IGB NEWS

Upcoming Events

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Image Of The Month

IP @ IGB

Department Announcements

Volume 9 Number 4

UPCOMING EVENTS

IGB Seminar (GEGC)

Empowering the Translation of Genomic Discoveries into Mainstream Practices: A Scalable Workhorse Technology for Accurate Quantitative Mutation Detection and Targeted Genomic Analysis

August 23, 2016, 12:00 p.m.

612 Carl R. Woese Institute for Genomic Biology

Damla Bilgin
Agena Bioscience

IGB Pioneers Seminar

Title TBA

August 30, 2016, 12:00 p.m.

612 Carl R. Woese Institute for Genomic Biology

Richard A. Gibbs, PhD
Baylor College of Medicine
Director, Human Genome Sequencing Center

IGB Pioneers Seminar (BCXT)

Title TBA

September 6, 2016, 12:00 p.m.

612 Carl R. Woese Institute for Genomic Biology

Nicholas V. Hud, PhD
Georgia Institute of Technology
Director, NSF Center for Chemical Evolution

IGB Entrepreneurship Lecture

Title TBA

September 13, 2016, 12:00 p.m.

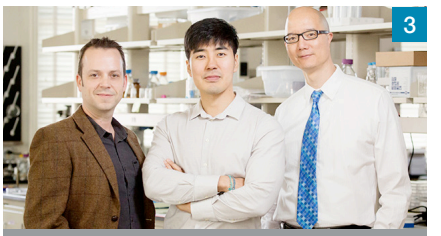
612 Carl R. Woese Institute for Genomic Biology

Michael S. Kinch, PhD
Washington University
Associate Vice Chancellor and Director,
Center for Research Innovation in Business, and
Professor of Radiation Oncology,
School of Medicine

FEATURED NEWS

2

Endangered venomous mammal predates dinosaurs' extinction



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Shape of tumor may affect whether cells can metastasize

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Grant News: PETROSS

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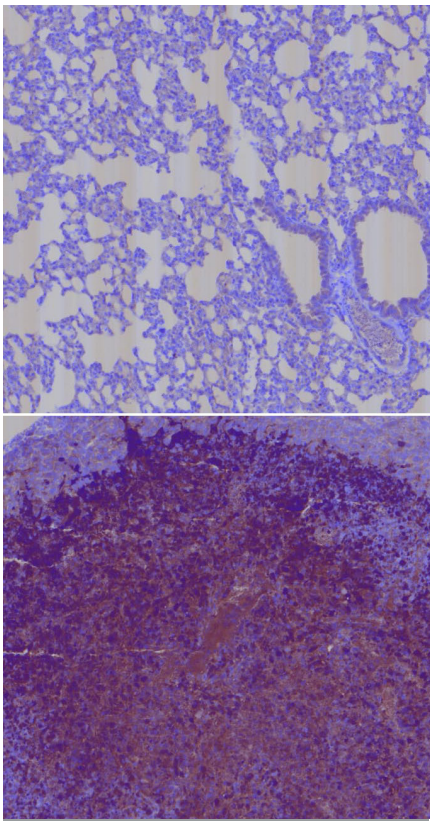
On the Grid: Happenings at IGB

IMAGE OF THE MONTH



This month's image features two different types of staining of tissue sections (Caspase-3 DAB and Hematoxylin) of mouse tumors, using the Imaging Cytometer (iCyte). The iCyte allows one to quantify the signal intensity of Caspase-3 in tumor vs non tumor cells. It is a laser scanning cytometer which combines digital microscopy with image processing and the real time population data analysis of analytical cytometry.

Image courtesy of Kingsley Boateng of IGB Core Facilities.

IGB News

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

FEATURE

Endangered venomous mammal predates dinosaurs' extinction, study confirms

The University of Illinois and University of Puerto Rico have completely sequenced the mitochondrial genome for the *Hispaniolan solenodon*, filling in the last major branch of placental mammals on the tree of life.

The study, published in *Mitochondrial DNA*, confirmed that the venomous mammal diverged from all other living mammals 78 million years ago, long before an asteroid wiped out the dinosaurs.

"It's just impressive it's survived this long," said co-first author Adam Brandt, a postdoctoral researcher at Illinois. "It survived the asteroid; it survived human colonization and the rats and mice humans brought with them that wiped out the solenodon's closest relatives."

The study also supports recent findings that the Dominican Republic contains genetically distinct northern and southern populations that should be conserved as separate sub-species. Furthermore, the study found that the southern population has little diversity, whereas the northern population is much more diverse.

An offspring's nuclear DNA is a mixture of genes from each parent while mitochondrial DNA is passed directly from mother to offspring without changes, creating a genetic record that researchers can use to trace back the lineage of organisms.

Because solenodons are endangered, it is difficult to acquire DNA. Working with colleagues at several universities in the Dominican Republic, UPR Professor of Genetics Taras Oleksyk and his team collected samples by laying on the ground and waiting for the solenodons to crawl across their bodies.

Brandt and co-first author Kirill Grigorev, a bioinformatician at the Caribbean Genome Center, analyzed the samples using two different methods to determine the sequence of nucleotides (building blocks that make up DNA) of the solenodon's mitochondrial genome. Independently, the two methods produced the exact same results.

ZooDom veterinarian Adrell Núñez (center) draws blood from a solenodon for DNA samples. Researchers caught the venomous mammal by allowing it to walk across their bodies at night in the forests of the Dominican Republic. Pictured from left to right: Nicolas De J. Corona, Adrell Núñez, Taras K. Oleksyk, and Yimell Corona.

A previous study used a different set of genes to estimate that solenodons diverged from mammals during the Cretaceous Period 76 million years ago. Working with an expert at Texas A&M, this study used a very different method but still established a similar estimate: 78 million years.

Interestingly, these two estimates align with a hypothesis regarding how the solenodon came to inhabit the island of Hispaniola. Some geologists speculate that the island was part of a volcanic arc connected to Mexico 75 million years ago and over time the arc has moved eastward.

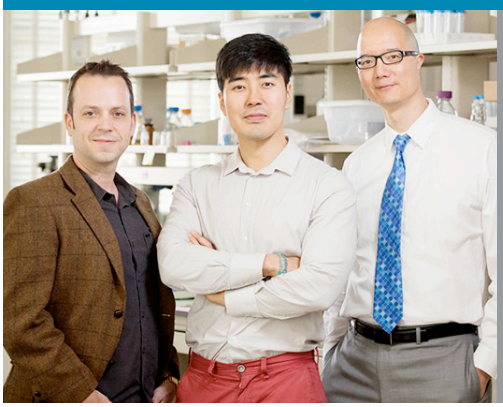
"Whether they got on the island when the West Indies ran into Mexico 75 million years ago, or whether they floated over on driftwood or whatever else much later is not very clear," said lead researcher Alfred Roca, a professor of animal sciences and member of the CGRH theme at IGB.

What they do know is that any close ancestors are long gone, and today's solenodons are the only remnant of a very ancient group of mammals. While the solenodon is venomous and resembles a "giant rat with Freddy Krueger claws" (according to Roca), it evolved in the absence of carnivores. Today, it is threatened by cats and dogs introduced by humans as well as habitat loss.

The Dominican Republic made this study possible by supporting the collection of samples. Authors also include: Yashira M. Afanador-Hernández; Liz A. Paulin; William J. Murphy; Adrell Núñez; Aleksey Komissarov; Jessica R. Brandt; Pavel Dobrynin; J. David Hernández-Martich; Roberto María; Stephen J. O'Brien; Luis E. Rodríguez; and Juan C. Martínez-Cruzado.

The article "Mitogenomic sequences support a north–south subspecies subdivision within *Solenodon paradoxus*" is published **online** in *Mitochondrial DNA*.

Written by Claire Benjamin. Photo by Taras Oleksyk and Yashira Afanador.



Illinois researchers found that the shape of a tumor may play a role in how cancer cells become primed to spread. From left: materials science and engineering professor Kristopher Kilian, graduate student Junmin Lee and veterinary medicine professor Timothy Fan.

Shape of tumor may affect whether cells can metastasize

Only a few cells in a cancerous tumor are able to break away and spread to other parts of the body, but the curve along the edge of the tumor may play a large role in activating these tumor-seeding cells, according to a new University of Illinois study.

Using engineered tissue environments in various shapes and patterns, the study of skin cancer found that the more curved the cell cultures were, the more cancer cells at the edges displayed markers of stem cell characteristics – the key to spreading to other tissues. This has potential for furthering our understanding of cancer as well as developing personalized treatment plans.

Led by Kristopher Kilian, a professor of materials science and engineering (RBTE), and Timothy Fan, a professor of veterinary medicine (ACPP), the researchers published their findings in the journal *Nature Materials*.

"The most dangerous part of cancer is metastasis," Kilian said. "Some cells that we call cancer stem cells adopt deadly characteristics where they can travel through the bloodstream to other tissue and form new tumors. There's a need for ways to find these cells and to study them, and importantly, to develop drugs that target them, because these cancer stem cells are resistant to chemotherapy drugs that target the main tumor. This causes recurrence: The cancer comes back."

Kilian's group specializes in tissue engineering to create models of tumors, in order to more accurately study cancer processes in a culture dish. In the new study, the researchers cultured mouse skin-cancer colonies on various 2-D and 3-D environments of different shapes and patterns to see if the tumor shape contributes to activation of cancer stem cells, and to see where in the tumor the stem cells appeared.

They found that cancer stem cells seemed to appear in the highest numbers along the edges of the engineered tumor environments, particularly where there were corners and convex curves.

"It was actually quite surprising," Kilian said. "Normal stem cells prefer a soft, squishy, internal position. So for cancer, everyone had assumed that the cancer stem cells were in the middle of the tumor. We found that geometric constraints, like you would have where a tumor touches healthy tissue, seem to activate these cancer stem cells at the perimeter."

The researchers did a number of tests in their engineered environments to confirm tumor-spreading ability, such as genetic analysis. They also tested other cancer lines – human cervical, lung and prostate cancers – and found that they responded to the patterned tumor environments in the same way.

> *"We found that geometric constraints, like you would have where a tumor touches healthy tissue, seem to activate these cancer stem cells at the perimeter."*

Then Kilian's group teamed with Fan's group to test the skin-cancer stem cells in live mice, and found that the cells taken from the patterned environments were much more likely to cause tumors than cells taken from a conventional flat dish.

"We found that many more mice developed tumors when given the cells that we had engineered to have these stem cell characteristics, and they had a much higher incidence of metastasis in the lungs," Kilian said. "In a tumor, similarly, regions that develop these kinds of shapes may activate cells that can then escape and form more tumors. This may allow surgeons to look at the perimeter of a growing tumor and use the shape to guide their assessment of which regions could be more problematic – where they need to take out more tissue around the tumor and where they may not need to take as much."

Kilian hopes that the patterned, engineered tissue environments will give researchers a new way to find and culture cancer stem cells, which have been very elusive in conventional cultures – less than 1 percent of cells, he said. Beyond the fundamental science of finding and understanding these cancer-spreading cells, he also sees engineered tumor environments as having therapeutic applications in personalized medicine.

"You can imagine a patient has a particular tumor. You could engineer that in a dish, and using the patient's own cells, you could develop a model of their specific tumor to test out drugs," he said. "If you could take a patient's cells and within days have microtumors that you could use to screen all the available drugs, then an oncologist would be able to prescribe a treatment that's tailor-made for the patient that targets both the tumor cells and these elusive cancer stem cells that currently we can't see.

"There's a lot more work to be done, but we're very excited about how a very simple materials property of a growing tumor might be a culprit of the disease spreading. We think it opens up a new avenue of investigation for drug development, guiding surgery, and understanding progression and spreading of cancer," Kilian said. "Cancer is very complex, so putting it in context is key. If there is a microenvironment that provides the context for activating cells that can spread cancer, then that's important to know."

The American Cancer Society and the National Science Foundation supported this work. ■

Written by Liz Ahlberg. Photo by L. Brian Stauffer.

PETROSS

PLANTS ENGINEERED TO REPLACE OIL IN SUGARCANE & SWEET SORGHUM

Plants Engineered To Replace Oil in Sugarcane and Sweet Sorghum (PETROSS) is engineering two of the most productive crops in the world—sugarcane and sweet sorghum—into ultra-productive biofuel crops to provide an indefinite and sustainable supply of bio-oil, competitive with fossil fuels and more productive and profitable per acre than corn and soybeans.

Grant helps project realize "ultra-productive" biofuel crops, attract investors

Imagine—instead of acres of oil wells on barren land—endless fields of towering green sugarcane, with each stalk producing renewable and sustainable biofuel.

The University of Illinois and the University of Florida have been awarded a third round of funding from the U.S. Department of Energy's Advanced Research Projects Agency-Energy (ARPA-E) to realize ultra-productive biofuel crops.

ARPA-E supports initial research for high-potential, high-impact energy technologies to show proof of concept prior to private-sector investment. ARPA-E grants are extremely competitive, and it is rare to receive additional funding, called "plus-up funds," and even rarer to earn a second round of plus-up funding.

Nearly $300,000 of plus-up funds will sustain the research project called Plants Engineered To Replace Oil in Sugarcane and Sweet Sorghum (PETROSS) for another year while it seeks additional investors and commercial partners.

"Our research project is on a trajectory to produce sugarcane that could give the U.S. an inexhaustible and environmentally friendly oil supply that could satisfy one quarter of the nation's fuel and provide a renewable source of jet fuel," said Project Director Stephen Long, Gutgsell Endowed Professor of Crop Sciences and Plant Biology at Illinois (GEGC). "These crops could be grown in areas of the Southeast that can no longer produce food crops, giving the region a much needed economic boost."

PETROSS is engineering sugarcane and sorghum to produce 20% oil, which equates to 13 times more biodiesel (and six time more profit) per acre than an acre of soybeans. Naturally these crops produce just 0.05% oil, which is not enough to convert to biodiesel. PETROSS has now produced a cane that accumulates 13% oil by dry weight. With just 5% oil that can be turned into biodiesel, PETROSS sugarcane is 4.5 times more profitable than soybeans per acre.

With ARPA-E's additional funding, the project will continue work to increase yields and to improve cold tolerance to expand the growing region of sugarcane, which is currently limited to small regions in Florida, Louisiana and Texas.

"Our research project is on a trajectory to produce sugarcane that could give the U.S. an inexhaustible and environmentally friendly oil supply that could satisfy one quarter of the nation's fuel and provide a renewable source of jet fuel."

To increase yields, PETROSS is improving photosynthesis, which turns the sun's energy into biomass for biofuel production; an improvement in photosynthesis directly correlates with an increase in yield. PETROSS has developed a plant that is 20% more efficient (producing 20% more biomass) under normal conditions. Under cooler conditions, PETROSS cane is nearly 50% more efficient.

ARPA-E's funding will support a techno-economic analysis of converting the PETROSS oil into jet fuel, another year of field trials in Florida, phenotyping of DNA assembled by PETROSS, phenotyping of PETROSS sugarcane, and an evaluation of PETROSS sugarcane by Syngenta.

Illinois is leading the project at the Carl R. Woese Institute for Genomic Biology; the partner institutions include the University of Florida, Brookhaven National University, and the University of Nebraska Lincoln.

***

For additional information, including opportunities to partner with PETROSS, please visit **petross.illinois.edu** or contact the Project Manager, Ank Michielsen, at *michiels@illinois.edu* or 217-244-7473. ■

Written by Claire Benjamin. Photo provided by PETROSS.

PETROSS sugarcane (right) is 20% more productive than normal sugarcane (left). PETROSS sugarcane is 17% taller with 43% more stems that are 18% thicker.

ON THE GRID
HAPPENINGS AT THE IGB

AWARDS

LEE DEVILLE

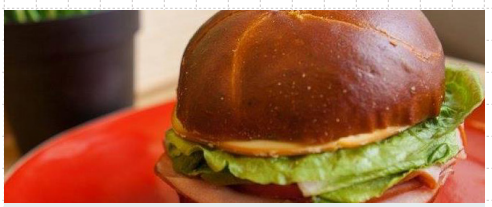
Lee DeVille, Associate Professor of Mathematics (Biocomplexity) received a Campus Excellence in Undergraduate Teaching Award from the University of Illinois for his positive impact on student learning.

REBECCA FULLER

Rebecca Fuller, Associate Professor of Animal Biology (Gene Networks in Neural & Developmental Plasticity) received a Campus Award for Excellence in Guiding Undergraduate Research from the University of Illinois for her excellence in involving undergraduate students in scholarly research.

MATTHEW WHEELER

Matthew Wheeler, Professor of Animal Sciences (Regenerative Biology & Tissue Engineering) received a Campus Award for Excellence in Faculty Leadership from the University of Illinois for his service and loyalty to the university.

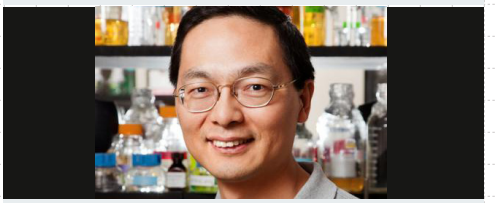


ARRAY CAFE

With Bevier Cafe closed this summer due to construction, Array Cafe will remain open from 8:00 - 3:30 every day to serve your needs.

CHENGXIANG ZHAI

ChengXiang Zhai, Professor of Computer Science (Biosystems Design) received a Campus Award for Excellence in Graduate Student Mentoring from the University of Illinois for his dedication in mentoring more than 60 graduate students.



HUIMIN ZHAO

Huimin Zhao, Centennial Endowed Chair Professor of Chemical and Biomolecular Engineering (Biosystems Design) was selected by the University of Illinois as the Steven L. Miller Chair in Chemical Engineering. Zhao also received the 2016 Charles Thom Award, recognizing exceptional merit in industrial microbiology and biotechnology, independence of thought, and originality that added appreciably to scientific knowledge.

SUMMER CAMP

POLLEN POWER

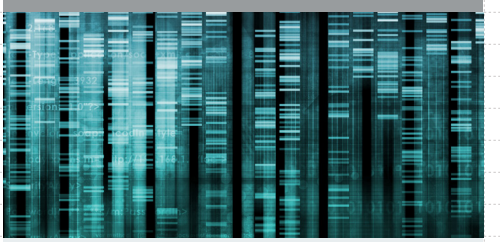
Registration for Pollen Power summer camp at the IGB is now open! Pollen Power is a week-long day camp for girls entering 6th-8th grade to learn about the biological sciences, climate change, and research careers. Find out more and sign up at **http://pollensummercamp.illinois.edu/**.

NEW ARRIVALS

KATHRYNE METCALF

Kathryne Metcalf has joined the IGB as a Outreach and Communications Specialist. Kathryne has previously worked at the IGB in a number of capacities, including as an intern in both the Communications and Outreach Groups. Her work supports IGB publications such as Biomarker and the Annual Report, as well as events including Genome Day and Pollen Power summer camp. She graduated from Beloit College in 2015 with a degree in Literary studies.

CONSORTIUM



GLOBAL BIOFOUNDRY CONSORTIUM

A newly established Global Biofoundry Consortium, led by Centennial Endowed Chair Professor of Chemical and Biomolecular Engineering Huimin Zhao, is investing in the systematized approach of engineering to touch off the next wave of biological discovery and innovation.

The consortium, whose founding members include the University of Illinois, Boston University, the University of Manchester, Tianjin University, the Tianjin Institute of Industrial Biotechnology of Chinese Academy of Sciences, and corporate partner Thermo Fisher Scientific, gathered at the IGB for their inaugural meeting to develop a strategic plan to achieve the consortium's central aim: to develop biofoundries for accelerated biological engineering and fundamental research.

ON THE GRID
HAPPENINGS AT THE IGB

FELLOWS

GUGGENHEIM FELLOWS

Six professors at the University of Illinois have been named 2016 Guggenheim Fellows, including two from the IGB.

Karin A. Dahmen, a professor of physics (BCXT, left), has wide-ranging interests in condensed matter physics and statistical physics, involving nonequilibrium dynamical systems, hysteresis, avalanches, earthquakes, population biology and disorder-induced critical behavior. She also is interested in other aspects of condensed matter physics and mathematical physics, and in areas of biophysics and geophysics, where methods of condensed matter physics can be fruitfully applied. Dahmen earned her Ph.D. from Cornell University. She is a fellow of the American Physical Society.

Rebecca Stumpf is a professor of anthropology (BCXT/CGRH, right) whose research focuses on comparative primate behavior, physiology and microbiomes to explain patterns of variation across the Primate Order (including humans) and attain a greater understanding of primate behavioral ecology, reproductive biology, conservation and health. She has faculty appointments in the Center for African Studies; the Program in Ecology, Evolution and Conservation; and the Beckman Institute for Advanced Science and Technology in addition to the IGB. Stumpf obtained her Ph.D. from Stony Brook University and the Max Planck Institute for Evolutionary Anthropology in 2004.

ART OPENING

ART OF SCIENCE 6.0

A huge thank you to everyone who attended our Art of Science opening at Gallery 217 in late April. We saw nearly 170 people come through the doors and take in the fantastic artwork from our researchers. Assistant Professor of Plant Biology Amy Marshall-Colon (GEGC, above, back left) and Cell and Developmental Biology graduate student Chris Seward (GNDP) added a new feature this year by taking the time to speak to the crowd about the research behind their images.

DEPARTMENT ANNOUNCEMENTS

BUSINESS

FY17 BENEFIT CHOICE ENROLLMENT FOR UNIVERSITY OF ILLINOIS EMPLOYEES

The FY17 Benefit Choice period will begin on Sunday, May 1, 2016 and end on Tuesday, May 31, 2016 with an effective date of July 1, 2016.

Please visit the NESSIE website at **https://go.uillinois.edu/BenefitChoice** for Benefit Choice news and announcements. UPB has scheduled three Benefit Choice information sessions on the Urbana campus during the month of May 2016. The sessions will cover the benefit changes that take effect July 1, the changes that employees can make during the Benefit Choice period, general benefit information and a Q & A. Registration is NOT required.

Questions?
Send an e-mail to *benefits@uillinois.edu* or contact the University Payroll and Benefits Services office at (217) 333-3111. ■

RECENT PUBLICATIONS

Please include your connection to the IGB in your author byline when submitting publications, as it will greatly help track potential newsworthy items and increase the possibility of coverage.

Zhang H, Srinivas S, Li D, Feng Y. Origin, dissemination and entry of the pandemic zika viruses. *Sci Bull*. 2016:1-3.

Jin H, Rube HT, Song JS. Categorical spectral analysis of periodicity in nucleosomal DNA. *Nucleic Acids Res*. 2016;44(5):2047-2057.

Tietz JI, Mitchell DA. Using genomics for natural product structure elucidation. *Curr Top Med Chem*. 2016;16(15):1645-1694.

Srivastava V, Weber JR, Malm E, Fouke BW, Bulone V. Proteomic analysis of a poplar cell suspension culture suggests a major role of protein S-acylation in diverse cellular processes. Front Plant Sci. 2016;7(APR2016).

Kim SY, Bender KW, Walker BJ, et al. The plastid casein kinase 2 phosphorylates rubisco activase at the thr-78 site but is not essential for regulation of rubisco activation state. *Front Plant Sci*. 2016;7.

Wildman DE. IFPA award in placentology lecture: Phylogenomic origins and evolution of the mammalian placenta. *Placenta*. 2016.

Weisgerber DW, Erning K, Flanagan CL, Hollister SJ, Harley BAC. Evaluation of multi-scale mineralized collagen-polycaprolactone composites for bone tissue engineering. *J Mech Behav Biomed Mater*. 2016;61:318-327.

Liu S, Clark LV, Swaminathan K, Gifford JM, Juvik JA, Sacks EJ. High-density genetic map of *miscanthus sinensis* reveals inheritance of zebra stripe. *GCB Bioenergy*. 2016;8(3):616-630.

Zhu X-, Lynch JP, Lebauer DS, Millar AJ, Stitt M, Long SP. Plants *in silico*: Why, why now and what?-an integrative platform for plant systems biology research. *Plant Cell Environ*. 2016;39(5):1049-1057.

Mazor T, Pankov A, Song JS, Costello JF. Intratumoral heterogeneity of the epigenome. *Cancer Cell*. 2016;29(4):440-451.

Liu J-, Kong II, Zhang G-, et al. Metabolic engineering of probiotic *saccharomyces boulardii*. *Appl Environ Microbiol*. 2016;82(8):2280-2287.

Molina-Espeja P, Viña-Gonzalez J, Gomez-Fernandez BJ, Martin-Diaz J, Garcia-Ruiz E, Alcalde M. Beyond the outer limits of nature by directed evolution. *Biotechnol Adv*. 2016.

Xia P-, Zhang G-, Liu J-, et al. GroE chaperonins assisted functional expression of bacterial enzymes in *saccharomyces cerevisiae*. *Biotechnol Bioeng*. 2016.

Chamberlain SD, Gomez-Casanovas N, Walter MT, et al. Influence of transient flooding on methane fluxes from subtropical pastures. *J Geophys Res G Biogeosci*. 2016.

Wheeler MM, Ament SA, Rodriguez-Zas SL, Southey B, Robinson GE. Diet and endocrine effects on behavioral maturation-related gene expression in the pars intercerebralis of the honey bee brain. *J Exp Biol*. 2015;218(24):4005-4014.

Rube HT, Lee W, Hejna M, et al. Sequence features accurately predict genome-wide MeCP2 binding *in vivo*. *Nat Commun*. 2016;7.

Paitz RT, Bukhari SA, Bell AM. Stickleback embryos use ATP-binding cassette transporters as a buffer against exposure to maternally derived cortisol. *Proc R Soc B Biol Sci*. 2016;283(1826).

Kromdijk J, Long SP. One crop breeding cycle from starvation? how engineering crop photosynthesis for rising CO2 and temperature could be one important route to alleviation. *Proc R Soc B Biol Sci*. 2016;283(1826).

Gonzalez-Pena D, Nixon SE, O'Connor JC, et al. Microglia transcriptome changes in a model of depressive behavior after immune challenge. *PLoS ONE*. 2016;11(3).

Davis JJ, Gerdes S, Olsen GJ, et al. PATtyFams: Protein families for the microbial genomes in the PATRIC database. *Front Microbiol*. 2016;7(FEB).

Lee MK, Park J, Wang X, et al. Rupture force of cell adhesion ligand tethers modulates biological activities of a cell-laden hydrogel. *Chem Commun*. 2016;52(26):4757-4760.

Wang Y, Cobb RE, Zhao H, eds. High-efficiency genome editing of streptomyces species by an engineered CRISPR/Cas system. *Academic Press Inc.*; 2016 Methods in Enzymology.

Huang Z, Van der Donk WA. An unexpected role for ergothioneine. *Natl Sci Rev*. 2015;2(4):382-383.

Anderson-Teixeira KJ, Wang MMH, Mcgarvey JC, Lebauer DS. Carbon dynamics of mature and regrowth tropical forests derived from a pantropical database (TropForC-db). *Global Change Biol*. 2016;22(5):1690-1709.

Lee J, Abdeen AA, Wycislo KL, Fan TM, Kilian KA. Interfacial geometry dictates cancer cell tumorigenicity. *Nat Mater*. 2016.

Vlcková K, Gomez A, Petrželková KJ, et al. Effect of antibiotic treatment on the gastrointestinal microbiome of free-ranging western lowland gorillas (*gorilla g. gorilla*). *Microb Ecol*. 2016:1-12.

Jayakody LN, Ferdouse J, Hayashi N, Kitagaki H. Identification and detoxification of glycolaldehyde, an unattended bioethanol fermentation inhibitor. *Crit Rev Biotechnol*. 2016:1-13.

Zhang H, Li X, Su X, Ang EL, Zhang Y, Zhao H. Production of adipic acid from sugar beet residue by combined biological and chemical catalysis. *ChemCatChem*. 2016.

Kang S, Paul K, Hankosky ER, Cox CL, Gulley JM. D1 receptor-mediated inhibition of medial prefrontal cortex neurons is disrupted in adult rats exposed to amphetamine in adolescence. *Neuroscience*. 2016;324:40-49. ■

ILLINOIS

IGB News is published by the IGB Communications Office.
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www.igb.illinois.edu 16.045