IGB NEWS

Upcoming Events
Monthly Profiles
Happenings at IGB

Image Of The Month
Research News
Department Announcements

Volume 13 Number 6

UPCOMING EVENTS

Genomes at Home
Introduction to IGB
October 17, 2020, 2:00 p.m.
Join via Zoom

Introduction to the IGB: Let's all think like a scientist! We're going to apply scientific principles of observation to items in the world around us. We'll also be making our very own origami DNA structure, and play a fun game with us that we like to call "Does this have DNA?"

Genomes at Home
Food and Fuel
October 24, 2020, 2:00 p.m.
Join via Zoom

Join us for the Food and Fuel edition of Genomes at Home where you'll have the chance to build your own plant!

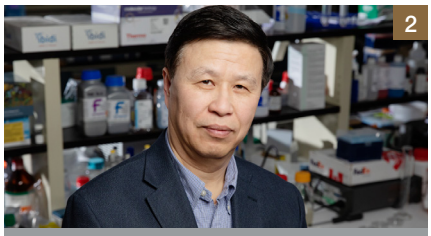
Fox Family Innovation and Entrepreneurship Lecture
My Lessons in Business
October 27, 2020, 12:00 p.m.
Join via Zoom

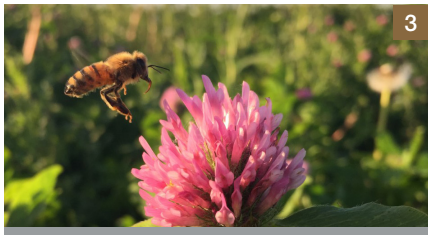
Scott Uknes, PhD
co-Founder and co-CEO, AgBiome

Genomes at Home
Food and Fuel
October 31, 2020, 2:00 p.m.
Join via Zoom

Join IGB members for a rousing game of Last Microbe Standing! And learn a little about evolution while we're at it.

FEATURED NEWS


2
Gene expression altered by direction of forces acting on cell


3
Team awarded $12.5M for new NSF Biology Integration Institute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Monthly Profile:
Alison Bell

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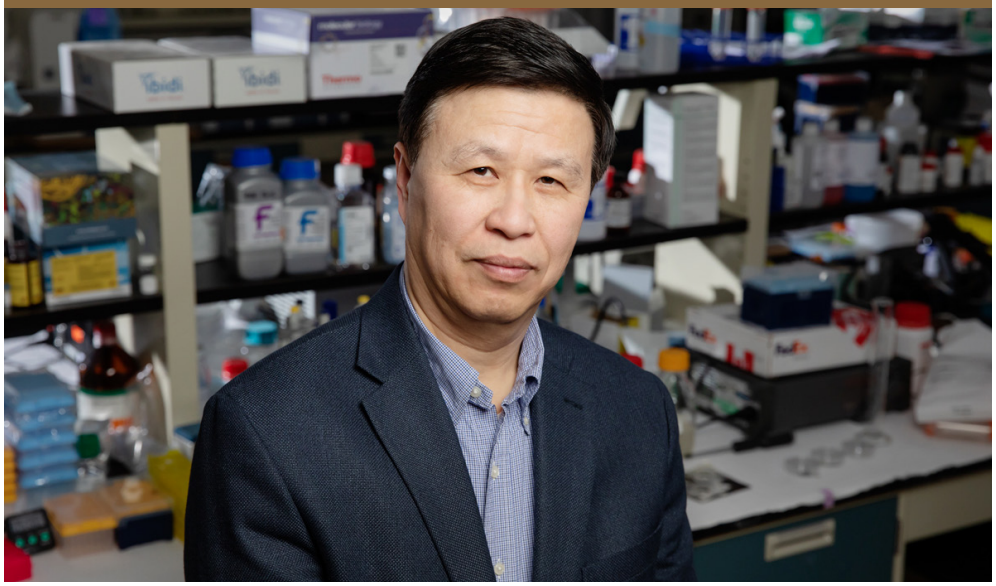
On the Grid:
Happenings at IGB

IMAGE OF THE MONTH

This month's image a 3D printed non-drying hydrogel (polyacrylamide, water and glycerol) heart model prototype measuring approximately 3.5x2.5x2.5 cm, to check the integrity of the right and left ventricles. Eventually a larger model will be printed and be used as a suture practice platform for surgeons. The sample was scanned using the X5000 NSI High Resolution MicroCT and rendered in 3D using the Imaris 3D visualization program. Image provided by Joanne Vanessa Hwang of the Hyunjoon Kong Group.

IGB News

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



Gene expression altered
by direction of forces acting on cell

Tissues and cells in the human body are subjected to a constant push and pull – strained by other cells, blood pressure and fluid flow, to name a few. The type and direction of the force on a cell alters gene expression by stretching different regions of DNA, researchers at Illinois and collaborators in China found in a new study.

The findings could provide insights into physiology and diseases such as fibrosis, cardiovascular disease and malignant cancer, the researchers said.

"Force is everywhere in the human body, and both external and internal forces can influence your body far more than you may have thought," said study leader Ning Wang (RBTE), a professor of mechanical science and engineering at Illinois. "These strains profoundly influence cellular behaviors and physiological functions, which are initiated at the level of gene expression."

The effects of physical forces and signals on cells, tissues and organs have been less studied than those of chemical signals and responses, yet physical forces play an important role in how cells function and respond to their environment, Wang said.

Most studies seeking to understand the mechanics of cells apply force using a microscope cantilever probe to tap a cell's surface or a focused laser beam to move a tiny particle across the surface. However, these techniques can only move in one dimension. This incomplete picture leaves fundamental questions unanswered, Wang said – for example, the difference in the responses to shear stress from blood flow and stretching from blood pressure.

Wang and his collaborators developed a method that allows them to move a magnetic bead in any direction, giving them a picture of the ways forces act on a cell in 3D. They call it three-dimensional magnetic twisting cytometry.

They found that the force from the magnetic bead caused a rapid increase in expression for certain genes, but the amount of the increase depended on the direction the bead moved. When the bead rolled along the long axis of the cell, the increase was the lowest, but when the force was applied perpendicularly – across the short axis of the cell – gene activity increased the most. When the bead was moved at a 45-degree angle or rotated in the same plane as the cell to induce shear stress, the response was intermediate.

"These observations show that gene upregulation and activation are very sensitive to the mode of the applied force, when the magnitude of the force remains unchanged," Wang said.

In further experiments, the researchers found that the reason for the difference lies in the method that the forces are relayed to the cell's nucleus, where DNA is housed. Cells have a network of support structures called the cytoskeleton, and the main force-bearing elements are long fibers of the protein actin. When they bend due to a force, they relay that force to the nucleus and stretch the chromosomes.

These actin fibers run lengthwise along the cell. So when the force strains them widthwise, they deform more, stretching the chromosomes more and causing greater gene activity, the researchers found.

They published their findings in the journal *Nature Communications.*

"A stress fiber is like a tense violin string. When a stress is applied across the short axis of the cell, it's just like when a person plucks a violin string vertically from the string's direction to produce a louder, more forceful sound," Wang said.

The researchers' next step will be to create disease models to see how different forces might help explain the mechanism of certain diseases, and to identify possible therapeutic targets or applications.

"In certain diseases, such as aortic valve calcification, arterial atherosclerosis, liver fibrosis or malignant tumors, these cellular responses and adaptation go awry, causing the tissues and organs to function abnormally," Wang said. "This is the first time that the mechanism of living cells' different biological responses to the direction of forces at the level of genes has been revealed, so perhaps with our three-dimensional approach we can understand these diseases better."

The U.S. National Institutes of Health and the National Science Foundation of China supported this work. Wang is affiliated with the Beckman Institute for Advanced Science and Technology, the Cancer Center at Illinois, the Carle Illinois College of Medicine, the department of bioengineering and the Holonyak Micro and Nanotechnology Lab at Illinois. ■

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

Collaborative team awarded $12.5M
for new NSF Biology Integration Institute

The National Science Foundation (NSF) announced a five-year, $12.5 million grant to integrate biology to a collaborative team based in the Carl R. Woese Institute for Genomic Biology at the University of Illinois Urbana-Champaign. The new institute, Genomics and Eco-evolution of Multi-scale Symbioses (GEMS), will include molecular, organismal, computational and theoretical approaches.

An interdisciplinary team of 27 professors from microbiology, plant biology, entomology, ecology, evolution, computational biology, and education, led by microbiology professor Rachel Whitaker (IGOH leader/BCXT), evolution, ecology and behavior professor Carla Cáceres (IGOH), and plant biology professor Katy Heath (IGOH) from University of Illinois, ecology and evolution professor Mercedes Pascual from University of Chicago, and biology professor Irene Newton from Indiana University, will integrate recent discoveries about the impact of microbial symbiosis on evolution and ecology.

"The inspiration behind GEMS is to integrate biology since all too often, fields of biology are siloed by funding, approach, language and culture," said Whitaker. "Surprisingly, some of the most significant divides on many campuses are between molecular and organismal approaches to biology. Because microbes lie at the interface between these spheres, our focus is on bringing the natural microbial world into view to integrate biology."

"Symbiosis is the process where two organisms come together to form emergent traits that neither has alone. GEMS recognizes that all around us there are nested symbiosis, with microbes like bacteria and viruses at their center," said Whitaker. "We see this in many ways as conceptually similar to bringing together molecular and organismal approaches into a unified biology."

"We seek to better understand the complex web of interactions that underlies the functioning of ecological systems," said Pascual. "Through symbioses in the broad sense of the word, the microbial world with its vast diversity changes how we need to address interactions between hosts."

"Symbioses already unify biology as nearly every living animal and plant harbors a microbial symbiont and each of our cells harbors the remnants of an ancient symbiont – the mitochondrion," said Newton. "It's clear that symbioses have dramatically altered the evolution of life on the planet and that they continue to have strong eco-evo influences on life."

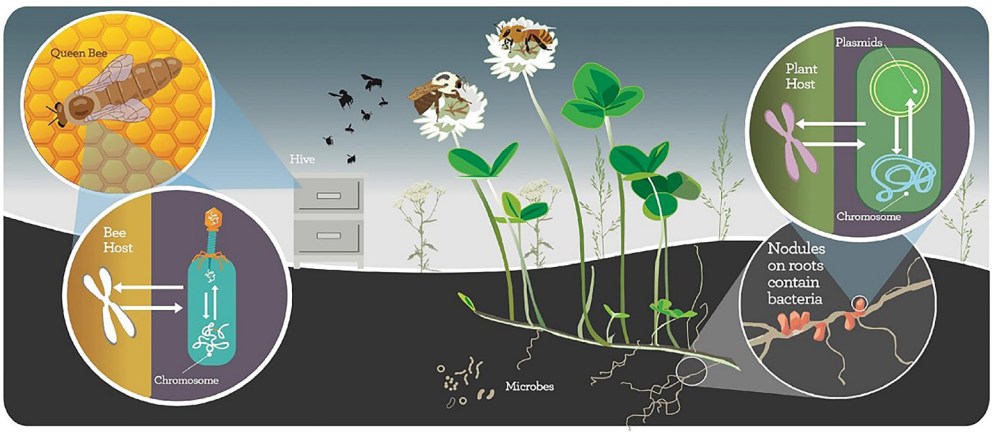
The work will also include University of North Carolina, Greensboro; the Kellogg Biological Station (KBS) Long-Term Ecological Research (LTER) site, Michigan State University; the National Center for Supercomputing Applications (NCSA), University of Illinois Urbana-Champaign; and the National Center for Genome Analysis Support (NCGAS), Indiana University. Partners in outreach endeavors include local Illinois school districts, Project Microbe (University of Illinois Urbana-Champaign), Cena y Ciencias (University of Illinois), the Illinois chapter of the Society for Advancement of Chicanos/Hispanics and Native Americans in Science (SACNAS), the Jim Holland Program at Indiana University, and the Marine Biological Lab (MBL).

NSF support will allow this team to work toward a bold vision that not only uses the study of symbiosis to integrate across science, but to port the best approaches across these institutions, to thoughtfully and effectively engage K-12 students and the broader public, and to break down historical barriers to creative and groundbreaking idea generation.

"What we don't truly understand is how genetic and molecular mechanisms used by microbes to interact with their hosts translates to large scale ecological and evolutionary processes," said Newton. "With this institute, we will study biology at multiple scales (from genetic and microbial to organismal, ecological, and evolutionary) and involve multiple disciplines within and outside of biology to fill these gaps in knowledge."

For more information, visit symbiosis.illinois.edu. ■

Written by Alisa King. Photo by Amy Toth. Graphic by Jillian Nickell.



MONTHLY PROFILE

Alison Bell is Professor, Getz Professional Scholar, and University Scholar in the Department of Evolution, Ecology and Behavior, whose lab focuses on understanding why individual animals behave differently from each other, using the threespined stickleback as a model organism to study proximate and ultimate causes of individual variation.

Alison Bell

Using genomics to understand individual variation in behavior

For Alison Bell (GNDP theme leader), her interest in biology peaked in a high school biology class in Northern California where she grew up.

"I remember when I was in high school I had a really awesome biology class," said Bell. "I had an amazing biology teacher who took us outside on wildflower walks and I thought wow, this is so cool. Looking for wildflowers counts as science! I never thought of myself as a science type person as I was more of an avid reader and considered myself to be more on the humanities side."

Bell went on to major in history, philosophy and social studies of science and medicine at the University of Chicago. During her college career, she conducted summer field work in North Carolina researching salamanders, with the early exposure to research setting her on track.

"I was one of those kids who was crazy about animals, and we also had a lot of them as pets," said Bell. "As humans, we are interested in the behavior of other humans and I think it's fascinating that we share this planet with other organisms. And so if you're interested in diversity, there's this incredible box of chocolates out there in terms of biodiversity of behavior that's available to study."

Bell went on to receive her PhD in population biology at the University of California-Davis before moving on to postdoctoral positions at the University of California-Davis and the University of Glasgow. Shortly after, she joined the department of evolution, ecology and behavior at the University of Illinois, with the IGB facilities and resources holding a lot of appeal.

"This was an effort on Gene Robinson's part to recruit people doing behavioral genomics in non-traditional model organisms, and who were also interested in applying genomic techniques," said Bell. "One of the draws of the IGB was its open, collaborative and friendly environment that I think is pretty unusual."

Research in the Bell lab focuses on understanding the consequences of individual differences in animal behavior using the threespined stickleback fish as a model organism, which also happens to be Bell's favorite animal. Among animal behaviorists, stickleback have been a favorite model organism as they are easy to collect and harbor a relatively rapid generation time. In the last 40 years, stickleback have become a model for studying evolution due to their diversity within the same species.

"There are a lot of challenges of trying to study behavior in both the field and in the lab and stickleback are really amenable to doing both," said Bell. "We see as many phenotypic or behavioral differences among populations as we do often among species. You can readily interbreed them as they are all a part of the same species so they're incredibly variable and that variation makes them interesting."

Like other fish species, stickleback males exhibit paternal care for their offspring, another area of focus in the Bell lab. Their research has revealed not only heritable individual variation in paternal care but also plasticity within individuals. As fish fathers, they build nests for their offspring, with a unique property hidden within the glue that's used to hold the nests together.

"The glue has antimicrobial properties and we think it may be a way for the fathers to help protect their developing offspring from getting harmful bacterial or fungal infections," said Bell. "I know people who've worked on trying to adapt this particular protein to commercialize it for commercial use for being able to have an underwater glue."

Bell's research questions align with the overall focus of the GNDP research theme, which is to understand the structures of conserved regulatory networks, and how they can be modified to yield biological diversity both between and within species. As the new GNDP theme leader, Bell is hoping to harness single-cell sequencing technologies to integrate information on molecular mediators between genotypic and phenotypic variation.

"We've had really productive collaborations and have brought in new members of the team that bring complementary expertise," said Bell. "One of the things I enjoy about working with people on our team is the analytical and computational prowess that is represented in our theme. The things that I am looking forward to is seeing how we can integrate some of these new techniques to address some of the same questions that we've been motivated by in the last five years or so."

As a member of the IGB research community, Bell has reflected on the challenges of maintaining a research lab, especially during the current unprecedented year. Despite not being able to participate in in-person activities this year, Bell has made adjustments both at home and in the lab to make things work.

"I think the personal responsibility of having people depend on securing grants and being able to support them is what stresses me out the most right now, given what's going on in the economy and in our world," said Bell. "We came up with a COVID-19 safety plan to make sure that people were being safe and were still able to get a lot of research done over the summer. In terms of home, my kids are doing virtual learning and we have an awesome babysitter who helps them with their schoolwork; we're really fortunate to be able to have somebody who helps out."

Bell is looking forward to continuing current collaborations and welcoming in new research members within the GNDP theme. She is excited to take part in interdisciplinary research at the IGB while still mentoring future scientists.

"I really like interacting with my colleagues and conducting interdisciplinary research, which I feel that the IGB is particularly great at," said Bell. "I enjoy talking to people who are outside my immediate discipline and the opportunity to do collaborative work with them. I also really like mentoring students and postdocs who have lots of cool ideas and are super bright and motivated. I enjoy that part of my job very much." ■

Written by Alisa King-Klemperer.
Photo by L. Brian Stauffer.

ON THE GRID
HAPPENINGS AT THE IGB

AWARDS

MARTIN BURKE

Martin Burke, May and Ving Lee Professor for Chemical Innovation and Professor of Chemistry (MMG), was named A Researcher to Know by the Illinois Science and Technology Coalition, highlighting the critical role of Illinois' university research in the national innovation economy.

AMY WAGONER JOHNSON

Amy Wagoner Johnson, Professor of Mechanical Science and Engineering (EIRH/RBTE) was awarded the Distinguished Engineering Educator Award from the Society of Women Engineers (SWE) for significant contributions to the engineering profession through education.

NEW ARRIVALS

NIKKI BOGART

Nikki Bogart (right) recently joined IGB as a Business and Procurement Specialist. She formerly worked in University Payables as a PO Payables processor and then as the Coordinator of Business Operations. She's been with the University of Illinois for just under 3 years. Nikki is a proud alumna of the University of Illinois.

NEW THEME

NEW IGB RESEARCH THEME AIMS TO IMPROVE REPRODUCTIVE HEALTH

Environmental exposures, particularly during pregnancy, can have long-lasting and devastating health impacts and exert long-ranging effects on maternal and child health. Particularly, exposures to endocrine disrupting chemicals (EDCs) — widely used in plastics and personal care products — have the potential to increase the prevalence of infertility and/or premature reproductive senescence in men and women, and reproductive disorders such as recurrent miscarriage, preeclampsia, and endometriosis in women. As a growing health concern, it is critically important to understand how exposure to EDCs affects fertility and establishment of pregnancy.

The newly formed Environmental Impact on Reproductive Health (EIRH) theme will focus on improving reproductive health by gaining fundamental knowledge in both normal variation in reproductive function and fertility disorders/diseases and developing therapeutic tools through multi-disciplinary research collaborations across campus. The EIRH theme represents the first co-led theme, with professors of comparative biosciences Jodi Flaws and Indrani Bagchi serving as co-theme leaders.

"We noticed that several faculty across campus were conducting research in the area of reproductive health or in the area of environmental health, but not actively working together on common projects," said Flaws and Bagchi. "Thus, we thought it would be nice to have a theme in IGB that brought together researchers in the fields of reproductive health and environmental health."

Researchers will use genomics, epigenomics, mechanics and bioengineering tools to develop platforms to study the physiology and pathology of the reproductive system to investigate the effects of exposure to EDCs on fertility, placental function, and endometriosis. Additionally, researchers will investigate the impact of stress and high fat diets on fertility and pregnancy outcomes since recent evidence suggests that maternal obesity and stress may be linked to impaired reproductive function.

Learn more and view the full list of EIRH faculty online.

OUTREACH

GENOMES AT HOME

From the creators of Genome Day . . . Genomes at Home! A series of hands on activities that can be done on Zoom from the comfort of your own home. Designed for elementary and middle school children, activities will be led by IGB scientists live on video and cover topics including the environment, energy use & production, health, and fundamental research at the IGB in an approachable manner for all ages.

Join us every Saturday at 2:00pm from October 17 to November 21 via Zoom
Meeting ID: 865 1546 8256, Password: 713702

October 17, 2020 - Introduction to the IGB

October 24, 2020 - Food and Fuel

October 31, 2020 - Emergence of Life

November 7, 2020 - Brains and Behavior

November 14, 2020 - DNA to Drugs

November 21, 2020 - Personalized Health

DEPARTMENT ANNOUNCEMENTS

BIOECONOMY

Part of IGB's mission is to stimulate the bioeconomy of the state of Illinois. Here, we feature innovation from IGB researchers.

IP @ IGB

Dr. Cecilia Gentle, the IGB's Economic Development Fellow, is available for consultations on filling out disclosure forms, or to present to research groups and other interested parties on the disclosure process. Contact Dr. Gentle at gentle2@illinois.edu.

IP FOR IMPACT

This month we had a very successful example of university IP with societal impact: a licensing agreement was made between Bayer and Systems Oncology, LLC for a compound called ERSOTM in pre-clinical development for metastatic Estrogen Receptor positive breast cancer, developed by chemistry professor Paul Hergenrother (ACPP leader/MMG) and biochemistry professor Dave Shapiro.

Read the full story on the IGB website. ■

CNRG

CNRG COVID POLICIES

If at all possible, please email help@igb.illinois.edu or call 333-4854 to get support instead of coming directly to the CNRG work area. By doing this, it allows us to leverage members of CNRG staff working from home and also prepare to safely meet users. CNRG staff will also clean all keyboards and mice that we come into contact with alcohol before and after our work.

BIOCLUSTER PRICE CHANGES

After an audit of Biocluster, CNRG has been asked to reduce the price of storage to $8.75/TB/mo and increase the cost of computation to $1.19/cpu/day. We expect that for most users these two changes will offset, leaving the monthly bills mostly unchanged.

BIOCLUSTER NEWS

This fall we will be working on identifying the new GPUs that will be going into Biocluster to replace the existing 1080Ti cards. Additionally, we will be starting work on the new storage system of Biocluster 3 and looking into a new archive platform that may offer additional benefits.

ZOOM TRAINING

Zoom has become the go-to for most videoconferencing needs. If you would like more information on using Zoom, information from Technology Services is located at:
https://answers.uillinois.edu/illinois/page.php?id=96159

In-depth trainings from Zoom can be obtained here:
Zoom Training I
Zoom Training II ■

BUSINESS OFFICE

ANNUAL CHARITABLE FUND DRIVE

The 2020 Campus Charitable Fund drive is underway from September 23rd–November 18th. Please consider contributing! Take a moment to read the brochure by visiting the website at www.ccfd.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 or jkking@illinois.edu. The deadline is November 18, 2020.

FLU SHOTS

McKinley Health Center is providing free flu shots to all students who have paid the Health Service Fee. The seasonal flu shot is also available to benefit eligible faculty, staff and retirees. There are several locations across campus between now and the end of October:

Campus Recreation Center East (CRCE): Now-Nov. 20, M-F
Veterinary Medicine: Oct. 20-21
Student Dining and Residential Programs Building: Oct. 22-23

To learn more about who is eligible, times, locations and components of the vaccine, please visit the McKinley Health Center website. If you plan to come to campus, please keep in mind that you must be up-to-date on your COVID-19 on-campus testing. For more information and further details please visit www.mckinley.illinois.edu/fluclinic

EMERGENCY CONTACTS

It is important to keep up-to-date emergency contact information on file. Please add or update your emergency contacts, especially if you have not reviewed them recently. Emergency contact information is kept confidential and accessed only in the case of a personal emergency and will never be made publicly available.

To view and update your emergency contacts, go to My UI Info and follow the steps below.

- Select My Profile.
- Select Access My Profile
- Enter your NetID and password. (Remember, you will be prompted to use 2FA for security authentication.)
- View the Emergency Contacts section to ensure your contacts are up to date.
- Select Edit to add, edit, or delete a contact as necessary.
- After making any changes select Submit.
- Select Log Out to exit.

When updating your emergency contact information, you should also review and update other information such as address, phone number, gender, ethnicity, marital status and disability status. ■

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.

Lee, M. J., Collins, J. D., Harwood, S. A., Mendenhall, R., & Huntt, M. B. (2020). "If you aren't White, Asian or Indian, you aren't an engineer": racial microaggressions in STEM education. *International Journal of STEM Education*, 7(1), [48]. https://doi.org/10.1186/s40594-020-00241-4

Athreya, N., Milenkovic, O., & Leburton, J. P. (2020). Interaction dynamics and site-specific electronic recognition of DNA-nicks with 2D solid-state nanopores. *npj 2D Materials and Applications*, 4(1), [32]. https://doi.org/10.1038/s41699-020-00166-0

Oh, C., Sun, P. P., Araud, E., & Nguyen, T. H. (2020). Mechanism and efficacy of virus inactivation by a microplasma UV lamp generating monochromatic UV irradiation at 222 nm. *Water Research*, 186, [116386]. https://doi.org/10.1016/j.watres.2020.116386

He, Z., Deng, Y., Xu, M., Li, J., Liang, J., Xiong, J., Yu, H., Wu, B., Wu, L., Xue, K., Shi, S., Carrillo, Y., Van Nostrand, J. D., Hobbie, S. E., Reich, P. B., Schadt, C. W., Kent, A. D., Pendall, E., Wallenstein, M., ... Zhou, J. (2020). Microbial functional genes commonly respond to elevated carbon dioxide. *Environmental International*, 144, [106068]. https://doi.org/10.1016/j.envint.2020.106068

Zhang, X., Wang, G., Zhang, S., Chen, S., Wang, Y., Wen, P., Ma, X., Shi, Y., Qi, R., Yang, Y., Liao, Z., Lin, J., Lin, J., Xu, X., Chen, X., Xu, X., Deng, F., Zhao, L., Lee, Y., ... Ming, R. (Accepted/In press). Genomes of the Banyan Tree and Pollinator Wasp Provide Insights into Fig-Wasp Coevolution. *Cell*. https://doi.org/10.1016/j.cell.2020.09.043

Olmez, S. Y., Mori, J., Miehling, E., Basar, T., Smith, R. L., West, M., & Mehta, P. G. (2020). A Data-Informed Approach for Analysis, Validation, and Identification of COVID-19 Models. (medRxiv). *Cold Spring Harbor Laboratory Press*. https://doi.org/10.1101/2020.10.03.20206250

Inzlicht, M., Werner, K. M., Briskin, J. L., & Roberts, B. W. (2020). Integrating Models of Self-Regulation. *Annual review of psychology*. https://doi.org/10.1146/annurev-psych-061020-105721

Weber, L. L., Aguse, N., Chia, N., & El-Kebir, M. (2020). PhyDOSE: Design of follow-up single-cell sequencing experiments of tumors. *PLoS computational biology*, 16(10), e1008240. https://doi.org/10.1371/journal.pcbi.1008240

Androwski, R. J., Asad, N., Wood, J. G., Hofer, A., Locke, S., Smith, C. M., Rose, B., & Schroeder, N. E. (2020). Mutually exclusive dendritic arbors in *C. elegans* neurons share a common architecture and convergent molecular cues. *PLoS genetics*, 16(9), e1009029. https://doi.org/10.1371/journal.pgen.1009029

Mast, D. H., Checco, J. W., & Sweedler, J. V. (2020). Advancing d-amino acid-containing peptide discovery in the metazoan. *Biochimica et Biophysica Acta - Proteins and Proteomics*, 140553. https://doi.org/10.1016/j.bbapap.2020.140553

Dibaeinia, P., & Sinha, S. (2020). SERGIO: A Single-Cell Expression Simulator Guided by Gene Regulatory Networks. *Cell Systems*, 11(3), 252-271.e11. https://doi.org/10.1016/j.cels.2020.08.003

Song, Q., Srinivasan, V., Long, S. P., & Zhu, X. G. (2020). Decomposition analysis on soybean productivity increase under elevated CO2 using 3-D canopy model reveals synergestic effects of CO2 and light in photosynthesis. *Annals of botany*, 126(4), 601-614. https://doi.org/10.1093/aob/mcz163

Parker, A. T., McGill, K., & Allan, B. F. (2020). Container Type Affects Mosquito (*Diptera: Culicidae*) Oviposition Choice. *Journal of medical entomology*, 57(5), 1459-1467. https://doi.org/10.1093/jme/tjaa045

Liao, Z., Lohan, D. J., Brooks, N. C., Allison, J. T., & Pilawa Podgurski, R. C. N. (2020). A Systematic Design Methodology for Series-Stacked Energy Decoupling Buffers Based on Loss-Volume Pareto Optimization. *IEEE Journal of Emerging and Selected Topics in Power Electronics*, 8(3), 2192-2205. [9064556]. https://doi.org/10.1109/JESTPE.2020.2987347

Hua, A., Chaudhari, P., Johnson, N., Quinton, J., Schatz, B., Buchner, D., & Hernandez, M. E. (2020). Evaluation of Machine Learning Models for Classifying Upper Extremity Exercises Using Inertial Measurement Unit-Based Kinematic Data. *IEEE Journal of Biomedical and Health Informatics*, 24(9), 2452-2460. [9108597]. https://doi.org/10.1109/JBHI.2020.2999902

Zhang, R., Han, M., Ta, K., Madsen, K. E., Chen, X., Zhang, X., Espinosa Marzal, R. M., & Gewirth, A. A. (2020). Potential-Dependent Layering in the Electrochemical Double Layer of Water-in-Salt Electrolytes. *ACS Applied Energy Materials*, 3(8), 8086-8094. https://doi.org/10.1021/acsaem.0c01534

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