

B&ESD Newsletter April 2012

Pubs and Products

Bast, C. B., Klotzbach, J. M., and E. V. Falke. 2012. Selected Chlorosilanes. Acute exposure guideline levels. In *Acute Exposure Guideline Levels for Selected Airborne Chemicals. Volume 11* (pp. 106-166). Washington, D.C.: The National Academies Press.

Evans, K. J., Salinger, A. G., Worley, P. H., Price, S., Lipscomb, W., Nichols, J., White, J. B., III, Perego, M., Edwards, J., Vertenstein, M., and J.-F. Lemieux. 2012. A modern solver template to manage solution algorithms in the Community Earth System Model. *Int. J. High Perf. Comp. App.* 26: 54-62.

On April 17th Elias Greenbaum, Miguel Rodriguez, Jr., Hairong Qi, and Xiaoling Wang were awarded a U. S. Patent (8,158,377) for their invention, Biosensor Method and System Based on Feature Vector Extraction.

Hauschild, V., Watson, A., and R. Bock. 2012. Decontamination and management of human remains following incidents of hazardous chemical release. *Am. J. Disaster Management* 7: 5-29.

Huntzinger, D. N., Post, W. M., Wei, Y., Michalak, A. M., West, T. O., Jacobson, A. R., Baker, I. T., Chen, J. M., Davis, K. J., Hayes, D. J., Hoffman, F. M., Jain, A. K., Liu, S., McGuire, A. D., Neilson, R. P., Potter, C., Poulter, B., Price, D., Raczka, B. M., Tian, H. Q., Thornton, P., Tomelleri, E., Viovy, N., Xiao, J., Yuan, W., Zeng, N., Zhao, M., and R. Cook. 2012. North American Carbon Program (NACP) regional interim synthesis: Terrestrial biospheric model intercomparison. *Ecol. Model.* 232: 144-157.

Kates, R. W., Travis, W. R., and T. J. Wilbanks. 2012. Transformational adaptation when incremental adaptations to climate change are insufficient. *P. Natl. Acad. Sci. USA* Available online. DOI: 10.1073/pnas.1115521109

Lam, P. K., Sokhansanj, S., Lim, C. J., Bi, X. T., Lau, A. K., and S. Melin. 2012. Drying characteristics and equilibrium moisture content of steam treated Douglas Fir (*Pseudotsuga menziesii*, L.). 2012. *Bioresource Technol.* Available online. DOI: 10.1016/j.biortech.2012.03.093

On March 27th Anatoli Melechko, Timothy McKnight, Michael Guillorn, Bojan Ilic, Vladimir Merkulov, Mitch Doktycz, Douglas Lowndes, and Michael Simpson were awarded a U. S. Patent (8,142,877 B2) for their invention, Nano Transfer and Nanoreplication Using Deterministically Grown Sacrificial Nanotemplates.

Milanez, S., Follansbee, M., and E. V. Falke. 2012. Bis-Chloromethyl Ether. Acute exposure guideline levels. In: *Acute Exposure Guideline Levels for Selected Airborne Chemicals. Volume 11* (pp. 13-61). Washington, D. C.: The National Academies Press.

Milanez, S., Follansbee, M., and E. V. Falke. 2012. Chloromethyl Methyl Ether. Acute exposure guideline levels. In: *Acute Exposure Guideline Levels for Selected Airborne Chemicals. Volume 11* (pp. 62-105). Washington, D. C.: The National Academies Press.

Moberly, J. G., Miller, C. L., Brown, S. D., Biswas, A., Brandt, C. C., Palumbo, A. V., and D. A. Elias. Role of morphological growth state and gene expression in *Desulfovibrio africanus* strain Walvis Bay mercury methylation. *Environ. Sci. Technol.* 46: 4296-4932.

Sangha, A. K., Parks, J. M., Standaert, R. F., Ziebell, A., Davis, M., and J. C. Smith. 2012. Radical coupling reactions in lignin synthesis: A density functional theory study. *J. Phys. Chem. B.* 116: 4760-4768.

Wang, G., and W. M. Post. 2012. A theoretical reassessment of microbial maintenance and implications for microbial ecology modeling. *FEMS Microbiol. Ecol.* Available online. DOI: 10.1111/j.1574-6941.2012.01389.x

Webb, E. G. and Y. Wu. 2012. A case study of agricultural residue availability and cost for a cellulosic ethanol conversion facility in the Henan province of China. Oak Ridge National Laboratory. ORNL/TM-2011/534

Wood, C., Diamond, G., Woodall, G., Koller, L., and E.V. Falke. 2012. Nitrogen Oxides. Acute Exposure Guideline Levels. In: *Acute Exposure Guideline Levels for Selected Airborne Chemicals. Volume 11* (pp. 167-256). The National Academies Press. Washington, D. C.: The National Academies Press.

Notable Achievements

The Climate Change Science Institute (CCSI) hosted its Science Advisory Board for the second annual meeting during January 20th-February 1st. This included a three-hour poster session with 40 posters presented.

Mac Post was highlighted in the April issue of the CCSI newsletter. Learn more about the CCSI online at <http://www.climatechangescience.ornl.gov/>.

On April 1st the family of Pat Mulholland participated in the Knoxville Marathon and were highlighted in an article in the *News Sentinel*. Read more online at http://www.wbir.com/news/article/214093/2/Family-runs-Knoxville-Marathon-to-bring-awareness-to-ALS?fb_ref=artsharetop&fb_source=home_online.

During April 2nd-5th Bob Cook, Suresh SanthanaVannan, Shi Shi Liu, and Yaxing Wei participated in the DataONE workshop (Boulder, CO).

Cheryl Bast and Carol Wood were invited to attend a Science Seminar at the United States Environmental Protection Agency (U. S. EPA) in Washington, D. C., on April 4th. The seminar was an update on the current state of the science and toxicity of perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS). They are working with their sponsor, the U. S. EPA Office of Water, to prepare a Health Effects Support Document for both of these chemicals.

Laurence Eaton was highlighted in the Oak Ridge National Laboratory (ORNL) Sustainable Campus newsletter about his work to renovate a Victorian-era house in Knoxville. He worked with two neighbors, as well as other investors, to renovate the house and make it eligible for Leadership in Energy and Environmental Design (LEED) certification. Beginning in March 2011, the construction attracted attention, including an article in the *News Sentinel*

(<http://www.knoxnews.com/news/2011/aug/16/chadra-harris-mccray-neighbors-unite-to-restore/>) and an appearance on the DIY Network, until its completion in December 2011.

ORNL Distributed Active Archive Center (DAAC) Deputy Manager, Tammy Beaty, participated in the Land Processes (LP) DAAC user working group meeting via WebEx.

During April 8th-12th Peter Schweizer presented “Monetizing fish richness at spatial scales relevant to ecology and resource management“ at the 2012 U. S.-International Association of Landscape Ecology (U. S.-IALE) Annual meeting that was held in Newport, RI. Co-authors are Laurence Eaton, Yetta Jager and Rebecca Efrogmson.

Jonathan R. Mielenz has been elected to a three-year term as a Director for the Society for Industrial Microbiology and Biotechnology (SIMB). SIMB is a non-profit scientific society, founded in 1949, dedicated to advancement of applied microbiology and biotechnology.

On April 10th Matt Langholtz presented at the 2012 Oklahoma Experimental Program to Stimulate Competitive Research (EPSCoR) Annual State Conference on Bioenergy in Stillwater, OK. Read more at <http://www.okepscor.org/public-outreach/news/save-date-2012-oklahoma-epscor-annual-state-conference>.

Erin Webb hosted John Cundiff of Virginia Tech at Oak Ridge National Laboratory (ORNL) during April 10th-12th. Erin is also currently serving as host to Bobby Grisso (Professor in Department of Biological Systems Engineering at Virginia Tech) for his sabbatical leave. Erin, along with Shahab Sokhansanj, met with the Virginia Tech visitors about collaborating on biomass logistics modeling. ORNL is a collaborator on a Board on Research Data and Information (BRDI) proposal led by Virginia Tech (preproposal submitted in April).

The Carbon Dioxide Information Analysis Center (CDIAC) updated their data files and graphical user interface (GUI) for accessing the National Climatic Data Center (NCDC) U.S. Historical Climatology Network (USHCN) database (both monthly and daily data) through 2011. The CDIAC-developed USHCN GUI is the main way users the world over access these critical climate data, and CDIAC's partnership with NCDC in quality assuring, documenting, and distributing these data dates back to the 1980s.

A team from ORNL joined others from Laurence Berkeley National Laboratory (LBNL) and University of Alaska Fairbanks (UAF) for a Next-Generation Ecosystem Experiments (NGEE) field research trip to Barrow, Alaska. David Graham, Ken Lowe, and Stan Wullschleger left April 11th for Fairbanks and then continued on to Barrow for a week of sampling permafrost soils, installing water wells, real-time web cameras on the tundra, etc. Read about NGEE's work in Alaska on their blog: <http://ngee-arctic.blogspot.com/>.

On April 11th Esther Parish and Laurence Eaton met with Sam Jackson, Mladen Grbovic and Jessica McCord at the University of Tennessee's Center for Renewable Carbon in order to discuss progress related to the development of an online Biomass Atlas for the Southeast Region and a Geographic Information System (GIS) data depository for ongoing research related to the Vonore, TN, switchgrass experiment.

Tammy Beaty and Suresh K. SanthanaVannan attended the Earth Observing System Data and Information System (EOSDIS) Data Center Managers Meeting during April 11th-13th at Goddard Space Flight Center, Greenbelt, MD.

On April 12th Keith Kline presented “Greenhouse Gas (GHG) Time Accounting: Trying to make it real, compared to what?” for the International Energy Agency (IEA) Task 38 Expert Work Group on Bioenergy GHG emission accounting, Argonne, IL.

During April 12th-13th Keith Kline helped draft initial content and outline for a white paper being developed on “Reference systems for evaluating climate effects of bioenergy” as an outcome of the Expert Working Meeting of IEA Task 38 at Argonne on “How to present the timing of emissions from bioenergy in life-cycle assessment (LCA) and GHG accounting?”

Xiaofeng Xu accepted an invitation to serve as an expert reviewer for the first order draft of the 2013 Intergovernmental Panel on Climate Change (IPCC) wetland supplement on April 13th. The review process will last 8 weeks.

In April the Oak Ridge Research Park hosted two nature walks. A wildflower walk on the 15th, led by botanist Larry Pounds and walk coordinator Trent Jett (ESD), had 14 people from the community participate, and a bird walk on the 28th, led by Jim Evans (Tennessee Wildlife Resources Agency [TWRA]) and Trent Jett, had 15 people in attendance.

Brennan Smith presented “An Overview of the HAP Best Practices Catalog” to the National Hydropower Association (NHA) Operational Excellence Task Force at the NHA Annual Conference on April 15th-19th in Washington, D. C.

On April 16th Maggie Davis and co-conveners of the International Organization for Standardization (ISO) Working Group made a presentation for international plenary meeting of ISO PC 248, Sustainability Criteria for Bioenergy, at Argonne National Lab, summarizing a final report on indirect effects.

During April 16th-20th Keith Kline and Maggie Davis participated in the ISO Project Committee 248 meetings on a standard on “Sustainability Criteria for Bioenergy” at Argonne National Lab. The plenary sessions accepted key language on indirect effects and nominated Keith to serve as lead editor for the next “Committee Draft” version of the standard.

Erin Webb presented a poster on integrating biomass logistics modeling with other biofuels related models to simulate the entire biofuel supply chain at the first annual University of Tennessee (U. T.) Biosystems Engineering and Soil Science research symposium on April 17th.

Brian Davison has been elected to the Society for Biological Engineering (SBE) Managing Board.

The Mercury Science Focus Area (SFA) held their Advisory Committee review at ORNL during April 19th-20th. The advisory committee is composed of members from U. S. Geological Survey, University of Michigan, University of Maryland, and Rutgers University (T. Barkay, Chair) and the Department of Energy (DOE) Oak Ridge Office of Environmental Management. The Mercury SFA program aims to provide scientific understanding of the mechanisms and rates of net methyl mercury production in mercury-contaminated environments. The project has made significant progress, and it will be peer reviewed at the end of May 2012. External collaborators were either present or on the conference calls. A poster session was organized in the foyer of building 1520, and all SFA staff and guests participated. Special thanks to Katherine Ragle who helped with the logistics of the review.

Tamara Rogers and Donna Kridelbaugh with the BioEnergy Science Center successfully completed a 3-day course, “Leading the 3 PROs: Projects, Programs and Professionals,” through the Center for Executive Education at the U. T., Knoxville. The course was focused on developing relationships, motivating and empowering team members, and implementing change successfully.

Bob Cook attended the European Geophysical Union (EGU) Annual Meeting, April 22nd-27th, in Vienna, Austria.

Misha Krassovski presented the following poster at EGU 2012: Fossil-Fuel CO₂ Emissions Database and Exploration System. Authors included Misha Krassovski, Tom Boden, T. J. Blasing, and Robert Andres.

Keith Eckerman has been awarded the Gold Medal for Radiation Protection of the Royal Swedish Academy of Sciences. Established in 1962, this medal is awarded to people who have made a highly valuable contribution to international radiation protection progress during the preceding ten years. Recipients are nominated by the International Commission on Radiological Protection (ICRP) and chosen by the Academy. Two former U. S. awardees include K. Z. Morgan, former director of the ORNL Health Physics Division, and Laurence Taylor, first president of the National Council on Radiation Protection and Measurements (NCRP).

Bob Andres attended The Terrestrial Ecosystem Science Principal Investigator's Meeting in Washington, D. C., from April 23rd-24th. He presented the poster, "Temporal, spatial, and uncertainty aspects of carbon dioxide emissions from fossil fuel combustion: Highlights of recent TES funding."

During April 23rd-27th Mark Bevelhimer presented “Applying Context and Perspectives in Environmental Analysis” on the panel “DOE Update: Advancing Marine and Hydrokinetic (MHK) commercialization” at the 5th Annual global Marine Renewable Energy Conference (GMREC) – Expanding Networks...Lowering the Cost of Energy. Vince Neary presented a poster titled “Verdant Measurement” and Shelaine Hetrick was an ORNL booth exhibitor at GMREC.

Mansueta Harris, former DOE-Science Undergraduate Laboratory Internships (SULI) student, presented her summer work at ORNL at the South Carolina Academy of Sciences 2012 meeting. Mansueta was the presenting author with Alope Kumar as the second and last author. Mansueta received the Sigma Xi award for her presentation.

Donna Kridelbaugh has begun work as a volunteer grant writer for the non-profit group, Discover Life in America. She is assisting in development of funding programs to support the All Taxa Biodiversity Inventory (ATBI) project that relies solely on private donations and grants. This project is aimed at identifying all species of life within the Great Smoky Mountains National Park with purposes of engaging citizen scientists, establishing biodiversity markers, and preserving natural resources. More information about the program and outreach opportunities can be found on the DLIA website. www.dlia.org

Tim Theiss, Erin Webb, Scott Curran, and Kevin Caffrey (former Oak Ridge Institute for Science and Education [ORISE] intern, now doctoral student at North Carolina State University) served as panelists for an Educational Opportunities in Biomass webinar hosted by the DOE Biomass Program on April 23rd. Tim gave an overview of student opportunities at ORNL, Erin provided a

mentor's perspective on how to be a successful intern, and Scott and Kevin related their experiences as student interns at ORNL. An estimated 150 people tuned in to the webinar.

A paper coauthored by Annetta Watson and Fredrick Dolislager has been selected as the 2011 Risk Management Paper of the Year by Human and Ecological Risk Assessment: An International Journal (HERA). The paper is titled "Developing Health-Based Pre-Planning Clearance Goals for Airport Remediation Following Chemical Terrorist Attack: Decision Criteria for Multipathway Exposure Routes" (HERA, 17: 57-121). HERA cited the paper for its "salient management actions should airports experience terrorists' release of toxic substances into airport environments."

On April 24th Virginia Dale and Paul Leiby presented "Indicators to support assessment of socioeconomic sustainability of bioenergy system" to the DOE workshop in Washington, D.C., on Social Aspects of Bioenergy Sustainability. Keith Kline, Gbadebo Oladosu, and Rebecca Efrogmson also attended. The presentation was based on the a paper developed by V. H. Dale, R. A. Efrogmson, K. L. Kline, M. H. Langholtz, P. N. Leiby, G. A. Oladosu, M. R. Davis, M. E. Downing, and M. R. Hilliard.

Brennan Smith attended a meeting on "Environmental Attribution" and also a meeting on the "Update on Lab activities planning – FY13" in Washington, D. C., during April 24th-25th.

On April 25th Matt Langholtz presented "Billion-ton update: An Overview" at the 4th Annual Energy Biosciences Institute (EBI) Biofuels Conference in Illinois.

Chris Lenhardt participated in a telecon of the Earth Science Information Partners (ESIP) Federation Decision Cluster on April 25th. Chris has also been appointed by the ESIP Federation Executive Committee to be the interim chair of the ESIP Federation Constitution and Bylaws Committee.

On April 26th Mark Downing, Erin Webb, and Curt Maxey served as technical reviewers for two proposed systems for renewable power generation at Fort Campbell.

During April 30th-May 3rd ORNL had the following contributions to the Society for Industrial Microbiology and Biotechnology conference in New Orleans, LA:

Posters:

- "Scientific Approaches for Assessing Land-Use Change" - Keith Kline, Gbadebo Oladosu, Virginia Dale, Allen McBride.
- "Estimating the Benefits and Costs of Sustainable Corn Stover Production" – Laurence Eaton, Virginia Dale, Mark Downing, Matthew Langholtz, David Muth, Bob Perlack.

Presentations (part of a session chaired by Kelly Tiller entitled "Biomass Supply & Sustainability" on the opening day.)

<http://sim.confex.com/sim/34th/webprogrampreliminary/Session2137.html>

- "The U.S. Billion Ton Update: Biomass Supply for a Bioenergy and Bioproducts Industry" - Laurence M. Eaton, Robert D. Perlack, Bryce Stokes, Mark Downing and John Ferrell
- "Simulation and Optimization of Agricultural Biomass Logistics Systems for Cellulosic Ethanol Production" – Mahmood Ebadian, Shahab Sokhansanj, and Taraneh Sowlati
- "Indicators to Support Environmental and socioeconomic Sustainability of Bioenergy Systems" – Virginia H. Dale, Latha M. Baskaran, Maggie R. Davis, Mark E. Downing, Laurence M. Eaton, Rebecca A. Efrogmson, Charles T. Garten Jr., Michael R. Hilliard,

Keith L. Kline, Henriette I. Jager, Matthew H. Langholtz, Paul N. Leiby, Allen C. McBride, Patrick J. Mulholland, Gbadebo A. Oladosu, Esther S. Parish, Peter E. Schweizer, and John M. Storey

The Subsurface biogeochemical research (SBR) staff participated in the SBR Principal Investigator (PI) meeting (April 30th-May 2nd). S. Brooks, D. Elias, B. Gu, L. Liang, and J. Smith were involved in three breakout sessions as moderators or panelists to help DOE develop grand challenges for the SBR program.

A poster presented by John Leeman, an undergraduate student of Megan Madden at the University of Oklahoma, has been selected to receive an Outstanding Student Paper Award for his presentation at the 2011 Fall Meeting in San Francisco, California. John's presentation was recognized as among the best of a strong group of student presenters. His poster presentation was entitled, "Experimental Results of Hydrate Reservoir Destabilization Through Heating." Co-authors included M. E. Elwood Madden at the University of Oklahoma with T. J. Phelps and C. J. Rawn of ORNL (PTS# 26023). This work was supported by the Methane Hydrates Program through DOE-Fossil Energy.

BESD New Arrivals

Hyunsung Jung arrived in April to work as a postdoctoral research associate with Tommy Phelps. Among his tasks, Hyunsung will apply, utilize and develop novel methods toward understanding the interactions and intercellular communication between subsurface bacteria and metals.

Anil Somenahally arrived in April to work as a postdoctoral research associate with Dwayne Elias. Anil will also apply, utilize and develop novel methods toward understanding interactions and intercellular communication between subsurface bacteria and metals (including heavy metals and radionuclides) the biotransformation of these metals, the resultant biogeochemistry, etc.

Sujithkumar Surendran Nair arrived in April to work as a postdoctoral research associate with Ben Preston and Stan Wullschleger. Sujithkumar will research models used to simulate the production of biomass for bioenergy crops.

Charlotte Wilson arrived in April to work as a postdoctoral research associate with Steve Brown. Charlotte will also work to apply, utilize and develop novel methods toward understanding the interactions and intercellular communication between subsurface bacteria and metals (including heavy metals and radionuclides), the biotransformation of these metals, the resultant biogeochemistry, and the subsequent effects on the microbial community.

Dilruba Yeasmin arrived in April to work as a postdoctoral research associate with Boualem Hadjerioua. Dilruba will be using programs to execute advanced spatial and temporal analyses of intersecting and overlapping engineered and natural water and energy systems.