

**B&ESD Newsletter**  
**July 2012**

**Pubs and Products**

- Defne, Z., Haas, K. A., Fritz, H. M., Jiang, L., French, S. P., Shi, X., Smith, B. T., Neary, V. S., and K. M. Stewart. 2012. National geodatabase of tidal stream power resource in USA. *Renew. Sust. Energ. Rev.* 16: 3326-3338.
- Efroymson, R. A., Dale, V. H., Kline, K. L., McBride, A. C., Bielicki, J. M., Smith, R. L., Parish, E. S., Schweizer, P. E., and D. M. Shaw. 2012. Environmental indicators of biofuel sustainability: What about context? *Environ. Manage.* Available online. DOI: 10.1007/s00267-012-9907-5
- Hurt, R. A., Jr., Brown, S. D., Podar, M., Palumbo, A. V., and D. A. Elias. Sequencing intractable DNA to close microbial genomes. *PLoS One* 7: e41295.
- Hyatt, D., LoCascio, P. F., Hauser, L. J., and E. C. Uberbacher. 2012. Gene and translation initiation site prediction in metagenomic sequences. *Bioinformatics* Available online. DOI: 10.1093/bioinformatics/bts429
- Iversen, C. M., Keller, J. K., Garten, C. T., and R. J. Norby. 2012. Soil carbon and nitrogen cycling and storage throughout the soil profile in a sweetgum plantation after 11 years of CO<sub>2</sub>-enrichment. *Glob. Chang. Biol.* 18: 1684-1697.
- Karpinets, T. V., Park, B. H., and E. C. Uberbacher. 2012. Analyzing large biological datasets with association networks. *Nuc. Acids Res.* Available online. DOI: 10.1093/nar/gks403
- Kumar, L., Tooyserkani, Z., Sokhansanj, S., and J. N. Saddler. 2012. Does densification influence the steam pretreatment and enzymatic hydrolysis of softwoods to sugars? *Bioresource Technol.* 121: 190-198.
- Leuze, M. R., Karpinets, T. V., Syed, M. H., Beliaev, A. S., and E. C. Uberbacher. 2012. Binding motifs in bacterial gene promoters modulate transcriptional effects of global regulators CRP and Arca. *Gene Regul. Syst. Biol.* 6: 93-107.
- Mosher, J. J., Vishnivetskaya, T. A., Elias, D. A., Podar, M., Brooks, S. C., Brown, S. D., Brandt, C. C., and A. V. Palumbo. Characterization of the *Deltaproteobacteria* in contaminated and uncontaminated stream sediments and identification of potential mercury methylators. *Aquat. Microb. Ecol.* 66: 271-282.
- Poovaliah, C. R., Shen, H., Wuddineh, W. A., Mielenz, J., Tschaplinski, T. J., Stewart, C. N., Chen, F., and R. A. Dixon. 2012. Overexpression of PvMYB4 in switchgrass leads to a three-fold increase in ethanol production without pretreatment. *In Vitro Cell Dev.-An.* 48: 60-61.
- Shem, W. O., Mote, T. L. and J. M. Shepherd. 2012. Validation of NARCCAP temperature data for some forest sites in the southeast United States. *Atmos. Sci. Let.* Available online. DOI: 10.1002/asl.395

Steed, C. A., Shipman, G., Thornton, P., Ricciuto, D., Erickson, D., and M. Branstetter. 2012. Practical application of parallel coordinates for climate model analysis. *Procedia Comp. Sci.* Available online. DOI: 10.1016/j.procs.2012.04.094

Tumuluru, J. S., Sokhansanj, S., Lim, C. J., Bi, T., Kuang, X. Y., and S. Melin. 2012. Effect of low and high storage temperatures on headspace gas concentrations and physical properties of wood pellets. *Int. Wood Prod. J.* Available online. DOI: 10.1179/2042645312Y.0000000019

Wang, G., Post, W. M., and M. A. Mayes. 2012. Development of microbial-enzyme-mediated decomposition model parameters through steady-state and dynamic analyses. *Ecol. Appl.* Available online. DOI: 10.1890/12-0681.1

Wang, G., Post, W. M., Mayes, M. A., Frerichs, J. T., and S. Jagadamma. 2012. Parameter estimation for models of ligninolytic and cellulolytic enzyme kinetics. *Soil Biol. Biochem.* 48: 28-38.

Yang, S., Giannone, R. J., Dice, L., Yang, Z. K., Engle, N. L., Tschaplinski, T. J., Hettich, R. L., and S. D Brown. 2012. Clostridium thermocellum ATCC27405 transcriptomic, metabolomic and proteomic profiles after ethanol stress. *BMC Genomics* 13: 336.

On July 3<sup>rd</sup> Yi-Heng Percival Zhang and Jonathan Mielenz were awarded a U.S. Patent (8,211,681) for their invention, Biohydrogen Production by an Artificial Enzymatic Pathway.

### **Notable Achievements**

Shahab Sokhansanj attended the 20th European Biomass Conference and Exhibition (EU BC&E) in Milan, Italy, June 18<sup>th</sup>-22<sup>nd</sup>. He was a co-author on the following posters:

- Naimi, Ladan J., Shahab Sokhansanj, Xiaotao Bi, Jim Lim, Alvin R. Womac, Staffan Melin. 2012. Defining Uncertainties in the Size of Ground Biomass Particles - Particle Diameter and Length from Sieve Analysis.
- He, Xiao, Anthony Lau, Shahab Sokhansanj. 2012. Experimental Determination of Water diffusivity of Aspen (*Populus tremuloides*).

Colleen Iversen has been featured in the July Issue of the Climate Change Science Institute (CCSI) Newsletter. Read more about the CCSI online at <http://climatechangescience.ornl.gov/>.

During July 1<sup>st</sup>-31<sup>st</sup> Keith Kline and Maggie Davis participated in nine International Organization for Standardization (ISO) PC248 webinars and submitted written proposals to improve text in the draft International Standard for Sustainability Criteria. Oak Ridge National Laboratory (ORNL) also developed a proposed process and schedule for the Editing Committee (led by Keith).

On July 2<sup>nd</sup> Virginia Dale and Keith Kline gave presentations on “Bioenergy Sustainability: Addressing the Science and the Need” for the Department of Energy (DOE) Biomass Program Staff meeting.

Paul Hanson has been designated a University of Tennessee (UT)-Battelle Corporate Fellow.

Shahab Sokhansanj has continued participation in SECTOR’s round robin testing of torrefied pellets. The SECTOR (acronym for Production of Solid Sustainable Energy Carriers from

Biomass by Means of Torrefaction) is a European-funded consortium of commercial and research organization. The project is focused on further development of torrefaction-based technologies for the production of solid bioenergy carriers up to pilot-plant scale and beyond, and on supporting the market introduction of torrefaction-based bioenergy carriers as a commodity renewable solid fuel. Under round robin testing arrangements, commercial torrefied pellet samples received from Europe are tested for physical & chemical properties. The tests conducted include bulk density, moisture content, durability, ash content, and calorific value. The first set of samples to be tested arrived on July 5<sup>th</sup> and the test results are to be reported by August 13<sup>th</sup>.

Virginia Dale, Laurence Eaton and Matt Langholtz contributed text, information and figures (based on the Billion Ton Update) to the forest chapter of the National Assessment of Climate Change. This chapter considers the role of forest resources in bioenergy as a way to both sequester carbon and offset fossil fuel use (which is the major contributor to increasing greenhouse gases that are affecting climate change).

Vince Neary attended the National Renewable Energy Laboratory (NREL) Instrumentation, Measurements and Modeling event during July 8<sup>th</sup>-11<sup>th</sup> in Bloomfield, CO, and presented “Turbulence measurement methods.”

During July 8<sup>th</sup>-12<sup>th</sup> Alope Kumar attended the American Society of Mechanical Engineers (ASME) 2012, Heat Transfer, Fluid Engineering, & Nanochannels, Microchannels, and Minichannels Conferences in Puerto Rico. He served as session chair for 2 sessions and as a co-chair for 1 session. Learn more about the ASME 2012 conference at <http://www.asmeconferences.org/HTFNMM2012/>.

On July 9<sup>th</sup> Kitty McCracken appeared in the ORNL news feature, “Kudzu Crusade.” It focused on Kitty's work in controlling invasive species on the Oak Ridge Reservation, as part of the ORNL Natural Resources Team. Read the feature online at [http://www.ornl.gov/info/features/get\\_feature.cfm?FeatureNumber=f20120709-000](http://www.ornl.gov/info/features/get_feature.cfm?FeatureNumber=f20120709-000).

On July 11<sup>th</sup> Virginia Dale and Ben Preston participated in “Dialogue,” a weekly hour-long radio discussion on WUOT, the local radio station affiliated with National Public Radio. The discussion focused on climate change in Tennessee. Listen online at [http://wuot.org/mt/archives/2012/07/000778-dialogue\\_climate\\_change\\_in\\_tennessee.html](http://wuot.org/mt/archives/2012/07/000778-dialogue_climate_change_in_tennessee.html).

On July 12<sup>th</sup> Keith Kline, Matt Langholtz, and Virginia Dale submitted a white paper to the Council on Sustainable Biomass Production (CSBP) on next steps in development of science-based sustainability standards.

The Plant-Microbe Interfaces (PMI) Science Focus Area (SFA) reverse site review was held in Rockville, MD, on July 12<sup>th</sup>. Mitch Doktycz, Jerry Tuskan, Chris Schadt, Dale Pelletier, Tim Tschaplinski, Greg Hurst, Ed Uberbacher and Guru Kora represented the SFA. The one-day affair included presentations for each of the different aims of the SFA as well as a scientific overview, a management presentation and a 15-minute video of the PMI knowledgebase. Seven scientific reviewers representing either academic institutions or other DOE facilities were present to review the SFA. Initial feedback from the PMI SFA program manager is very favorable toward continued funding of the project with minor revisions.

Several staff presented a series of lectures at the Oak Ridge Institute for Continued Learning (ORICL). The series “Mercury Transformation in the Environment” was presented on July 12,

19, 26, and August 2 by Scott Brooks, Baohua Gu, Jerry Parks, and Liyuan Liang. The lecture series had 53 students enroll, with more on the wait list.

On July 13<sup>th</sup> Keith Kline, Matt Langholtz, and Virginia Dale participated in a CSBP conference call on next steps in development of sustainability standards.

Also on July 13<sup>th</sup> the biomass fuels Combined Heat and Power (CHP) plant at the University of British Columbia (UBC) commenced its commissioning and start up activities. The UBC CHP is one-quarter (¼) of the size of the ORNL biomass steam plant. Nexterra Inc. is the manufacturer and installer of updraft gasifiers for UBC and ORNL systems. The UBC gasifier will produce steam for the next 3 months while transitioning gradually to producing electricity. The cleaned up syngas will fuel a 2-MW Janbacher internal combustion engine to run the generator. The ground biomass feedstock for this plant comes from a recycling yard in Langley, about 20 miles from Vancouver. The biomass is an aggregate of municipal and industrial residues. Feedstock the ORNL steam plant comes from chipping logs and from forest operations. Shahab Sokhansanj and his team characterize feedstock and develop least cost logistics for ORNL and UBC systems.

During July 15<sup>th</sup>-16<sup>th</sup> ORNL Distributed Active Archive Center (DAAC) Manager, Chris Lenhardt, attended the Data Observation Network for Earth (DataONE) User Group meeting.

The following presentations were given at the Mycological Society of America conference, July 15<sup>th</sup>-19<sup>th</sup> in New Haven, CT:

- Bonito, G., Reynolds, H., Chen, K. H., Grygansky, A., Hameed, K., Schadt, C., and R. Vilgalys. *Populus* species, genotype, and soil inoculum influences on the assemblage of rhizospheric fungal and bacterial communities.
- Hameed, K., Bonito, G., Krishnan, J., Gajdeczka, M., Schadt, C., and R. Vilgalys. Fungal communities of *Populus*: comparisons between culture-based and culture-independent approaches.
- Chen, K. H., Bonito, G., Reynolds, H., Schadt, C. and R. Vilgalys. From trees to grasses: Arbuscular mycorrhizal fungi community is shaped by host plant preference.

Several staff attended the HydroVision International 2012 Conference in Louisville, KY, during July 15<sup>th</sup>-20<sup>th</sup>. Presentations included:

- Bo Hadjerioua: “New Small HydroPower Technology to be Deployed in the United States (Phase One: Assessment-Evaluation)”
- Katherine Zhang: “Methodology and Process for Condition Assessment at Existing Hydropower Plants” and “Best Practices Implementation for Hydropower Efficiency and Utilization Improvement”
- Vince Neary: “National Lab Activities in Marine Hydrokinetics Research: Technology Development”
- Budi Gunawan: “Oak Ridge National Laboratory data post-processing methods for acoustic Doppler velocimeter and acoustic Doppler current profiler measurement at marine and hydrokinetic sites”
- Glenn Cada: “Jumping the ESA/MMPA Hurdles” and “The Use of Traits-Based Assessment Reservoir and Turbine Passage Survival of Untested Fish Species”
- Mark Bevelhimer: “Minimizing the Environmental Impact of Variable Flow Regimes while Maintaining the Value of Peaking Operations”

Fayzul Pasha also contributed an abstract entitled “Prediction of Total Dissolved Gas (TDG) at Hydropower Dams throughout the Columbia River Basin (CRB) – Challenges and Proposed Methodology.”

Glenn Cada was invited to co-organize and chair special sessions at HydroVision 2012 in Louisville, KY, during July 17<sup>th</sup>-20<sup>th</sup>.

On July 16<sup>th</sup> several ORNL staff participated in the residue removal analysis webinar (Doug Karlen and David Muth, presenters) demonstrating the Stover Removal Tool.

During July 16<sup>th</sup>-17<sup>th</sup> ORNL hosted Siwa Msangi, Senior Research Fellow from the International Food Policy Research Institute, in a series of discussions that emphasized land use change and climate change modeling for assessment of biofuels production.

The 2012 BioEnergy Science Center (BESC) Science Retreat was held during July 16<sup>th</sup>-19<sup>th</sup>. More than 230 members of BESC attended, including researchers, post-docs, students, commercialization council members, industrial affiliates, science advisory board members and members of the board of directors. 105 posters were displayed and 37 presenters highlighted BESC science. The following posters included authors from ORNL:

- BESC Knowledgebase. Mustafa H. Syed\*, Tatiana V. Karpinets, Morey Parang, Michael R. Leuze, Byung H. Park, Doug Hyatt, Steven D. Brown, and Edward C. Uberbacher.
- BESC sample information management system. Susan Holladay\*, Sheryl Martin, Leslie Galloway, Guruprasad Kora, Ed Uberbacher, Paul Gilna.
- The DOE Systems Biology Knowledgebase: Plant Science Domain. Priya Ranjan\*, Doreen Ware, David Weston, Sergei Maslov, Shinjae Yoo, Dantong Yu, Michael Schatz, James Gurtowski, Matt Titmu, Jer-ming Chi, Sunita Kumari, Andrew Olson, Shiran Pasternak, Jim Thomason, Ken Youens-Clark, Mark Gerstein, Gang Fang, Darryl Reeves, Pam Ronald, Chris Henry, Sam Seaver, and Adam Arkin.
- Investigating lignocellulosic biomass at the nanoscale. Laurene Tetard\*, Ali Passian\* and Brian Davison.
- Linking SNP maps, protein isoforms and observed phenotype traits in *Populus*. Andrey Gorin\*, Ranjan Priya, and Gerald Tuskan.
- Exploring genome architecture and gene functional roles in *Clostridium thermocellum*. Nikita Arnold, Andrey Gorin\*, Robert Cottingham, Steve Brown, Tamah Fridman, Loren Hauser, Israel Huff, Daniel Quest, and Edward Uberbacher.
- Quantification of selected redox metabolites in cell supernatants. Bruce A. Tomkins\*, Keiji G. Asano, and Gary J. Van Berkel, Timothy J. Tschaplinski, and Jonathan Lo.
- Binding affinities of monolignols to *Arabidopsis thaliana* peroxidase (ATP A2). Amandeep Sangha\*, Jerry Parks, Jeremy Smith.
- Initial binding of cellulose chain into the cellulase catalytic tunnel. Pavan K. Ghattay\*, M. Emal Alekozai, Gregg Beckham, Michael F. Crowley, Edward C. Uberbacher, and Xiaolin Cheng.
- Comparative proteomics unveils functional signatures of cellulose formation (*Populus*) and deconstruction (cellulolytic microorganisms) at a cellular level. Richard J. Giannone\*, Paul Abraham, Rachel Adams, Andrew Dykstra, Gerald A. Tuskan, and Robert L. Hettich.
- Protease-Optimized Spectral Indexing (POSI) improves quantification in shotgun proteomics datasets of bioenergy-related organisms. Rachel Adams\*, Richard Giannone, Paul Abraham, and Robert Hettich.

Presenters are indicated with an asterisk.

During July 17<sup>th</sup>-18<sup>th</sup> Bob Cook attended the National Snow and Ice Data Center (NSIDC) user working group meeting.

During July 17<sup>th</sup>-20<sup>th</sup> ORNL DAAC Manager, Chris Lenhardt, attended the Earth Science Information Partners (ESIP) Federation Summer Meeting 2012 in Madison, WI. While at the ESIP meeting, Chris led a session of the Constitution and Bylaws Committee in his role as Interim Chair.

Wei Wang has been invited to join the editorial board as an American Associate Editor for *Materials Focus*, a newly launched scientific journal by American Scientific Publishers. Read more about *Materials Focus* at <http://www.aspbs.com/mat.htm>.

On July 18<sup>th</sup> a four-part session focused on "Ecological Assessment Research" was initiated with a presentation by Mark Peterson for ORICL at Roane State Community College in Oak Ridge. The presentation provided an overview of research at ORNL's Aquatic Ecology Laboratory. On July 25<sup>th</sup> Marshall Adams (now retired) provided an update on ORNL's monitoring studies of the Tennessee Valley Association (TVA) fly ash spill in Kingston. Terry Mathews, Kitty McCracken and Mike Ryon are scheduled for presentations to ORICL in August.

On July 19<sup>th</sup> Virginia Dale was the keynote speaker at the ORNL Celebration of Women in Science, and her talk was on "From Disturbance to Sustainability: Following Interesting Questions and Fun Opportunities." Esther Parish presented a poster on "Designing Bioenergy Cropping Systems to Maximize Sustainability Objectives."

Sonya Clarkson and Donna Kridelbaugh shared their research during the Women in Science event held July 19<sup>th</sup>. The ORNL Committee for Women sponsored the poster session. Sonya Clarkson presented a poster entitled "Furan aldehyde detoxification in *Thermoanaerobacter pseudethanolicus*," and Donna Kridelbaugh presented a poster entitled "Microbial conversion of plant biomass inhibitors to value added products."

During July 19<sup>th</sup>-20<sup>th</sup> Paul Leiby presented 2 papers, "Tradable Credits System Design and Cost Savings For a National Low Carbon Fuel Standard For Road Transport" and "Energy Security Implications of a National Low Carbon Fuel Standard" as part of the National Low Carbon Fuel Standard study held in Washington, DC. Read more at <http://NationalLCFSProject.ucdavis.edu>.

On July 20<sup>th</sup> Debo Oladosu, Keith Kline and Maggie Davis submitted comments to finalize a report co-authored with Marcelo Moreira (from the Brazilian Institute for International Trade Negotiations [ICONE]) titled, "Comparison of Regions and Modeling of Land in the Global Trade Analysis Project (GTAP) for Dynamic Energy Policy Simulations (DEPS) and Brazilian Land Use Model (BLUM)." Options to improve bioenergy simulations by comparing inputs and outputs are discussed in the report, submitted to Brazil collaborators in the Bioethanol Science and Technology Laboratory (CTBE), The São Paulo Research Foundation (FAPESP) and ICONE.

During July 23<sup>rd</sup>-24<sup>th</sup> Esther Parish presented a poster on "Designing Bioenergy Cropping Systems to Maximize Sustainability Objectives" at a 60-person workshop on "Visualization Technologies to Support Research on Environment Interactions" held in Annapolis, MD, by the new National Socio-Environmental Synthesis Center (SESYNC). Esther's travel expenses were paid by SESYNC through a grant from the National Science Foundation.

On July 24<sup>th</sup> the ORNL DAAC Management team met via teleconference with ORNL DAAC's Earth Science Data and Information System (ESDIS) System Engineer, Nate James, and the Land

(LP) DAAC's ESDIS Systems Engineer, John Moses, to discuss routine operations. Additionally Lead Developer, Suresh K. SanthanaVannan, presented a demo on ORNL DAAC tools.

Also on July 24<sup>th</sup> ORNL hosted Woody Keown, Robert Rohrbaugh, Rainer Cina, Phil Green and Ryan West from Proctor and Gamble (P&G) in a series of discussions that emphasized feedstock assessment and sustainability metrics.

Deputy DAAC Manager, Tammy W. Beaty, participated in the ESDIS Organizing Committee on ES Metadata Seminar telecon on July 25<sup>th</sup>. The Seminar will be held November 28<sup>th</sup> at Goddard Space Flight Center (GSFC).

Scott Brooks is quoted in the article, "Rifle researchers test microbes' appetite for uranium cleanup" that appeared on the website for *The Daily Sentinel* (Grand Junction, CO) on July 25<sup>th</sup>. Read more online at <http://www.gjsentinel.com/news/articles/rifle-researchers-test-microbes-appetite-for-urani/>.

On July 25<sup>th</sup> the article, "Gaining quick-snap access to environmental data" appeared on the website for the *Knoxville News Sentinel*. Read the article, containing comments by Bob Cook, online at <http://blogs.knoxnews.com/munger/2012/07/gaining-quick-snap-access-to-e.html>.

The 2012 Annual Meeting of the Society for Mathematical Biology was hosted by UT's NimBIOS center this month. Yetta Jager served on the local organizing committee and presented a paper on DOE Waterpower-funded multi-objective optimization of flow releases for salmon and energy. She also led a multinational group of attendees on a Forest Service snorkeling trip in Citico Creek. The guide posted a blog on the adventure: <http://forum.nanfa.org/index.php/topic/12874-citico-creek/>.

The Partitioning in Trees and Soils (PITS) team successfully completed experimental <sup>13</sup>CO<sub>2</sub> labeling of 4 mature dogwood trees at the UT Forest Resources Research and Education Center (FRREC) in Oak Ridge, TN. This was the second of three seasonal labeling events (May, July, September) at the site designed to assess carbon flux from tree foliage through stems, to roots, mycorrhizae, and soils in support of improving mechanistic modeling of ecosystem C partitioning. The team included Jeffrey Warren, Colleen Iversen, Richard Norby, Joanne Childs, Deanne Brice, Jiafu Mao, Dan Ricciuto and several student interns.

On July 26<sup>th</sup> LP DAAC Manager, Tom Sohre, LP DAAC Scientist Chief, Dave Meyer, and LP DAAC Project Manager, Chris Doescher, visited with ORNL DAAC Management Team. Discussions centered on shared user communities and future collaborations.

On July 26<sup>th</sup> ORNL hosted Gerald McGlamery, James Lattner and Linelle Jacob from ExxonMobil Chemical Company to discuss current outlook on biomass availability as well as biomass processing facilities. Discussion included both ORNL and UT staff.

On July 26<sup>th</sup> an article titled "Fishing for answers" was released on the ORNL public website. The article focuses on research being led by Glenn Cada and Mark Bevelhimer that examines the potential environmental effects of hydrokinetic energy from hydropower turbines on fish. Read the feature at [http://www.ornl.gov/info/features/get\\_feature.cfm?FeatureNumber=f20120726-00](http://www.ornl.gov/info/features/get_feature.cfm?FeatureNumber=f20120726-00).

On July 26<sup>th</sup>, ORNL DAAC User Services Lead, Jim Lay, participated on behalf of himself and ORNL DAAC Deputy Director, Tammy Beaty, in a final planning telecon with ESDIS, LP DAAC, and Socioeconomic Data and Applications Center (SEDAC) staff for the Ecology Society of America (ESA) meeting August 5<sup>th</sup>-10<sup>th</sup>.

During July 26<sup>th</sup>-31<sup>st</sup> Danny Inman (NREL) visited ORNL. During the visit, he explored ways to work with scientists from ORNL and UT to address the needs of OBP in defining bioenergy sustainability baselines and targets, developing ways to assess land changes attributed to bioenergy, and conducting a watershed assessment of bioenergy effects. This last activity is being developed into a plan for a Watershed Sustainability Assessment (WASA) that will be submitted to OBP. The visit included a field trip to switchgrass fields and watershed sampling in the Lower Little Tennessee watershed as well as a tour of Genera Inc.

An article in the journal *Hydro Review*, “Small Hydro: Power of the Dammed: How Small Hydro Could Rescue America’s Dumb Dams,” discusses hydropower work by ORNL. Read the article online at <http://www.hydroworld.com/articles/hr/print/volume-31/issue-05/article/small-hydro-power-of-the-damned-how-small-hydro-could-rescue-americas-dumb-dams.html>.

On July 27<sup>th</sup> Bob Cottingham traveled to DOE Headquarters in Germantown, MD, to help give an overview of the Systems Biology Knowledgebase (KBase) to BER Program Managers. KBase will be a community-driven, extensible and scalable open-source software framework and application system designed to accelerate our understanding of microbes, microbial communities, and plants. Read more online at <http://kbase.us>.

On July 30<sup>th</sup> a feature was published in the DOE Pulse (number 368) titled "Teresa Mathews combats historical contamination with modern science." The article focuses on recent mercury studies Terry is leading in the Environmental Sciences Division (ESD) Aquatic Ecology Laboratory. Read online at <http://www.ornl.gov/info/news/pulse/no368/profile.shtml>.

Also on July 30<sup>th</sup> Shahab Sokhansanj participated in the development of Standard ASABE X564, “Methods for Determining Properties of Combustible Solid Fuels of Plant Origin (Biomass)”. The meeting was held at the Annual International Meeting of the American Society of Agricultural and Biological Engineers (ASABE) in Dallas, TX. The proposed Standard will provide a list of approved ISO-developed standard methods that are applicable to properties of solid fuels from biomass of plant origin used for combustion and pyrolysis. Biomass of plant origin considered in this proposal includes all primary, secondary and tertiary biomass of plant origin that was produced directly by photosynthesis. The proposed standard covers definitions of biomass, solid biofuels, physical and chemical, sampling and reporting. ASABE X564 is ready for balloting among participating development committees and the ASABE Standards Committee. The ASABE develops and publishes the standard under the direction of the American National Standards Institute (ANSI).

Shahab Sokhansanj also organized and chaired a half-day special forum entitled “Supply of high tonnage feedstock” during the Annual International Meeting of the ASABE, July 30<sup>th</sup>-August 2<sup>nd</sup> in Dallas, TX. The invited speakers were primary investigators for five DOE-funded logistics projects. These collaborative projects are developing new equipment to handle and deliver high tonnage biomass feedstock for cellulosic biofuels production:

- Kevin Comer, FDC Enterprises: “Cellulosic Ethanol Feedstock Delivery System Development”
- Tim Volk (John Possilius, CNH): “Supply Systems for Short-Rotation Woody Biomass”
- Al Womac, UT: “High-Volume Switchgrass Harvest and Supply in the Southeast”



- Maynard Herron, AGCO Corp.: “Challenges in Harvesting and Storing Stover”
- Steve Taylor, Auburn University (Robert Rummer, United States Department of Agriculture [USDA] Forest Services): “Forest Residue Harvest for Bioenergy”

Shahab was also a coauthor on the following papers presented:

- Mani, Sudhagar, Vikram, Yandapalli and Shahab Sokhansanj. Effect of particle size and binder concentrations on the granulation characteristics of biomass. ASABE Paper No. 121338193.
- Mani, Sudhagar Wayne Winkler, Shahab Sokhansanj. Torrefaction characteristics of densified wood fuel pucks. ASABE Paper No. 121338195.
- Naimi J. Ladan, Shahab Sokhansanj, Sebastian Fuchs, Xiaotao Bi, C. Jim Lim, Staffan Mellin, Till Adrian. A study on pelletization characteristics of feedstock from an industrial pellet Mill. ASABE Paper No. 121337661.
- Naimi J. Ladan, Shahab Sokhansanj, Xiaotao Bi, C. Jim Lim, Staffan O. Melin. A study on the impact of wood species on grinding performance. ASABE Paper No. 121337659.

On July 31<sup>st</sup> Virginia Dale, Esther Parish, and Latha Baskaran delivered a 4<sup>th</sup> quarter Sustainability Joule 4 milestone report to OBP discussing ways that sustainability baselines and targets for water quality and productivity can be addressed in the Lower Little Tennessee watershed.

Also on July 31<sup>st</sup> Peter Schweizer presented “Ecosystem Goods and Services: Monetizing Fish Species Richness in Ecosystem Valuation” at the 5<sup>th</sup> Annual International Ecosystem Services Partnership (ESP) Conference in Portland, OR. Co-authors of the paper are Yetta Jager, Laurence Eaton and Rebecca Efroymsen.

### **BESD New Arrivals**

Rajesh Acharya arrived in July to work as a post-Masters research associate with Alope Kumar. Rajesh will work on investigation of biofouling and the use of modulated surfaces to prevent fouling by microorganisms.

Amber Bible arrived in July to work as a postdoctoral research associate with Jennifer Morrell-Falvey. Amber’s work will include identifying microbial gene targets through functional assays and characterizing their role in plant-microbe interactions.

Maria Fernanda (Marifer) Campa is a post-Bachelors Higher Education Research Experiences (HERE) student working with Amy Wolfe. Maria will be working on Ethical, Legal and Social Issues (ELSI) research that focuses on emerging nanoscale science, bioenergy research and synthetic biology. In addition, she can help identify and analyze other factors that affect the ability of mission-oriented scientific research to achieve its societal objectives.

Taniya Roy Chowdhury arrived in July to work as a postdoctoral research associate with David Graham. Taniya will fill a position in the NGEE (Next-Generation Ecosystem Experiments) Biogeochemistry Program and work with the NGEE team, seeking to reduce uncertainty in climate prediction by better understanding critical land-atmosphere feedbacks in terrestrial ecosystems.

Eric Dixon is an undergraduate HERE student working with Amy Wolfe. Eric will assist with various projects dealing with energy, technology, policy and behavior, including, (1) for DOE's

Office of Energy and Renewable Energy (a) Federal Energy Management Program's Institutional Change Working Group task implementation and (b) Federal Inland Hydropower Working Group support; (2) ORNL's Sustainable Campus Initiative Employee, Family and Community Engagement Roadmap; and (3) for DOE's Office of Science, support for ORNL's Ethical, Legal and Social Issues Scientific Focus Area. Eric's assignments will vary over the course of his internship at ORNL, but will include literature reviews, web site content development, and research in support of document preparation (e.g., fact sheets, reports, etc.).

Juliane Hopf arrived in July to work as a postdoctoral research associate with Eric Pierce. Juliane will support a range of projects focused on developing an improved understanding of mineral and glass weathering across a range of time- and length-scales to predict contaminant release and migration from subsurface/geologic disposal environments.

Nannan Jiang arrived in July to work as a post-Masters research associate with Adam Guss. Nannan will work on understanding how plant matter can be converted into renewable fuels, design and implement novel metabolic pathways in *E. coli* and engineer biofuel production pathways from abundant plant materials.

There were no new staff hires for July.