Manager, Tammy Beaty, ORNL DAAC Chief Scientist, Bob Cook, and ORNL DAAC Metadata Coordinator, Les Hook, participated in the Monthly Regional and Global Data (RGD) Telecon with Carroll Curtis.

On September 6th Keith Kline convened and facilitated the International Organization for Standardization (ISO) Sustainability Criteria for Bioenergy webinar for an 18-member international Editing Committee working toward consensus on the first “committee draft” document. The draft was subsequently distributed for review by member countries enrolled in TC-248. All comments are due by December 17th, when they will be consolidated, reviewed and discussed in the next plenary meeting in January 2013.

Loukas Petridis was part of a September 7th review committee on the proposal evaluation for allocation of supercomputing time for the study of molecular dynamics.

On September 7th Virginia Dale participated in a conference call of the Steering Committee/Programming Committee for the Sun Grant National Conference on “Science for Biomass Feedstock Production and Utilization” to be held in October 2nd-5th in New Orleans.

Boualem Hadjerioua went to Vanderbilt University in Nashville, TN on September 7th. He met with professors and Ph.D. students. The work concerned Hydrodynamics and Water Quality Modeling in coordination with Nashville District Corps of Engineers.

Also on September 7th Keith Kline and Virginia Dale joined a conference call of the Council on Sustainable Biomass Production (CSBP) regarding its future direction.

Allison Fortner and Jana Randolph went to Anderson, SC, on September 10th for Greenhouse gas emission sampling.

On September 11st ORNL DAAC Deputy Manager, Tammy Beaty, ORNL DAAC Chief Scientist, Bob Cook, and ORNL DAAC Metadata Coordinator, Les Hook, participated in the Terrestrial Ecology Telecon, discussing both North American Carbon Program (NACP) and Large-scale Biosphere-Atmosphere Experiment in Amazonia (LBA) data archiving.

Loukas Petridis participated in a Biological and Environmental Research (BER)/National Energy Research Scientific Computing Center (NERSC) workshop: Large Scale Computing and Storage Requirements for Biological and Environmental Research during September 11th-12th. Loukas

presented a talk and co-authored a report establishing a mission need for computing within the Office of Science and guiding National Energy Research Scientific Computing (NERSC) procurements and service offerings.

During September 12th- 14th Jeremy Smith took part in the National Science Foundation (NSF) "Structural Biochemistry" panel review.

On September 13th ORNL DAAC Manager, Chris Lenhardt, participated in a telecon of the Earth Science Information Partners (ESIP) Federation Executive Committee, in his capacity as interim Chair of the ESIP Constitution and Bylaws Committee.

Also on September 13th ORNL DAAC Deputy Manager, Tammy Beaty and ORNL DAAC User Services Coordinator, Jim Lay, participated in the Earth Science Data and Information System (ESDIS) American Society of Agronomy (ASA)/Crop Science Society of America (CSSA)/Soil Science Society of America (SSSA) planning telecon.

The patented process for extremophile biohydrogen production, co-invented by Dwayne Elias, Melanie Mormile, Matthew Begemann, and Judy Wall, was featured on the Science Daily website in the article, "Microbiologist Patents Process to Improve Biofuel Production." Read the article online at <http://www.sciencedaily.com/releases/2012/09/120911151825.htm>.

On September 13th ORNL Distributed Active Archive Center (DAAC) Manager, Chris Lenhardt, participated in a telecon of the Earth Science Information Partners (ESIP) Federation Executive Committee, in his capacity as interim Chair of the ESIP Constitution and Bylaws Committee.

A \$14.3M U.S. Department of Energy (DOE) grant to study crassulacean acid metabolism (CAM) and drought tolerance in has been awarded to Xiohan Yang, as well as researchers at the University of Nevada, the University of Liverpool, and Newcastle University. Ultimately the findings will be applied to biofuel crops.

Mark Bevelhimer went to Cumberland, TN, on September 14th to do field sampling.

Bob Andres attended the 12th International Global Atmospheric Chemistry (IGAC) Open Science Conference in Beijing, China, from September 17th-21st. He showed the poster, "Uncertainty associated with global carbon dioxide emissions from fossil fuel consumption" with co-author T. Boden of the ORNL Carbon Dioxide Information Analysis Center (CDIAC). While in Beijing, Bob also gave invited lectures at Tsinghua University and Peking University.

Liyuan Liang received a 2012 ORNL award for Research & Development Leadership at the group level for "her leadership in aligning subsurface science in ESD with DOE priorities; creating an environment that promotes staff hiring, development, and high-impact publication; and providing strategic direction that has resulted in programmatic growth and cross-division collaboration."

ORNL DAAC Chief Scientist, Bob Cook, along with Yaxing Wei and Ranjeet Devarakonda, attended the Data Observation Network for Earth (DataONE) All-Hands Meeting in Albuquerque, NM, during the week of September 17th.

On September 17th Jeremy Smith gave a lecture entitled: "In silico neutron scattering" at the European Spallation Source Neutron Data Workshop in Copenhagen, Denmark.

During September 17th-19th Gerald Tuskan was an invited keynote speaker and chair of the biomass/biofuel workshop/panel meeting at “The 2012 Annual Symposium of US-China Eco partnership for Environmental Sustainability; Land Use, Ecosystem, and Sustainable Development.” This event was hosted by the Institute of Applied Ecology, Chinese Academy of Science, Shenyang, Liaoning province, China.

Brennan Smith and Boualem Hadjerioua attended the DOE Hydropower and Renewable Integration Workshop in Portland, OR, during September 17th – 20th. The workshop explored the capabilities of hydropower to facilitate the integration of variable renewables. It also addressed the barriers preventing the full use of the existing hydropower fleet and advanced pumped storage technologies. At the workshop Bo gave two presentations:

1. Water Quality (Prediction of Total Dissolved Gas at Hydropower Dams)
2. Simulation and Optimization of Large Scale Controlled Reservoir System Constituent Response to Power Generation Activities.

On September 18th Rebecca Efrogmson presented “Sustainability Indicators for Bioenergy Systems and Applicability to Genetically Modified Organisms (GMOs)” at the 12th International Symposium on Biosafety of Genetically Modified Organisms in St. Louis, MO. The talk was in a session entitled “Symposium on Biofuel Crop Risk Assessment – Regulatory, Industry, and Academic Perspectives.” Rebecca participated in a panel discussion, along with the other speakers from the United States Department of Agriculture (USDA), Canadian Forest Service, Ceres, Inc., Virginia Tech University, and the University of Florida.

During September 18th-20th Melissa Klembara, Kristen Johnson, and Dan Lehrburger from the DOE Office of the Biomass Program (OBP) as well as Corinne Valkengurg from Pacific Northwest National laboratory (PNNL) met with staff from the National Transportation Research Center (NTRC) and Bioenergy Program including the Renewable Energy Systems Group, Landscape Ecology & Regional Analysis Group and Energy Analysis Group. September 18th was spent in Vonore, TN, where Genera Innovation Center hosted a tour and the group visited field sites sampling water attributes from study watersheds (supported by the USDA Coordinated Agricultural Project [CAP] Southeastern Partnership for the Integrated Bioenergy Supply Systems in conjunction with ORNL).

During September 18th-20th ORNL staff briefed OBP representative, Kristen Johnson, on sustainability and analysis projects, reviewing the progress made this FY and plans for FY13.

ORNL DAAC Deputy Manager, Tammy Beaty, and ORNL DAAC User Services Coordinator, Jim Lay, attended the Earth Observing System Data and Information System (EOSDIS) User Services Working Group (USWG) Meeting in Sioux Falls, SD, during September 18th-21st.

On September 20th Shujiang Kang, Keith Kline and ORNL research staff that have teamed to develop a global scale high-performance computing (HPC)-Environmental Policy Integrated Climate (EPIC) bioenergy crop modeling platform gave a presentation to Xuesong Zhang (Pacific Northwest National Laboratory, hosted by Mac Post), Kristen Johnson, and others on progress and next steps.

Kitty McCracken and Mike Ryon participated in organization, planning and presentation of the Oak Ridge Community Workshop: Dealing With Invasive Plants, held on September 21st at the Oak Ridge Civic Center.

ORNL DAAC Manager, Chris Lenhardt, participated in a telecon of the ESIP Commons Governance Group on September 21st.

Josh Scull, Human Resources Specialist in the Biosciences and Environmental Sciences Divisions (B&ESD), led an open discussion entitled “YESSS, We Can! How to Take Charge of Our Careers,” as part of the Young Evolving Scientists Seminar Series (YESSS) group meeting on September 21st. The discussion focused on changes in the ORNL postdoc program, how YESSS can contribute to these changes and how to add career development resources to the YESSS group platform. YESSS is a professional support group for early career scientists (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 and you are interested in subscribing to the YESSS email list, please visit the website <https://email.ornl.gov/mailman/listinfo/yesss> or send an email with just the word “subscribe” in the subject line to yesss-request@email.ornl.gov.

On September 21th ORNL DAAC Deputy Manager, Tammy Beaty, ORNL DAAC Chief Scientist, Bob Cook, ORNL DAAC System Engineer, Ben McMurry, and ORNL DAAC Lead Developer, Suresh K. SanthanaVannan participated in the Citations telecon.

David Bjornstad and Greg Zimmerman were Planning Team members, and Amy Wolfe served as a session chair for a University of Tennessee Howard Baker Center for Public Policy symposium entitled, "Base-load Electricity from Natural Gas and Nuclear Power: The Role of Federal and State Policy." The symposium was held on September 21st–22nd in Knoxville, TN.

Steve Tomanicek gave the invited talk "Neutron diffraction studies on the perdeuterated Toho-1 β -Lactamase" at the 14th International Conference on the Crystallization of Biological Macromolecules (ICCBM) during September 23rd-28th in Huntsville, AL. Co-authors included K. L. Weiss, K. K. Wang, M. P. Blakeley, J. Cooper, Y. Chen, and L. Coates.

Amy Wolfe was a panelist/presenter in a session entitled, “Driving Sustainability and Continuous Improvement through Culture Change” at the GreenGov Symposium on September 24th in Washington, D.C.

The DAAC senior staff held its monthly telecon with Nate James, ORNL DAAC ESDIS System Engineer, on September 25th.

Also on September 25th Don Hodges and Virginia Dale hosted Marko Debeljak from The Jozef Stefan Institute in Ljubljana, Slovenia. Marko met with various staff from the Bionenergy Resource & Engineering Systems Team, Environmental Sciences Division (ESD) Terrestrial Systems Modeling and Landscape Ecology & Renewable Energy Team. Marko also presented “Inductive machine learning in ecological modeling” at a special seminar on September 25th.

Jeremy Smith gave the Departmental Colloquium on September 25th in the Chemistry Department at Imperial College London with a lecture entitled "Computational Biophysics for Energy and the Environment."

The CDIAC web site (cdiac.ornl.gov) was redesigned by Fred Baes, Dale Kaiser, Giri Palanisamy, and Tom Boden, with helpful reviews by other ESD staff and detailed usability studies from colleagues at the United States Geological Survey (USGS) and the University of Tennessee (UT). The new design has a more modern look and feel, more intuitive navigation to enable quicker data discovery, support for additional viewing platforms (e.g., mobile devices and

tablets), and more apparent and distinct presentation/organization of CDIAC data holdings and CDIAC-supported programmatic efforts.

On September 26th Bo Saulsbury gave the presentation "Fueleconomy.gov: New Features and Tools" at the DOE Clean Cities Program's 2012 Peer Exchange and Vehicle Technology Deployment Workshop in Estes Park, CO.

Bo Hadjerioua attended a workshop at Stony Brook University in Stony Brook, NY, during September 26th-28th. He gave an invited presentation entitled "United State Hydropower Fleet and Resource Assessments."

On September 27th 2012, ORNL DAAC Manager, W. Chris Lenhardt, ORNL DAAC Deputy Manager, Tammy Beaty, ORNL DAAC Chief Scientist, Bob Cook, and ORNL DAAC Lead Developer Suresh SanthanaVannan meet with the Land Processes (LP) DAAC management team to discuss FY2013 collaborations.

Also on September 27th Virginia Dale hosted 10 students and 2 teachers from the Knoxville L&N Science, Technology, Engineering and Mathematics (STEM) Academy (<http://knoxcountysystemac.knoxschools.org/modules/cms/pages.phtml?pageid=48062&sessionid=1eb90eb61dce7a2f1b38c5ed11bdd423>) who toured the Oak Ridge National Laboratory facilities including the Aquatics Laboratory and Greenhouses. Virginia also gave a presentation titled "Indicators to support sustainability assessment of energy systems."

During September 27th-28th Keith Kline, Virginia Dale, and Maggie Davis assisted Tim Theiss and NTRC in hosting Professor Ulf Schuchardt, from the University of Campinas (UNICAMP) and currently funded by the São Paulo Research Foundation (FAPESP) to work on aviation biofuel research with Boeing/EMBRAER. Ulf is interested in catalysis and ORNL research related to bioenergy sustainability.

BESD New Arrivals

Anthony Bryan arrived in September to work as a postdoctoral research associate with Wellington Muchero and Jay Chen in the Biosciences Division (BSD) Plant Systems Biology group. Anthony will characterize genes selected from *Populus* genome-wide association studies that regulate biomass recalcitrance. Anthony received his Ph.D. degree in molecular and cellular biology from the University of Arizona (Tucson) in 2011.

Santonu Goswami arrived in September to work as a postdoctoral research associate with Daniel Hayes. Santonu's work will be in support of a grant in the Climate Change Science Institute (CCSI) to study high latitude ecosystem dynamics related to global environmental change at broad scales. A key component of this project requires a focused effort on regionalization and scaling issues, including multi-scale mapping of spatial environmental correlates.

Raja Payyavula arrived in September to work as a postdoctoral research associate with Udaya Kalluri. Raja will be working on the DOE BioEnergy Research Center project. This project involves application of genetics, transcriptomics, proteomics, metabolomics, imaging, cell wall characterization and bioinformatics approaches to study cell wall biosynthesis and remodeling in *Populus*. Raja will be closely involved with characterization of transgenic plants in order to further understand cell wall biosynthesis and recalcitrance of biomass.

Juan Wang, a Ph.D. candidate from Lanzhou University in China, received a two-year scholarship to work on *Populus* genetics and genomics with specific emphasis on discovering genes that affect Plant-microbe interactions. She will work with Wellington Muchero in the Plant Systems Biology group for the duration of her studies.

Jun Yang arrived in September to work as a Visiting Scientist with Jay Chen at the Plant Systems Biology Group. Jun will study the molecular mechanism underlying plant-microbe interactions. Prior to joining the ORNL team, Jun worked as a plant molecular biologist and molecular geneticist at the Institute of Plant Physiology and Ecology of the Chinese Academy of Sciences.

There were no new staff hires in September.