

# IGB NEWS

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Volume 14 Number 5

## UPCOMING EVENTS

### IGB Seminar - CABBI

*Soil respiration responses to climate change are constrained by climate history*

September 21, 2021, 12:00 p.m.

[Join via Zoom](#)

Christine Hawkes, PhD  
North Carolina State University  
Professor, Department of Plant and Microbial Biology

### Genome Day

September 25, 2021

11:00 a.m. - 3:00 p.m.

Join us for a day of fun hands-on activities designed to teach children about DNA, genes, genomes, and evolution. This year we are partnering with PYGMALION to host Genome Day in their outdoor location outside the Rose Bowl in Urbana.

### IGB Seminar - DEI

*"Picture a Scientist" Q&A with film director Ian Cheney*

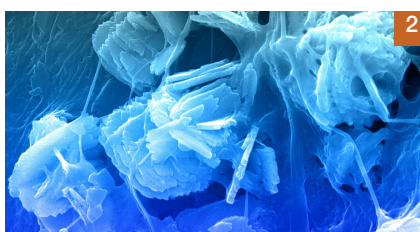
September 28, 2021, 12:00 p.m.

[Join Q&A via Zoom](#)

Ian Cheney  
American documentary filmmaker, cinematographer, and producer

Participants who register will receive a link and password to our private screening room prior to the Q&A, from Saturday September 25 through Monday, September 27, and may watch the film at any time during that period. [RSVP here.](#)

## FEATURED NEWS



Improving biomaterials design for bone regeneration



\$25M tech grant lets Illinois researchers 'talk' to plants

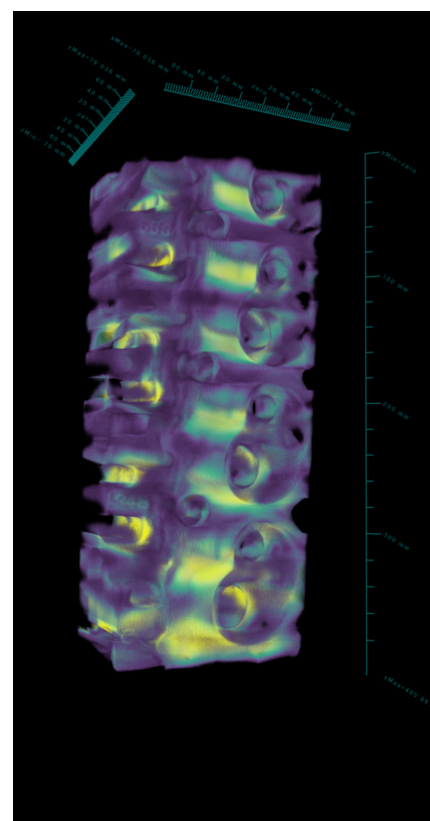


Monthly Profile: Carlos Spinks



On the Grid: Happenings at IGB

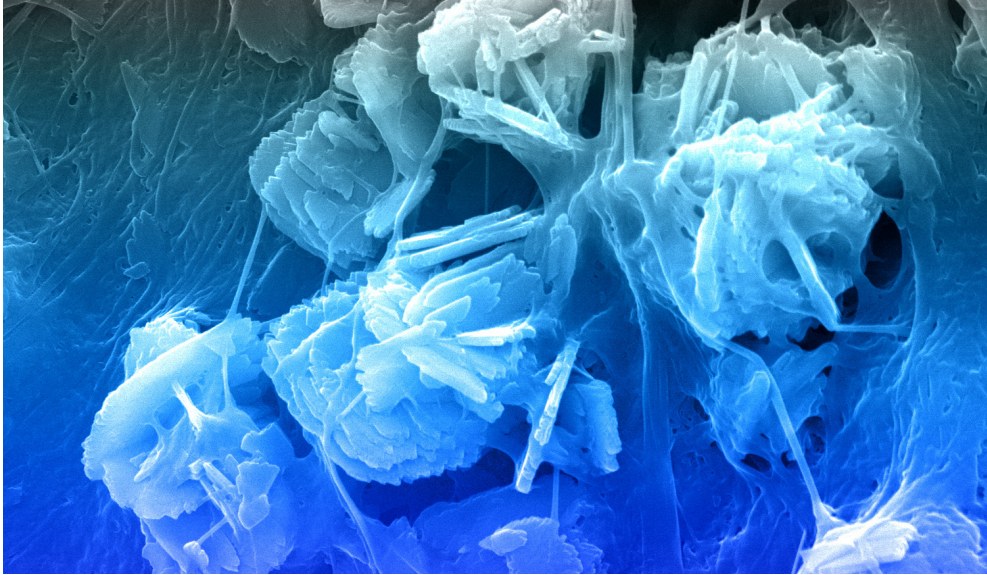
## IMAGE OF THE MONTH



The image shows the 3D CT reconstruction of a high performance cylinder head cast from scrap aerospace aluminum alloy AA7075. This helps in determining casting defects such as, microporosity and hot tearing. The cylinder head measures 20x8x5.75 inches and weighs approximately 40 pounds. The 3D images were obtained using the NSI X-5000 3D micro CT system and rendered using NSI efX software at the IGB.

### IGB News

Share your news with the IGB. Send ideas on stories, articles, and features to [nvasi@illinois.edu](mailto:nvasi@illinois.edu).



## Improving biomaterials design for bone regeneration

Bone injuries in the face and skull—known as craniomaxillofacial defects—can be caused by sports injuries, vehicle accidents, or battlefield injuries. Repairing such defects is complicated because different types of cells need to interact with each other. In a new study, researchers are investigating the types of material used in reconstruction to see which one works best.

Over 2 million bone graft surgeries occur annually across the world. CMF bone defects are usually irregularly shaped, which is why they are often repaired using regenerative biomaterials. The Harley Lab develops collagen scaffold biomaterials containing components that are found in bone, such as calcium and phosphate ions, and sugar compounds called glycosaminoglycans (GAGs).

“Our lab focuses on developing degradable biomaterials – also known as scaffolds – for bone and tissue repair,” said Vasiliki Kolliopoulos, a graduate student in the Harley lab. “There are many types of cells in the bone environment that contribute to healing, including stem cells that form bone, and monocytes that help with the immune response. This study investigated how the scaffold material affects the combined behavior of these different cells.”

The researchers adapted a collagen biomaterial to include one of three different types of GAGs found in the bone tissue microenvironment: chondroitin-4-sulfate, chondroitin-6-sulfate, and heparin. They then investigated how these GAGs influence processes important to bone regeneration such as stem cell activity, immune cell activation, and endothelial cell activity, which is important for the formation of new blood vessels.

To do so, stem cells were added to the scaffolds and

the surrounding solution, or media, was collected for up to twenty-one days. Stem cells are powerful factories of molecules that may influence other cells in the wound environment. After being collected, the conditioned media was added to cultures of endothelial cells, which are found in blood vessels. “Bone regeneration requires the growth of blood vessels and not many people have looked at how scaffold materials affect endothelial cells and how it could improve bone repair,” said Marley Dewey, a former graduate student in the Harley lab.

The researchers tracked the growth of the endothelial cells for 6-12 hours. “Although heparin is known to directly influence blood vessel formation, to our surprise we saw that the media generated by stem cells in chondroitin-6-sulfate scaffolds led to the greatest amount of blood vessel development compared to the other two scaffolds,” Kolliopoulos said.

The conditioned media was also studied to determine the types of molecules, known as soluble factors, that aid in blood vessel and bone development. Finally, the researchers added the conditioned media to monocytes and tracked their growth for 21 days to measure the types of immune cells they turned into. They found that the types and number of soluble factors were different for each scaffold type, and chondroitin-6-sulfate media produced the greatest number of immune cells that help during an inflammatory response.

The researchers are planning to further investigate the responses of the immune cells. “Stem cells can signal to monocytes when your body sounds the alarm that something is wrong. Therefore, we want to see whether the stem cells that are grown in the scaffolds in an inflammatory environment

will secrete a different cocktail of soluble factors,” Kolliopoulos said.

“These results show that the soluble factors play an important role in these multicellular systems,” Kolliopoulos said. “We showed that there are differences in the cell responses depending on what material is used and it is important to understand these interactions before you move on to more complicated experiments.”

It is unclear what aspect of the scaffold material is contributing to the differences in growth factors and cell growth, a problem the Harley lab plans to tackle next. “After we identify how the scaffolds influence the cells, we want to combine the different cell types to see what happens,” Kolliopoulos said. “We are trying to develop biomaterials that will be used by surgeons to repair bone defects. Understanding what these materials do to multiple cell types is important.”

Mai Ngo, the third author on the paper, helped in understanding the blood vessel development. The paper “Glycosaminoglycan content of a mineralized collagen scaffold promotes mesenchymal stem cell secretion of factors to modulate angiogenesis and monocyte differentiation” was published in *Materials* and can be found at <https://doi.org/10.1016/j.mta.2021.101149>.

The work was supported by the National Institute of Dental and Craniofacial Research of the National Institutes of Health, the NSF Graduate Research Fellowship, and the Chemistry-Biology Interface Research Training Program at the University of Illinois. ■

*Written by Ananya Sen. Photo by Marley Dewey.*



## RESEARCH



### \$25M tech grant lets Illinois researchers ‘talk’ to plants

The National Science Foundation (NSF) announced today an investment of \$25 million to launch the Center for Research on Programmable Plant Systems (CROPPS). The center, a partnership among the University of Illinois at Urbana-Champaign, Cornell University, the Boyce Thompson Institute, and the University of Arizona, aims to develop tools to listen and talk to plants and their associated organisms.

“CROPPS will create systems where plants communicate their hidden biology to sensors, optimizing plant growth to the local environment. This Internet of Living Things (IoLT) will enable breakthrough discoveries, offer new educational opportunities, and open transformative opportunities for productive, sustainable, and profitable management of crops,” says Steve Moose (BSD/CABBI/GEGC), the grant’s principal investigator at Illinois. Moose is a genomics professor in the Department of Crop Sciences, part of the College of Agricultural, Consumer and Environmental Sciences (ACES).

As an example of what’s possible, CROPPS scientists could deploy armies of autonomous rovers to monitor and modify crop growth in real time. The researchers created leaf sensors to report on belowground processes in roots. This combination of machine and living sensors will enable completely new ways of decoding the language of plants, allowing researchers to teach plants how to better handle environmental challenges.

“Right now, we’re working to program a circuit that responds to low-nitrogen stress, where the plant growth rate is ‘slowed down’ to give farmers more time to apply fertilizer during the window that is the most efficient at increasing yield,” Moose explains.

With 150+ years of global leadership in crop sciences and agricultural engineering, along with newer

transdisciplinary research units such as the National Center for Supercomputing Applications (NCSA) and the Center for Digital Agriculture (CDA), Illinois is uniquely positioned to take on the technical challenges associated with CROPPS.

But U of I scientists aren’t working alone. For years, they’ve collaborated with partner institutions to conceptualize the future of digital agriculture and bring it into reality. For example, researchers at Illinois’ CDA and Cornell’s Initiative for Digital Agriculture jointly proposed the first IoLT for agriculture, laying the foundation for CROPPS.

“CROPPS represents a significant win from having worked closely with our partners at Cornell and other institutions. We’re thrilled to move forward with our colleagues to shift paradigms in agriculture,” says Vikram Adve, Donald B. Gillies Professor in computer science at Illinois and co-director of the CDA.

CROPPS research may sound futuristic, and that’s the point.

The researchers say new tools are needed to make crops productive, flexible, and sustainable enough to feed our growing global population under a changing climate. Many of the tools under development – biotransducers small enough to fit between soil particles, dexterous and highly autonomous field robots, field-applied gene editing nanoparticles, IoLT clouds, and more – have been studied in the proof-of-concept phase, and are ready to be scaled up.

“One of the most exciting goals of CROPPS is to apply recent advances in sensing and data analytics to understand the rules of life, where plants have much to teach us. What we learn will bring a stronger biological dimension to the next phase of digital agriculture,” Moose says.

CROPPS will also foster innovations in STEM education through programs that involve students at all levels, and each partner institution will share courses in digital agriculture topics. CROPPS also aims to engage professionals in digital agriculture at any career stage, and learn how the public views innovations in this emerging technology area.

“Along with cutting-edge research, CROPPS coordinated educational programs will address the future of work in plant sciences and agriculture,” says Germán Bollero, associate dean for research in the College of ACES.

CROPPS is one of NSF’s Science and Technology Centers (STC). This program supports exceptionally innovative, complex research and education projects that focus on sparking new scientific paradigms through transformative technologies. NSF funded just six STCs this year, and CROPPS is the first to focus on plant biology and digital agriculture.

Additional Illinois faculty participating in CROPPS include Cabral Bigman-Galimore, Department of Communication; Romit Roy Choudhury, Department of Electrical and Computer Engineering; Girish Chowdhary (GEGC), Department of Agricultural and Biological Engineering and Department of Computer Science; Matt Hudson (CABBI/GNDP), Department of Crop Sciences; Meghan Lang, National Center for Supercomputing Applications; Amy Marshall-Colon (CABBI/GEGC), Department of Plant Biology; Tony Studer (CABBI/GEGC), Department of Crop Sciences; and Lav Varshney, Department of Electrical and Computer Engineering. ■

*Written by Lauren Quinn.  
Photo by L. Brian Stauffer.*

## MONTHLY PROFILE



*Carlos Spinks is the supervisor of the snack bar at the Array Café at the IGB.*

### Carlos Spinks IGB Array Café

If you go to the Array Café for a cup of coffee or a quick snack, be sure to ring the bell at the counter top. You will be greeted by a loud and friendly “hello” from Carlos Spinks, the supervisor at the café. Carlos starts his day at the IGB at 7 am, getting ready for his customers and closes the café at 3:30 pm. He always has a story and a smile, although the mask hides it these days, for everyone who meets him.

“I was raised on a farm in Humboldt, a small town in west Tennessee. I’ve done everything from going to the hen house, working with the cows, and helping my grandfather with his tomato, corn, and beans crops. We didn’t need an alarm clock—we had a rooster for that. I had a good upbringing,” Spinks said.

Spinks moved to Champaign with his mother and three siblings when he was 12. “It was a big change coming from a small town to what I thought was a big city. There was a lot of people and traffic. I was homesick for a long time because I missed the southern hospitality where people would always wave,” Spinks said.

After Spinks graduated from high school, he got his first job at a restaurant called Pickles Food & Fun on Neil Street, where he worked for 13.5 years. “I had my mind set on going to college, but I had my first daughter when I was 18 and I couldn’t see myself leaving her mother to take care of her alone,” Spinks said. “The restaurant was good to me, but my first daughter

changed my life, and I started looking for other jobs.”

Spinks joined the IGB as a security guard in 2008. He was hired by Darci Edmonson, the Special Events Coordinator. “Darci and I graduated together and my in-laws and her parents are really close friends,” Spinks said.

Since Spinks has spent some time in the food industry, he was considered a good fit for

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*My mother always said  
“Treat others as you want  
others to treat you”  
and that’s stuck with  
me for a long time.*

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running the café. “For the most part it’s not a stressful job like I have had in the past. The biggest challenge I face is the beginning of the semester every year. The break because of COVID made it that much harder because it’s like opening all over again: you have to start from scratch from your vendors to your students,” Spinks said.

“I like working with the people here, they’re wonderful. I’ve had some great students who have worked for me,” Spinks said. “The first year I ran the café, I kept all the students I hired

for all four years. Some of them didn’t have any work experience, but I believe in giving people chances. Even if they don’t have the experience, this job is a stepping stone for them, not a career.”

When he’s not working at the café, Spinks spends his time fishing and hunting with his father-in-law and friends in southern Illinois. “Although I used to play a lot of sports just to stay fit in my younger days, now I’m an outdoorsman. I’m not young anymore so I can’t run up and down the basketball court, but I do play with my grandson every now and then,” Spinks said. “I work hard and take care of my family.”

When asked about what he’s most proud of, his eyes light up. “I am proud of my four daughters: my oldest is 30 and is a nurse at Carle, the second oldest is 24 and recently got out of the military, the third is a junior at Illinois State University, and the fourth is 15 and became a freshman this year,” Spinks said. “Seeing them thrive makes me proud.” ■

**Written by Ananya Sen.  
Photo by Jillian Nickell.**



# ON THE GRID HAPPENINGS AT THE IGB

## AWARDS



### ALISON BELL

Alison Bell, Professor of Evolution, Ecology, and Behavior (GNBP leader) was elected a Fellow of the Animal Behavior Society.



### MOHAMMED EL-KEBIR

Mohammed El-Kebir, Assistant Professor of Computer Science (IGOH), received an NSF CAREER Award for his work utilizing single-cell sequencing as a way to further understand cancerous tumors. CAREER awards are given to early-career faculty who exemplify leadership through research and education.



### ZEYNEP MADAK-ERDOGAN

Zeynep Madak-Erdogan, Associate Professor of Nutrition (CGD/EIRH/GSP) was named Editor-in-Chief of the *Journal of the Endocrine Society* (JES), which provides coverage of clinical research, clinical practice information, and basic research in all areas of endocrinology.



### MAY BERENBAUM

May Berenbaum, Professor and Head of Entomology (GEGC/IGOH) was named the new Director of the Center for Advanced Study (CAS) at the University of Illinois Urbana-Champaign.



### JOSEPH IRUDAYARAJ

Joseph Irudayaraj, Founder Professor of Bioengineering (CGD/EIRH), was named a 2021 Fellow of the International Academy of Medical and Biological Engineering (IAMBE) for pioneering contributions to the development of nanoparticle biosensors and single-cell technologies for quantification of mRNA and other disease biomarkers.



### RUBY MENDENHALL

Ruby Mendenhall, Associate Professor of Sociology (GNBP) received the 2021 Pearl Birnbaum Hurwitz Humanism in Healthcare Award from the Arnold P. Gold Foundation, presented annually to a woman who exemplifies humanism and has advanced the well-being of at-risk or underserved populations in the healthcare arena.



### MARNI BOPPART

Marni Boppert, Professor of Kinesiology and Community Health (RBTE), was named a Fellow of the American Physiological Society (FAPS), which honors distinguished leaders who have demonstrated excellence in science and have made significant contributions to physiological sciences and related disciplines.



### TING LU

Ting Lu, Assistant Professor of Bioengineering (BCXT/BSO/CABBI/MME), jointly received the 2021 Future Insight Prize, established by Merck KGaA, Darmstadt, Germany to stimulate innovative solutions for humanity's greatest problems in the areas of health, nutrition, and energy, for work which uses microbes and chemicals to break down end-of-life plastics and transform them into edible food.



### SATISH NAIR

Satish Nair, Department of Biochemistry Head (MME/MMG), has been appointed the inaugural Gregorio Weber Endowed Chair of Biochemistry, established as a gift from the late George and Tamara Mitchell.

# ON THE GRID HAPPENINGS AT THE IGB

## MEDALLION



### 10 IGB MEMBERS RECEIVE PRESIDENTIAL MEDALLION

University of Illinois President Tim Killeen on Monday honored 28 key leaders of the system's COVID-19 response with the Presidential Medallion, including 10 from the IGB. The medallion is the highest honor that the system president can bestow.

Those receiving Presidential Medallions included Fadi G. Alnaji (Brooke Lab), post-doctoral researcher focusing on virology; Christopher Brooke (IGOH), associate professor of microbiology, UIUC; Martin D. Burke (MMG), May and Ving Lee Professor for Chemical Innovation at UIUC and associate dean for research at the Carle Illinois College of Medicine; Timothy M. Fan (ACPP/CGD), professor and the assistant head of research and graduate studies in the UIUC Department of Veterinary Clinical Medicine; Nigel D. Goldenfeld (BCXT leader/GNDP), Swanlund Endowed Chair and Center for Advanced Study Professor of Physics, UIUC; Kelsie J. Green (Burke Group), laboratory technician, UIUC Department of Chemistry; Paul J. Hergenrother (ACPP leader/MMG), Kenneth L. Rinehart Jr. Endowed Chair in natural products chemistry, UIUC; Sergei Maslov (BCXT/CABBI), professor of bioengineering and physics and Bliss Faculty Scholar, UIUC; Diana Rose E. Ranoa, research fellow at the Carl R. Woese Institute for Genomic Biology, UIUC; and Rebecca Smith (IGOH), associate professor of epidemiology.

## MEALS POLICY



### BUSINESS MEALS, REFRESHMENTS, AND ALCOHOL

The Office of the Vice President, Chief Financial Officer & Comptroller announces updates to policy 8.1.1 Business Meals, Refreshments, and Alcohol to allow expenses for virtual meetings with written approval from individuals specified in the policy.

Highlights of the update include:

Expenses for individual business meals associated with virtual meetings must have written approval from the dean, vice chancellor, associate chancellor, assistant vice president, provost, or their delegate.

The approval should be submitted with the expense report.

[Full policy available here.](#)

## CORAL



### NSF GRANT AWARDED TO DEVELOP MATERIALS FOR ENHANCED CORAL RECRUITMENT, SURVIVAL

A team consisting of mechanical science and engineering professors Amy Wagoner Johnson (EIRH/RBTE) and Gabriel Juarez, and civil and environmental engineering professor Rosa Espinosa-Marzal (EIRH) have been awarded a continuing National Science Foundation (NSF) Convergence Research grant to work on coral recruitment and survival. [Read the full article here.](#)

## FAREWELL



### NIGEL GOLDENFELD RETIRES FROM ILLINOIS

Swanlund Endowed Chair and Center for Advanced Study Professor in Physics Nigel Goldenfeld (BCXT leader/GNDP) will be closing the chapter on his Illinois career and moving on to the University of California, San Diego (UCSD). There, Goldenfeld will hold the Chancellor's Distinguished Professorship of Physics where he will continue his work on biological complexity, evolution, ecology and condensed matter theory.

## GENOME DAY



### GENOME DAY AT PYGMALION

Genome Day presents a series of interactive science activities and demonstrations put on by IGB scientists. Activities will cover topics including the environment, energy use and production, health, and research at the IGB in an approachable manner for all ages.

Saturday, September 25th from 11-3 at the Rose Bowl Tavern.



# ON THE GRID HAPPENINGS AT THE IGB

## GRANT



### PROFESSOR RECEIVES GRANT TO FOSTER HEALTH EQUITY AMONG CHICAGO YOUTH

A new grant will help reduce disparities in healthcare through a unique new training program led by Ruby Mendenhall (GNDDP), Associate Professor in Sociology, African American Studies, Urban and Regional Planning, and Social Work and Associate Dean for Diversity and Democratization of Health Innovation at the Carle Illinois College of Medicine. The programming will create a culture of innovation that centers around the health and wellness of mostly Black and Latinx high school students and young adults living in Chicago.

With the \$500,000 MacArthur Foundation grant, Mendenhall and her research team will create programming and wellness tools, including art, to foster healing from racial trauma such as police killings, gun violence, and higher rates of COVID-19 deaths.

“It is our hope to have this culture of innovation so embedded in the young people’s lives that it permeates all areas of their health and well-being and fosters community healing, especially in neighborhoods with high levels of violence,” said Mendenhall.

## IGEM



### IGEM 2021: DESIGNING BETTER ENZYMES TO BREAK DOWN PLASTIC

Polyethylene terephthalate, or PET, is a type of plastic that is widely used for packaging food and beverages, including soft drinks, juices, and water. Although PET is the most recycled plastic in the U.S., its current recycling rate is only 31%. This year’s UIUC iGEM team aims to improve that by tweaking PETase—a naturally-occurring enzyme found in *Ideonella sakaiensis*, a bacterium discovered in 2016 as the world’s first PET-eating bacterium.

PET is usually commercially recycled by re-melting or with the help of chemicals. Each method has disadvantages. Although incinerating PET bottles is cheaper and more efficient, it slowly releases CO<sub>2</sub>. On the other hand, the chemical treatments make PET resistant to biological degradation. Additionally, only clean PET plastic waste, without any residuals from food or drinks, can be treated by the current industrial PETase recycling methods, necessitating the use of alternative treatment procedures.

The 2021 team consists of Mary Cook; Jefrin Joseph, a junior in molecular and cellular biology; Kristin Lai, a senior in bioengineering; Suva Narayan; Royal Shrestha; and Angela Yoon. They will also be partnering with the University of Toronto and the University of Texas, Austin since the iGEM teams from those universities are also working on PET plastic. The Illinois iGEM team is sponsored by the Carl R. Woese Institute for Genomic Biology and the Center for Advanced Bioenergy and Bioproducts Innovation.

## AWARD



Carle Illinois  
College of Medicine

### HEALTH INNOVATION PROFESSOR APPOINTMENTS

Mehmet Eren Ahsen, Assistant Professor of Business Administration (CGD); Brian Aldridge, Clinical Professor in Rural Animal Health Management (IGOH); Wawrzyniec Dobrucki, Associate Professor of Bioengineering (RBTE); Bruce Fouke, Professor of Geology (BCXT); Iwona Jasiuk, Professor of Mechanical Science and Engineering (RBTE); Zeynep Madak-Erdogan, Associate Professor of Nutrition (CGD/EIRH/GSP); and Rebecca Smith, Associate Professor of Pathobiology (IGOH) joined the Carle Illinois College of Medicine with Health Innovation Professor appointments. The new professors deliver on Carle Illinois’ commitment to advance the discovery and translation of breakthrough health innovations and take a holistic approach to improving the medical field and human condition.

The new Health Innovation faculty represent a range of disciplines and are positioned to be drivers of innovation in medicine and healthcare, which will fuel health-related funding from government agencies, industry, foundations, and individuals, and inspire a range of new cause-based philanthropic giving campaigns.

“As champions of interdisciplinary research, the faculty will pioneer new approaches to the medical education of Carle Illinois’ physician innovators,” said King Li, Dean of the Carle Illinois College of Medicine. “They will also serve as agents of change innovation and research in the world’s first engineering-based college of medicine.”

## 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.

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>

Vilbert, A. C., Liu, Y., Dai, H., & Lu, Y. (2021). Recent advances in tuning redox properties of electron transfer centers in metalloenzymes catalyzing the oxygen reduction reaction and H<sub>2</sub> oxidation important for fuel cell design. *Current Opinion in Electrochemistry*, 30, [100780]. <https://doi.org/10.1016/j.coelec.2021.100780>

Popescu, G. (2021). Large-scale Phase Retrieval. *Light: Science and Applications*, 10(1), 175. <https://doi.org/10.1038/s41377-021-00616-4>

Boettcher, A. N., Schachtschneider, K. M., Schook, L. B., & Tuggle, C. K. (2021). Swine Models for Translational Oncological Research: An Evolving Landscape and Regulatory Considerations. *Mammalian Genome*. <https://doi.org/10.1007/s00335-021-09907-y>

Das Gupta, A., Krawczynska, N., & Nelson, E. R. (2021). Extracellular Vesicles-The Next Frontier in Endocrinology. *Endocrinology*, 162(9). <https://doi.org/10.1210/endo/bqab133>

Jeon, S., Li, Q., Ranard, K. M., Rubakhin, S. S., Sweedler, J. V., Kuchan, M. J., & Erdman, J. W. (2021). Spatiotemporal biodistribution of  $\alpha$ -tocopherol is impacted by the source of <sup>13</sup>C-labeled  $\alpha$ -tocopherol in mice following a single oral dose. *Nutrition Research*, 93, 79-86. <https://doi.org/10.1016/j.nutres.2021.07.005>

Chiu, K., Bashir, S. T., Gao, L., Gutierrez, J., de Godoy, M. R. C., Drnevich, J., Fields, C. J., Cann, I., Flaws, J. A., & Nowak, R. A. (2021). Subacute Exposure to an Environmentally Relevant Dose of Di-(2-ethylhexyl) Phthalate during Gestation Alters the Cecal Microbiome, but Not Pregnancy Outcomes in Mice. *Toxics*, 9(9). <https://doi.org/10.3390/toxics9090215>

Nelson, A. T., Wang, Y., & Nelson, E. R. (Accepted/In press). TLX, an orphan nuclear receptor with emerging roles in physiology and disease. *Endocrinology*. <https://doi.org/10.1210/endo/bqab184>

Chen, D., Kim, J. T., Chamorro, L. P., & Timperman, A. T. (2021). Exceeding ohmic scaling by more than one order of magnitude with a 3D ion concentration polarization system. *Lab on a chip*, 21(16), 3094-3104. <https://doi.org/10.1039/d1lc00470k>

Kuanyshev, N., Deewan, A., Jagtap, S. S., Liu, J., Selvam, B., Chen, L.-Q., Shukla, D., Rao, C. V., & Jin, Y.-S. (2021). Identification and Analysis of Sugar Transporters Capable of Co-transporting Glucose and Xylose Simultaneously. *Biotechnology Journal*, e2100238. <https://doi.org/10.1002/biot.202100238>

Goswami, N., Lu, Y., Kandel, M. E., Fanous, M. J., Bohn-Wippert, K., Tevonian, E. N., Dar, R. D., & Popescu, G. (2021). Monitoring reactivation of latent HIV by label-free gradient light interference microscopy. *iScience*, 24(8), [102940]. <https://doi.org/10.1016/j.isci.2021.102940>

Chakraborty, S., Andrade, F. C. D., & Smith, R. L. (2021). An Interdisciplinary Approach to One Health: Course Design, Development, and Delivery. *Journal of Veterinary Medical Education*, [e20210021]. <https://doi.org/10.3138/jvme-2021-0021>

Jiang, C., Guan, K., Khanna, M., Chen, L., & Peng, J. (2021). Assessing Marginal Land Availability Based on Land Use Change Information in the Contiguous United States. *Environmental Science and Technology*, 55(15), 10794-10804. <https://doi.org/10.1021/acs.est.1c02236>

Turner, J. G., & Murphy, C. J. (2021). How Do Proteins Associate with Nanoscale Metal-Organic Framework Surfaces? *Langmuir*, 37(32), 9910-9919. <https://doi.org/10.1021/acs.langmuir.1c01664>

Gupta, M., Zaharias, P., & Warnow, T. (2021). Accurate Large-scale Phylogeny-Aware Alignment using BALi-Phy. *Bioinformatics* (Oxford, England). <https://doi.org/10.1093/bioinformatics/btab555>

Stephens, Z., Milosevic, D., Kipp, B., Grebe, S., Iyer, R. K., & Kocher, J. P. A. (2021). PB-Motif—A Method for Identifying Gene/Pseudogene Rearrangements With Long Reads: An Application to CYP21A2 Genotyping. *Frontiers in Genetics*, 12, [716586]. <https://doi.org/10.3389/fgene.2021.716586>

Xie, X., Kendzior, M. C., Ge, X., Mainzer, L. S., & Sinha, S. (2021). VarSAN: Associating Pathways with a Set of Genomic Variants Using Network Analysis. *Nucleic acids research*. <https://doi.org/10.1093/nar/gkab624>

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