# Monthly Newsletter for the Biosciences & Environmental Sciences Divisions (B&ESD) September 2013

## Pubs and Products

Abraham, P., Adams, R. M., Tuskan, G. A., and R. L Hettich. 2013. Moving away from the reference genome: evaluating a peptide sequencing tagging approach for single amino acid polymorphism identifications in the genus Populus. *J. Proteome Res.* 12:3642-51.

Ghattyvenkatakrishna, P. K., and B. Mostofian. 2013. Dynamics of water in the amphiphilic pore of amyloid fibrils. *Chem. Phys. Lett.* 582: 1-5.

Ghattyvenkatakrishna, P., Uberbacher, E. C., and X. Cheng. 2013. Effect of the amyloid β hairpin's structure on the handedness of helices formed by its aggregates. *FEBS Lett.* 587: 2649-2655.

Gilna P. 2013. Cellulosic biofuels, Science Omega Review Europe, Issue 2.

Hansen, R., Hinestrosa, J. P., Shubert, K., Morrell-Falvey, J., Pelletier, D., Messman, J., Kilbey, S. M., Lokitz, B., and S. Retterer. 2013. Lectin-functionalized poly(glycidyl methacrylate)-block-poly(vinyldimethyl azlactone) surface scaffolds for high avidity microbial capture. *Biomacromolecules* 14: 3742-3748.

Kominoski, J. S., Follstad Shah, J. J., Canhoto, C., Fischer, D. G., Gilling, D. P., González, E., Griffiths, N. A., Larrañaga, A., LeRoy, C. J., Mineau, M. M., McElarney, Y. R., Shirley, S. M., Swan, C. M., and S.D. Tiegs. 2013. Forecasting functional implications of global changes in riparian plant communities. *Front. Ecol. Environ.* 11: 423-432.

Lian, P., Guo, H. B., Smith, J. C., Wei, D. Q., and H. Guo 2013. Catalytic mechanism and origin of high activity of cellulase TmCel12A at high temperature: a quantum mechanical/molecular mechanical study. *Cellulose* Available online. DOI: 10.1007/s10570-013-0011-7

Maksyutov, S., Takagi, H., Valsala, V. K., Saito, M., Oda, T., Saeki, T., Belikov, D. A., Saito, R., Ito, A., Yoshida, Y., Morino, I., Uchino, O., Andres, R. J., and T. Yokota. 2013. Regional CO2 flux estimates for 2009–2010 based on GOSAT and ground-based CO2 observations. *Atmos. Chem. Phys.* 13: 9351-9373.

Mostofian, B., Smith, J. C., and X. Cheng. 2013. Simulation of a cellulose fiber in ionic liquid suggests a synergistic approach to dissolution. *Cellulose* Available online. DOI: 10.1007/s10570-013-0018-0

Trajano, H. L., Engle, N. L., Foston, M., Ragauskas, A. J., Tschaplinski, T. J., and C. E. Wyman. 2013. The fate of lignin during hydrothermal pretreatment. *Biotechnol. Biofuel.* 6: 110.

Wang, W., Nallathamby, P. D., Foster, C. M., Morrell-Falvey, J. L., Mortensen, N. P., Doktycz, M. J., Gu, B., and S. T. Retterer. 2013. Volume labeling with Alexa Fluor dyes and surface

functionalization of highly sensitive fluorescent silica ($SiO_2$) nanoparticles. *Nanoscale* Available online. DOI: 10.1039/C3NR02639F

Report finalized and entered into PTS for now-completed project that was sponsored by DOE-EERE: Wolfe, A.K. and T. P. Hendrick, *Homeowner Decision Making and Behavior Relating to Deep Home Retrofits: Results of Homeowner Interviews.* ORNL/TM-2012/498, September 2012 (updated September 2013).

Wu, W., Watson, D. B., Luo, J., Carley, J., Mehlhorn, T., Kitanidis, P. K., Jardine, P. M., and C. S. Criddle. 2013. Surge block method for controlling well clogging and sampling sediment during bioremediation. *Water Res.* 47: 6566-6573.

Yang, S., Pan, C., Tschaplinski, T. J., Hurst, G. B., Engle, N. L., Zhou, W., Dam, P., Xu, Y., Rodriguez, M., Jr., Dice, L., Johnson, C. M., Davison, B. H., and S. D. Brown. Systems biology analysis of Zymomonas mobilis ZM4 ethanol stress responses. *PLoS One* Available online. DOI: 10.1371/journal.pone.0068886

Yazdanpanah, F., Sokhansanj, S., Lim, J., Lau, A., Bi, X., Lam, P. Y., and S. Melin. 2013. Potential for flammability of gases emitted from stored wood pellets. Canadian J. Chem. Eng. Available online. DOI: 10.1002/cjce.21909

Young, R. A., Wood, C., Carlson-Lynch, H., Ripple, S., Ruijten, M., and E. V. Falke. 2013. Selected Monoisocyanates. Acute Exposure Guideline Levels. In: *Acute Exposure Guideline Levels for Selected Airborne Chemicals*, Volume 15 (pp. 200-276). National Research Council, The National Academies Press: Washington, D.C.

## Notable Achievements

Brennan Smith was a panel speaker during Hydrovision International 2013: Session 1C: Where is Tomorrow's Hydro? This session received an attendee choice award.

The Hg SFA team won the UT-Battelle Scientific Research Award, to be presented at the annual Awards Night celebration on November 15th. The team members are noted "for groundbreaking research in biotic and abiotic mechanisms of mercury methylation in the environment, leading to high-impact publications in *Science* and *Nature Geoscience*." Oak Ridge National Laboratory (ORNL) Staff involved are Liyuan Liang, Mircea Podar, Craig Brandt, Steven Brown, Dwayne Elias, Baohua Gu, Alexander Johs, Carrie Miller, Jerry Parks, Jeremy Smith, Scott Brooks, and Xiangping Yin.

On September 4th Rebecca Efroymson attended the Western North Carolina Bioenergy Field Day at the Mountain Crops Horticultural Research Station of North Carolina State University.

The user proposal entitled "High resolution cell wall structure and polymer analysis of Populus natural variants," submitted by Jay Chen and Wellington Muchero in response to the Department of Energy (DOE) scientific user facility Environmental Molecular Sciences Laboratory (EMSL) call for science theme proposals, has been approved. In this proposed research, X-ray photoelectron spectroscopy and a helium ion microscope will be used to analyze cell wall

structure and polymers in the stems and roots of natural variants of Populus. This will advance our understanding of the impact of aboveground cell wall chemistry on belowground cell wall structure and chemistry.

Jim Elkins gave an oral presentation entitled "A proteomics approach to identify mechanisms for biotransformation of furan aldehydes in Thermoanaerobacter pseudethanolicus 39E" at the 12th International Thermophiles Meeting in Regensburg, Germany, held September 8th-13th.

Yetta Jager was invited to present in a symposium, “Finding Simplicity in Complexity: Matching Models to Data” at the American Fisheries Society 2013 Little Rock, AR. September 9 – 13, 2013. She presented ”Modeling the viability of fishes in fragmented rivers” and participated in a panel discussion on the topic of how much complexity is needed.

Brennan Smith attended the National Hydropower Association (NHA) Hydraulic Power Committee Fall Meeting in Spokane, WA, during September 9th -11th.

On September 10th Cheryl Bast and Greg Zimmerman were interviewed by news reporter Samantha Manning of WATE-TV about chemical weapons, such as those alleged to have been used recently in Syria. Cheryl provided information about the toxicity of chemical nerve agents, including the lethal doses. Greg provided information about ongoing research at ORNL to assist the U.S. Army with its mission of destroying the entire U.S. chemical weapons stockpile. The TV segment aired on Knoxville’s Channel 6 nightly news program on September 10th and an article based on the interview can be viewed online at http://www.wate.com/story/23396531/ornl-employees-assist-us-with-destruction-of-chemical-weapons.

Bob Cook has been named to the Editorial Board for the journal *Scientific Data,* a new data publishing initiative from the Nature Publishing Group, the publishers of *Nature.* Scientific Data will launch in 2014 as an online-only, open access publication for descriptions of scientifically valuable datasets. Scientific Data is committed to improving access to research data, facilitating its interpretation and reuse, providing credit for data production and curation, and promoting reproducible research. For more information see http://www.nature.com/scientificdata/.

Santonu Goswami was invited to participate in a National Science Foundation (NSF)-sponsored workshop on cyberinfrastructure for polar sciences during September 10th-12th and organized by the Polar Geospatial Center at the University of Minnesota in Minneapolis, MN. Read more at http://www.pgc.umn.edu/meetings/cyber2013/main.

The proposal entitled "RNA-seq enabled Expression Quantitative Trait Locus (eQTL) in Populus," submitted by Jay Chen, Wellington Muchero, Xiaohan Yang, Priya Ranjan and David Weston in response to DOE Joint Genome Institute (JGI) Community Sequencing Program (CSP) has been approved. In this proposed research RNA-sequencing will be used to determine the transcriptomes of a total of 400 RNA samples isolated from the developing xylem of Populus trees derived from the progeny of a *Populus trichocarpa* × *Populus deltoides* pseudo-backcross pedigree. This will enable the gene expression Quantitative Trait Locus (eQTL) analysis. The resulting data will facilitate the rapid characterization of high-value QTLs already mapped in the same pedigree and the identification of transcriptional networks contributing to complex phenotypic traits of biomass quality, overall productivity and cell wall chemistry.

Shih-Chieh Kao attended a National Lab Analysis Capabilities for Quadrennial Energy Review meeting in Denver, CO, during September 12th-13th.

September 16th-19th Jim Lay attended the annual User Services Working Group (USWG) Technical Information Meeting at the National Aeronautics and Space Administration (NASA) Langley Atmospheric Sciences Data Center.

Bob Cook has been named to the Editorial Board for the journal *Scientific Data,* a new data publishing initiative from the Nature Publishing Group, the publishers of *Nature.* Scientific Data will launch in 2014 as an online-only, open access publication for descriptions of scientifically valuable datasets. Scientific Data is committed to improving access to research data, facilitating its interpretation and reuse, providing credit for data production and curation, and promoting reproducible research.

On September 17th-18th Virginia Dale presented "Opportunities to design biofuel systems for multiple environmental services" at the symposium on "Sustainable Biofuels in the Nearer Term" at the University of Minnesota.

Boualem Hadjerioua met with Michael McCall, the Program Manager for the Tennessee Valley Association (TVA). They met at ORNL on September 18th.

Brennan Smith attended a DOE headquarters program meeting in Washington, D.C., on September 18th -19th.

Amy Wolfe met with DOE-Energy Efficiency and Renewable Energy (EERE) Federal Energy Management Program (FEMP) program managers on September 24th in Washington, DC. Barry Shumpert joined one of those meetings by telephone.
Brennan Smith and Patrick O'Connor attended a Hydropower Cost Modeling project meeting with EUGC sub-committee industry representatives in Dallas, TX, during September 23rd -25th.

Yetta Jager and Tony King participated in the 2nd of 4 working group meetings on modeling Biotic Interactions hosted by the National Institute for Biological and Mathematical Synthesis at the University of Tennessee, Knoxville (UTK), held September 23rd-26th. Read more at http://www.nimbios.org/workinggroups/WG_biotic_interactions.

During September 24th-26th Virginia Dale presented at the Integrated Biomass Supply Systems (IBSS) Annual Meeting held at North Carolina State University, Raleigh, NC. Esther Parish also attended the meeting.

Amy Wolfe participated in full-day meetings of the American Association for the Advancement of Science (AAAS) Committee on Scientific Freedom and Responsibility (CSFR) on September 25th and 26th, at AAAS headquarters in Washington, DC. Amy is a CSFR committee member.

Boualem Hadjerioua attended the NHA Regional Meeting in Anchorage, AK, during September 25th -28th. Bo also gave a presentation entitled "Water Power for Alaska."

During September 30th-October 3rd Rebecca Efroymson presented a poster on sustainability

indicators for algal biofuels at the Algae Biomass Summit in Orlando, FL.

During September 30th-October 4th Keith Kline and Maggie Davis attended the International Organization for Standardization (ISO) PC 248 Plenary to review second committee draft of ISO 13065, Sustainability Criteria for Bioenergy.

**BESD New Arrivals**

Syeda Absar arrived in September to work as a post-Masters research associate with Ben Preston.

Nathan Cude arrived in September to work as a post-doctoral research associate with Dale Pelletier in Biosciences Division (BSD) Biological and Nanoscale Systems group.

Natalie Griffiths reported to work September, working with Paul Hanson in ESD's Ecosystem Science group.

Nolan Hertel, Professor of Nuclear and Radiological Engineering at Georgia Institute of Technology, accepted a Joint Faculty Appointment in the Environmental Sciences Division. His appointment is in the Risk and Regulatory Analysis Team in the Human Health Risk and Environmental Analysis Group. He will spend approximately 80% of the remaining calendar year in residence at ORNL and serve as the acting director of the Center for Radiation Protection Knowledge. He will provide leadership to the radiation protection dosimetry program as ORNL seeks to preserve and expand this important activity that has a 50-year history of excellence in the development and use of models and methodology for radiation protection.
Nolan has been at Georgia Institute of Technology since 1993 and prior to that was a faculty member at the University of Texas at Austin. He received his PhD in Nuclear Engineering from the University of Illinois at Urbana-Champaign and has supervised 42 MS students and 25 Ph.D. students in nuclear and radiological engineering. His research contributions include computational dosimetry, radiation detection, neutron spectroscopy, radiation dosimetry, radiological assessment, radiation shielding and radiation instrument modeling. Most recently he assessed the potential use of portal monitors to assess internal contamination of individuals potentially exposed by radiological dispersion device events and by mixed fission product releases from nuclear reactor accidents.

Sara Kleindienst arrived in September to work as a postdoctoral research associate with Tony Palumbo. Sara joins a multi-disciplinary team and will apply advanced and integrated techniques to advance scientific understanding of the ecophysiology of microorganisms relevant to DOE missions in remediation and long-term site stewardship, as well as in climate change.

Larry Millet arrived in September to work as a postdoctoral research associate with Mitch Doktycz in BSD's Biological and Nanoscale Systems group.

Cara Mousa reported to work in September, working with Stan Wullschleger in ESD.

Kaitlin Palla arrived in September to work as a post-Masters research associate in the Plant Systems Biology group with Xiaohan Yang. Kaitlin will work on creating gene constructs for

genetic transformation, performing transient and stable transformation experiments to transfer CAM genes into Arabidopsis, poplar and tobacco plants, and characterizing transgenic plants using molecular and physiological approaches.

Dave Ussery reported to work in September, working as the group leader in BSD's Comparative Genomics group.

Makhan Virdi, post-doctoral fellow at ORNL, joined the ORNL DAAC team to assist with the MODIS subsetting and visualization tools.