IGB NEWS

Upcoming Events
Monthly Profiles
Happenings at IGB

Image Of The Month
Research News
Department Announcements

Volume 15 Number 6

UPCOMING EVENTS

IGB Lunchbox Series

Spicing up a Food Product Development Capstone Course with Human Centered Design Zest!

November 18, 2022, 12:00 p.m.

Spice Box Cafe, 2nd Floor Bevier Hall, 905 S. Goodwin Ave

Dawn Bohn, PhD,
Food Science & Human Nutrition

Saadeddine Shehab, PhD,
Siebel Center for Design

Registration for the buffet is full but additional space is provided at the Spice Box and you are welcome to attend the seminar.

IGB Seminar

An Evolutionary Pyrrhic Victory: Sticklebacks' Gain and Loss of a Costly Immune Response to Tapeworm Infection

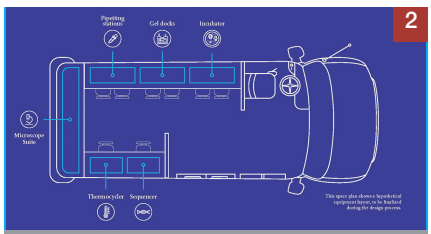
December 6, 2022, 12:00 p.m.

612 IGB Conference Center

Daniel Bolnick, PhD

University of Connecticut; Professor, Department of Ecology and Evolutionary Biology

FEATURED NEWS



2

IGB Gene Drive aims to broaden science accessibility

3

Collaborative team at IGB discovers new natural products

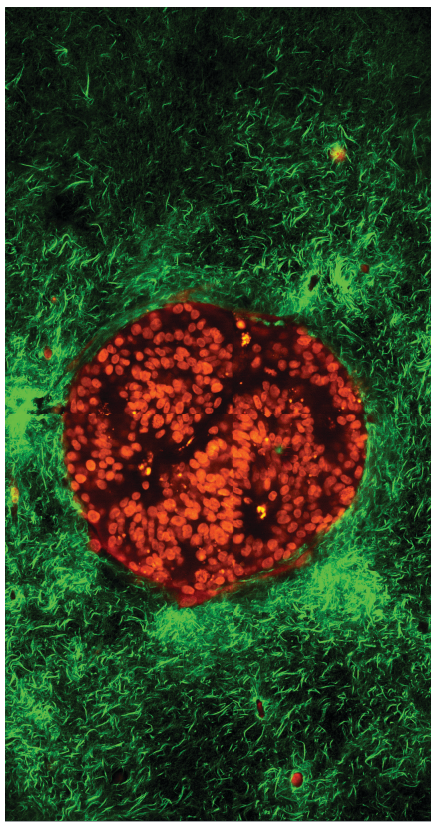
4

IGB Profile: Ruben Sanchez-Nieves

5

On the Grid: Happenings at IGB

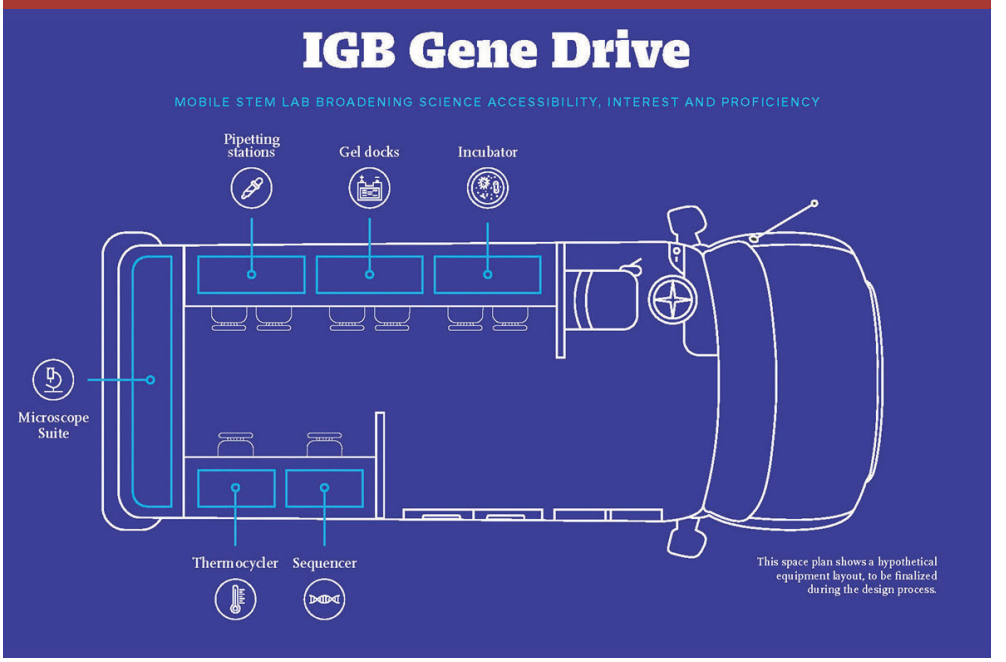
IMAGE OF THE MONTH



This is a a SHG image of a FET colorectal cancer cell spheroid embedded in a 3D type-I collagen gel. The nuclei of the cancer cells at the center are stained with DAPI. This experiment shows how cancer spheroids reorganize collagen fibers around them through mechanical interaction with the fibers. Image courtesy of Umnia Doha of the Saif lab.

IGB News

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



IGB Gene Drive
aims to broaden science accessibility

Advances in genomic studies have now permeated all aspects of our lives from agriculture to health and wellness. It is therefore becoming increasingly important to help the community understand these innovations so that they can navigate the increasingly complex realm of genomics. To this end, the outreach team at the Carl R. Woese Institute for Genomic Biology is planning to construct, staff, and operate a mobile STEM lab.

There is a pressing need for STEM interventions for underrepresented minorities and low-income students in Illinois: 53% of the students are low-income, and that number jumps to 91% in Chicago. Concerningly, the highest poverty districts in Illinois receive 22% less student funding than the lowest poverty districts, the worst disparity rate in the country. Over 83% of Illinois school districts are underfunded, and this funding disparity contributes to 20% of all Illinois schools being ranked as "underperforming" or "lowest performing." Statewide, 50% of all students are deemed not proficient in science. Therefore, there is a need for interventions that can provide the necessary STEM learning experiences.

The IGB has always been interested in public engagement, conducting a diverse range of activities over the past seven years which have catered to over 10,000 participants. With this new approach the outreach team aims to clarify the role of genomics in all aspects of life, stressing the importance of science literacy for non-scientists.

With the help of a $26,900 grant from Illumina Inc. and the Illumina Corporate Foundation, the IGB Gene Drive will deliver hands-on engagement with genomics research in areas including genetically modified organisms, microbiomes, antibiotic resistance, CRISPR, and personalized health. "Growing up in a small, rural Illinois community, it means the world to me to be partnering with the IGB on the mobile STEM lab," said Melissa Spears, a Senior Staff Customer Experience Culture Specialist at Illumina. "I am humbled and proud that Illumina and the IGB are "driving" genomics forward in districts where this would otherwise not be possible."

"We are very excited to receive Illumina's enthusiastic support for this new endeavor. They have also generously donated an iSeq 100 Sequencing System for our mobile lab," said Daniel Urban, the IGB Senior Outreach Coordinator, who worked with Illumina to secure the grant.

The IGB Gene Drive's mission is to provide research experiences for populations that have been traditionally underserved in STEM education. They will focus on the urban core of Chicago and St. Louis, and rural areas throughout the Midwest. To this end, the team will be partnering with the Champaign-Urbana Mass Transit District, who have agreed to provide a bus for these efforts. The completely self-contained and state-of-the-art mobile lab will allow the team to travel to economically and educationally disadvantaged locations, providing these communities with the opportunity to access equipment that is usually limited to highly funded institutions.

The mobile lab will also provide volunteering opportunities for the scientists at the IGB who represent the diversity of age, gender, race, and ethnicities that are required at any research institute. Together with these volunteers, the IGB Gene Drive will create novel content for the mobile STEM curricula that will address the concerns of different communities. The students will learn science by using the tools and technology necessary to conduct research and, hopefully, will make some interesting discoveries. The IGB Gene Drive will also develop a network of schools, libraries, and community centers who are committed to implementing science education that will meaningfully connect to the unique life experiences of their learners.

"At Illumina, we are dedicated to providing equitable STEM education to students and we know proximity to science centers and programs is a barrier to accessing unique opportunities," said Vanessa Light, the STEM Education Program Manager at Illumina. "By supporting the Mobile STEM Lab at the IGB, we can help bring hands-on activities, the latest technology, and exposure to careers directly to our future scientists, engineers, and innovators."

To volunteer, contact Daniel Urban at djurban2@illinois.edu. ■

Written by Ananya Sen. Graphic by Mirhee Lee.

Collaborative team at IGB
discovers new natural products at unprecedented speed

Many of the drugs we utilize in modern medicine are naturally produced by microbes. Penicillin, an antibiotic derived from certain molds, is one of the most notable natural products due to its recognition as one of the biggest advances in medicine and human health. As DNA sequencing has become cheaper and faster, scientists now have access to hundreds of thousands of microbial genomes and the natural products they produce. However, Doug Mitchell (MMG), the John and Margaret Witt Professor of Chemistry at University of Illinois, says this pales in comparison to the number of compounds these organisms have the capacity to make using the genetic pathways they possess.

"This is just the tip of the iceberg," said Mitchell. "There's a disparity in what we know today in terms of known molecules versus what nature has the capacity to produce. Like 100 to one at least."

One group of natural products that has become a popular source of antibiotics are called ribosomally synthesized and post-translationally modified peptides, or simply, "RiPPs." Traditional methods for accessing RiPPs are slow, and involve taking genes one by one and putting them into a model organism, like E. coli, to see what compound it produces. However, in a new paper resulting from a massive collaborative effort at the Carl R. Woese Institute for Genomic Biology, researchers were able to discover and characterize new RiPPs at an unprecedented speed and scale using the Illinois Biological Foundry for Advanced Biomanufacturing. iBioFAB is a laboratory automation system which can evaluate and assemble multiple synthetic gene pathways from hundreds of genes at once, something that would traditionally take many researchers and much more time to accomplish. This project features a collaboration between Mitchell's lab, the lab of Huimin Zhao (BSD/GSE leader/CABBI/CGD/MMG), the Steven L. Miller Chair of chemical and biomolecular engineering, and the lab of Wilfred van der Donk (MMG), Richard E. Heckert Endowed Chair in Chemistry and Howard Hughes Medical Institute Investigator.

"There's no way that any one of our labs could have done all of this on their own. The IGB has provided the crucible for this kind of interdisciplinary research."

The three co-first authors, Alex Battiste, fourth year PhD student in the Mitchell lab, Chengyou Shi, fifth year PhD candidate in the Zhao lab, and Richard Ayikpoe, a postdoc in the van der Donk lab, described how they each led a part of the project in their respective labs. Shi's team ordered synthetic genes and then assembled them into candidate pathways, or gene clusters, using iBioFAB integrated with a genome mining program called RODEO. Then, different classes of the gene clusters were given to Battiste and Ayikpoe's teams to test which pathways were functional and likely to produce new RiPPs in E. coli. Any structures of RiPPs that showed antibiotic activities were characterized in detail by Ayikpoe's team. The high-throughput technology allowed for 96 pathways comprised of about 400 genes to be tested at once, with the production of 30 new compounds.

"Compared with traditional RiPP discovery methods, our platform is scalable and high-throughput in many aspects, from the biosynthetic gene cluster identification, the cloning, the production, and detection and characterization," said Shi. "This, I would say, is the first such platform for large scale RiPP discovery."

Out of the new compounds discovered, three were found to have antibacterial properties. When tested against Klebsiella pneumoniae, which are highly virulent antibiotic-resistant bacteria, the newly discovered antibacterial RiPPs were found to be effective at killing the dangerous bacteria. The researchers say this could be a new avenue for discovering compounds that are effective against bacteria that are resistant to current antibiotic drugs.

"We found three RiPPs that have antimicrobial properties against pathogens that are known to be involved in hospital acquired infections, including Klebsiella," said Ayikpoe. "This research shows that

by using this platform to extend the number of biosynthetic gene clusters that we can screen at once, we are more likely to discover anti-microbial compounds that could have therapeutic properties."

The team says the goal of the paper is two-fold: to demonstrate the ability of the high-throughput technology to quickly construct and test gene clusters for new RiPPs, but also to emphasize the kind of large-scale collaborative projects that are made possible within the IGB. "There's no way that any one of our labs could have done all of this on their own. The IGB has provided the crucible for this kind of interdisciplinary research," Mitchell said.

Battiste described how the IGB inspires collaborative projects like this one naturally through its design. "The IGB makes it very easy to just talk to people when you see them all the time in your theme, which lowers the barrier for starting projects with them," Battiste said. "Everyone in the MMG theme works on similar stuff even if we're from different labs. So we all have different types of expertise but they mesh well together, and you get to learn about the types of techniques they're using. It's been one of my favorite parts of working here, the sense of camaraderie amongst all of the people on the team."

To highlight the spirit of collaboration embodied by their paper, the labs are working with the Department of Chemistry to create a video to showcase both their research and all that the IGB offers to empower projects like these, and to hopefully inspire more of them. The video is set to release soon to accompany the publication of the paper in *Nature Communications*.

All three co-first authors described how their education, research, and job prospects have benefitted greatly from their time at the IGB, highlighting that it is both the people and the technology together that make IGB a great place to conduct research. "The collaborative atmosphere that the IGB offers in diversity and growth, both in terms of science and social life, is really remarkable." said Ayikpoe.

This research was supported by funding from NIH. The paper is available via Nature Communications: doi.org/10.1038/s41467-022-33890-w.

Written by Shelby Lawson. Photo by Grainger College of Engineering

DEPARTMENT ANNOUNCEMENTS

BUSINESS

UNIVERSITY OF ILLINOIS AMAZON BUSINESS

Departments should continue maximizing the use of University of Illinois System contracts found in iBuy. When iBuy contracts are not available, Amazon may be utilized.

Only employees who are participating in the University's Amazon Business account will be authorized to use the System's sales tax exemption letters for Amazon purchases. Therefore, employees who would like to purchase from Amazon and are not members of the University's Amazon Business account should contact their Department Card Manager (DCM) to determine who should make purchases on behalf of their department. At a future date, the System may not reimburse employees who use personal funds to make Amazon purchases.

The central Amazon Business account must be used only for System business purposes. No personal purchases may be made from System email addresses in the business account. Personal use or any unauthorized use of the System's sales tax exemption is prohibited and may constitute a violation of state law and result in removal of access to the University's Amazon business account, disciplinary or legal action.

All Amazon Business users must follow all university and departmental purchasing policies.

For full information please visit https://www.obfs.uillinois.edu/purchases/university-amazon-business.

FACILITIES & SERVICES

IGB HOLIDAY SCHEDULE

The IGB building, which includes administrative offices purchasing, shipping and receiving, and Array Cafe, will be closed during the following holiday dates:

Thanksgiving
Thursday, November 24 and Friday, November 25

Christmas & New Year's
Friday, December 23, 2022 through Monday, January 2, 2023

Do not place orders for packages that may be delivered during these times. Full services will resumes on Tuesday, January 3.

Additional building information for the holidays available at https://www.igb.illinois.edu/igb-holiday-schedule-and-building-information.

Please contact facilities@igb.uiuc.edu if you have any questions.

PhD candidate Ruben Sanchez-Nieves from the Whitaker Lab looks to characterize and sequence plasmids such as Solfolobus Islandicus.

Ruben Sanchez-Nieves

Exploring the genomic secrets of the world's hardiest organism

Even in the most extreme locations, life can thrive. Microbes called thermophiles are able to colonize environments that extremely hot, with temperatures above 75 °C (167 °F), and acidity of 3.5 pH or lower. Ruben Sanchez-Nieves, a 6th year PhD candidate in the lab of Rachel Whitaker (IGOH), a professor of microbiology, studies the genomics and evolution of these unique organisms to better understand how they are able to survive in such intense conditions.

"The diversity of microbes is amazing," said Sanchez-Nieves. "For example, there are microbes that can literally breathe iron instead of air. And then the broad range of where you find them — in our gut, on our skin, in hot springs, in the depths of the sea… they're basically everywhere. They colonize any environment that has water on Earth. And I wanted to know, at a molecular level, how life can take so many forms."

Sanchez-Nieves grew up partially in Puerto Rico, where he was born, and partially in Houston, Texas, as his parents moved around for work. A first-generation college student, Sanchez-Nieves attended University of Puerto Rico for his undergraduate degree with the original goal to go into medicine. However, after taking a microbial physiology class and a microbial ecology class, he was enamored with the diversity of microbes, and decided to explore them further for his master's degree, which he earned studying the biology and phylogeny of halophiles, a type of thermophile. Sanchez-Nieves described how his fascination with the intricacies of microbes made sense looking back on his upbringing:

"My dad was a mechanic, and growing up, I got to see very intricately see how cars work and what makes them work," Sanchez-Nieves said. "I think that's partially why I got really into the nitty gritty of biology, like molecular level. When you're working in genetics its sort of the same thing, right? You want to see what gene is affecting a phenotype, and what happens when you remove it or change it. I think that mechanical way of thinking from my dad transferred over to my interests in biology of microbes."

His current graduate research looks at mobile genetic elements, otherwise known as plasmids, in *Solfolobus Islandicus*, a species of thermophile that can exist in incredibly hot and acidic conditions. Sanchez-Nieves' research involves sequencing and characterizing plasmids produced by *S. Islandicus*, as well as determining

> *"I think that mechanical way of thinking from my dad transferred over to my interests in biology of microbes."*

recombination frequencies in the chromosomes associated with the produced plasmids. However, these microbes can only be found in extreme environments, so to collect them, the Whitaker lab takes a yearly trip to Yellowstone National Park to the hot springs the microbes live in. Sanchez-Nieves described the thrill of these trips to collect the microbes:

"It's that border between cool and scary," Sanchez-Nieves described. "We go off trails to get to the hot springs, and it's awesome to see, just, raw nature. We often see bugling elks nearby because we go during their mating season, and sometimes we have to turn back if they're aggressive. But the camaraderie of everyone when we go, being in the mountains together… it's one of my favorite places to be."

In 2021, after deciding that he wanted to pursue an industry career path, Sanchez-Nieves participated in the Kleinmuntz Center's Young Innovator Program. "I wanted to get more into manufacturing and synthetic biology and combine that with genomics in thermophiles." Sanchez-Nieves said. Young Innovators is a professional development program that aims to train graduate students and postdoctoral staff on how to communicate science, and design projects that are innovative and profitable. Sanchez-Nieves proposed a project to modify thermophiles, like *S. Islandicus*, to be used for different manufacturing purposes. One example would be extracting starch from crops, since the hydrolysis process happens at high temperatures that thermophiles can withstand. The benefit of using thermophiles for manufacturing is that the intense conditions the microbes would be grown in would help prevent contamination, something that is difficult to prevent via other means of production. Though his project was ultimately not chosen as one of the three to be funded, Sanchez-Nieves described how the program still helped give him skills essential for his career ambitions:

"The program gave me experience with business acumen and learning what matters more in academia, where you go a lot into theoretical, versus business, where you have to have a purpose to what you're saying. So, it was nice to get an idea of what science in the business world looks like."

Sanchez-Nieves plans to finish up this spring/summer, and would like to work in biotechnology or synthetic biology, making microbial products for manufacturing or medicinal purposes. When not conducting research, Sanchez-Nieves says he enjoys going on hikes and cooking tasty dishes with his fiancé. He and his fiancé also follow Christianity, which he says is an essential part of their lives. "Having that spiritual component has been key to getting through the toughest moments, and helps me live each day grounded and focused on the things that matter most to me." Sanchez-Nieves said.

Sanchez-Nieves lives by the poem "*If*" by Rudyard Kipling, in which a father talks to his son about living a life based on integrity, composure, humility, and most of all, living it to the fullest:

"If you can fill the unforgiving minute

With sixty seconds' worth of distance run,

Yours is the Earth and everything that's in it,

And – which is more – you'll be a Man, my son!"

—Final stanza of *If* by Rudyard Kipling

Written by Shelby Lawson.

ON THE GRID
HAPPENINGS AT THE IGB

AWARDS

MARTIN BURKE

Martin Burke, May and Ving Lee Professor for Chemical Innovation (MMG), was elected to the National Academy of Medicine, one of the highest honors in the fields of health and medicine which recognizes individuals who have demonstrated outstanding professional achievement and commitment to service.

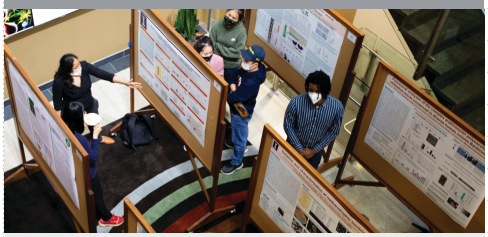
POC PROGRAM

ILLINOIS PROOF-OF-CONCEPT PROGRAM (IPOC)

The Office of Technology Management is accepting applications for a new round of funding through the Illinois Proof-of-Concept program (IPOC). IPOC funds projects that help move UIUC research innovations closer to public use and positive societal impact. Proposals welcome from all disciplines. Awards up to $50,000. Apply by January 6, 2023.

More information:
https://otm.illinois.edu/IPOC

CALL FOR FELLOWS



CARL R. WOESE INSTITUTE FOR GENOMIC BIOLOGY FELLOWSHIPS

The IGB is once again offering fellowships for truly exceptional young scholars who have completed their PhD or other relevant terminal degree within the last two years, who are looking for a stimulating and supportive interdisciplinary environment to carry out both independent and collaborative research.

IGB Fellows typically spend two years conducting research in one of several research themes in the Institute, ideally overlapping with two or more of these thematic areas. The annual salary is $58,000, in addition to a $7,500 research allowance.

Visit https://www.igb.illinois.edu/article/apply-igb-postdoctoral-fellowship for information on the specific themes currently seeking a Fellow.

EVENT

IGB HOLIDAY PARTY

Join us for the IGB Holiday Party as it returns this year with a celebration on all three floors of the lab building. The party will take place from 4:00pm to 6:00pm on Monday, December 5th. Mark your calendars!

SYMPOSIUM

GORDON RESEARCH SYMPOSIUM ON CO2 ASSIMILATION IN PLANTS

The Gordon Research Symposium on CO2 Assimilation in Plants from Genome to Biome: Photosynthesis Efficiency in a Changing Climate will take place on May 6-7, 2023 (our associated GRC runs May 7-12, 2023) in Barga, Italy.

This unique meeting is held immediately prior to our associated longstanding GRC, and builds a forum exclusively for early-career scientists (PhD students and Postdocs) to network and receive mentorship from leaders in academia, industry, publishing and government agencies. GRS attendance helps to maximize the GRC experience for early career researchers, and helps to establish an open and collegial atmosphere. We highlight unpublished, cutting edge research, with opportunities for discussion so that researchers can leave with an understanding of experiments needed for publication.

For more information please visit https://www.grc.org/co2-assimilation-in-plants-from-genome-to-biome-conference/2023/.

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.

Ayikpoe, R. S., Shi, C., Battiste, A. J., Eslami, S. M., Ramesh, S., Simon, M. A., Bothwell, I. R., Lee, H., Rice, A. J., Ren, H., Tian, Q., Harris, L. A., Sarksian, R., Zhu, L., Frerk, A. M., Precord, T. W., van der Donk, W. A., Mitchell, D. A., & Zhao, H. (2022). A scalable platform to discover antimicrobials of ribosomal origin. *Nature communications*, 13(1), [6135]. https://doi.org/10.1038/s41467-022-33890-w

Jain, I., Berg, I. C., Acharya, A., Blaauw, M., Gosstola, N., Perez-Pinera, P., & Underhill, G. H. (2022). Delineating cooperative effects of Notch and biomechanical signals on patterned liver differentiation. *Communications biology*, 5(1), [1073]. https://doi.org/10.1038/s42003-022-03840-9

Kusumah, J., & Gonzalez de Mejia, E. (2022). Impact of soybean bioactive compounds as response to diet-induced chronic inflammation: A systematic review. *Food Research International*, 162, [111928]. https://doi.org/10.1016/j.foodres.2022.111928

Bashir, S. T., Chiu, K., Zheng, E., Martinez, A., Chiu, J., Raj, K., Stasiak, S., Lai, N. Z. E., Arcanjo, R. B., Flaws, J. A., & Nowak, R. A. (2022). Subchronic exposure to environmentally relevant concentrations of di-(2-ethylhexyl) phthalate differentially affects the colon and ileum in adult female mice. *Chemosphere*, 309, [136680]. https://doi.org/10.1016/j.chemosphere.2022.136680

Marjanovic, M., & Boppart, S. A. (2022). The unperturbed picture: Label-free real-time optical monitoring of cells and extracellular vesicles for therapy. *Current Opinion in Biomedical Engineering*, 24, [100414]. https://doi.org/10.1016/j.cobme.2022.100414

Zou, W., Martell Monterroza, A., Yao, Y., Millik, S. C., Cencer, M. M., Rebello, N. J., Beech, H. K., Morris, M. A., Lin, T-S., Castano, C. S., Kalow, J. A., Craig, S. L., Nelson, A., Moore, J. S., & Olsen, B. D. (2022). Extending BigSMILES to non-covalent bonds in supramolecular polymer assemblies. *Chemical Science*, 13(41), 12045-12055. https://doi.org/10.1039/D2SC02257E

Hubner, A. M., Canisso, I. F., Coelho, W. M., Ribeiro, L., Aldridge, B. M., & Lima, F. S. (2022). A randomized controlled trial examining the effects of treatment with propylene glycol and injectable cyanocobalamin on naturally occurring disease, milk production, and reproductive outcomes of dairy cows diagnosed with concurrent hyperketonemia and hypoglycemia. *Journal of Dairy Science*, 105(11), 9070-9083. https://doi.org/10.3168/jds.2021-21328

Sonam, S., Bangru, S., Perry, K. J., Chembazhi, U. V., Kalsotra, A., & Henry, J. J. (2022). Cellular and molecular profiles of larval and adult *Xenopus corneal* epithelia resolved at the single-cell level. *Developmental Biology*, 491, 13-30. https://doi.org/10.1016/j.ydbio.2022.08.007

Hubner, A., Canisso, I. F., Peixoto, P. M., Coelho, W. M., Ribeiro, L., Aldridge, B. M., Menta, P., Machado, V. S., & Lima, F. S. (2022). Characterization of metabolic profile, health, milk production, and reproductive outcomes of dairy cows diagnosed with concurrent hyperketonemia and hypoglycemia. *Journal of Dairy Science*, 105(11), 9054-9069. https://doi.org/10.3168/jds.2021-21327

Angello, N. H., Rathore, V., Beker, W., Wołos, A., Jira, E. R., Roszak, R., Wu, T. C., Schroeder, C. M., Aspuru-Guzik, A., Grzybowski, B. A., & Burke, M. D. (2022). Closed-loop optimization of general reaction conditions for heteroaryl Suzuki-Miyaura coupling. *Science*, 378(6618), 399-405. https://doi.org/10.1126/science.adc8743

Maino Vieytes, C. A., Zhu, R., Gany, F., Burton-Obanla, A., & Arthur, A. E. (2022). Empirical Dietary Patterns Associated with Food Insecurity in U.S. Cancer Survivors: NHANES 1999–2018. *International journal of environmental research and public health*, 19(21). https://doi.org/10.3390/ijerph192114062

Ruiz-Vera, U. M., Balikian, R., Larson, T. H., & Ort, D. R. (2022). Evaluation of the effects of elevated CO2 concentrations on the growth of cassava storage roots by destructive harvests and ground penetrating radar scanning approaches. *Plant, Cell & Environment*. https://doi.org/10.1111/pce.14474

Shree, N., Ding, Z., Flaws, J., & Choudhury, M. (2022). Role of microRNA in Endocrine Disruptor-Induced Immunomodulation of Metabolic Health. *Metabolites*, 12(11). https://doi.org/10.3390/metabo12111034

Yang, S., Bi, J., Drnevich, J., Li, K., & Nowak, R. A. (2022). Basigin is necessary for normal decidualization of human uterine stromal cells. *Human Reproduction*, [deac229]. https://doi.org/10.1093/humrep/deac229

Varela, S., Zheng, X., Njuguna, J. N., Sacks, E. J., Allen, D. P., Ruhter, J., & Leakey, A. D. B. (2022). Deep Convolutional Neural Networks Exploit High-Spatial- and -Temporal-Resolution Aerial Imagery to Phenotype Key Traits in Miscanthus. *Remote Sensing*, 14(21). https://doi.org/10.3390/rs14215333

Zhou, H., Zhu, R., Ung, A., & Schatz, B. (2022). Population analysis of mortality risk: Predictive models from passive monitors using motion sensors for 100,000 UK Biobank participants. *PLOS Digital Health*, 1(10), [e0000045]. https://doi.org/10.1371/journal.pdig.0000045

Berger, B., Tian, D., Li, W. V., El-Kebir, M., Tomescu, A. I., Singh, R., Beerenwinkel, N., Li, Y., Boucher, C., & Bar-Joseph, Z. (2022). What are the keys to succeeding as a computational biologist in today's research climate? *Cell Systems*, 13(10), 781-785. https://doi.org/10.1016/j.cels.2022.09.005

He, J., Abueidda, D., Koric, S., & Jasiuk, I. (2022). On the use of graph neural networks and shape-function-based gradient computation in the deep energy method. *International Journal for Numerical Methods in Engineering*. https://doi.org/10.1002/nme.7146

Eckardt, N. A., Ainsworth, E. A., Bahuguna, R. N., Broadley, M. R., Busch, W., Carpita, N. C., Castrillo, G., Chory, J., Dehaan, L. R., Duarte, C. M., Henry, A., Jagadish, S. V. K., Langdale, J., Leakey, A. D. B., Liao, J. C., Lu, K-J., Mccann, M. C., Mckay, J. K., Odeny, D. A., ... Zhang, X. (2022). Climate change challenges, plant science solutions. *Plant Cell*, [koac303]. https://doi.org/10.1093/plcell/koac303 ■

ILLINOIS

IGB News is published by the IGB Communications Office.
Contact Nicholas Vasi (nvasi@illinois.edu)
www.igb.illinois.edu 22.114