

IGB NEWS

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Image Of The Month
IP @ IGB
Administrative News

Volume 7, Number 6

UPCOMING EVENTS

IGB Pioneers in Genomic Biology Seminar (BSD)

Mammalian Synthetic Biology from Parts to Modules to Therapeutic Systems

October 21, 2014, 12:00 p.m.

612 Institute for Genomic Biology

Ron Weiss, PhD

Massachusetts Institute of Technology
Department of Biological Engineering

Genome Day

A day of DNA, genes, genomes, and evolution

November 1, 2014, 1:00 p.m.

Orpheum Children's Science Museum
346 North Neil Street, Champaign

Everyone is welcome for a free day of exhibits and activities designed to present the environment, energy use and production, health, and fundamental research at the IGB in an approachable manner for all ages.

IGB Seminar (GEGC)

Using High-Throughput Phenotyping to Characterize Crop Abiotic Stress Responses

November 11, 2014, 12:00 p.m.

612 Institute for Genomic Biology

Craig Yendrek, PhD

University of Illinois,
Institute for Genomic Biology

IGB Seminar

New Techniques for Multiple Sequence Alignments with up to 1,000,000 Sequences

November 18, 2014, 12:00 p.m.

612 Institute for Genomic Biology

Tandy Warnow, PhD

University of Illinois, Urbana-Champaign
Department of Bioengineering

FEATURED NEWS



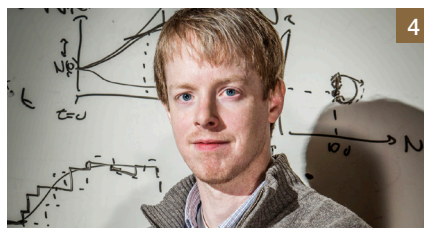
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Search For Better Biofuels
Microbes Leads to Human Gut



3

Climate Relicts May Help to
Understand Climate Change



4

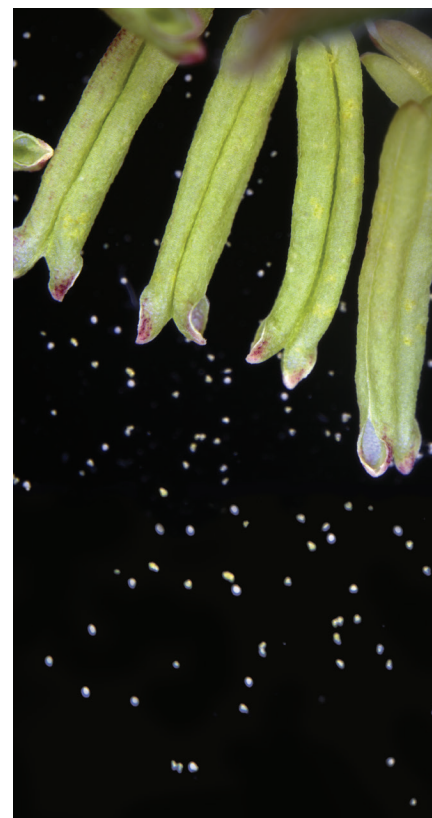
Profile:
James O'Dwyer



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On the Grid:
Happenings at IGB

IMAGE OF THE MONTH



This month's image, "Corn Anther and Pollen" was produced by members of Pollen Power!, the IGB summer day camp for middle school girls.

The campers used the Zeiss Axiozoom V16, and were ably assisted by Andrew Leakey of Plant Biology, and IGB Core Facilities members Glenn Fried and Mayandi Sivaguru.

IGB News

Share your news with the IGB. Send ideas on stories, articles, and features to nvasi@illinois.edu.



Search For Better Biofuels Microbes Leads to the Human Gut

Scientists have scoured cow rumens and termite guts for microbes that can efficiently break down plant cell walls for the production of next-generation biofuels, but some of the best microbial candidates actually may reside in the human lower intestine, researchers report.

Their study, reported in the *Proceedings of the National Academy of Sciences*, is the first to use biochemical approaches to confirm the hypothesis that microbes in the human gut can digest fiber, breaking it down into simple sugars in order to ferment them into nutrients that nourish human cells. These findings have significance for human health but also for biofuels production, since the same sugars can be fed to yeast to generate ethanol and other liquid fuels. The human microbes appear to be endowed with enzymes that break down a complex plant fiber component more efficiently than the most efficient microbes found in the cow rumen, the researchers report.

Their work in cows led the researchers to the human microbes, said University of Illinois animal sciences professor and Institute for Genomic Biology faculty member Isaac Cann, who led the new analysis with his colleagues, animal sciences professor Roderick Mackie and M.D./Ph.D. student Dylan Dodd. Cann also is a microbiology professor, and the Deputy Director of the Energy Biosciences Institute. Dodd is now at Stanford University.

"In looking for biofuels microbes in the cow rumen,

we found that *Prevotella bryantii*, a bacterium that is known to efficiently break down (the plant fiber) hemicellulose, gears up production of one gene more than others when it is digesting plant matter," Cann said.

When searching a database for similar genes in other organisms, the researchers found them in microbes from the human gut. The team focused on two of these human microbes, *Bacteroides intestinalis* and *Bacteroides ovatus*, which belong to the same bacterial phylum as *Prevotella* from the cow.

(above) Microbiology professor Isaac Cann, who with colleagues found human gut bacterial enzymes able to break down hemicellulose

"We expressed the human gut bacterial enzymes and found that for some related enzymes, the human ones actually were more active (in breaking down hemicellulose) than the enzymes from the cow," Cann said.

When the researchers looked more closely at the structure of the human enzymes, they saw something unusual: many single polypeptide (protein) chains actually contained two enzymes, one of which was embedded in the other. Further analysis of the most important protein revealed that the

embedded component was a carbohydrate-binding module (CBM), which, as its name implies, latches on to carbohydrates such as hemicellulose. This enzyme shreds the plant fiber hemicellulose so that other enzymes can work on it to break it down into its unit sugars.

Working with U. of I. biochemistry professor Satish Nair, the researchers also noticed that the CBM "put a kink" in the fiber when it bound to it. This bending action may bring the fiber close to the other enzyme in the protein so it can get to work breaking the bonds between the sugars. Further research is needed to confirm this hypothesis, Cann said.

The study points to human microbes as a potentially potent source of microbes that can aid in biofuels production, Cann said.

"In addition to finding microbes in the cow rumen and termite gut, it looks like we can actually make some contributions ourselves," he said. "And our bugs seem to have some enzymes that are even better than those in the cow rumen."

The Energy Biosciences Institute (EBI) and the U.S. Department of Agriculture funded this research. The EBI is a public-private collaboration funded with \$500 million for 10 years from the energy company BP and includes researchers from Illinois, the University of California at Berkeley and the Lawrence Berkeley National Laboratory. ■

Written by Diana Yates. Photo by L. Brian Stauffer.

RESEARCH



Scott Woolbright is an IGB Fellow with the Genomic Ecology of Global Change research theme, whose work includes climate related gene expression profiling.

Climate Relicts May Help Researchers Understand Climate Change

While hiking through the Ozarks' characteristic oak and hickory forests as a teenager, ecologist Scott Woolbright discovered something decidedly uncharacteristic for the region: prickly pear cacti growing on an exposed, rocky ledge.

In a recent paper published in *Trends in Ecology and Evolution*, Woolbright describes how populations and communities like these, known as climate relicts, can help scientists understand how ecological communities are affected by climate change.

Rocky, well-drained slopes in the Ozarks often create habitat "islands" within the surrounding forest known as glade ecosystems, said Woolbright, who is a postdoctoral fellow at the IGB in the Genomic Ecology of Global Change research theme. In the Ozarks, glades often help to preserve isolated communities of cacti and other desert and prairie species that dominated the area during the Hypsithermal, a period of warming that occurred four to eight thousand years ago.

Ecologists have recently begun to discuss climate relicts as potential "natural laboratories" for studying the evolution of single plant species. Woolbright and co-authors suggest expanding such studies to include interactions between plants and other organisms that can drive community and ecosystem patterns.

It can be very difficult to replicate the long-term effects of climate change over very large geographic areas in the laboratory or field. But isolated climate relicts that are distributed across landscapes create "natural experiments" that help to overcome these problems of scale.

Using the genomic technologies he's learned at the IGB, Woolbright hopes to develop a research program that investigates climate-driven changes in

species interactions at the gene level. While such a program would contribute to basic community and ecosystem research, it also has significant im-

"Interactions with other species can play very important roles in species survival. If we don't take those interactions into account, we can miss things that are really important."

plications for ecological conservation and restoration.

"We're learning that you often can't just go out and preserve a single species," Woolbright said. "Interactions with other species can play very important roles in species survival. If we don't take those interactions into account, we can miss things that are

really important."

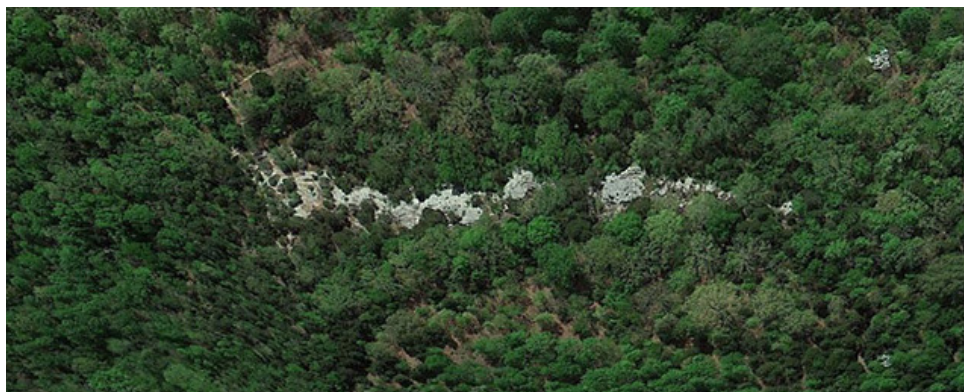
Many climate relicts are threatened by small population size, ongoing environmental change in already stressful environments, invasions from species in adjacent non-relict communities, and human encroachment.

Woolbright said it will take the cooperation of many stakeholders to conserve relicts for their historical, ecological and aesthetic value.

Thomas Whitham, Catherine Gehring, and Gerard Allan from Northern Arizona University as well as Joseph Bailey from the University of Tennessee were co-authors in this study.

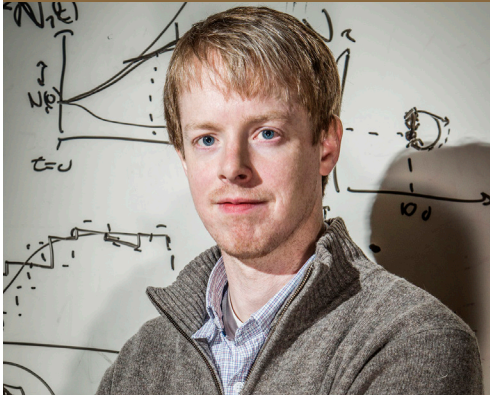
The IGB's fellows program supported Woolbright, who was inspired to pursue a career in climate change ecology by his encounter with Ozark glades. ■

Written by Claire Sturgeon. Photo by Kathryn Coulter. Satellite image courtesy of Google Earth.



A satellite image of a glade at Round Bluff Natural Preserve in Shawnee Hills, Johnson County, Illinois, one of several glade ecosystems that occur throughout Southern Illinois.

PROFILE



James O'Dwyer is an Assistant Professor of Plant Biology, whose research focuses on understanding how ecological processes drive the patterns of species and organisms that occur in nature.

James O'Dwyer: From Physics to Ecological Theory

James O'Dwyer, an Assistant Professor of Plant Biology at the University of Illinois and member of the Institute for Genomic Biology, envisions a new approach for modeling the patterns and dynamics of ecological systems—things like how species are distributed through space and time.

At one end of the spectrum are tractable models with few parameters, but that can get basic predictions wrong, and at the other end are models that parameterize every detail, an almost impossible feat.

His challenge, and that of others in his field, is to take the best parts from these two schools of thought and combine them into a theoretical framework that falls somewhere in the middle.

"It's exciting because all these variables make these questions really challenging," O'Dwyer said. "But it is hard to know when you are leaving out mechanisms or variables that are important. I think the daunting part is how do we find ways to identify which are the key variables?"

The questions his team works on are biological. But solutions to these problems can come from combining the vast stores of knowledge biologists have accumulated on natural ecosystems, with tools from physics and mathematics for the analysis of complex systems.

O'Dwyer earned his doctorate in Physics from the University of Cambridge before moving onto a postdoctoral appointment at the University of Oregon where he worked on microbial ecology and evolution.

"Ecology is much harder because it doesn't have any of the simplifying features that you find in physics," O'Dwyer said. "Everything is different. Everything is contingent. Actually finding ways to get a handle on modeling in ecology is harder."

About 250 years after an apple inspired Isaac New-

ton, Albert Einstein's Theory of General Relativity revolutionized our understanding of gravity in the same way that Henry Ford transformed transportation.

"Einstein's gravity goes beyond Newton's, it doesn't completely disregard it. It allows you to predict more and create a more cohesive picture overall,"

"We have simplified ecological models that capture some phenomena, but we're not completely happy with them because other predictions are clearly wrong. How do we take one step beyond this? That can be hard, and it might demand a new way of thinking."

said O'Dwyer. "We have simplified ecological models that capture some phenomena, but we're not completely happy with them because other predictions are clearly wrong. How do we take one step beyond this? That can be hard, and it might demand a new way of thinking."

In a recent paper in *Ecology Letters*, O'Dwyer improved a 35-year-old ecology model that helps scientists understand how species evolve over decades to millions of years. But, as he will tell you, it's just a small step in the right direction, not the ecological equivalent of relativity theory.

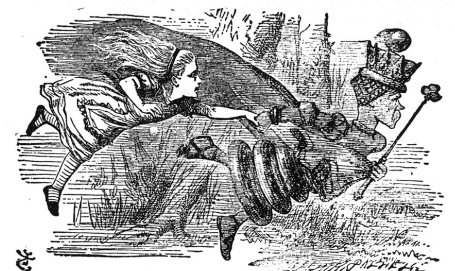
"It is an incremental step at this point. But we will need those conceptual leaps that incorporate the best parts of different models to really understand complex ecological systems better," he said in a recent news release.

O'Dwyer was also an Omidyar Fellow, at the complexity-themed Santa Fe Institute, before joining the University of Illinois as an assistant professor in the School of Integrative Biology.

"One great thing about being here is that you have people doing interesting biology across different schools, different departments, and themes at the IGB," O'Dwyer said. "I could probably meet with somebody for coffee every week and talk about something interesting and still be going at this point. And that's what I have been doing."

"The nice thing about being here, is even though this university is huge, it is an extremely friendly and collegial place," he continued. "That played a big part in coming here. It's nice that Illinois combines these two things. I really found that optimal combination of a big place with a lot of interesting science going on that also felt very friendly." ■

Written by Claire Sturgeon. Photo by L. Brian Stauffer.



O'Dwyer's collaboration with the National University of Singapore on an ecology model to better understand how species evolve was inspired by the Red Queen from Lewis Carroll's *Through the Looking Glass*.
Read more: <http://bit.ly/1qsHgEC>

ON THE GRID

HAPPENINGS AT THE IGB

AWARDS



UNIVERSITY SCHOLARS

Paul Hergenrother, Professor of Chemistry (Cellular Decision Making in Cancer) and Sandra Rodriguez-Zas, Professor of Animal Sciences (Gene Networks in Neural & Developmental Plasticity) have been named as University Scholars, a program created to recognize the university's most talented teachers, scholars and researchers.

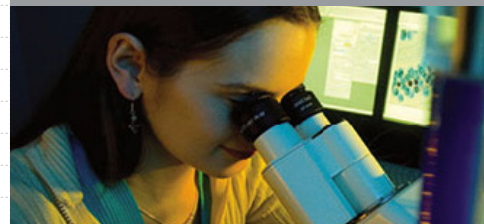
NEW ARRIVALS



AUSTIN CYPHERSMITH

Austin Cyphersmith joins the IGB as a Research Specialist in the IGB Core Facilities. He received his Ph.D. in Chemistry from the University of Massachusetts Amherst in 2012. He is currently working on bringing STED microscope capability to Core Facilities.

CEM



REGISTER NOW

Registration is now open for the Certificate in Entrepreneurship and Management (CEM) FastTrac® TechVenture™ Spring 2015 program. The program is designed for entrepreneurial minded MD students, DVM students, PhD students, and Post-Doctoral Associates in engineering, life sciences, and related disciplines who are interested in understanding the business, economic, and legal issues in scientific and high technical start-up ventures. Registration is due December 12, 2014 and classes begin January 10, 2015. More information and registration is available at <http://www.igb.illinois.edu/cem/>.

GENOME DAY



SAVE THE DATE VOLUNTEERS NEEDED

Genome Day is an opportunity for the community to learn about DNA, genes, genomes, and evolution at the Orpheum Children's Science Museum on November 1, 2014. Activities will be designed to present the energy use and production, environment, health, and fundamental research at the Institute for Genomic Biology in an approachable manner for all ages. Admission to the event and museum will be free.

Those interested in volunteering at the event can fill out the online form [here](#). For more information contact Sara Haag, Coordinator of Outreach, sehaag2@illinois.edu.

NIKKI GENTRY

Nikki Gentry joins the IGB supporting the Biosystems Design research theme and the Regenerative Biology and Tissue Engineering research theme. Before joining IGB, Nikki worked as a Construction Management Project Assistant for the Capital Programs Department. Prior to joining the University of Illinois at Urbana-Champaign staff, she spent over 17 years in customer service and office managerial settings.



VIJAY SINGH

Professor Vijay Singh joins the IGB as an affiliate in the Genomic Ecology of Global Change (GEGC) Research Theme. Dr. Singh is a Professor in the Department of Agricultural and Biological Engineering, and Associate Director of Engineering in the Center for Advanced BioEnergy Research. His research interests include economic analysis and modeling of bioprocessing and the design of processes for corn fractionation.

WORKSHOP



PEPG ECOPHYSIOLOGY WORKSHOP, PORTUGAL

The PePG workshop, organized by the Society for Experimental Biology, provides a week long training for graduate students and post-doctoral fellows in analyzing the physiology of plants, particularly photosynthetic efficiency, in the field. The IGB GEGC theme provided roughly 25% of the speakers for the program, a testament to Illinois' leadership in these fields. In the photo above postdoc Justin McGrath ably assists plant biology professor Steve Long with a water demo.

ON THE GRID

HAPPENINGS AT THE IGB

IP @ IGB

TROL ACT IS BETTER FOR UNIVERSITIES

Many are calling for reform of the nation's patent laws. Pressure has been placed on Congress to enact legislation that will curb abusive litigation practices employed by certain nonpracticing entities. This development in patent law has garnered a great deal of media attention and it directly affects University of Illinois research.

Nonpracticing entities are organizations that enforce patent rights but do not manufacture products or supply services based upon the patents in question. A patent troll is one type of nonpracticing entity. Patent trolls amass large IP portfolios and make money by threatening baseless infringement lawsuits. Other types of nonpracticing entities include universities and research organizations, as well as individual inventors who lack the resources to develop their technology.

Congress has made repeated attempts to address perceived weaknesses in patent law, but early efforts were broad and potentially impeded the ability of legitimate nonpracticing entities to protect their IP. For example, the Innovation Act of 2013 was an expansive reform effort aimed at reducing frivolous patent litigation brought by patent trolls. The bill created heightened pleading standards that made it more difficult for nonprac-

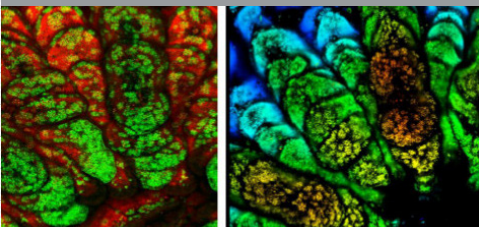
ting entities to bring lawsuits against infringers. Because the bill addressed nonpracticing entities in general, universities worried that the provision would hinder them from being able to defend their patents.

Unable to garner sufficient support for the Innovation Act, the House has introduced a new bill that is much narrower in scope. The TROL Act (Targeting Rogue and Opaque Letters Act of 2014) does not hinder a university's ability to defend its IP. Rather, the bill serves to rein in abusive patent demand letters sent by nonpracticing entities in bad faith.

This new reform effort is much more focused and therefore better for universities. It preserves a university's ability to go after infringers while disincentivizing trolls from threatening litigation. The proposed legislation has won support from organizations including the Association of American Universities, the American Council on Education, and the Association of Public and Land-grant Universities. Congress will vote on this bill in the coming months.

Do you have questions about patenting your research? Please contact Brad Edwards (ebeward@illinois.edu) or Lisa Dhar (ldhar10@illinois.edu) of the Office of Technology Management.

CORALS



MICROSCOPY METHODS REVEAL POLYP TISSUE MORPHOLOGY

Professor of geology Bruce Fouke, with lead authors Mayandi Sivaguru and Glenn Fried of the IGB Core Facilities, have published a new

paper on the imaging techniques to determine the three-dimensional morphology and cellular structure of polyp tissues in Caribbean reef building corals in the September edition of JoVE. Several approaches were used, including fluorescence microscopy, serial block face imaging, and two-photon confocal laser scanning microscopy.

A technical video supplemented the manuscript, and can be [viewed here](#). There is also a helpful overview of the project contained within an overview of the September summary of JoVE, which can be [viewed here](#).

PHOTOSYNTHESIS



ILLINOIS RESEARCH BOOSTS CORNELL UNIVERSITY FINDINGS

Based on work under an NSF grant led by plant biologist Steve Long with postdoc Justin McGrath called Exploiting Prokaryotic Proteins (EPP), Cornell University has published a new paper in *Nature* which, when taken with the work of Long's group involving genetically modified tobacco plants field tested in Illinois, could provide a massive potential for an increase in photosynthesis.

Read the [Cornell release](#), and the *Nature* paper that utilizes the Illinois research.

EVENT



IGB HALLOWEEN PARTY

IGB students, faculty, staff and families are welcome to join us for the annual IGB Halloween Party.

As always, plenty of candy will be on hand and prizes will be awarded for best costume.

Thursday, October 30
4:00 pm
Array Cafe
IGB concourse level

ADMINISTRATIVE NEWS

BUSINESS

2014 CAMPUS CHARITABLE FUND DRIVE

The 2014 Campus Charitable Fund drive is underway. Please consider contributing! Take a moment to read the brochure by visiting the website at www.ccfid.illinois.edu.

A few things you might want to remember:

- **We encourage everyone to give by on-line payroll deduction.**
If you are giving by payroll deduction, please remember to type in the annual amount you wish to donate. There is no limit to the number of agencies that you may select, but the minimum ANNUAL donation is \$24.00 (\$2 per month).
- When making a one-time donation, make your check(s) payable to the umbrella organization(s) listed on the Pledge Form, not to designations within the umbrella.

If you have any questions throughout the campaign, please contact Jacinda King at 244-2276 / jking@igb.illinois.edu.

The deadline is November 7, 2014. ■

OPERATIONS & FACILITIES

UPDATING YOUR IGB INFORMATION

All new members to the IGB must fill out an entry form and be properly registered. However, there are occasions when this information will need to be updated. Please email Kathy Millage, IGB Operations & Facilities Office Manager, at kmillage@illinois.edu should any of the following occur:

- Your theme or status (undergrad, grad, post-doc, etc.) has changed since you originally submitted your IGB entry form. You may need to submit an updated IGB entry form.
- You are leaving IGB permanently. An IGB exit form should be completed.
- Your IGB key(s) are no longer needed. A form is required to receive your refundable \$20.00 key deposit.

FIRE ALARM TESTING

In order to meet the University Campus Code Compliance & Fire Safety requirements, Facilities & Services (F&S) will be testing the fire alarm system in the IGB building starting on Monday, October 20th through Friday October 24th. On Wednesday, October 22nd at 7:00 AM F&S will test the alarm horns and flashers. There will be no need to evacuate the building during this test. Please post this notice in your areas for any employees that may not have access to this information. ■

UNIVERSITY LIBRARY

DEPARTMENT OF ENERGY (DOE) PUBLIC ACCESS PLAN

In response to the White House's Office of Science and Technology Policy (OSTP) memo "Increasing Access to the Results of Federally Funded Scientific Research," the DOE released a Public Access Plan this summer. The plan presents the DOE's plans for public access to scientific publications and digital scientific data generated with DOE funding.

The DOE is hosting a portal and search interface tool, the Public Access Gateway for Energy and Science (PAGES), for unclassified scholarly publications resulting from DOE funding. The DOE released a beta version of PAGES in August, and since October 1, 2014, the DOE includes PAGES submission requirements in award agreements.

The DOE is phasing in the requirements for scientific data. The first phase began October 1, 2014, with data management requirements appearing in funding solicitations and invitations issued by the DOE's Office of Science. Data management plans (DMPs) must now be submitted with DOE Office of Science proposals, and these DMPs should address whether and how data generated in the proposed research will be shared and preserved. If you need to create a DMP, remember you can use the DMPTool (<https://dmptool.org/>) to step you through the DMP requirements of the DOE (and many other funding agencies).

The DOE is the first federal agency to publicly respond to that OSTP memo, but that memo applies to all federal agencies with more than \$100 million in R&D expenditures, so in time, other agencies will be announcing their new plans and requirements.

If you have questions about any of this, please contact Sarah Williams, the Life Sciences Data Services Librarian, at scwillms@illinois.edu. ■

COMMUNICATIONS

PUBLICATIONS

A list of recent publications is maintained on the IGB website at <http://www.igb.illinois.edu/news/publications>, but for a comprehensive list of publications a much more robust resource can be found on the IGB RefShare page, from the link at the top of that same page.

New publication info is added on a regular basis, and in order to continue to keep the database as accurate as possible, if you are an author please add your connection to the IGB in your author byline. Not only will this greatly help track potential newsworthy publications, it also increases the possibility of press coverage for the publication and for the IGB! ■

ADMINISTRATIVE NEWS

RECENT PUBLICATIONS

Kang SS, Jeraldo PR, Kurti A, et al. Diet and exercise orthogonally alter the gut microbiome and reveal independent associations with anxiety and cognition. *Mol Neurodegener.* 2014;9:36.

Wichelecki DJ, Vendiola JAF, Jones AM, Al-Obaidi N, Almo SC, Gerlt JA. Investigating the physiological roles of low-efficiency D-mannonate and D-gluconate dehydratases in the enolase superfamily: Pathways for the catabolism of L-gulonate and L-idonate. *Biochemistry (N Y).* 2014;53(35):5692-5699.

Caravas J, Wildman DE. A genetic perspective on glucose consumption in the cerebral cortex during human development. *Diabetes Obes Metab.* 2014;16:21-25.

Verdu P, Pemberton TJ, Laurent R, et al. Patterns of admixture and population structure in native populations of northwest north america. *PLoS Genet.* 2014;10(8):e1004530.

Zhang G, Kong II, Kim H, Liu J, Cate JH, Jin YS. Construction of a quadruple auxotrophic mutant of an industrial polyploidy *saccharomyces cerevisiae* using RNA-guided Cas9 nuclease. *Appl Environ Microbiol.* 2014.

Zopf DA, Mitsak AG, Flanagan CL, Wheeler M, Green GE, Hollister SJ. Computer aided-designed, 3-dimensionally printed porous tissue bioscaffolds for craniofacial soft tissue reconstruction. *Otolaryngol Head Neck Surg.* 2014.

Byrne MB, Leslie MT, Gaskins HR, Kenis PJ. Methods to study the tumor microenvironment under controlled oxygen conditions. *Trends Biotechnol.* 2014.

Zhou Y, Lin N, Zhang B. An iteration normalization and test method for differential expression analysis of RNA-seq data. *BioData Min.* 2014;7:15-0381-7-15. eCollection 2014.

Doroghazi JR, Albright JC, Goering AW, et al. A roadmap for natural product discovery based on large-scale genomics and metabolomics. *Nat Chem Biol.* 2014.

Luo Y, Cobb RE, Zhao H. Recent advances in natural product discovery. *Curr Opin Biotechnol.* 2014;30C:230-237.

Ha T. Single-molecule methods leap ahead. *Nat Methods.* 2014;11(10):1015-1018.

Caliari SR, Harley BA. Collagen-GAG scaffold biophysical properties bias MSC lineage choice in the presence of mixed soluble signals. *Tissue Eng Part A.* 2014;20(17-18):2463-2472.

Lax S, Smith DP, Hampton-Marcell J, et al. Longitudinal analysis of microbial interaction between humans and the indoor environment. *Science.* 2014;345(6200):1048-1052.

Lin Y, Chomvong K, Acosta-Sampson L, et al. Leveraging transcription factors to speed cellobiose fermentation by *saccharomyces cerevisiae*. *Bio-technology for Biofuels.* 2014;7:126.

Kim T-, Sun J, Lu S, Zhang J, Wang Y. The regulation of beta-adrenergic receptor-mediated PKA activation by substrate stiffness via microtubule dynamics in human MSCs. *Biomaterials.* 2014;35(29):8348-8356.

Rosenthal DM, Ruiz-Vera UM, Siebers MH, Gray SB, Bernacchi CJ, Ort DR. Biochemical acclimation, stomatal limitation and precipitation patterns underlie decreases in photosynthetic stimulation of soybean (glycine max) at elevated [CO₂] and temperatures under fully open air field conditions. *Plant Science.* 2014;226:136-146. ■

SAFETY

SECURITY UPDATE

Courtesy of Steffan Nass, FBI WMD Coordinator, Springfield Division

Due to the sensitive nature of the research conducted at the Institute for Genomic Biology, there exists a desire by some bad actors to acquire access to such through fraudulent means. Every person, from principle investigator to graduate assistant, at the IGB may be targeted through an e-mail Phishing attack.

E-mail is inherently insecure and the overwhelming majority of recent computer intrusions utilized some sort of Phishing attack. Never click on a link or attachment from an unknown sender, or that from a friend that you were not expecting, without first verifying its validity via telephone.

If you notice any suspicious activity or receive any such unsolicited communications, report it immediately to IGB security personnel.

To best secure your research in this digital age, simply remember to ARM yourself:

- A:** Avoidance. Get unnecessary data off the network or other storage. Do not expose more than is necessary.
- R:** Resilience. Have sufficient backup data, including offline, and equipment to survive an attack.
- M:** Mitigation. Have a plan to recover from an attack. ■



IGB News is published by the IGB Communications Office.
Contact Nicholas Vasi (nvasi@illinois.edu)
www.igb.illinois.edu 14.108