

IGB NEWS

Upcoming Events
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Image Of The Month
Research News
Department Announcements

Volume 14 Number 7

UPCOMING EVENTS

IGB Postdoc Association Presents

Building the SHIELD saliva-based COVID-19 surveillance system from the ground up: A personal story

December 17, 2020, 12:00 p.m.

[Join via Zoom](#)

Diana Ranoa, PhD

IGB Fellow, Anticancer Discovery from Pets to People

IGB Pioneers Seminar

Unexpected role of steroid hormones in reproduction, aging, and bioelectricity

January 26, 2021, 12:00 p.m.

Polina Lishko, PhD

University of California, Berkeley
Associate Professor of Cell and Developmental Biology

IGB Seminar - GNDP

TBD

February 2, 2021, 12:00 p.m.

Brian Beliveau, PhD

University of Washington
Assistant Professor of Genome Sciences

IGB Seminar - GEGC

TBD

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

Nathan Springer, PhD

University of Minnesota
Professor of Plant and Microbial Biology

FEATURED NEWS



2

Supporting new research areas through seed funds



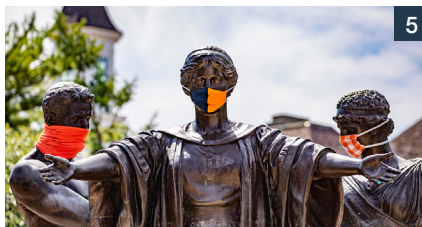
3

Initiative offers COVID-19 testing, explores viral social transmission



4

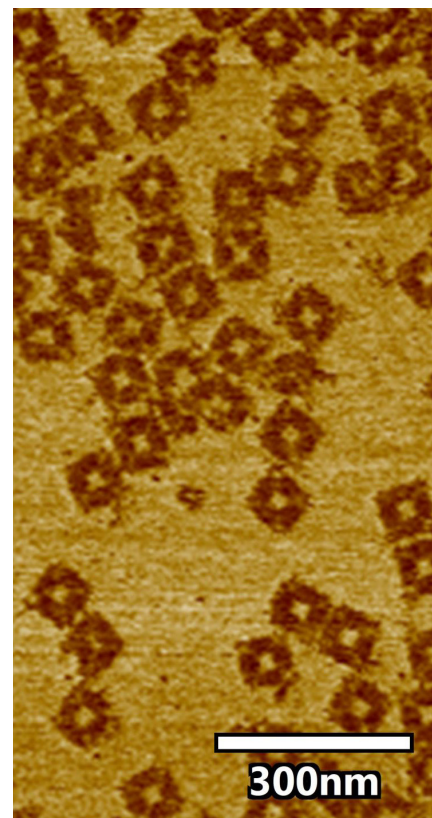
Monthly Profile: Collin Kieffer



5

On the Grid: Happenings at IGB

IMAGE OF THE MONTH



300nm

This month's image shows a two-dimensional (2D) DNA origami self-assembled of synthetic DNA oligonucleotides with programmed sequences. This is a molecular pegboard/platform (80nm*80nm) that can arrange external elements with nanometer scale accuracy for different applications. The sample was scanned using Cypher AFM from Asylum Research at the Carl R. Woese Institute for Genomic Biology Core Facility.

IGB News

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



Supporting new research areas through seed funds

From the beginning, Kim and Robert Benziger shared a desire to spread positivity and to give back to the community so that others would have the same opportunities. In line with their philanthropy, the Benzigers have given a generous contribution to the Director's Innovation Fund, which provides seed funds for budding IGB research themes.

Growing up in the Northwest side of Chicago, Kim and Robert Benziger attended the same high school where they were acquainted with each other. It wasn't until the day when Robert Benziger reunited with Kim Benziger at an Illinois State University school dance that their relationship blossomed. The Benzigers just recently celebrated their 56th wedding anniversary.

"We got married right after Kim finished college, but I still had a semester to go because I took an engineering undergraduate degree and attended law school," said Robert Benziger. "She supported me for three years while I finished my schooling at Illinois."

After completing her BS in elementary education from Illinois State University, Kim Benziger began teaching kindergarten in Mansfield, Illinois while Robert Benziger finished law school at the University of Illinois Urbana-Champaign.

"I wanted to be a teacher when I went to college and my interests were primary grades and art," said Kim Benziger. "I was able to put those together and so it worked out quite well for my interests."

After a number of years living out of state due to various jobs, the Benzigers returned to Deerfield, Illinois where they have lived ever since. Upon returning to

Illinois, Robert Benziger established a scholarship at his alma mater, after which the Benzigers received an

Above:
*Robert and Kim Benziger
at SoyFACE (Soybean Free Air
Concentration Enrichment) during
their 2019 tour of IGB
research projects.*

invitation to visit a program hosted by the IGB at the Chicago Field Museum. It was there that the Benzigers' interest in genomic research was triggered.

"We were fascinated with the demonstrations and programs they had set up in the space," said Mr. and Mrs. Benziger. "The graduate students impressed us with their enthusiasm, knowledge, and communication skills."

The Benzigers developed an adoration and appreciation for nature from their passion for gardening and National Geographic tours, which took them to places like Antarctica and the Galapagos Islands. These trips reinforced their embedded desire to learn new things about nature and the world around them.

"When they invited us to do a tour of the IGB, we told them we were interested in nature, specifically work at IGB that focused on adapting crops for climate change and the future of pollinators because

we had read about their decline," said Mr. and Mrs. Benziger. "They told us about the honey bee study and we said we'd be interested in learning about that. We also got to visit the corn and soybean fields where atmospheric controls simulated changing climate conditions and learn about the honey bee study — it was a wonderful tour."

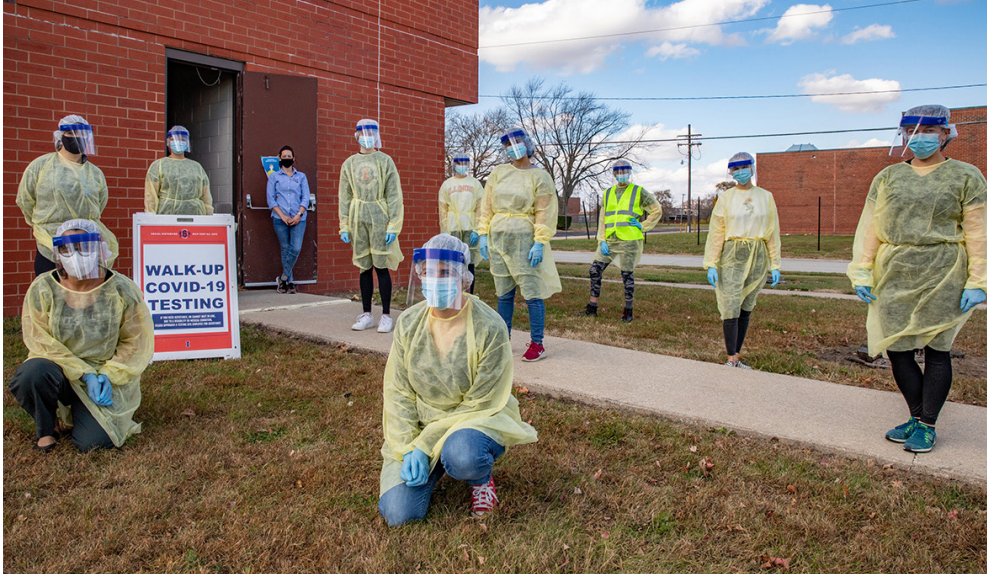
While living in Mansfield, Illinois, the Benzigers became acquainted with a local farming family where they learned about farming practices and the challenges farmers faced. One of the topics addressed during their IGB visit was the future of crop growth in light of climate change, reflecting the Benzigers' interests in all aspects of nature. Their wide-ranging interests spurred them to support the development and in-depth studies of new research areas.

"We wanted to do something positive that has the potential to outlive us and so we thought providing seed money for the initial work within potential new themes would be important," said Mr. and Mrs. Benziger. "Our investment opens doors to things we couldn't even imagine or think possible."

"Everything blended well together and we keep finding new ways to express our interests," said Mr. and Mrs. Benziger. "The campus visit gave us such a wonderful grounding in understanding the research taking place and the programs that we kept hearing about. Education is a forever thing that should be for everyone all the time and our experiences with the University of Illinois only reinforced that for us." ■

*Written by Alisa King-Klemperer.
Photo by Alaina Kanfer.*

RESEARCH



Initiative offers COVID-19 testing, explores virus transmission's social factors

An interdisciplinary team of Illinois scientists is working with clinicians and community researchers to expand access to COVID-19 testing by providing pop-up testing clinics for agricultural workers and others at various locations in Rantoul, Illinois.

The team – microbiology professor Rachel Whitaker (IGOH leader/BCXT) and anthropology professors Jessica F. Brinkworth (IGOH), Korinta Maldonado, Ellen Moodie and Gilberto Rosas – also is investigating the structural, economic and sociocultural factors that impact transmission and response to the disease among essential agricultural laborers in rural communities like Rantoul.

Workers at the Rantoul Foods pork-processing plant were among the first outbreak clusters when COVID-19 emerged in central Illinois early last spring. When that cluster occurred, a group of researchers at the IGB assembled to see whether experts at the university could help contain the spread.

James F. Lowe (IGOH), a professor of veterinary clinical medicine, and civil and environmental engineering professor Helen Nguyen (IGOH) collected 24 air samples and 140 surface samples in the plant over a seven-week period. But when they found no traces of the virus in those samples, it raised questions about how the disease was being spread person to person at work and among other people in the community.

“Efforts to find out how the disease spreads within this community are pivotal,” said Lowe, a leading researcher on disease control and biosecurity in the meat industry. “These essential workers are valued and protected in the workplace. When they are unable to do their jobs, the entire food production pipeline, from farm to table, is disrupted.”

“The problem is, in this community and others there are many essential workers but not universal access to

COVID-19 testing resources or response,” Whitaker said. “There’s generally not a lot of infrastructure for reaching these groups.

“The Labor Health Equity Action Project started out with this acute realization of an infection cluster, and then quickly turned to all of these complexities that might cause people, especially essential workers, to be more susceptible to or affected by the COVID pandemic. This is a really important area of research that’s growing.”

According to data from the U.S. Centers for Disease Control and Prevention, front-line and essential workers are at increased risk of exposure to COVID-19. Moreover, many of these workers are racial and ethnic minorities, who are more likely to progress to severe cases.

Dr. Cristina Medrano, who is employed part-time at the U. of I.’s McKinley Health Center and is establishing a private practice in Champaign, organized volunteer clinicians for the project. They and the U. of I. team have coordinated four testing clinics so far, including one at Rantoul’s Multicultural Community Center that was provided in conjunction with Frances Nelson Health Center. Other clinics were held at the Greater New Light Baptist Church and at Rantoul Parks and Recreation Department facilities.

Participants are donating blood and saliva samples for testing, and they are being surveyed about behaviors and about living and working conditions associated with higher rates of infectious disease.

The research may shed light on disparities in COVID-19 infection rates among various demographic groups, Brinkworth said.

In addition to organizing the clinics, Brinkworth is researching the roles of social stress and life experiences

on immune function and COVID-19 transmission and severity among Rantoul workers.

“We also want them to tell us what misinformation they may have received and what their needs are – all of that affects where we go and what we try to do next,” she said. “The circumstances here in Rantoul reiterate what’s happening all across the Midwest and globally.”

“Obviously, testing is not the only answer and is one element of a larger strategy,” said Moodie, who is an expert on Central America, human rights and ethnographic research. “Our goal is to understand how we can address questions of how to protect oneself, what are good public health practices and how to mitigate the spread of the virus within particular communities.”

Three community researchers hired and trained by the anthropologists are conducting ethnographic interviews by phone, collecting data on the social pathways that promote transmission of the disease. These researchers either have experience working with agricultural workers or are of races or ethnicities represented in the broader community.

“These groups deserve not only equal access to testing and health care but also to knowledge about virus transmission,” said Maldonado, who also is a professor of American Indian studies. “By producing the research knowledge collaboratively and reporting the findings back to these communities, we can find better, smarter mitigation strategies.”

Funding for the project was provided by the College of Agricultural, Consumer and Environmental Sciences; the Office of the Vice Chancellor for Research and Innovation; the IGB; the Illinois Pork Producers Association; and private donors. ■

Written by Sharita Forrest. Photo by Fred Zwicky.

MONTHLY PROFILE



Colin Kieffer is an Assistant Professor of Microbiology whose lab focuses on advanced imaging techniques to visualize HIV pathogenesis in tissues with the goals of understanding relevant modes of virus dissemination, investigating the latent virus reservoir, and characterizing the effectiveness of anti-HIV therapies.

Collin Kieffer: Understanding mechanisms of HIV pathogenesis through multiscale imaging

Growing up largely in Madison, Wisconsin, Collin Kieffer (IGOH) got to experience first-hand a potential career as a scientist, living so close to the University of Wisconsin-Madison (UW-Madison). Ultimately, it was Kieffer's passion for the outdoors that sparked his interest in the natural world around him.

"I'm very much an outdoors person and so I think part of it is liking the natural world and being in the natural world," said Kieffer. "I started doing all my initial research looking more at ecology or microbes in the environment as opposed to medically-related microbiology fields. I really wanted to be out and about in the environment but also understand what's going on at the microscopic level."

After taking a medical microbiology class at UW-Madison, Kieffer became interested in the field of translational medical research and pathogenesis. Thereafter, Kieffer graduated from UW-Madison with a BS in Bacteriology and took a non-traditional career path.

"I spent several years surfing and skiing around the world before I realized I wanted to do something a little more meaningful with my life," said Kieffer. "I was working construction in Madison and applied for a position at then-startup biotech company, Eragen Biosciences, as a technician. Spending a couple years there, I realized I wanted to go to graduate school."

Kieffer started his graduate studies at the University of Utah where he was able to maintain an active lifestyle consisting of activities such as mountain climbing, mountain biking, and skiing. Here, in the lab of Wes Sundquist, Kieffer began studying viruses, with work focusing on understanding the protein network of virus production in HIV-infected cells.

"We solved NMR structures of proteins and tested how these proteins worked in various assays, including fluorescence microscopy," said Kieffer. "This is where I started doing more microscopy-based research. I never stopped using microscopy as a way to look inside the cell and understand mechanisms of how various cellular processes occur at basic levels."

After receiving his PhD in Biochemistry at the University of Utah, Kieffer completed postdoctoral positions at the Huntsman Cancer Institute at the University of Utah in the lab of Bryan Welm and at the California Institute of Technology (Caltech) in the lab of Nation-

al Academy of Sciences member Pamela Bjorkman. During his time at Caltech, Kieffer developed humanized mouse models — mice with humanized immune systems — for HIV infection studies.

"Since HIV infects human immune cells, we can infect these animals with HIV and recapitulate a lot of aspects of HIV biology," said Kieffer. "Since you can't do experiments on humans and experiments with non-human primates are expensive, humanized mice became valuable models of HIV biology."

Kieffer then brought his expertise to the University of Illinois Urbana-Champaign and joined the microbiology department; his wife, Beth Stadtmueller, whom he met in Utah, is also a faculty member at the University of Illinois in the department of Biochemistry. While at Wisconsin, Kieffer would hear about the revolutions and discoveries taking place at the University of Illinois microbiology department.

"Illinois has a great track record as an institute as one of the original land grant institutions and there's a great history of academic research performance there," said Kieffer. "There's also the department of microbiology that has a huge longstanding tradition as one of the best places to do microbiology research in the world."

As a member of the IGOH research theme, Kieffer brings translational research to a research theme that covers basic research and spans multiple scales, from single cell organisms to ecological networks. Kieffer was also drawn to the collaborative, interdisciplinary nature of the IGB and the instrumentation there, which is necessary for his research.

"We can look at the fine points along the spectrum in the IGOH theme by imaging things at multiple scales in order to understand a biological process," said Kieffer. "My research looks at things from big to small so I think it fits really well. Our research platform dovetails well with the overall ideas that IGOH is trying to understand, which is how infection genomics can be impacted both ecologically and globally."

Kieffer's lab takes a system-based approach to understand the structural details of HIV infection using multiple levels of microscopy, from fluorescence microscopy at the single-cell level to electron microscopy at the single virus level. Their work also includes development of new technologies that would allow a

closer look at viruses in tissues in their native state and the latent virus reservoir.

"HIV is a huge problem because it's been almost 40 years since we've discovered it as the causative agent of AIDS and yet, we still have no vaccine or cure," said Kieffer. "If you stop taking your anti-retroviral drugs, your virus loads in your body are going to increase as if you've never seen the virus before. This is due to a population of latently infected cells that are infected but not producing viruses so they're hidden from the immune system. This is really what's blocking us from generating a cure for HIV and so one thing my lab is focused on is understanding where the latent virus reservoir is and how we can eradicate it."

"What I like most and least about scientific research is asking questions that no one has the answers to and those that lead to endless possible answers," said Kieffer. "It's really exciting to be involved in teasing apart these questions and seeing and understanding something new that no one else in the world has understood before."

One of the challenges Kieffer reflected on was maintaining balance between family life and high level research. This year was especially challenging for the recently established Kieffer lab, which had to shut down early this year due to the COVID-19 pandemic. Despite the setbacks, Kieffer found a way to keep himself motivated by getting involved in public outreach and giving presentations on the molecular biology and virology of COVID-19 and SARS-CoV-2. Kieffer also volunteered to help with early efforts in supplying local hospitals with virus transfer medium used for initial COVID-19 testing.

"I wanted to do something of value so when I heard (microbiology professor) Chris Brooke down the hall from me was trying to get virus transfer medium together for initial testing, I thought I could help in any way I can," said Kieffer. "Our lab has also helped in giving lab supplies to local hospitals early on when they needed help. I'm still working from home, but my lab is now up and running and everyone is thrilled to be back. It's tough, but we have to compartmentalize and make it through." ■

*Written by Alisa King-Klemperer.
Photo by Colin Kieffer.*

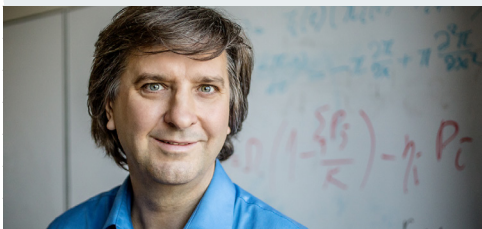
ON THE GRID HAPPENINGS AT THE IGB

AWARDS



ALISON BELL CARL BERNACCHI

Alison Bell, Professor of Evolution, Ecology, and Behavior (GNBP leader) and Carl Bernacchi, Professor of Plant Biology (CABBI/GEGC) have been elected 2020 Fellows of the American Association for the Advancement of Science, in recognition of important contributions to STEM disciplines, pioneering research, leadership, and teaching, fostering collaborations, and advancing public understanding of science.



SERGEI MASLOV

Sergei Maslov, Professor and Bliss Faculty Scholar of Bioengineering (BCXT/CABBI) was elected Fellow of the American Physical Society, which recognizes members who have made advances in physics through original research and publication.

ADDRESS



UPDATE YOUR MAILING ADDRESS AND CONSENT FOR ONLINE TAX FORMS

Please review and update your Mailing Address on file with the University of Illinois System for benefits and/or tax purposes. If you receive your tax forms (e.g., W-2, 1042-S) via Postal Mail, it's important to update your Mailing Address before December 31, 2020. You can provide consent for electronic access to your tax forms at My UI Info. If you've given consent in the past, and already access your tax forms online, then you do not need to consent again.

To Review And Update Your Mailing Address:

- Go to My UI Info at <https://www.hr.uillinois.edu/myinfo>.
 - Select My Profile.
 - Select Access My Profile green button.
 - Enter your NetID and password. (You will be prompted to use 2-Factor Authentication)
- View Address/Contact Information to ensure your Mailing Address is accurate. Select Edit to add or edit your mailing address as necessary. After making any changes select Submit.

- Select Log Out to exit.

To Provide Consent To Access Tax Forms Online:

- Go to My UI Info at <https://www.hr.uillinois.edu/myinfo>.
- Select W-2/1042-S Tax Statement.
- Select the Access Tax Forms green button.
- Enter your NetID and password. (You will be prompted to use 2-Factor Authentication)
- Select Continue.
- On the Online Tax Forms page, select Consent/Withdraw Consent to view instructions.
- Follow the instructions on the form to provide consent. (A PDF viewer is required to retrieve your consent code)
- Select the Consent button.
- Select Log Out to exit. Once complete, you will receive an email from the University of Illinois System to the designated email address confirming your consent. ■

BUILDING

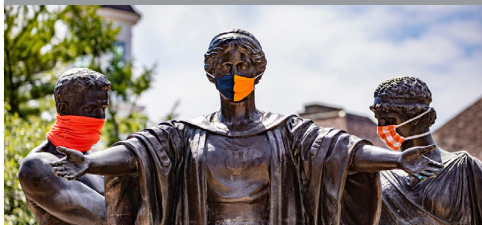


IGB BUILDING HOLIDAY SCHEDULE AND INFORMATION

December 24 to January 4

The IGB building will be closed, which includes administrative offices, purchasing, shipping and receiving, and Array Cafe. Card access doors are only accessible with a valid IGB prox card. Please visit this link for [full information](#). Building will reopen with limited services on Monday, January 4. ■

COVID-19



COVID-19 RESEARCH STUDY

A new research study will explore how COVID-19 behaves over time. Faculty, staff, or students who test positive for COVID-19 will receive a text message with information about enrolling.

The U. of I. viral dynamics study is part of the Rapid Acceleration of Diagnostics initiative of the National Institutes of Health. The study seeks to determine how results from different testing methods correlate and answer questions regarding the early course of the virus and when someone becomes infectious after exposure.

Study participants can earn up to a \$300 gift card and can help fight the coronavirus.

For more information, email coviddetect@uillinois.edu or visit <https://news.uillinois.edu/view/6367/46027586>.

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.

Kim, B.S., Kim, M.K., Cho, Y., Hamed, E.E., Gillette, M.U., Cha, H., Miljkovic, N., Aakalu, V.K., Kang, K., Son, K.N., Schachtschneider, K.M., Schook, L.B., Hu, C., Popescu, G., Yu S., Im, S.G., Lee, J., Lee, C.H., Kong, H.J., Electrothermal Soft Manipulator Enabling Safe Transport and Handling of Thin Cell/Tissue Sheets and Bioelectronic Devices. *Science Advances* 6: eabc5630 (2020). Highlighted by <https://eandt.theiet.org/content/articles/2020/10/octopus-like-sucker-transfers-thin-tissues-and-electronics/> <https://news.illinois.edu/view/6367/1745853877>

Sullivan K., Park C.G., Ito, J.D., Kandel, M.E., Popescu, G., Kim, Y.J., & Kong, H.J. Matrix softness-mediated 3D zebrafish hepatocyte modulates response to endocrine disrupting chemicals. *ACS Environmental Science and Technology*. 54: 13797-13806 (2020).

G. J. Pagan-Diaz, J. Drnevich, K. P. Ramos-Cruz, R. Sam, P. Sengupta, and R. Bashir, "Modulating electrophysiology of motor neural networks via optogenetic stimulation during neurogenesis and synapogenesis", *Sci. Rep.* 10, 12460 (2020); doi:10.1038/s41598-020-68988-y.

Y. Kim, G. Pagan-Diaz, L. Gapinske, Y. Kim, J. Suh, E. Solomon, J. F. Harris, S.W. Nam, and R. Bashir, "Integration of Graphene Electrodes with 3D Skeletal Muscle Tissue Models", *Adv. Healthcare Mater.* 9, 1901137 (2020); doi:10.1002/adhm.201901137.

Jee-Wei Emily Chen, Jan Lumibao, Sarah Leary, Jann N. Sarkaria, Andrew J. Steelman, H. Rex Gaskins, Brendan A. C. Harley, Crosstalk between microglia and patient-derived glioblastoma cells inhibit invasion in a three-dimensional gelatin hydrogel model. *J Neuroinflammation* 17, 346 (2020). <https://doi.org/10.1186/s12974-020-02026-6>

Ocier, C. R., Richards, C. A., Bacon-Brown, D. A., Ding, Q., Kumar, R., Garcia, T. J., Van De Groep, J., Song, J-H., Cyphersmith, A. J., Rhode, A., Perry, A. N., Littlefield, A. J., Zhu, J., Xie, D., Gao, H., Messinger, J. F., Brongersma, M. L., Toussaint, K. C., Goddard, L. L., & Braun, P. V. (2020). Direct laser writing of volumetric gradient index lenses and waveguides. *Light: Science and Applications*, 9(1). <https://doi.org/10.1038/s41377-020-00431-3>

Bauer, J., Emon, M. A. B., Staudacher, J. J., Thomas, A. L., Zessner-Spitzenberg, J., Mancinelli, G., Krett, N., Saif, M. T., & Jung, B. (2020). Author Correction: Increased stiffness of the tumor microenvironment in colon cancer stimulates cancer associated fibroblast-mediated prometastatic activin A signaling (*Scientific Reports*, (2020), 10, 1, (50), 10.1038/s41598-019-55687-6). *Scientific reports*, 10(1), [7606]. <https://doi.org/10.1038/s41598-020-64239-2>

Mitros, T., Session, A. M., James, B. T., Wu, G. A., Belaffif, M. B., Clark, L. V., Shu, S., Dong, H., Barling, A., Holmes, J. R., Mattick, J. E., Bredeson, J. V., Liu, S., Farrar, K., Glowacka, K., Jezowski, S., Barry, K., Chae, W. B., Juvik, J. A., ... Rokhsar, D. S. (2020). Genome biology of the paleotetraploid perennial biomass crop *Miscanthus*. *Nature communications*, 11(1), [5442]. <https://doi.org/10.1038/s41467-020-18923-6>

Smith, B. P., Auvi, L. S., Welge, M., Bushell, C. B., Bhargava, R., Elango, N., Johnson, K., & Madak-Erdogan, Z. (2020). Identification of early liver toxicity gene biomarkers using comparative supervised machine learning. *Scientific reports*, 10(1), [19128]. <https://doi.org/10.1038/s41598-020-76129-8>

Schwartz-Duval, A. S., Konopka, C. J., Moitra, P., Daza, E. A., Srivastava, I., Johnson, E. V., Kampert, T. L., Fayn, S., Haran, A., Dobrucki, L. W., & Pan, D. (2020).

Intratumoral generation of photothermal gold nanoparticles through a vectorized biomineralization of ionic gold. *Nature communications*, 11(1), [4530]. <https://doi.org/10.1038/s41467-020-17595-6>

Döbelin, N., Maazouz, Y., Heuberger, R., Bohner, M., Armstrong, A. A., Wagoner Johnson, A. J., & Wanner, C. (2020). A thermodynamic approach to surface modification of calcium phosphate implants by phosphate evaporation and condensation. *Journal of the European Ceramic Society*, 40(15), 6095-6106. <https://doi.org/10.1016/j.jeurceramsoc.2020.07.028>

Beuchat, G., Xue, X., & Chen, L. Q. (2020). Review: The Next Steps in Crop Improvement: Adoption of Emerging Strategies to Identify Bottlenecks in Sugar Flux. *Plant Science*, 301, [110675]. <https://doi.org/10.1016/j.plantsci.2020.110675>

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Hedman, H. D., Varga, C., Duquette, J., Novakofski, J., & Mateus-Pinilla, N. E. (2020). Food Safety Considerations Related to the Consumption and Handling of Game Meat in North America. *Veterinary Sciences*, 7(4). <https://doi.org/10.3390/vetsci7040188>

Jiao, Y., Kandel, M. E., Liu, X., Lu, W., & Popescu, G. (2020). Real-time Jones phase microscopy for studying transparent and birefringent specimens. *Optics Express*, 28(23), 34190-34200. <https://doi.org/10.1364/OE.397062>

Sullivan, K. M., Park, C. G., Ito, J. D., Kandel, M., Popescu, G., Kim, Y. J., & Kong, H. (2020). Matrix Softness-Mediated 3D Zebrafish Hepatocyte Modulates Response to Endocrine Disrupting Chemicals. *Environmental science & technology*, 54(21), 13797-13806. <https://doi.org/10.1021/acs.est.0c01988>

Chee, Y. M., Colbourn, C. J., Dau, H., Gabrys, R., Ling, A. C. H., Lusi, D., & Milenkovic, O. (2020). Access balancing in storage systems by labeling partial Steiner systems. *Designs, Codes, and Cryptography*, 88(11), 2361-2376. <https://doi.org/10.1007/s10623-020-00786-z>

Digrado, A., Mitchell, N. G., Montes, C. M., Dirvanskyte, P., & Ainsworth, E. A. (2020). Assessing diversity in canopy architecture, photosynthesis, and water-use efficiency in a cowpea magic population. *Food and Energy Security*, 9(4), [e236]. <https://doi.org/10.1002/fes3.236>

Pinedo, P., Santos, J. E. P., Chebel, R. C., Galvão, K. N., Schuenemann, G. M., Bicalho, R. C., Gilbert, R. O., Rodriguez Zas, S., Seabury, C. M., Rosa, G., & Thatcher, W. W. (2020). Early-lactation diseases and fertility in 2 seasons of calving across US dairy herds. *Journal of Dairy Science*, 103(11), 10560-10576. <https://doi.org/10.3168/jds.2019-17951>

Zerpa, D., Li, J., & Ming, R. (2020). Genomic and morphological analyses of *Sapindaceae* species. *Acta Horticulturae*, 1293, 125-128. https://doi.org/10.17660/ACTAHORTIC.2020.1293_18 ■

I ILLINOIS

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www.igb.illinois.edu 20.117