IGB NEWS

Upcoming Events

Monthly Profiles

Happenings at IGB

Image Of The Month

IP @ IGB

Department Announcements

Volume 10 Number 2

UPCOMING EVENTS

IGB 10 Year Anniversary

March 29, 2017, 5:30 p.m.
Sangamo Club, 227 E. Adams Street
Springfield, IL 62701

10th anniversary celebration with Art of Science exhibit and reception.

Fox Family Innovation and Entrepreneurship Lecture

10 Most Critical Factors for Startup Success
April 4, 2017, 12:00 p.m.
612 Carl R. Woese Institute for Genomic Biology

Tom Denison
Co-Founder, President
SmartHealth Activator

Art of Science 7.0

Opening Reception
April 13, 2017, 6:00 p.m.
[co][lab], 206 W. Main St., Urbana

Showcasing imagery from the Core Facilities, the exhibit highlights cutting-edge IGB research.

IGB Distinguished Public Lecture

Genetic Analysis of Inherited Breast and Ovarian Cancer: From Gene Discovery to Precision Medicine and Public Health
April 17, 2017, 4:00 p.m.
Alice Campbell Alumni Center
601 S. Lincoln Avenue

Mary-Claire King, PhD
University of Washington School of Medicine
Medical Genetics and Genome Sciences

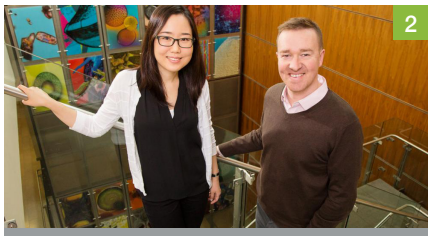
IGB Fellows Symposium

May 4, 2017, 8:30 a.m.
612 Carl R. Woese Institute for Genomic Biology

Sua Myong, Johns Hopkins University
Scott Edwards, Harvard University

Register at **http://fellows.igb.illinois.edu/**

FEATURED NEWS



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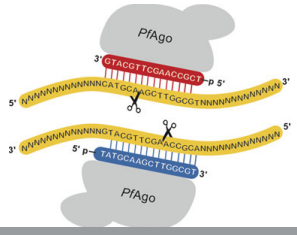
Changing the bone marrow environment alters blood cells



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New genetic engineering method biotechnological tool

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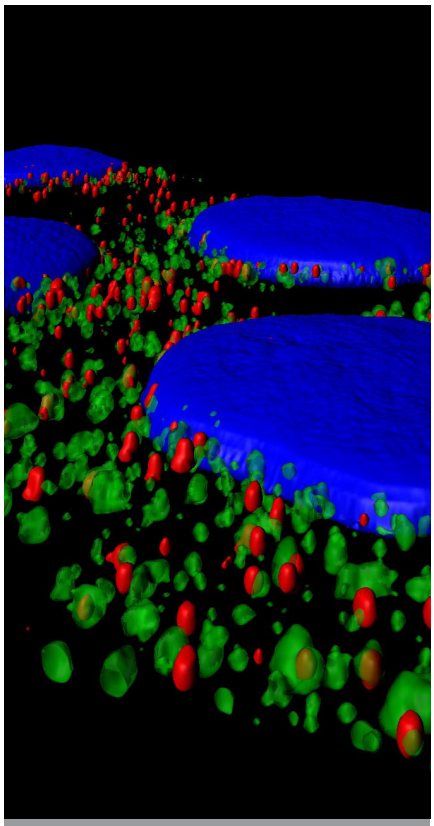
Monthly Profile: I-STEM's DNA & Health Day

5

On the Grid: Happenings at IGB

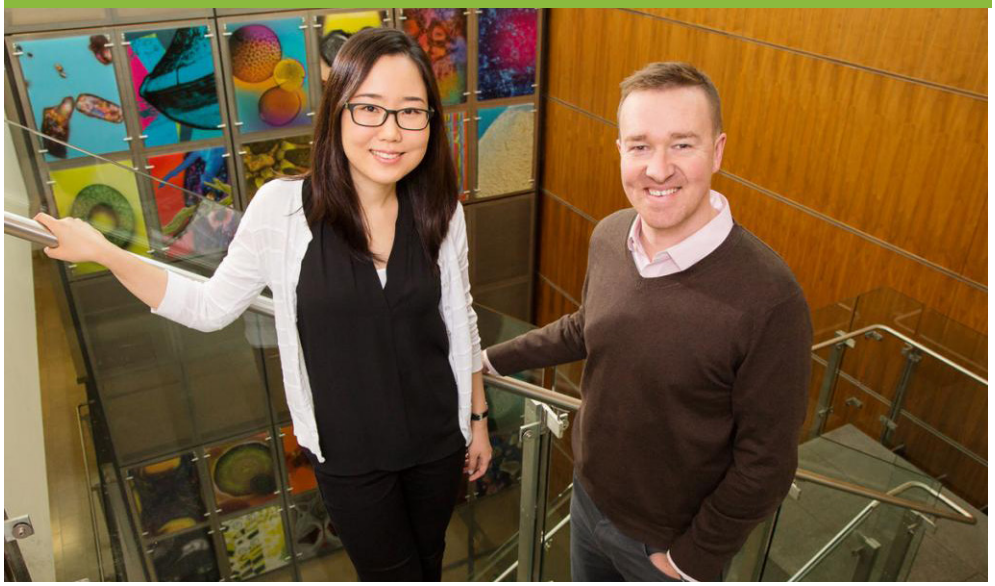
IMAGE OF THE MONTH



Human adenovirus (HAdV), a water-borne enteric virus, is used as a model virus to understand how free chlorine inactivates viruses. On this image, viruses (red) can be seen infecting cells and becoming either trapped or released from endosomes (green). Confocal microscopy helps to examine different portions of the virus life cycle, and identify the step in the replication cycle that is inhibited by treatment of virions with free chlorine. Image courtesy of Kelley D. Goncalves of the Joanna L. Shisler Lab.

IGB News

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



Changing the environment within bone marrow alters blood cell development

Researchers at the University of Illinois report they can alter blood cell development through the use of biomaterials designed to mimic characteristics of the bone marrow.

The findings, reported in the journal *Science Advances*, are a first step toward developing more effective bone marrow treatments for diseases like leukemia and lymphoma.

Blood cells flow throughout the body delivering life-supporting oxygen and nutrients. As these cells are used and recycled they are regenerated by bone marrow, the soft tissue inside the body's long and hollow bones.

Certain regions of bone marrow contain hematopoietic stem cells (HSCs), the precursors of all blood and immune cells, said University of Illinois chemical and biomolecular engineering professor Brendan Harley (pictured above, right), who led the research with postdoctoral researcher Ji Sun Choi (left).

"The tissue environment that surrounds these cells in the bone marrow provides a wealth of signals that can alter how these precursor cells behave. This paper looked at the signals provided by the tissue matrix itself," said Harley, who is also the theme leader of the Regenerative Biology & Tissue Engineering research theme at the IGB.

One of the major tools that oncologists use to treat leukemia and lymphoma involves transplanting HSCs. The donor stem cells must locate marrow cavities and start producing blood and immune cells. However, there is a limited quantity of available donor HSCs and the success rate of transplantation is low.

"We're interested in this problem from an engineering standpoint," Harley said. "The goal is to create better tools to both expand the number of donor HSCs and improve their capacity to repopulate the bone marrow after transplantation."

"An engineered bone marrow will be of enormous value for treating hematopoietic cancers such as leukemia, but also for understanding the process of bone marrow failure and other hematopoietic diseases."

Like cells throughout the body, HSCs are contained in a three-dimensional tissue environment known as the extracellular matrix. Harley and Choi gathered samples of HSCs from mice and then grew them in the laboratory using biomaterials engineered to mimic some of the extracellular matrix properties of the native bone marrow. Their goal was to examine how these engineered systems could alter the HSCs' capacity to proliferate and differentiate to become blood cells.

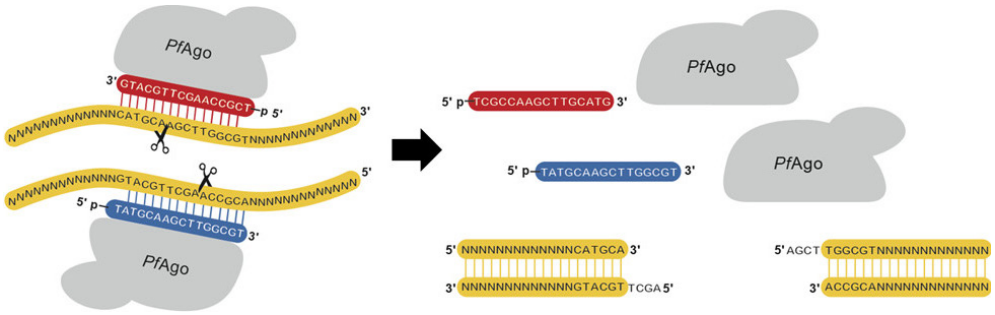
The researchers examined two main elements of the matrix that regularly interact with HSCs: collagen and fibronectin. They found that the HSCs that were exposed to collagen proliferated more rapidly but that they had differentiated, meaning they were no longer stem cells. When exposed to fibronectin, the stem cells proliferated less rapidly, but were able to maintain their stem cell-like nature.

"With the collagen substrates, we got more cells but not useful cells," Harley said. "With the right combination of stiffness in the matrix and the presence of fibronectin, we identified a class of biomaterials that show promise for being able to maintain and eventually expand these stem cells outside of the body. An engineered bone marrow will be of enormous value for treating hematopoietic cancers such as leukemia, but also for understanding the process of bone marrow failure and other hematopoietic diseases."

This project is only the first step in controlling the signals from the matrix that influence HSCs, Harley said. He and other researchers in his lab are currently investigating other features of the matrix that can be manipulated to increase the number of stem cells and make them more effective in transplantation.

The National Science Foundation, National Institutes of Health and the American Cancer Society of Illinois supported this research.

Written by Sarah Banducci.
Photo by L. Brian Stauffer.



New method of genetic engineering
indispensable tool in biotechnological applications

Research by Professor of Chemical and Biomolecular Engineering Huimin Zhao and graduate student Behnam Enghiad is pioneering a new method of genetic engineering for basic and applied biological research and medicine. Their work, reported in ACS Synthetic Biology on February 6 [DOI:10.1021/acssynbio.6b00324], has the potential to open new doors in genomic research by improving the precision and adherence of sliced DNA. Zhao leads the Biosystems Design research theme at the IGB.

"Using our technology, we can create highly active artificial restriction enzymes with virtually any sequence specificity and defined sticky ends of varying length," said Zhao. "This is a rare example in biotechnology where a desired biological function or reagent can be readily and precisely designed in a rational manner."

Restriction enzymes are an important tool in genomic research: by cutting DNA at a specific site, they create a space wherein foreign DNA can be introduced for gene-editing purposes. This process is not only achieved by naturally-occurring restriction enzymes; other artificial restriction enzymes, or AREs, have risen to prominence in recent years. CRISPR-Cas9, a bacterial immune system used for "cut-and-paste" gene editing, and TALENs, modified restriction enzymes, are two popular examples of such techniques.

Though useful in genetic engineering, no AREs generate defined "sticky ends"—an uneven break in the DNA ladder-structure that leaves complementary overhangs, improving adhesion when introducing new DNA. "If you can cleave two different DNA samples with the same restriction enzyme, the sticky ends that are generated are complementary," explained Enghiad. "They will hybridize with each other, and if you use a ligase, you can stick them together."

However, restriction enzymes themselves have a critical drawback: the recognition sequence which prompts them to cut is very short—usually only four to eight base pairs. Because the enzymes will cut anywhere that sequence appears, researchers rely on finding a restriction enzyme whose cut site appears only once in the genome of their organism or plasmid—an often difficult proposition when the DNA at hand might be thousands of base pairs long.

The Pyrococcus furiosus Argonaute (PfAgo) based platform for generating artificial restriction enzymes (AREs) is capable of recognizing and cleaving DNA sequences at virtually any arbitrary site and generating defined sticky ends of varying length.

This problem has been partially solved simply by the sheer number of restriction enzymes discovered: more than 3600 have been characterized, and over 250 are commercially available. "Just in our freezer, for our other research, we have probably over 100 different restriction enzymes," said Enghiad. "We look through them all whenever we want to assemble something … the chance of finding the unique restriction site is so low.

"Our new technology unifies all of those restriction enzymes into a single system consisting of one protein and two DNA guides. Not only have you replaced them, but you can now target sites that no available restriction enzymes can."

Enghiad and Zhao's new technique creates AREs through the use of an Argonaute protein (PfAgo) taken from Pyrococcus furiosus, an archeal species. Led by a DNA guide, PfAgo is able to recognize much longer sequences when finding its cut site, increasing specificity and removing much of the obstacles posed by restriction enzymes. Further, PfAgo can create longer sticky ends than even restriction enzymes, a substantial benefit as compared to other AREs.

"When we started, I was inspired by a paper about a related protein—TtAgo. It could use a DNA guide to cleave DNA, but only up to 70 degrees," explained Enghiad. "DNA strands start to separate over 75 degrees, which could allow a protein to create sticky ends. If there were a protein that was active at higher temperatures, I reasoned, that protein could be used as an artificial restriction enzyme.

"So I started looking for that, and what I found was PfAgo."

In addition to replacing restriction enzymes in genetic engineering processes, Enghiad and Zhao believe their technology will have broad applications in the biological research. By creating arbitrary sticky ends, PfAgo could make assembly of large DNA molecules easier, and enables cloning of large DNA molecules such as biochemical pathways and large genes.

The application of these techniques is broad-reaching: ranging from discovery of new small molecule drugs to engineering of microbial cell factories for synthesis of fuels and chemicals to molecular diagnostics of genetic diseases and pathogens, which are the areas Zhao and Enghiad are currently exploring.

"Due to its unprecedented simplicity and programmability (a single protein plus DNA guides for targeting), as well as accessibility … we expect PfAgo-based AREs will become a powerful and indispensable tool in all restriction enzyme or nuclease-enabled biotechnological applications and fundamental biological research," said Zhao. "It is to molecular biology as the CRISPR technology is to cell biology." ■

Written by Kathryne Metcalf.

The I-STEM Education Initiative (I-STEM) works with internal and external partners to evaluate STEM education programs, provide news coverage of STEM initiatives and events, to facilitate the development of education and outreach programs, and to help develop policies in Illinois and nationally that promote STEM education.

I-STEM's DNA & Health Day

UHS Scholar-Athletes Discover Omics at the IGB

Taking a break from their regular classes and the gym, on February 22nd, 63 scholar-athletes from the Urbana High School boys' and girls' basketball teams visited the IGB on campus to learn about DNA sciences during I-STEM's DNA and Health Day. While learning about DNA and Health via a number of hands-on activities, they also got to interact with some Illinois researchers. During a tour of the IGB, they got hands-on experience with state-of-the-art microscopes and cutting-edge technology. And over a pizza lunch, they discovered some resources available for them should they choose to attend Illinois. What did the students take away from the event? Hopefully the notion that exploring the world of "Omics" is intriguing and fun and that they too could become scientists if they so choose.

According to Illinois researcher Bruce Fouke, DNA sciences have now been dubbed the "Omics." What are "Omics?" Wiley's online library defines them as the universal detection of genes (genomics), mRNA (transcriptomics), proteins (proteomics) and metabolites (metabolomics) in a specific biological sample.

Why a DNA and Health Day? According to Fouke, Omics are "absolutely fundamental to every single aspect of our daily lives," both now and in the future. "Everything from energy and the environment, to health care, and even space exploration are all fully dependent on the application of Omics sciences."

But why would it be important to expose high-schoolers to Omics? Fouke indicates that "Every future health care decision that these students will make, every future decision on food security and grocery shopping, every decision as a citizen scientist when they go to the polls and vote on climate change policies…everything depends on integrated sciences, and the Omics sciences are at the heart of all of this."

So one purpose of the event was to expose the students to STEM via topics related to DNA and Health, plus Omics research at Illinois. The idea was that as students did fun, hands-on activities about DNA (building DNA models), DNA extraction (extracting DNA from strawberries), DNA to RNA to protein (making paper models of nitrogen bases), science equipment (making a centrifuge), emergence of life and DNA and mutations (using microscopes), cancer (cause, prevention, and treatment), and drug building (building models of molecules), they would not only learn about the subject matter, but begin to feel comfortable with the idea that they too can do science.

"Every future health care decision that these students will make, every future decision on food security and grocery shopping, every decision as a citizen scientist when they go to the polls and vote on climate change policies…everything depends on integrated sciences."

Another purpose of the event? To expose the students, many from underserved populations, to the idea that like many of the Illinois researchers at the event, they too could have a career in STEM.

For example, during his presentation, Bruce Fouke, an Illinois professor in both Geology and Microbiology, strongly advocated the notion that students are scholar-athletes, and that they should prepare for careers beyond sports.

"In our modern-day, globally-connected, sports-crazed society, so often the approach is to say that a student is a great athlete. Then, as an afterthought, it might be mentioned in passing that this same student is in school and that they should also achieve good grades. However, all emphasis and recognition is placed on the "athlete" aspect, and minimal-to-no emphasis is placed on the "scholar" aspect…Both academics and sports endeavors are vitally important, and neither can truly exist without the other…but to constantly short-change and deemphasize the "scholar" is a tragic disservice to all students, which ends up threatening their future as well as that of society as a whole."

However, the meat of Fouke's message was an exhortation to students that their time as an athlete would most likely be transient, and that they needed to prepare for a career for the rest of their lives.

"The vast (99%) majority of students will never be professional athletes," explains Fouke, "and thus their livelihoods and future wellbeing absolutely depends on them being scholars first and athletes second. And even for those that do make it to the pros, their bodies will not work forever, and every pro athlete must at some time in their lives depend on the development of their scholarly life to succeed and survive in our society."

Fouke further emphasized that "both the "scholar" and the "athlete" aspects of a student's life require exactly the same skillset to be successful…dedication, commitment, hard work, diligence, heads-up recognition of everything that is happening around you, learning the rules and playing by the rules, teamwork, mutual respect and sportsmanship."

To read the full article, visit http://www.istem.illinois.edu/news/DNA.Day.17.html.

Story and photograph by Elizabeth Innes, Communications Specialist, I-STEM Education Initiative.

ON THE GRID
HAPPENINGS AT THE IGB

IGB AT THE FIELD

THE WORLD OF GENOMICS AT THE FIELD MUSEUM

Explore The World of Genomics May 19-20 at The Field Museum during a special event presented by the IGB. Meet with IGB scientists in Stanley Field Hall and take part in hands-on activities to discover the fascinating world of genomic science and its impact on our lives.

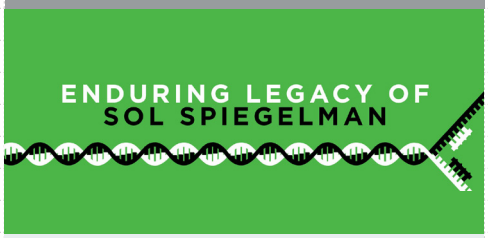
Learn about how genes affect behavior and health by examining bee brains in 3D, witness the drug discovery pipeline in action, see how scientists are learning to grow enough food for tomorrow by identifying better crops yourself and observe how life begins and adapts in our ever-changing world by interacting with samples of the earliest life on Earth. Visit https://www.fieldmuseum.org/at-the-field/programs/world-genomics for more info.

ONLINE COURSE

IGB MOOC

The IGB's Massive Open Online Course (MOOC) "Genomics: Decoding the Universal Language of Life" is now live and open for enrollment. This beginner level course contains 6 weeks of study and encompasses topics drawn from the IGB's expansive research portfolio such as how genes work, why microbes play such an important role chemically, how DNA sequencing can be used to predict risk to health and wellness, and what differences exist in genetically modified plants. There are several enrollment options available through Coursera, and more information can be found at https://www.coursera.org/learn/genomics-research.

SYMPOSIUM



THE ENDURING LEGACY OF SOL SPIEGELMAN

In honor of University of Illinois microbiologist Sol Spiegelman and his work with recombinant DNA technology, the IGB is hosting the symposium "The Enduring Legacy of Sol Spiegelman." We are featuring a public lecture and a series of plenary talks from October 20-22, 2017.

Our national panel of speakers, including two Nobel Laureates, encompasses diverse disciplines such as microbiology, biochemistry, cellular and development biology, neuroscience, and biomolecular engineering, and will be presenting on current and future work in their respective fields. Register now at http://spiegelman2017.igb.illinois.edu/.

FELLOWS

IGB FELLOWS SYMPOSIUM

IGB FELLOWS SYMPOSIUM

Current IGB research and issues in the life sciences will be presented during a day-long series of lectures by faculty, students, and Fellows from across campus at the IGB's annual Fellows Symposium.

Scott Edwards, Professor of Organismic and Evolutionary Biology from Harvard University joins Sua Myong, former IGB Fellow and Associate Professor of Biophysics at Johns Hopkins University as the featured keynote speakers.

Register today at http://fellows.igb.illinois.edu/.

IGB IN SPRINGFIELD

IGB 10 YEAR ANNIVERSARY RECEPTION AT THE STATE CAPITOL

A celebration of the 10th anniversary of the IGB with the state legislature, featuring a special exhibition from our Art of Science program and remarks from IGB Director Gene Robinson. Join us starting at 5:30pm at the Sangamo Club, 227 E. Adams Street in Springfield, Illinois.

SCHOLARSHIP

CARL R. WOESE UNDERGRADUATE RESEARCH SCHOLAR

The Carl R. Woese Undergraduate Research Scholar Program offers undergraduate students the opportunity to pursue interdisciplinary research at the IGB. The successful applicant will conduct research on a full time basis over 10 weeks during the summer, and will be paid on an hourly basis up to a total of $4,500.

Applicants must complete an application form, provide a CV, and a description of the proposed research project. The research description should not exceed two single spaced pages. The research project can be in any area of research that takes place at the IGB. The successful proposal will be understandable to a broad audience. Applications must be received by March 17, 2017, apply at http://www.igb.illinois.edu/content/carl-r-woese-undergraduate-research-scholar.

ON THE GRID
HAPPENINGS AT THE IGB

AWARDS

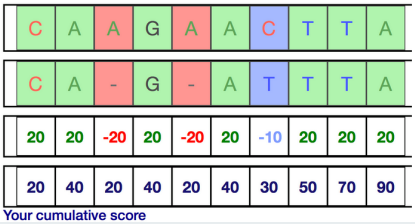
HYUNJOON KONG

Hyunjoon Kong, Professor and Centennial Scholar in Chemical and Biomolecular Engineering (RBTE) was named an American Institute for Medical and Biological Engineering (AIMBE) Fellow for outstanding contributions to the fields of biomaterials, bioimaging contrast agents and tissue engineering.

TANDY WARNOW

Tandy Warnow, Founder Professor of Bioengineering and Computer Science (BCXT, CGRH) was elected a 2017 Fellow of the International Society for Computational Biology (ISCB) for outstanding contributions to the fields of computational biology and bioinformatics.

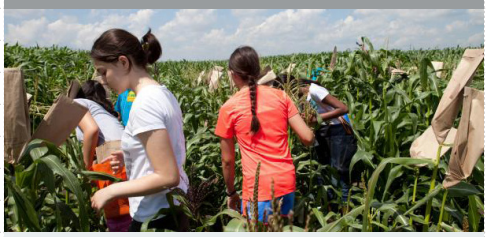
TEACHING ENGINE



TEACHENG

Looking to gamify your genomic knowledge? Visit TeachEnG, the Teaching Engine for Genomics, part of KnowEnG, our NIH-funded initiative to create a Center of Excellence in Big Data Computing (NIH Big Data to Knowledge (BD2K) Initiative). http://song.igb.illinois.edu/TeachEnG/.

SUMMER CAMP



POLLEN POWER!

Join us for Pollen Power!, our summer camp that provides an opportunity for girls to study plant responses to climate change. Small research groups led by female graduate students will use million-dollar microscopes to image pollen, giving the campers first-hand experience in a research environment with female mentors. The camp is designed for girls who are entering 6th, 7th or 8th grade in the Fall 2017, and who have an interest in plants and the environment.

Visit http://pollensummercamp.illinois.edu/ for more info and to register.

WALK OF LIFE

THE WALK OF LIFE: A CELEBRATION OF THE PAST AND A PATH TO FUTURE DISCOVERY

The Walk of Life, the IGB's commemorative paved walkway, is a reminder of the multitude of people who have impacted the IGB, and a celebration of each person's unique contributions to this Institute, to the University, and to the world. Hear the history behind those who have chosen to make a permanent contribution to our Institute and how the Walk of Life is celebrating the discoveries that inspire our ground-breaking genomic research at http://www.igb.illinois.edu/news/walk-life-celebration-past-and-path-future-discovery.

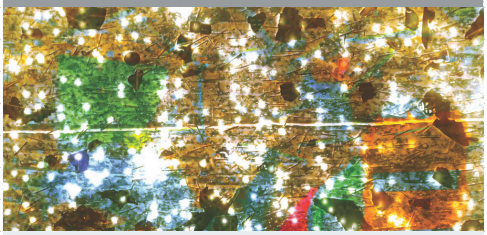
SPECIAL LECTURE

IGB DISTINGUISHED PUBLIC LECTURE SERIES

The IGB Distinguished Public Lecture series is proud to present Mary-Claire King, PhD, of the University of Washington School of Medicine, who will give a special talk "Genetic Analysis of Inherited Breast and Ovarian Cancer: From Gene Discovery to Precision Medicine and Public Health" at the Alice Campbell Alumni Center, 601 S. Lincoln Avenue in Urbana on April 17 at 4:00pm.

Dr. King studies genetics and the interaction of genetics and environmental influences on human conditions including HIV, lupus, and inherited deafness, and through her work was able to identify the gene responsible for many breast and ovarian cancers.

ART OF SCIENCE



ART OF SCIENCE SHOW 7.0

Showcasing imagery from the Core Facilities at the IGB, the Art of Science exhibit highlights cutting-edge research that is addressing significant problems in the environment, medicine, energy use and production, and fundamental research. Hosted in a new location this year, the exhibit will have an opening reception on April 13 at 6:00pm and will run through May 14 at [co][lab] at 206 W. Main Street in Urbana.

DEPARTMENT ANNOUNCEMENTS

BUSINESS

ON-LINE W2 & 1042-S AVAILABLE NOW

If you have consented to receive your form W-2 and/or 1042-S electronically, it is now available. Below are the instructions to retrieve your form.

Access To Electronic Forms W-2 & 1042-S

1. Go to NESSIE at: https://nessie.uihr.uillinois.edu/cf/index.cfm
2. Select the "Compensation" tab.
3. Click on the link "W-2/1042-S Tax Statement".
4. Click "Continue".
5. Log in using your NetID and password. For more information on what NetID and password to use please refer to the NESSIE Login Changes FAQ (https://nessie.uihr.uillinois.edu/cf/index.cfm?Item_ID=4977)
6. Enter your Personal Identification Number (PIN) or create one.
7. Once you are on the W-2/1042-S Tax Statement Consent Form page, click 'Continue.'
8. On the Online Tax Forms page, click on the link of the 2016 tax form you want to retrieve.
9. Click on the 'Continue to View/Print' button.
10. Select the link of the tax form you want to retrieve (i.e. 2016 W-2 Form or 2016 1042-S Form).

Your Form W-2 or 1042-S will display on the screen. You may print the form (the form is 2 pages so if your printer has duplex printing you may want to turn it on) or save your form to a hard drive or disk. You may also log off and retrieve it again later through the same process via NESSIE.

If you have questions you may contact University Payroll & Benefits Customer Service by phone at UIUC 217-265-6363(UIUC), 312-996-7200 (UIC) and 217-206-7144 (UIS) or email *payinq@uillinois.edu*. ■

IGB POSTDOC ASSOCIATION

IGB POSTDOC ASSOCIATION MEETING

Are you interested in pursuing a job in a government or industrial lab? If so, come to the April 6th IGB Postdoc Association meeting!

We will be having Neil Price from USDA ARS (https://www.ars.usda.gov/people-locations/person?person-id=34743) and a senior scientist from ADM (http://www.adm.com/en-US/Pages/default.aspx) come talk about how they chose their careers, present a brief overview of their research, and discuss what they do on a day-to-day basis. Afterwards, we will have a panel discussion where you can get your questions answered so come with questions! As always, we will have a pizza lunch so come early (~11:45 am) for pizza and socializing. ■

UNIVERSITY LIBRARY

DATA NUDGE: MONTHLY REMINDER TO MANAGE RESEARCH DATA

Would you like to manage your research data more proactively? You can sign-up to receive monthly data management reminders that come with quick, easy tips and activities designed by the campus Research Data Service. To sign-up for Data Nudge: go.illinois.edu/nudge.

For other helpful data management tips, follow the Research Data Service on Twitter (@ILresearchdata). The Research Data Service provides simple data management tips and reminders every Thursday (#DataTipThursday). ■

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.

Thapa, S., Patel, J. A., Reuter-carlson, U., & Schroeder, N. E. (2017). Embryogenesis in the parasitic nematode Heterodera glycines is independent of host-derived hatching stimulation. *BMC Developmental Biology*, 17(1). DOI: 10.1186/s12861-016-0144-7

Nickel, L. B., Iveniuk, J., & Roberts, B. W. (2017). Compensatory Conscientiousness Redux: A Direct Replication of Roberts, Smith, Jackson, and Edmonds (2009). *Social Psychological and Personality Science*, 8(1), 29-35. DOI: 10.1177/1948550616662026

Maslov, S., & Sneppen, K. (2017). Population cycles and species diversity in dynamic Kill-the-Winner model of microbial ecosystems. *Scientific Reports*, 7, [39642]. DOI: 10.1038/srep39642

RECENT PUBLICATIONS

Yang, T., Tang, Z., Xie, X., Carroll, R., Wang, G., Wang, Y., ... Zhang, Y. (2017). Deformation mechanisms of Al0.1CoCrFeNi at elevated temperatures. *Materials Science and Engineering A*, 684, 552-558. DOI: 10.1016/j.msea.2016.12.110

Kougias, D. G., Hankosky, E. R., Gulley, J. M., & Juraska, J. M. (2017). Beta-hydroxy-beta-methylbutyrate (HMB) ameliorates age-related deficits in water maze performance, especially in male rats. *Physiology and Behavior*, 170, 93-99. DOI: 10.1016/j.physbeh.2016.12.025

Wang, X., Lin, G., Cui, G., Zhou, X., & Liu, G. L. (2017). White blood cell counting on smartphone paper electrochemical sensor. *Biosensors and Bioelectronics*, 90, 549-557. DOI: 10.1016/j.bios.2016.10.017

Clark, K. M., Tian, S., Van der Donk, W. A., & Lu, Y. (2017). Probing the role of the backbone carbonyl interaction with the CuA center in azurin by replacing the peptide bond with an ester linkage. *Chemical Communications*, 53(1), 224-227. DOI: 10.1039/c6cc07274g

Turner, T. L., Kim, E., Hwang, C. H., Zhang, G. C., Liu, J. J., & Jin, Y. S. (2017). Short communication: Conversion of lactose and whey into lactic acid by engineered yeast. *Journal of Dairy Science*, 100(1), 124-128. DOI: 10.3168/jds.2016-11784

Song, Q., Chen, D., Long, S. P., & Zhu, X. G. (2017). A user-friendly means to scale from the biochemistry of photosynthesis to whole crop canopies and production in time and space – development of Java WIMOVAC. Plant, Cell and Environment, 40(1), 51-55. DOI: 10.1111/pce.12816

Rogers, A., Medlyn, B. E., Dukes, J. S., Bonan, G., von Caemmerer, S., Dietze, M. C., ... Zaehle, S. (2017). A roadmap for improving the representation of photosynthesis in Earth system models. *New Phytologist*, 213(1), 22-42. DOI: 10.1111/nph.14283

Horesh, D., Lowe, S. R., Galea, S., Aiello, A. E., Uddin, M., & Koenen, K. C. (2017). An in-depth look into PTSD-depression comorbidity: A longitudinal study of chronically-exposed Detroit residents. Journal of Affective Disorders, 208, 653-661. DOI: 10.1016/j.jad.2016.08.053

Silva, G. M., Brito, I. R., Sales, A. D., Aguiar, F. L. N., Duarte, A. B. G., Araújo, V. R., ... Figueiredo, J. R. (2017). *In vitro* growth and maturation of isolated caprine preantral follicles: Influence of insulin and FSH concentration, culture dish, coculture, and oocyte size on meiotic resumption. *Theriogenology*, 90, 32-41. DOI: 10.1016/j.theriogenology.2016.10.026

Perez, S. D., Du, K., Rendeiro, C., Wang, L., Wu, Q., Rubakhin, S. S., ... Rhodes, J. S. (2017). A unique combination of micronutrients rejuvenates cognitive performance in aged mice. *Behavioural Brain Research*, 320, 97-112. DOI: 10.1016/j.bbr.2016.11.019

Whitley, K. D., Comstock, M. J., & Chemla, Y. R. (2017). High-resolution "fleezers": Dual-trap optical tweezers combined with single-molecule fluorescence detection. *In Methods in Molecular Biology* (Vol. 1486, pp. 183-256). (*Methods in Molecular Biology*; Vol. 1486). Humana Press Inc.. DOI: 10.1007/978-1-4939-6421-5_8

Polk, J. D., Stumpf, R. M., & Rosengren, K. S. (2017). Limb dominance, foot orientation and functional asymmetry during walking gait. *Gait and Posture*, 52, 140-146. DOI: 10.1016/j.gaitpost.2016.11.028

Hoeflinger, J. L., Hoeflinger, D. E., & Miller, M. J. (2017). A dynamic regression analysis tool for quantitative assessment of bacterial growth written in Python. *Journal of Microbiological Methods*, 132, 83-85. DOI: 10.1016/j.mimet.2016.11.015

Seo, S. O., Wang, Y., Lu, T., Jin, Y. S., & Blaschek, H. P. (2017). Characterization of a *Clostridium beijerinckii* spo0A mutant and its application for butyl butyrate production. *Biotechnology and Bioengineering*, 114(1), 106-112. DOI: 10.1002/bit.26057

De Souza, A. P., Massenburg, L. N., Jaiswal, D., Cheng, S., Shekar, R., & Long, S. P. (2017). Rooting for cassava: insights into photosynthesis and associated physiology as a route to improve yield potential. *New Phytologist*, 213(1), 50-65. DOI: 10.1111/nph.14250

Shu, X., Wang, J., Shen, X., & Qu, A. (2017). Word segmentation in Chinese language processing. *Statistics and its Interface*, 10(2), 165-173.

Mozdzen, L. C., Vucetic, A., & Harley, B. A. C. (2017). Modifying the strength and strain concentration profile within collagen scaffolds using customizable arrays of poly-lactic acid fibers. *Journal of the Mechanical Behavior of Biomedical Materials*, 66, 28-36. DOI: 10.1016/j.jmbbm.2016.10.017

Idkaidek, A., Agarwal, V., & Jasiuk, I. (2017). Finite element simulation of Reference Point Indentation on bone. *Journal of the Mechanical Behavior of Biomedical Materials*, 65, 574-583. DOI: 10.1016/j.jmbbm.2016.08.031

Nelson, R. M., Temnykh, S. V., Johnson, J. L., Kharlamova, A. V., Vladimirova, A. V., Gulevich, R. G., ... Kukekova, A. V. (2017). Genetics of Interactive Behavior in Silver Foxes (*Vulpes vulpes*). *Behavior Genetics*, 47(1), 88-101. DOI: 10.1007/s10519-016-9815-1

Grier, W. K., Iyoha, E. M., & Harley, B. A. C. (2017). The influence of pore size and stiffness on tenocyte bioactivity and transcriptomic stability in collagen-GAG scaffolds. *Journal of the Mechanical Behavior of Biomedical Materials*, 65, 295-305. DOI: 10.1016/j.jmbbm.2016.08.034

Browne, P., Tamaki, H., Kyrpides, N., Woyke, T., Goodwin, L., Imachi, H., ... Cadillo-Quiroz, H. (2017). Genomic composition and dynamics among Methanomicrobiales predict adaptation to contrasting environments. *ISME Journal*, 11(1), 87-99. DOI: 10.1038/ismej.2016.104

Varatharajah, Y., Iyer, R. K., Berry, B. M., Worrell, G. A., & Brinkmann, B. H. (2017). Seizure Forecasting and the Preictal State in Canine Epilepsy. *International Journal of Neural Systems*, 27(1), [1650046]. DOI: 10.1142/S0129065716500465

Guo, T., & Allison, J. T. (2017). On the use of mathematical programs with complementarity constraints in combined topological and parametric design of biochemical enzyme networks. *Engineering Optimization*, 49(2), 345-364. DOI: 10.1080/0305215X.2016.1188091

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