

IGB NEWS

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Volume 14 Number 6

UPCOMING EVENTS

IGB Seminar - CABBI

Opportunities for CABBI Collaboration with JBEI (and other DOE assets) in Laboratory Operations and Data Management Infrastructure
October 19, 2021, 12:00 p.m.

[Join via Zoom](#)

Nathan Hillson, PhD
Director of Synthetic Biology Informatics at the Joint Bioenergy Institute (JBEI)

IGB Seminar - EIRH

Racial/Ethnic Disparities in Environmental Chemical Exposures & Women's Reproductive Health
October 26, 2021, 12:00 p.m.

[Join via Zoom](#)

Tamarra James-Todd, PhD
Harvard University
Mark and Catherine Winkler
Assistant Professor of Environmental Reproductive and Perinatal Epidemiology

IGB Faculty Spotlight Lecture

November 9, 2021, 12:00 p.m.

[Join via Zoom](#)

Jacob Sherkow, J.D.
University of Illinois
Professor of Law
IGB Affiliate, Genomic Security and Privacy Theme

FEATURED NEWS



Graduate students awarded for their innovative proposals



Referential alarm calls increase vigilance in brood parasite hosts

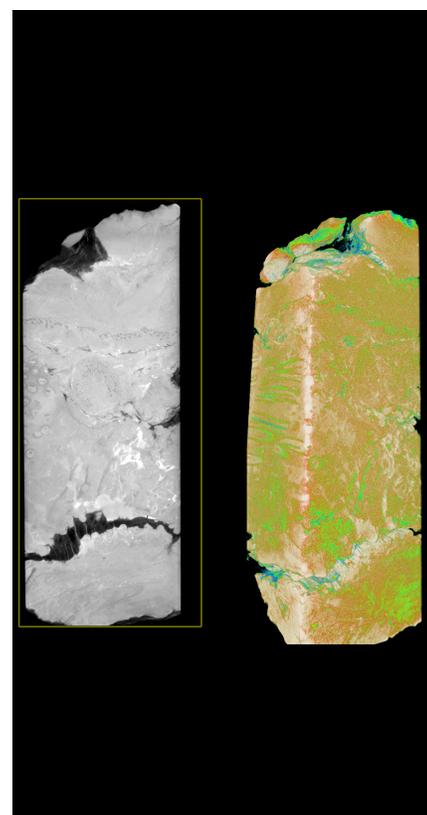


Monthly Profile:
Amy Cash-Ahmed



On the Grid:
Happenings at IGB

IMAGE OF THE MONTH



This image depicts a slice of a coal ball from the Pennsylvanian period (~300 million years ago) that contains permineralized plant material from a peat swamp. CT allows for distinguishing the plant organs contained within a coal ball for taxonomic identification. This was taken using an X5000 NSI High-Resolution Micro-CT and rendered in Imaris at the IGB Core Facilities, author Scott Lakeram of Plant Biology.

IGB News

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

FEATURE



Graduate students awarded for their innovative proposals

The first Young Innovator Program concluded in August 2021. It was a ten-week summer program that was designed to teach trainees how to become innovative leaders in their fields. The program concluded with an idea competition, where the participants showcased the skills that they learned over the summer.

Funded by the Catherine and Don Kleinmuntz Center for Genomics in Business and Society (Kleinmuntz Center), the program was developed by Cecilia Gentle, a former IGB Economic Development Fellow, and Erin Louer, IGB's education coordinator and manager of the Kleinmuntz Center. It was held for 1-2 hours once a week and the syllabus revolved around teaching the participants all aspects of innovation including patent law, technology transfer, market research, science communication, and entrepreneurship.

The participants were coached by Catherine Kleinmuntz for their final presentations. They were evaluated based how well the participants identified a problem, its solution and market attractiveness, and whether they could complete the project within the proposed budget and time frame. The top three participants were awarded with tiered funds ranging from \$5,000-\$20,000. The winners will use the funds to advance their novel innovations.

The judges included Mark Tracy, a biopharmaceutical product development executive; Gerald Wilson, the President and Co-founder of Autonomic Materials Incorporated; Jamie Kasuboski, the Vice President of OMX Ventures; and Denise Elser, the Medical Director of the Women's Health Institute of Illinois. They unanimously agreed that it was difficult to choose the winners and they wished that all the

participants could be awarded. Everyone was encouraged to continue working on their innovations and were applauded for their efforts.

The three winners were all graduate students in the lab of Brendan Harley (RTBE leader/EIRH), a Robert W. Schaefer Professor of Chemical and Biomolecular Engineering. Vasiliki Koliopoulos, who won first place, plans to develop a novel platform to screen biomaterials for bone injuries. Bone is the second most transplanted tissue and the current treatment materials are expensive and require time to make. The proposed platform will use collagen scaffolds that are made up of materials that are already found in bone. The screening platform will be used to test a range of cells and proteins to see how they interact inside the bone environment. If developed, it will be the only 3D high throughput screening platform that is rapid and cost effective.

The second-place winner was Aleczandria Tiffany, who is developing an implant for tissue regeneration. The musculoskeletal system—bone, cartilage, and muscle—can be damaged through diseases like arthritis and osteoporosis and injuries. Unfortunately, the current treatment methods for bone and cartilage tissue repair don't always match how the native tissue behaves and can sometimes lead to other complications. Tiffany is proposing a new technology, which is inspired by the growth plates—highly specialized tissues in children that are responsible for growth. These regions have three distinct zones that are critical for development and Tiffany plans to develop a material that has similar zones to mimic the growth plate environment. By doing so, she hopes to develop a new tool that can be used to repair damaged tissue.

Victoria Kriuchkovskaia won third place for her project which will attempt to develop a platform to screen drugs for glioblastoma, which is a lethal brain tumor that is currently incurable due to its complex nature and challenging location. It is usually treated with surgery, radiotherapy, and chemotherapy with temozolomide. Although TMZ is the only widely-used drug for glioblastoma, most tumors are resistant. Additionally, it is challenging to develop new drugs because the animal models are expensive and difficult to work with. To deal with this problem, Kriuchkovskaia will develop a 3D brain cancer model that can mimic the tumor environment and can therefore be used to screen different drugs. In collaboration with the Cancer Center at Illinois, Kriuchkovskaia will test thousands of anticancer drugs, many of which were developed by researchers at the University of Illinois.

The other participants included Alida de Flamingh, a postdoctoral fellow in the Malhi lab, who is developing a genomic sex identification toolkit to help in animal conservation efforts; Walden Li, a graduate student in the Jensen lab, who is working on preventing cavities caused by *Streptococcus mutans* by using peptides that target them without damaging the other members of the microbial community in the mouth; and Sheng Wang, a postdoctoral fellow in the Guan lab, who is combining satellite data and field data, using artificial intelligence, to monitor soil carbon levels and crop health.

The participants enjoyed the program and were grateful for the opportunity. "I found the program very interesting. There were aspects I had never encountered before, such as intellectual property

and patenting, and it gave me a good grasp of how to set up projects in the future,” de Flamingh said. “This program was special because we were able to translate our work into product development and market understanding,” Kolliopoulos said. “I learned that you need to talk to people and get involved with your network. Moving forward, I hope to continue

applying these skills not only as a graduate student but as a woman in a biosciences career.”

In addition to monetary awards, all participants will also be receiving one year of paid affiliation to EnterpriseWorks at the Research Park. EnterpriseWorks supports the University of Illinois and community

entrepreneurs in all stages of their startup journey. Having affiliate status will allow all participants to access the shared working space and facilities, including support with visual branding and website development. ■

Written by Ananya Sen. Graphic by Eleanor Grosch.

RESEARCH



Referential alarm calls increase vigilance in brood parasite hosts

Yellow warblers are hosts to brood parasitic brown-headed cowbirds, which rely on other species to raise their offspring. Warblers use referential “seet” calls to warn female warblers specifically of the brood parasitic brown-headed cowbirds that may try to lay eggs in their nests. When exposed to experimental playbacks of seet calls one day, female warblers were more vigilant the next morning, researchers report in the current issue of the journal *Biology Letters*.

“Playback experiments are a powerful way to study the behaviors of birds in response to parasitic stimuli. Previously, these kinds of referential alarm calling experiments showed that yellow warblers do something specific right away when they hear the seet call,” said Mark Hauber (GNDDP), a professor of evolution, ecology, and behavior at the University of Illinois Urbana-Champaign and a fellow of the *Wissenschaftskolleg zu Berlin*.

Specifically, female warblers return to the nest and sit tightly after hearing a seet call. This defense mechanism prevents the brown-headed cowbird from inspecting the nest to plan when to lay her own egg in it and throwing warbler eggs out of the nest. However, cowbirds themselves only lay eggs in the minutes before sunrise and not during the

daytime when most researchers have studied seet call responses.

“We wanted to see whether the warbler still remembers, a day later, that there is a potential parasitic threat to the nest and exhibits behaviors that are representative of protecting the nest from the parasite into the future,” said Hauber.

To investigate whether female warblers remembered the potential threat, researchers exposed yellow warblers to either seet calls, chip calls — an alert for predators —, or no playbacks (as controls). Observations were made using two methods: direct observation by research personnel and temperature loggers inside the warbler nests. The nests were left undisturbed by researchers from the time of playback to sunrise the next morning, said Hauber.

“We found that yellow warbler females who heard seet calls the previous day would sit on their nest for a longer period of time and would get off the nest fewer times compared to when they heard silence or the chip calls,” said Shelby Lawson, first-author of the study and a doctoral student in the Hauber lab. “They’re thinking of the cowbird the next morning even though the cowbird signal was the previous day.”

These behaviors suggest that the yellow warblers are possibly recalling past events — the seet calls — and engaging in mental time travel that boosts their nest attendance the next day. The alternative is a heightened state of alert lasting from the time of the playback call till the next morning, said Hauber.

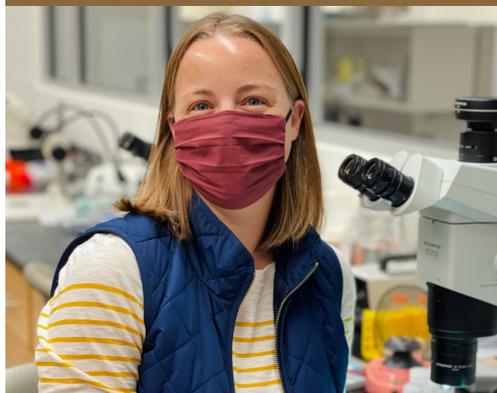
“Our findings show the warblers may be doing something cognitively advanced to be able to think of the threat the next day,” said Lawson. “We don’t know mechanistically what’s going on in their head when they hear the seet call and so we have future studies planned to measure brain activity as we play different sounds.”

Other co-authors of the paper include Janice Enos, Caroline Wolf, Katharine Stenstrom, Sarah Winnicki, Thomas Benson and Sharon Gill. For more info, please visit: www.cowbirdlab.org

Funding was provided by the American Ornithological Society, the Illinois Ornithological Society, the National Geographic Society, the School of Integrative Biology at the University of Illinois Urbana-Champaign, and the National Science Foundation. ■

*Written by Alisa King-Klempner.
Photo by Shelby Lawson.*

MONTHLY PROFILE



Amy Cash-Ahmed is a Research Laboratory Manager at IGB, where she manages Dr. Gene Robinson's laboratory.

Amy Cash-Ahmed

Research Laboratory Manager, Robinson Lab

Originally from Farmer City, Illinois, Amy Cash-Ahmed was always passionate about animals, and by the time she was six years old, she wanted to become a veterinarian. She had a high school teacher who inspired her to pursue her undergraduate studies in biology. "Plus, I've always had a love for animals, so I knew going into college that I wanted to do biology," she said.

Eventually, during undergraduate school, her ambitions to become a veterinarian changed into becoming a researcher. She fell in love with honey bee work developed by one of her teaching assistants who was working in Gene Robinson's lab. She started to do undergraduate research in the same lab. Cash-Ahmed shared with enthusiasm: "I loved it all: the molecular biology, the bees, the research. I also loved working in the outreach events. Those experiences set the tone for the rest of my career."

Cash-Ahmed received her PhD in molecular biology in 2012, from Indiana University. Since she has always been a fan of the Midwest, when there was an opportunity for her and her husband to start their careers in Champaign-Urbana,

"We jumped at that chance as we love it here since it just feels like home," she said. Cash-Ahmed continues working directly with honey bees.

"They're fascinating. They are tiny creatures that exhibit amazing behaviors and tasks in the hive and are important to agriculture," Cash-Ahmed explained. "They are also really cool organisms to get

"I truly love mentoring, and I love getting other people excited about science."

other people excited about science," she said. She went on to explain how working with honey bees is an easy way to introduce people to animal behavior, as they are generally interested in what goes on in honey bee colonies.

Amy is passionate about mentoring students and doing science outreach. You would be hard-pressed to find such an enthusiastic mentor - "I truly love men-

toring, and I love getting other people excited about science," she explained.

In her workplace, besides doing research, Amy is a mentor for students of different age groups including high school students, undergraduate students, PhD students, and even postdoctoral research scientists. Her goal is to help and support all these students, not only with their hands-on work in science but also with their life goals, including what they want to do with their lives and careers.

For her, Champaign-Urbana is the perfect place for a work-life balance. "I love my job, I love the research, I love working with honey bees and this is also a great place for my kids to go to school and it's safe," she explained.

When she is not at the IGB, Cash-Ahmed spends a lot of time with her husband and their six- and eight-year-old kids. However, during the Covid-19 pandemic, it has been a struggle. "Balancing work and family and trying to do it safely," has been her biggest career challenge. Nevertheless, they spend time riding bikes, going to beaches, kayaking, and hiking. ■

Written by Joana Bordalo.
Photo by Jessica Quicksall.

ON THE GRID HAPPENINGS AT THE IGB

AWARDS



KORINTA MALDONADO

Korinta Maldonado, Assistant Clinical Professor of Anthropology (IGOH), received the 2021 Immigrant Leadership Award from the Champaign-Urbana Immigration Forum, which recognizes the contributions of individuals and organizations that have created a welcoming atmosphere for immigrants in the Champaign-Urbana community.



RIPAN MALHI

Ripan Malhi, Professor of Anthropology (GNBP/GSP/IGOH) received the Robert W. Sussman Award for Scientific Contributions to Anthropology from the Steering Group of Section H (Anthropology) of the American Association for the Advancement of Science, which recognizes meritorious scientific contributions to the field of anthropology.

NEW ARRIVALS



HANNAH MCCLELLAN

Hannah McClellan recently joined the IGB as an Office Support Associate. Prior to starting at the IGB, Hannah worked for the Office of the Vice Provost for International Affairs and Global Strategies. She has been with the University for a little over 2 years.

TRAINING



ETHICS TRAINING

As a University of Illinois employee, you are required to complete ethics training on an annual basis. This year's course focuses on relevant issues and events as they relate to the State Officials and Employees Ethics Act and Illinois Executive Order 15-09.

The training is available now and will remain accessible through 5:00 PM Central Time on November 1, 2021.

To complete your coursework, please do the following:

- Open your browser and make sure your pop-up blockers are set to allow pop-ups from <https://lms.apps.uillinois.edu>
- Click "NetID Login"

- Choose your university location and "Select"
- Enter your university netid and password and "Login"
- Once logged into the University of Illinois System Training LMS, on the Course Overview screen, select the "2021 Annual Ethics Training" icon by clicking on the image
- On the dashboard, please click on the "2021 Annual Ethics Training for Faculty and Staff" link
- Your course will open and you may progress following the on screen prompts to complete your training
- Upon completion, click the link provided to obtain your Certificate of Completion

The course may be completed in segments or in one sitting, and your progress will be bookmarked when you log back into the course. The course will take approximately 40 minutes to 1 hour to complete and should be completed during your regular work hours or as your supervisor directs.

Scheduled reminders will be sent to anyone

who has not completed the course in its entirety on October 18th and October 29th. To avoid receiving reminders from the University Ethics Officer, please complete this requirement prior to the scheduled reminder dates.

If you are having difficulty with your Net ID and password, please contact your respective support desk for assistance:

- UIC: 312-413-0003 option 9 (Help Center)
- UIS: 217-206-6000 (Information Technology Services)
- UIUC: 217-244-7000 (Technology Services)

University Ethics and Compliance staff are available to assist with content questions: 866-758-2146; ethicsofficer@uillinois.edu. For additional information regarding the annual ethics training requirement, please visit our website: www.ethics.uillinois.edu/training/illinois_mandatory_ethics_training.

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.

Gomez-Casanovas, N., Blanc-Betes, E., Moore, C. E., Bernacchi, C. J., Kantola, I., & DeLucia, E. H. (2021). A review of transformative strategies for climate mitigation by grasslands. *Science of the Total Environment*, 799, [149466]. <https://doi.org/10.1016/j.scitotenv.2021.149466>

Bulut-Karslioglu, A., Jin, H., Kim, Y. K., Cho, B., Guzman-Ayala, M., Williamson, A. J. K., Hejna, M., Stötzel, M., Whetton, A. D., Song, J. S., & Ramalho-Santos, M. (2021). Chd1 protects genome integrity at promoters to sustain hypertranscription in embryonic stem cells. *Nature communications*, 12(1), [4859]. <https://doi.org/10.1038/s41467-021-25088-3>

Walton, A., Toth, A. L., & Dolezal, A. G. (2021). Developmental environment shapes honeybee worker response to virus infection. *Scientific reports*, 11(1), [13961]. <https://doi.org/10.1038/s41598-021-93199-4>

Yuan, H., Wang, X., Lin, T. Y., Kim, J., & Liu, W. T. (2021). Disentangling the syntrophic electron transfer mechanisms of *Candidatus geobacter eutrophica* through electrochemical stimulation and machine learning. *Scientific reports*, 11(1), [15140]. <https://doi.org/10.1038/s41598-021-94628-0>

Yu, H., Ma, Y., Lu, Y., Yue, J., & Ming, R. (2021). Expression profiling of the Dof gene family under abiotic stresses in spinach. *Scientific reports*, 11(1), [14429]. <https://doi.org/10.1038/s41598-021-93383-6>

Singh, R., Liu, H., Shanklin, J., & Singh, V. (2021). Hydrothermal Pretreatment for Valorization of Genetically Engineered Bioenergy Crop for Lipid and Cellulosic Sugar Recovery. *Bioresource Technology*, 341, [125817]. <https://doi.org/10.1016/j.biortech.2021.125817>

Kurambhatti, C., Lee, J. W., Jin, Y. S., Juneja, A., Kumar, D., Rausch, K. D., Tumbleson, M. E., Bekal, S., & Singh, V. (2021). Process design and techno-economic analysis of 2'-fucosyllactose enriched distiller's dried grains with solubles production in dry grind ethanol process using genetically engineered *Saccharomyces cerevisiae*. *Bioresource Technology*, 341, [125919]. <https://doi.org/10.1016/j.biortech.2021.125919>

Jin, Y., Yu, S., Liu, J. J., Yun, E. J., Lee, J. W., Jin, Y. S., & Kim, K. H. (2021). Production of neogaroooligosaccharides by probiotic yeast *Saccharomyces cerevisiae* var. *boulardii* engineered as a microbial cell factory. *Microbial cell factories*, 20(1), [160]. <https://doi.org/10.1186/s12934-021-01644-w>

Mao, Y., Akdeniz, N., & Nguyen, T. H. (2021). Quantification of pathogens and antibiotic resistance genes in backyard and commercial composts. *Science of the Total Environment*, 797, [149197]. <https://doi.org/10.1016/j.scitotenv.2021.149197>

Lee, J. W., Kwak, S., Liu, J. J., Yun, E. J., & Jin, Y. S. (2021). 2'-Fucosyllactose production in engineered *Escherichia coli* with deletion of waaF and wcaJ and overexpression of FucT2. *Journal of Biotechnology*, 340, 30-38. <https://doi.org/10.1016/j.jbiotec.2021.08.007>

Bhosale, Y., Parthasarathy, T., & Gazzola, M. (2021). A remeshed vortex method for mixed rigid/soft body fluid–structure interaction. *Journal of Computational Physics*, 444, [110577]. <https://doi.org/10.1016/j.jcp.2021.110577>

Yun, E. J., Seo, S. O., Kwak, S., Oh, E. J., Lee, S. H., Jin, Y. S., & Kim, K. H. (2021). Fast filtration with a vacuum manifold system as a rapid

and robust metabolome sampling method for *Saccharomyces cerevisiae*. *Process Biochemistry*, 110, 195-200. <https://doi.org/10.1016/j.procbio.2021.08.012>

Gonzalez, J. A., Histed, A. R., Nowak, E., Lange, D., Craig, S. E., Parker, C. G., Kaur, A., Bhuvanagiri, S., Kroll, K. J., Martyniuk, C. J., Denslow, N. D., Rosenfeld, C. S., & Rhodes, J. S. (2021). Impact of bisphenol-A and synthetic estradiol on brain, behavior, gonads and sex hormones in a sexually labile coral reef fish. *Hormones and Behavior*, 136, [105043]. <https://doi.org/10.1016/j.yhbeh.2021.105043>

Bhargava, S. S., Cofell, E. R., Chumble, P., Azmoodeh, D., Someshwar, S., & Kenis, P. J. A. (2021). Exploring Multivalent Cations-based Electrolytes for CO₂ Electroreduction. *Electrochimica Acta*, 394, [139055]. <https://doi.org/10.1016/j.electacta.2021.139055>

Fuchs, S. J., Crandall, D., Moore, J. E., Sivaguru, M., Fouke, B. W., Espinoza, D. N., Akono, A. T., & Werth, C. J. (2021). Geochemically induced shear slip in artificially fractured dolomite- and clay-cemented sandstone. *International Journal of Greenhouse Gas Control*, 111, [103448]. <https://doi.org/10.1016/j.ijggc.2021.103448>

Aksland, C. T., & Alleyne, A. G. (2021). Hierarchical model-based predictive controller for a hybrid UAV powertrain. *Control Engineering Practice*, 115, [104883]. <https://doi.org/10.1016/j.conengprac.2021.104883>

Moskát, C., & Hauber, M. E. (2021). Male common cuckoos use a three-note variant of their “cu-coo” call for duetting with conspecific females. *Behavioural Processes*, 191, [104472]. <https://doi.org/10.1016/j.beproc.2021.104472>

Zuo, Q., Chen, K. L., Eve, A. A., Liu, Y. J., Kim, S. H., Katzenellenbogen, B. S., Katzenellenbogen, J. A., & Madak-Erdogan, Z. (2021). Pathway preferential estrogens prevent hepatosteatosis due to ovariectomy and high-fat diets. *Nutrients*, 13(10), [3334]. <https://doi.org/10.3390/nu13103334>

Brache, V., Vieira, C. S., Plagianos, M., Lansiaux, M., Merkatz, R., Sussman, H., Cochon, L., Tejada, A. S., Kumar, N., Loeven, D., Blithe, D. L., Aprem, A. S., Williams, A. R. W., Kannan, A., Bagchi, I. C., & Sitruk-Ware, R. (2021). Pharmacodynamics and pharmacokinetics of a copper intra-uterine contraceptive system releasing ulipristal acetate: A randomized proof-of-concept study. *Contraception*, 104(4), 327-336. <https://doi.org/10.1016/j.contraception.2021.06.010>

Khanna, M., Chen, L., Basso, B., Cai, X., Field, J. L., Guan, K., Jiang, C., Lark, T. J., Richard, T. L., Spawn-Lee, S. A., Yang, P., & Zipp, K. Y. (2021). Redefining marginal land for bioenergy crop production. *GCB Bioenergy*, 13(10), 1590-1609. <https://doi.org/10.1111/gcbb.12877>

Shin, J., Jin, Y. S., Park, Y. C., Park, J. B., Lee, Y. O., Kim, S. K., & Kweon, D. H. (2021). Enhancing acid tolerance of *Escherichia coli* via viroporin-mediated export of protons and its application for efficient whole-cell biotransformation. *Metabolic Engineering*, 67, 277-284. <https://doi.org/10.1016/j.ymben.2021.07.007> ■

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