IGB NEWS

Volume 11 Number 6

UPCOMING EVENTS

IGB Seminar (RBTE)

Multidisciplinary studies of functional muscle repair and regeneration: Opportunities for clinical transition

October 16, 2018, 12:00 p.m.

612 Carl R. Woese Institute for Genomic Biology

George J. Christ, PhD
University of Virginia, Department of Biomedical Engineering and Orthopedic Surgery

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World of Genomics at the St. Louis Science Center

October 18-20, 2018

Saint Louis Science Center
5050 Oakland Avenue, St. Louis, MO 63110

One of the IGB's most successful and comprehensive public engagement events, the World of Genomics, will be showcased at the St. Louis Science Center, one of America's most visited museums by Forbes Traveler Magazine.

IGB Faculty Spotlight Lecture

Paleogenomics, community engagement and evolutionary histories of Indigenous peoples of North America

October 23, 2018, 12:00 p.m.

612 Carl R. Woese Institute for Genomic Biology

Ripan Mahli, PhD
University of Illinois; Department of Anthropology; IGB Faculty, Computing Genomes for Reproductive Health and Regenerative Biology & Tissue Engineering themes

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Lunch with the Core

Long-term Live Cell Imaging of Endogenous Loci by CRISPR/Cas9-mediated Knock-in of an Optimized TetO Repeat

October 24, 2018, 12:00 p.m.

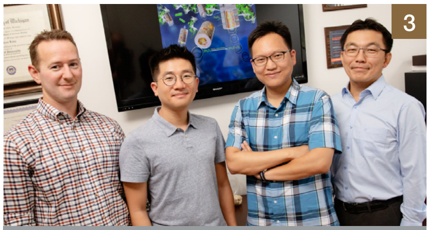
612 Carl R. Woese Institute for Genomic Biology

Ipek Tasan, Graduate Research Assistant, Department of Chemical and Biomolecular Engineering

FEATURED NEWS

2

Kidney stones have distinct geological histories



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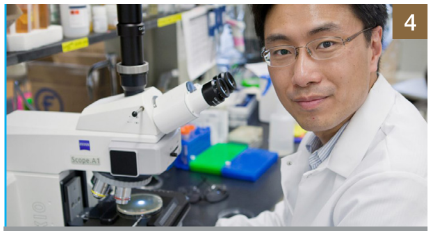
Researchers develop microbubble scrubber



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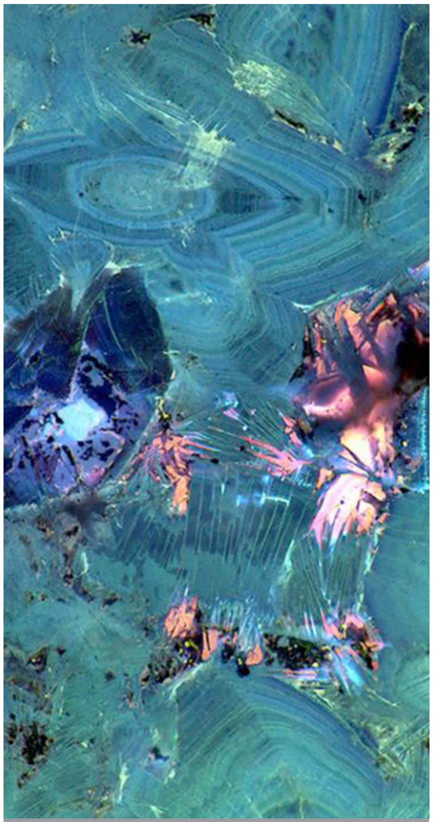
Monthly Profile: Yong-Su Jin

5

On the Grid: Happenings at IGB

IMAGE OF THE MONTH



This month features an extreme close-up of a thin slice of human kidney stone, revealing intricate patterns within the mineral layers. Image is courtesy of the Bruce Fouke lab, provided by Professor of Geology and Microbiology Bruce Fouke, Core Facilities Associate Director Mayandi Sivaguru, and MD/PhD student Jessica Saw.

IGB News

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

FEATURE

Kidney stones
have distinct geological histories

A geologist, a microscopist and a doctor walk into a lab and, with their colleagues from across the nation, make a discovery that overturns centuries of thought about the nature and composition of kidney stones. The team's key insight, reported in the journal Scientific Reports, is that kidney stones are built up in calcium-rich layers that resemble other mineralizations in nature, such as those forming coral reefs or arising in hot springs, Roman aqueducts or subsurface oil fields.

Most importantly for human health, the researchers found, kidney stones partially dissolve and regrow again and again as they form.

This contradicts the widely held notion that kidney stones are homogenous rocks that never dissolve and are different from all other rocks in nature, said University of Illinois geology and microbiology professor Bruce Fouke (above middle, BCXT), who led the new research with Jessica Saw (left), an M.D. student at the Mayo Clinic School of Medicine and Ph.D. student at Illinois; and Mayandi Sivaguru (right), an associate director of the Carl Zeiss labs@location at the IGB.

"Contrary to what doctors learn in their medical training, we found that kidney stones undergo a dynamic process of growing and dissolving, growing and dissolving," Fouke said. "This means that one day we may be able to intervene to fully dissolve the stones right in the patient's kidney, something most doctors today would say is impossible.

"Instead of being worthless crystalline lumps, kidney stones are a minute-by-minute record of the health and functioning of a person's kidney," he said.

The findings were the result of looking at kidney stones much more closely and with a broader array of light and electron microscopy techniques than others had employed before, said Sivaguru, the lead author of the study who led the microscopy work. The methods included bright-field, phase-contrast, polarization, confocal, fluorescence and electron microscopy, with newly invented combinations of these tools and X-ray spectroscopy.

Many of the techniques are commonly employed in geology and geobiology, but have not been used to study mineralizations in living organisms, like the kidney stones and gallstones that form in the human body, Fouke said. In particular, the use of ultraviolet light, which causes some minerals and proteins to fluoresce at different wavelengths, offered a vast new treasure trove of information.

A recently developed technology, Airyscan super-resolution microscopy, allowed the team to view the samples at 140-nanometer resolution, a much higher magnification than is normally possible with light microscopy.

The effort resulted in spectacularly clear, colorful images of the interior growth history of the kidney stones, revealing that they are built up in alternating thin layers of organic matter and crystals, interrupted in places with jutting interior crystals.

In the earliest stages of kidney stone development, the researchers found, crystals of a hydrated form of calcium oxalate adhere to one another, forming a big, irregular clump. Layers of organic matter and crystals build up on top of this inner core, creating an outer shell. The stones continue to dissolve and grow. Being able to see the layers clearly for the first time made it possible to recreate this geological history, Fouke said.

"In geology, when you see layers, that means that something older is underneath something younger," he said. "One layer may be deposited over the course of very short to very long periods of time."

But many of the layers were disrupted, revealing that part of the stones – usually the interior dihydrate crystals – had dissolved. New crystals of a dehydrated form of calcium oxalate had begun to grow again within those voids.

"Therefore, just one rock represents a whole series of events over time that are critical to deciphering the history of kidney stone disease," Fouke said.

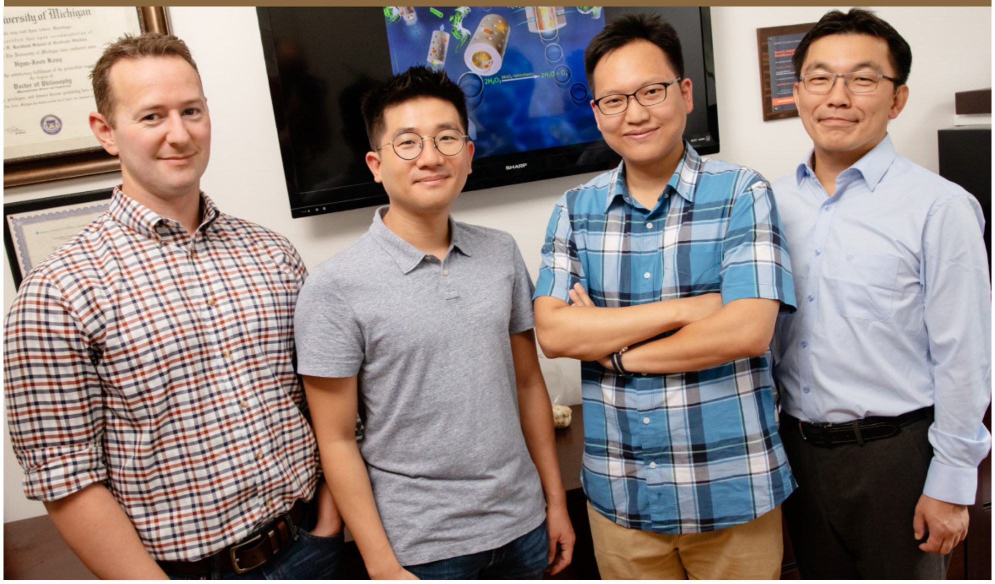
Researchers and doctors who study and treat kidney disease will now need to rethink their basic assumptions, Saw said.

"Before this study, it was thought that a kidney stone is just a simple crystal that gets bigger over time," she said. "What we're seeing here is that it's dynamic. The stone is growing and dissolving, growing and dissolving. It's very rich with many components. It's very much alive."

Fouke, Saw and Sivaguru are IGB members; Saw is pursuing a PhD in molecular and integrative physiology at Illinois.

The Mayo Clinic and University of Illinois Strategic Alliance for Technology-Based Healthcare, the Mayo Clinic O'Brien Urology Research Center and the National Aeronautics and Space Administration Astrobiology Institute supported this research. ■

Written by Diana Yates. Photo by L. Brian Stauffer.



Researchers develop microbubble scrubber to destroy dangerous biofilms

Stiff microbial films often coat medical devices, household items and infrastructure such as the inside of water supply pipes, and can lead to dangerous infections. Researchers have developed a system that harnesses the power of bubbles to propel tiny particles through the surfaces of these tough films and deliver an antiseptic deathblow to the microbes living inside.

Biofilms are slimy colonies of microbes held together by internal scaffolds, clinging to anything they touch. About 80 percent of all medical infections originate from biofilms that invade the inner workings of hospital devices and implants inside patients. Eradication is difficult because traditional disinfectants and antibiotics cannot effectively penetrate a biofilm's tough surface, the researchers said.

In the journal *ACS Applied Materials and Interface*, a team led by researchers at the University of Illinois at Urbana-Champaign describes how they used diatoms – the tiny skeletons of algae – loaded with an oxygen-generating chemical to destroy microbes.

"Most of us get those black or yellow spots in our showers at home," said co-author Hyunjoon Kong of the IGB's Regenerative Biology & Tissue Engineering research theme, professor of chemical and biomolecular engineering and a Carle Illinois College of Medicine affiliate. "Those spots are biofilms and most of us know it takes a lot of energy to scrub them away. Imagine trying to do this inside the confined space of the tubing of a medical device or implant. It would be very difficult."

Looking to nature and basic mechanics for a solution, the researchers developed a system that uses naturally abundant diatoms along with hydrogen peroxide and tiny oxygen-generating sheets of the compound manganese oxide.

"We could have fabricated a particle using 3D printers, but luckily nature already provided us with a cheap and abundant option in diatoms," said co-author and postdoctoral researcher Yongbeom Seo. "The species of diatom we selected are hollow, highly porous and rod-shaped, providing a lot of surface area for the bubbles to form and a channel for the bubbles to escape."

Above: Professor of Chemical and Biomolecular Engineering Simon Rogers, left, postdoctoral researchers Jun Pong Park and Yongbeom Seo and Professor of Chemical and Biomolecular Engineering Hyunjoon Kong led an international team that developed hydrogen peroxide-bubbling microparticles that may help eradicate dangerous biofilms.

The chemical reaction between the hydrogen peroxide and manganese oxide nanosheets takes place within the empty space inside the diatom. The result is a flourish of microbubbles that flow through the tiny channel, propelling the rigid diatoms forward with enough force to break up the surface and internal structure of the biofilms, the researchers said.

"We dope the particles with nanosheets of manganese oxide, then mix them with hydrogen peroxide and apply that to the surface of the biofilm," Kong said. "Once the diatoms break through to the internal structure of the biofilm, they continue to expel bubbles and facilitate the entry of hydrogen peroxide, which is an effective disinfectant against bacteria and fungus."

The researchers believe that their success is a result of a decision to focus on the mechanical aspects of biofilm destruction, not the chemical aspects of simply killing microbes.

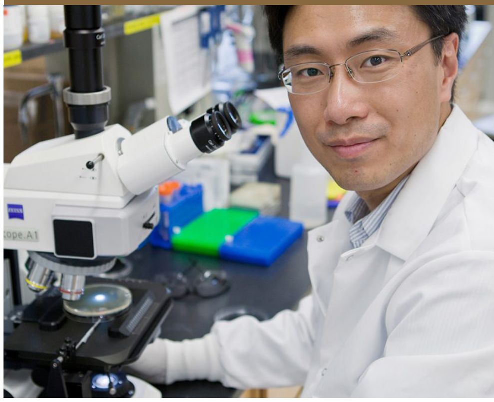
"We have arrived at a mechanistic solution for this problem and the possibilities for this technology are endless," said co-author Simon Rogers, a professor of chemical and biomolecular engineering. "We are discussing our research with clinicians who have many exciting ideas of how to use this system that we did not even think of originally, such as the removal of dental plaque."

U. of I. researchers Jiayu Leong, Jun Dong Park, Yu-Tong Hong, Yu-Heng Deng, Vitaliy Dushnov and Joonghui Soh also contributed to this study. Additional co-authors include Sang-Hyon Chu of the National Institute of Aerospace, Cheol Park of the NASA Langley Research Center, Dong Hyun Kim of the Korea Institute of Industrial Technology and Yi Yan-Yang of the Institute of Bioengineering and Nanotechnology in Singapore.

The National Institutes of Health, the National Science Foundation and the Korea Institute of Industrial Technology supported this research.

Written by Lois Yoksoulian. Photo by L. Brian Stauffer.

MONTHLY PROFILE



Yong-Su Jin is Professor of Food Microbiology in the Department of Food Science and Human Nutrition, whose research is centered on metabolic engineering of microorganisms to produce biofuels and chemicals from renewable biomass.

A beautiful song

Yong-Su Jin embraces the science and art of metabolic engineering

As a researcher, Yong-Su Jin sees both science and art in his work. He sees science in the measuring, testing and theorizing. But in the creativity and passion that his field requires, he sees art.

Jin is a professor in the Department of Food Science and Human Nutrition and a member of IGB's BSD and MME themes.

Much of his research has focused on metabolic engineering, which involves altering microorganisms' metabolic functions to create valuable products such as pharmaceuticals and biofuels.

As Jin's career has grown, so has the field of metabolic engineering.

"Before, metabolic engineering meant just changing one or two genes to change the phenotype," he said. "It was pretty straightforward."

Over time, scientists started to look into what impact these changes have. Ideas from other fields, like systems biology and synthetic biology, became intertwined with ideas in metabolic engineering.

"I witnessed that and found it was a pretty interesting area, and very well aligned with the IGB," Jin said.

One of Jin's research projects focused on human milk oligosaccharide, a unique sugar found in human breast milk. When ingested, microorganisms in the infant gut use this sugar as food, which leads to stronger gut development.

Scientists were interested in overproducing this beneficial sugar in the lab, as it is only found in breast milk. Jin's research showed this could be done in both E. coli and yeast by introducing an enzyme that resulted in the production of the sugar.

"It's a very interesting example of how metabolic engineering can contribute to society," Jin said.

Metabolic engineering is also aiding the Center for Advanced Bioenergy and Bioproducts Innovation (CABBI), a research collaboration between the IGB and the Institute for Sustainability, Energy, and Environment that is searching for economic and sustainable bioenergy solutions. Jin is a part of CABBI's Conversion theme, which is trying to develop microbial strains that can produce molecules such as biodiesel and jet fuel. He is working on engineering yeast to produce organic acid and alcohol, two valuable products.

> *"Right now we have most of the instruments, but the problem is we don't know how to conduct this orchestra well."*

Jin is also involved in Realizing Increased Photosynthetic Efficiency (RIPE), a research project focused on enhancing the photosynthetic capacity of staple food crops. This is often done by introducing or deleting enzymes in the crop.

RIPE researchers are currently testing these changes in crops, but it takes years to do. Jin is developing a way to test these changes faster by using a smaller model: microalgae, a unicellular species that performs photosynthesis. Scientists can test their manipulations faster in the microalgae to see if they will work in crops — in theory, what's tested in microalgae should be similar in the crop.

As most of Jin's research involves making metabolic engineering work, he finds himself interested in understanding the underlying mechanisms that make it work. He wants to learn more about how gene expression and metabolic pathways — the chemical reactions that are manipulated in metabolic engineering — are controlled.

Jin compares it to a conductor guiding an orchestra. Though an orchestra may have all the right instruments and musicians, it is nothing without the control and guidance provided by its conductor. Metabolic engineering has a similar dynamic.

"Even though we introduce all the metabolic pathways, we need this control tower," Jin said. "We need to figure out when this pathway should be activated, when this pathway should be downregulated, in order to have a good production of the metabolite."

Metabolic engineering has come a long way since Jin's research began. Scientists have made significant advances, but more work is needed, especially when it comes to control. Again, he compares it to building an orchestra.

"Ten years ago we had only a trumpet and a violin, so people wanted to get a cello, a trombone, a timpani," he said. "Right now we have most of the instruments, but the problem is we don't know how to conduct this orchestra well."

Jin can relate this idea to his own work and career. He's often felt frustration at the unknowns of metabolic engineering.

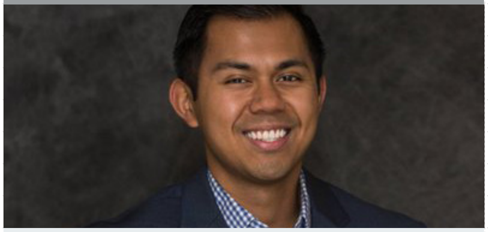
But as the conductor of his own orchestra — his own research — Jin is happy to be learning.

"I'm still a very inefficient conductor now," he said. "But in the future, my dream is to make a very beautiful song." ■

Written by Emily Scott. Photo by Kathryn Faith.

ON THE GRID
HAPPENINGS AT THE IGB

AWARDS

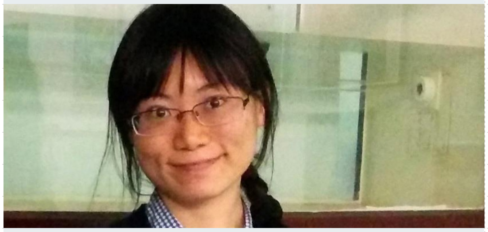


JAN LUMIBAO

Jan Lumibao, Predoctoral Research Fellow, Nutritional Sciences, and member of the Gaskins Lab (RBTE), was selected as a finalist in the MilliporeSigma 2018 Life Science Awards Program for Tumor Biology for excellent work in the categories of Innovation, Potential Impact, Communication, and Scientific Rigor, and will present at the Life Science Award Prize Event in Darmstadt, Germany.

ZAN LUTHEY-SCHULTEN

Zan Luthey-Schulten, William H. and Janet G. Lycan Professor of Chemistry (BCXT), was selected as a 2019 Fellow of the Biophysical Society for excellence in science and her contributions towards the expansion of the field of biophysics.



HONG-YAN SHIH

Hong-Yan Shih, Physics postdoc in the Goldenfeld lab (BCXT) was awarded the 2019 Dissertation Award in Statistical and Nonlinear Physics by the American Physical Society (APS), which recognizes exceptional young scientists who have performed original doctoral thesis work of outstanding scientific quality in this field.

GRANT

$5M DOE GRANT FOR ENERGY CROPS STUDY

Crop Sciences Associate Professor D.K. Lee and collaborators were awarded $5 million from the U.S. Department of Energy for a study titled "Next-Generation Feedstocks for the Emerging Bioeconomy." The team will assess field-scale yield of advanced switchgrass varieties such as "Independence" — which was developed by Lee — for pre-commercialization. Team members also will examine other warm-season perennial grasses such as switchgrass blends, big bluestem, prairie cordgrass, and Miscanthus. Read the full story here.

NOBEL

DR. FRANCES ARNOLD AWARDED 2018 NOBEL PRIZE IN CHEMISTRY

Congratulations to Dr. Frances Arnold of California Institute of Technology for receiving the 2018 Nobel Prize in Chemistry. IGB had the pleasure of hosting Dr. Arnold during the 2017 Enduring Legacy of Sol Spiegelman symposium, seen here with BSD theme leader and Professor of Chemical and Biomolecular Engineering Huimin Zhao, a former member of the Arnold lab.

WORLD OF GENOMICS

WORLD OF GENOMICS COMING TO ST. LOUIS SCIENCE CENTER

One of the IGB's most successful and comprehensive public engagement events, the World of Genomics, will be showcased for three days at the St. Louis Science Center from October 18-20, 2018. The St. Louis Science Center, ranked as one of America's most visited museums by Forbes Traveler Magazine, has long served as a destination for all ages with an interest in learning about science and technology.

The World of Genomics will feature six interactive learning stations. At these stations, a team of Illinois volunteers from dozens of scientific fields will highlight hands-on activities and interactive demonstrations that describe the deep portfolio of IGB research in easy to understand terms.

SPEAKER

DAVID QUAMMEN

Our heartfelt thanks and gratitude to David Quammen, author of *The Tangled Tree: A Radical New History of Life,* for spending the day with us, visiting IGB and speaking with our students, and giving an incredible talk at Spurlock Museum entitled "Carl Woese and the Revolution He Triggered."

DEPARTMENT ANNOUNCEMENTS

BUSINESS

ANNUAL CHARITABLE FUND DRIVE

The 2018 Campus Charitable Fund drive is underway September 17th–November 9th. Please consider contributing! Take a moment to read the brochure by visiting the website at www.ccfd.illinois.edu.

A few things you might want to remember: We encourage everyone to give by on-line payroll deduction. If you are giving by payroll deduction, please remember to type in the annual amount you wish to donate. There is no limit to the number of agencies that you may select, but the minimum ANNUAL donation is $24.00 ($2 per month). When making a one-time donation, make your check(s) payable to the umbrella organization(s) listed on the Pledge Form, not to designations within the umbrella. If you have any questions throughout the campaign, please contact Jacinda King at 244-2276 or jkking@igb.illinois.edu. The deadline is November 9, 2018. ■

COMPUTER NETWORK AND RESOURCE GROUP

NEW WIRELESS NETWORK

Over the last weeks CNRG has deployed a new wireless network across the IGB. This new network should have improved coverage, faster roaming between access points, and now offers users the option of authenticating through eduroam.

If you have any questions or know of any areas of the building that do not have good coverage, please let us know at help@igb.illinois.edu. ■

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.

Peters, J. W., Beratan, D. N., Bothner, B., Dyer, R. B., Harwood, C. S., Heiden, Z. M., ... Adams, M. WW. (2018). A new era for electron bifurcation. *Current Opinion in Chemical Biology*, 47, 32-38. DOI: 10.1016/j.cbpa.2018.07.026

Hernandez, J., Volland, A., Leyshon, B. J., Juda, M., Ridlon, J. M., Johnson, R. W., & Steelman, A. J. (2018). Effect of imidacloprid ingestion on immune responses to porcine reproductive and respiratory syndrome virus. *Scientific Reports*, 8(1), [11615]. DOI: 10.1038/s41598-018-30093-6

Wang, K. K. A., Ng, T. L., Wang, P., Huang, Z., Balskus, E. P., & van der Donk, W. A. (2018). Glutamic acid is a carrier for hydrazine during the biosyntheses of fosfazinomycin and kinamycin. *Nature Communications*, 9(1), [3687]. DOI: 10.1038/s41467-018-06083-7

Principe, D. R., Overgaard, N. H., Park, A. J., Diaz, A. M., Torres, C., McKinney, R., ... Schook, L. B. (2018). KRASG12D and TP53R167H Cooperate to Induce Pancreatic Ductal Adenocarcinoma in Sus scrofa Pigs. *Scientific Reports*, 8(1), [12548]. DOI: 10.1038/s41598-018-30916-6

Chowdhury, R., Ren, T., Shankla, M., Decker, K., Grisewood, M., Prabhakar, J., ... Maranas, C. D. (2018). PoreDesigner for tuning solute selectivity in a robust and highly permeable outer membrane pore. *Nature Communications*, 9(1), [3661]. DOI: 10.1038/s41467-018-06097-1

Dong, S., Massalha, N., Plewa, M. J., & Nguyen, T. H. (2018). The impact of disinfection Ct values on cytotoxicity of agricultural wastewaters: Ozonation vs. chlorination. *Water Research*, 144, 482-490. DOI: 10.1016/j.watres.2018.07.065

Zheng, X., Xue, L., & Qu, A. (2018). Time-varying correlation structure estimation and local-feature detection for spatio-temporal data. *Journal of Multivariate Analysis*, 168, 221-239. DOI: 10.1016/j.jmva.2018.07.012

Ho-Shui-Ling, A., Bolander, J., Rustom, L. E., Johnson, A. W., Luyten, F. P., & Picart, C. (2018). Bone regeneration strategies: Engineered scaffolds, bioactive molecules and stem cells current stage and future perspectives. *Biomaterials*, 180, 143-162. DOI: 10.1016/j.biomaterials.2018.07.017

Biehl, M. J., Kaylan, K. B., Thompson, R. J., Gonzalez, R. V., Weis, K. E., Underhill, G. H., & Raetzman, L. T. (2018). Cellular fate decisions in the developing female anteroventral periventricular nucleus are regulated by canonical Notch signaling. *Developmental Biology*, 442(1), 87-100. DOI: 10.1016/j.ydbio.2018.06.005

Kang, S., Cox, C. L., & Gulley, J. M. (2018). High frequency stimulation-induced plasticity in the prelimbic cortex of rats emerges during adolescent development and is associated with an increase in dopamine receptor function. *Neuropharmacology*, 141, 158-166. DOI: 10.1016/j.neuropharm.2018.08.037

Zealand, A. M., Mei, R., Papachristodoulou, P., Roskilly, A. P., Liu, W. T., & Graham, D. W. (2018). Microbial community composition and diversity in rice straw digestion bioreactors with and without dairy manure. *Applied Microbiology and Biotechnology*, 102(19), 8599-8612. DOI: 10.1007/s00253-018-9243-7

RECENT PUBLICATIONS

Zhang, S., Kieffer, S. J., Zhang, C., Alleyne, A. G., & Braun, P. V. (2018). Directed Molecular Collection by E-Jet Printed Microscale Chemical Potential Wells in Hydrogel Films. *Advanced Materials*, 30(38), [1803140]. DOI: 10.1002/adma.201803140

Choi, J. S., Ilin, Y., Kraft, M. L., & Harley, B. A. C. (2018). Tracing Hematopoietic Progenitor Cell Neutrophilic Differentiation via Raman Spectroscopy. *Bioconjugate Chemistry*, 29(9), 3121-3128. DOI: 10.1021/acs.bioconjchem.8b00459

Wang, P., Liang, J., Shi, L. Z., Wang, Y., Zhang, P., Ouyang, M., ... Wang, Y. (2018). Visualizing Spatiotemporal Dynamics of Intercellular Mechanotransmission upon Wounding. *ACS Photonics*, 5(9), 3565-3574. DOI: 10.1021/acsphotonics.8b00383

Zamroziewicz, M. K., Paul, E. J., Zwilling, C. E., & Barbey, A. K. (2018). Determinants of fluid intelligence in healthy aging: Omega-3 polyunsaturated fatty acid status and frontoparietal cortex structure. *Nutritional Neuroscience*, 21(8), 570-579. DOI: 10.1080/1028415X.2017.1324357

Kapoor, I., & Nair, S. K. (2018). Structure-Guided Analyses of a Key Enzyme Involved in the Biosynthesis of an Antivitamin. *Biochemistry*, 57(36), 5282-5288. DOI: 10.1021/acs.biochem.8b00576

Deng, Y., Hsiang, T., Li, S., Lin, L., Wang, Q., Chen, Q., ... Ming, R. (2018). Comparison of the mitochondrial genome sequences of six Annulohypoxylon stygium isolates suggests short fragment insertions as a potential factor leading to larger genomic size. *Frontiers in Microbiology*, 9(SEP), [2079]. DOI: 10.3389/fmicb.2018.02079

Mancini, A., Xavier-Magalhães, A., Woods, W. S., Nguyen, K. T., Amen, A. M., Hayes, J. L., ... Costello, J. F. (2018). Disruption of the β1L Isoform of GABP Reverses Glioblastoma Replicative Immortality in a TERT Promoter Mutation-Dependent Manner. *Cancer Cell*, 34(3), 513-528.e8. DOI: 10.1016/j.ccell.2018.08.003

Kisley, L., Serrano, K. A., Davis, C. M., Guin, D., Murphy, E. A., Gruebele, M., & Leckband, D. E. (2018). Soluble Zwitterionic Poly(sulfobetaine) Destabilizes Proteins. *Biomacromolecules*, 19(9), 3894-3901. DOI: 10.1021/acs.biomac.8b01120

Mukherjee, S., Mukherjee, M., Mukherjee, A., Bhagi-Damodaran, A., Lu, Y., & Dey, A. (2018). O2 Reduction by Biosynthetic Models of Cytochrome c Oxidase: Insights into Role of Proton Transfer Residues from Perturbed Active Sites Models of CcO. *ACS Catalysis*, 8(9), 8915-8924. DOI: 10.1021/acscatal.8b02240

Khatun, M. A., Hoque, M. A., Zhang, Y., Lu, T., Cui, L., Zhou, N. Y., & Feng, Y. (2018). Bacterial Consortium-Based Sensing System for Detecting Organophosphorus Pesticides. *Analytical chemistry*, 90(17), 10577-10584. DOI: 10.1021/acs.analchem.8b02709

Sweedler, J. V. (2018). Where Do Our Manuscripts Come From? *Analytical chemistry*, 90(17). DOI: 10.1021/acs.analchem.8b03710

Ganguli, A., Pagan-Diaz, G. J., Grant, L., Cvetkovic, C., Bramlet, M., Vozenilek, J., ... Bashir, R. (2018). 3D printing for preoperative planning and surgical training: a review. *Biomedical Microdevices*, 20(3), [65]. DOI: 10.1007/s10544-018-0301-9

Kukekova, A. V., Johnson, J. L., Xiang, X., Feng, S., Liu, S., Rando, H. M., ... Zhang, G. (2018). Erratum to: Red fox genome assembly identifies genomic regions associated with tame and aggressive behaviours (*Nature Ecology & Evolution*, (2018), 2, 9, (1479-1491), 10.1038/s41559-018-0611-6).

Rubessa, M., Ambrosi, A., Gonzalez-Pena, D., Polkoff, K. M., & Wheeler, M. B. (2018). Non-invasive nuclear magnetic resonance analysis of male and female embryo metabolites during *in vitro* embryo culture. *Metabolomics*, 14(9), [113]. DOI: 10.1007/s11306-018-1414-0

Shocket, M. S., Vergara, D., Sickbert, A. J., Walsman, J. M., Strauss, A. T., Hite, J. L., ... Hall, S. R. (2018). Parasite rearing and infection temperatures jointly influence disease transmission and shape seasonality of epidemics. *Ecology*, 99(9), 1975-1987. DOI: 10.1002/ecy.2430

Reddy, B., Hassan, U., Seymour, C., Angus, D. C., Isbell, T. S., White, K., ... Bashir, R. (2018). Point-of-care sensors for the management of sepsis. *Nature Biomedical Engineering*, 2(9), 640-648. DOI: 10.1038/s41551-018-0288-9

Fine, J. D., Shpigler, H. Y., Ray, A. M., Beach, N. J., Sankey, A. L., Cash-Ahmed, A., ... Robinson, G. E. (2018). Quantifying the effects of pollen nutrition on honey bee queen egg laying with a new laboratory system. *PloS one*, 13(9), [e0203444]. DOI: 10.1371/journal.pone.0203444

Kukekova, A. V., Johnson, J. L., Xiang, X., Feng, S., Liu, S., Rando, H. M., ... Zhang, G. (2018). Red fox genome assembly identifies genomic regions associated with tame and aggressive behaviours. *Nature Ecology and Evolution*, 2(9), 1479-1491. DOI: 10.1038/s41559-018-0611-6

Konopka, A. R., Wolff, C. A., Suer, M. K., & Harber, M. P. (2018). Relationship between intermuscular adipose tissue infiltration and myostatin before and after aerobic exercise training. *American Journal of Physiology - Regulatory Integrative and Comparative Physiology*, 315(3), R461-R468. DOI: 10.1152/ajpregu.00030.2018

D'Alessandro-Gabazza, C. N., Méndez-García, C., Hataji, O., Westergaard, S., Watanabe, F., Yasuma, T., ... Gabazza, E. C. (2018). Identification of halophilic microbes in lung fibrotic tissue by oligotyping. *Frontiers in Microbiology*, 9(AUG), [1892]. DOI: 10.3389/fmicb.2018.01892

Liu, Y., Song, Z., Zheng, N., Nagasaka, K., Yin, L., & Cheng, J. (2018). Systemic siRNA delivery to tumors by cell-penetrating α-helical polypeptide-based metastable nanoparticles. *Nanoscale*, 10(32), 15339-15349. DOI: 10.1039/c8nr03976c

Anorma, C., Hedhli, J., Bearrood, T. E., Pino, N. W., Gardner, S. H., Inaba, H., ... Chan, J. (2018). Surveillance of Cancer Stem Cell Plasticity Using an Isoform-Selective Fluorescent Probe for Aldehyde Dehydrogenase 1A1. *ACS Central Science*, 4(8), 1045-1055. DOI: 10.1021/acscentsci.8b00313

Yu, Y., Han, P., Zhou, L. J., Li, Z., Wagner, M., & Men, Y. (2018). Ammonia Monooxygenase-Mediated Cometabolic Biotransformation and Hydroxylamine-Mediated Abiotic Transformation of Micropollutants in an AOB/NOB Coculture. *Environmental Science and Technology*, 52(16), 9196-9205. DOI: 10.1021/acs.est.8b02801

Liu, H., Nelson, A. Z., Ren, Y., Yang, K., Ewoldt, R. H., & Moore, J. S. (2018). Dynamic Remodeling of Covalent Networks via Ring-Opening Metathesis Polymerization. *ACS Macro Letters*, 7(8), 933-937. DOI: 10.1021/acsmacrolett.8b00422

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