IGB NEWS

Upcoming Events
Monthly Profiles
Happenings at IGB

Image Of The Month
Research News
Department Announcements

Volume 11 Number 1

UPCOMING EVENTS

IGB Seminar (IGOH)

Using Genetic Data at Multiple Scales to Understand Constraints on Viral Adaptation
February 13, 2018, 12:00 p.m.
612 Carl R. Woese Institute for Genomic Biology

Katia Koelle, PhD
Duke University
Biology Department

Lunch with the Core

Multiplexing and Single Molecule Counting in Cells and Tissues using Infrared Semiconductor Nanocrystals
February 14, 2018, 12:00 p.m.
612 Carl R. Woese Institute for Genomic Biology

Andrew Smith
Assistant Professor of Bioengineering, Materials Sciences & Engineering and Technology Entrepreneurship at Illinois

Fox Family Innovation and Entrepreneurship Lecture

PhD Student to Entrepreneur
February 20, 2018, 12:00 p.m.
612 Carl R. Woese Institute for Genomic Biology

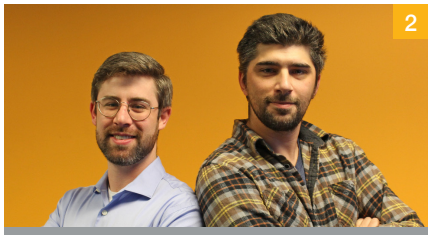
Andrew Miller, PhD
Co-Founder and CEO
Karuna Pharmaceuticals

IGB Seminar (MMG)

Form Follows Function: Evolution of Protein Scaffolds for Phosphoryl Group Transfer
March 6, 2018, 12:00 p.m.
612 Carl R. Woese Institute for Genomic Biology

Karen N. Allen, PhD
Boston University
Department of Chemistry

FEATURED NEWS



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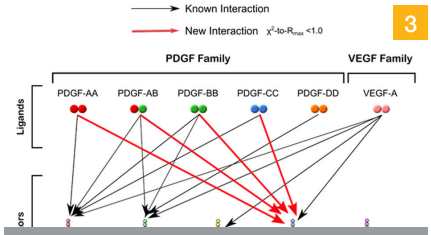
Entrepreneurship program leads student to start company



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New pathway to cancer drug development

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Monthly Profile: Vivian Tang

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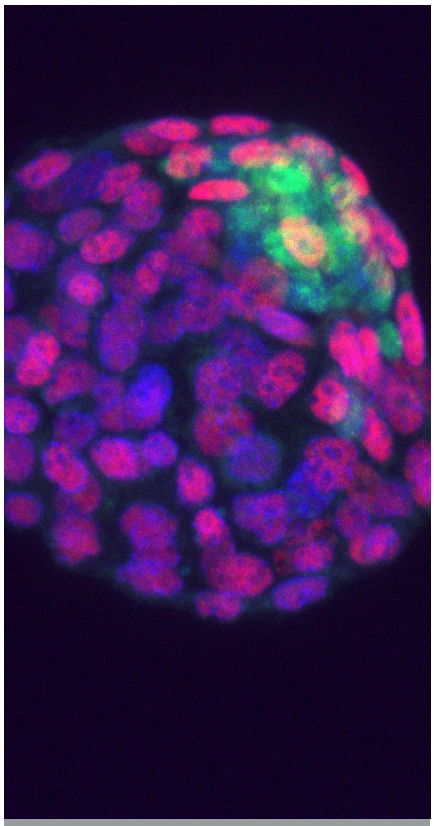
On the Grid: Happenings at IGB

IMAGE OF THE MONTH



This month features a mouse blastocyst exposed to 100 µM MEHP in vitro. The green color represents Oct-4 expression, a marker for inner cell mass; the pink color represents Cdx-2, a marker for trophectoderm, and blue represents Hoeschst staining of nuclei. Taken with the Zeiss LSM 880, provided by Rachel Braz Arcanjo and Dr. Romana Nowak, Reproductive Health and Toxicology Lab, Department of Animal Sciences.

IGB News

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

FEATURE

Entrepreneurship program
leads student to start company

The IGB's Fox Family Innovation and Entrepreneurship Certificate Program has inspired one participant to found a company with a mission to create computational tools for biomedical researchers.

Last spring, Joe Peterson participated in the program while finishing his PhD in chemistry at the University of Illinois. He always knew he wanted to do something entrepreneurial, and when he heard about the program, he thought it was the perfect opportunity to learn more about the business side of product development.

"I took (the program) wanting to do some networking," he said. "But it turned out to be quite a bit more."

The 13-week program introduces academics to entrepreneurship and has participants create their own business plan. Visiting speakers from industry and various campus resources cover topics such as finances, intellectual property, marketing, product development and more. Students are introduced to campus resources that can help them start their own business.

"It goes through how to design a plan for your business," Peterson said. "How to think about your idea, how to go about discovering who your customers are."

After completing the program, he decided to use what he learned to co-found SimBioSys, Inc. with biophysicist John Cole, Jr. Their company is now a tenant at EnterpriseWorks, a startup incubator at the University's Research Park that Peterson learned of through the certificate program.

The idea behind SimBioSys, Inc. stems from Peterson and Coles's doctoral research in computational biology in the lab of chemistry professor Zaida Luthey-Schulten, who is part of the IGB's Biocomplexity theme. Their research fueled their passion for creating software that aids scientific discovery. As a result, their company's mission is to create computational technologies that analyze how tissues interact.

"We're trying to design computational tools that allow you to peer into (diseased) tissues to see exactly how all the cells are interacting," Peterson said.

Current techniques for analyzing these interactions are limited. Technologies to image tissues at high resolution, such as mass spectrometry, destroy the tissue and can only capture a single moment in time. Other technologies, such as MRI or PET scans, can show several points in time, but the images are low resolution. SimBioSys is creating a way to view interactions in tissues with high resolution at many time points.

Co-founders Joe Peterson, left, and John Cole, Jr. of SimBioSys, Inc.

The way they're doing this is by making computer simulations that combine several types of data being generated by the -omics revolution — genomics, transcriptomics, metabolomics, and proteomics — with low resolution images from scans such as from an MRI. By analyzing all aspects of the interactions that occur within tissues, they hope to gain a better understanding of how they behave and what underlying features give rise to disease.

They plan to first investigate breast cancer, though the technology will be applicable to diseases of all types.

Peterson sees the Fox Family Innovation and Entrepreneurship Certificate Program as integral to his appreciation of the business side of entrepreneurship that is now a part of his everyday life.

"I'd recommend (the program) to any graduate student," he said. "I didn't really respect the business side before taking it — there's a lot of work that goes into it."

After further development of their prototype, they hope their technology will be picked up by pharmaceutical companies and eventually become a part of the drug development process.

"Ideally, we would like to partner with some drug companies to help them develop a drug. That's the ultimate goal," Peterson said. "What John and I really want to do is make an impact in that area."

Written by Emily Scott. Photo by SimBioSys, Inc.

The Fox Family Innovation and Entrepreneurship Lecture Series and Certificate Program bring a series of speakers to discuss all aspects of innovation and entrepreneurship. This program has been designed to introduce IGB and science academics to fundamental business methodologies including creating a business plan, managing intellectual property, overseeing finances, marketing, and customer discovery, and other skills essential for entrepreneurial ventures.

Visit the certificate program page for more information.

Unsuspected flexibility offers new pathway to cancer drug development

Blood vessels are the supply lines of the human body, bringing nutrients and oxygen to cells and carrying away waste. Controlling the growth of these supply lines can be an effective tactic to combat several different types of disorders, including cancer, stroke, and injury. A new study led by Assistant Professor of Bioengineering Princess Imoukhuede has added layer of nuance to our understanding of the signals that direct blood vessel growth, published in Scientific Reports (DOI: 10.1038/s41598-017-16610-z).

"If we learn how the proteins fit together and cause protein function, then you can imagine that drugs can be developed that block the way things fit together and other drugs can be developed that enhance how things fit together," said Imoukhuede. "Unlocking this understanding would lead to better drug design for treating several diseases including cancers and even cardiovascular diseases."

Many aspects of development and growth are regulated by growth factors, molecules produced by the body that direct tissue growth and encourage cells to divide. Each type of growth factor plays a unique role in specific tissues and phases of development, and this individuality of function is reflected in individuality of form: the particular three-dimensional shape of each type of growth factor allows it to interact with a specific set of receptors, molecules that coat the surface of cells and translate external signals into internal ones. This interaction is called binding.

Two different growth factors, vascular endothelial growth factor (VEGF) and platelet-derived growth factor (PDGF), are known to play important roles in blood vessel growth. Drugs that influence the signaling activity of each of these molecules have been used to treat various disorders. In particular, drugs that influence VEGF signaling have been a major focus of cancer therapies.

"Many anti-VEGF drugs including Avastin [a drug used to treat a variety of cancers] have failed due to drug resistance, which makes treatment ineffective and difficult to manage," Chen said. "Our initial research question was to better understand how tumor microenvironment develops resistance towards anti-angiogenic drugs, and eventually build better models to predict drug efficacy."

The group realized that drug resistance, as well as lesser efficacy in some individuals, might be explained if the body were somehow able to compensate for the loss of one type of signal by replacing it with another, similar one. The researchers recalled a study showing that VEGF can sometimes interact with receptors for PDGF. What if PDGF did something similar, attaching to VEGF receptors and acting like a second-string football player, keeping the game going in the absence of the starting athlete?

Imoukhuede and her coauthors tested their idea by examining the strength of every combination of paired interactions between the two growth factors and their families of receptors. Because of indications from past research that the two growth factors might be flexible in their partnering with receptors, they were not surprised to see that PDGF could form a bond with one of the VEGF receptors. What did surprise them was the strength of that chemical attraction.

"Cross-family binding has kind of been observed, but it's seen as very weak, the molecule is not the same, it doesn't fit in well, so it's never a tight binding to that receptor," Mamer said. "We would have imagined it orders and orders of magnitude weaker, and some of the interactions that we did find were almost at the level of VEGF itself, which meant that they could be very clinically significant."

These findings are in part a reminder that molecules are in no way bound by the names we give them. Names for cellular products are often chosen based on the context in which they were first discovered; while this system has some advantages, it can also lead to unconscious bias in what hypotheses are developed around those molecules and their functions.

The group hopes that exploring these types of complexities in growth factor signaling will eventually contribute to the development of more effective therapies either to promote signaling to aid recovery from conditions such as injury or stroke, or to inhibit it to block tumor growth. The next step toward this goal is to discover the functional results of cross-binding between the VEGF and PDGF signaling systems.

"Just because two molecules interact doesn't mean this actually can induce the changes in structure that are necessary for all the signaling events that come out of it," Mamer said.

"The next goal is to determine if the binding leads to protein activity, and if so to measure how much activity we see and how that leads to cell growth and cell movement," Imoukhuede said. "We eventually want to determine if this 'second string' can perform as well as our starters, and to fundamentally determine whether they are playing the same game." ■

Written by Claudia Lutz. Photo by L. Brian Stauffer.

Research Assistant Professor of Cell and Developmental Biology Vivian Tang works on surrounding cell-cell adhesion, from the role of cell-cell adhesive contacts in essential epithelial functions including permeability barrier formation and wound healing, to the molecular mechanism of junction regulation during health and disease.

Vivian Tang:
Understanding the cellular perspective of human disease

Ever since she was a graduate student, Vivian Tang has been intrigued by how groups of cells interact with each other.

Her favorite cells to study are epithelial cells. These cells cover surfaces of the body, such as the skin or the inside of the lungs, and they work in interesting ways.

"The magical thing is that each cell has to interact with all its neighbors and it has to be continuous, or else we'll have an open wound," she said. "They're shaping the environment that's outside of themselves that help us to perform our functions."

Tang, a research assistant professor of cell and developmental biology, started her career in biochemistry because she wanted to understand cell-cell adhesion molecules, which are proteins responsible for binding cells together.

The cell surface contains multiple sets of cell-cell adhesion molecules, which interact with the machinery inside cells and affect the cell's behavior in numerous ways.

"It's wide open," Tang said. "Very little is known in terms of connecting from the molecular level to the tissue level."

Over the years, new technologies have allowed scientists to better understand cell-cell interaction, creating never-ending research opportunities.

"The same question from when I first started as a grad student stays the same," Tang said. "But we get more answers because there are new technologies and new improvements and new thinking."

This increased knowledge of cell-cell interaction can help explain problems in human disease. Around 80 percent of cancer cases originate from epithelial cells. Many types of chronic diseases that affect people across gender, race, and age groups are due to breakage of cell-cell interaction. The cells are used to connecting to each other, so if that interaction is disrupted somehow, the cells start to divide uncontrollably, causing tumors to form.

Tang hopes her research can help understand exactly how this happens, leading to better prevention and management methods for human diseases.

Her current research involves cataloging all of the molecules that are involved in cell-cell adhesion.

"The same question from when I first started as a grad student stays the same. But we get more answers because there are new technologies and new improvements and new thinking."

This includes over 20 proteins, which have never been fully cataloged. Tang wants to figure out why so many proteins are present when only two proteins are actually needed for cell adhesion.

"Something else must be happening," she said. "If you need cell-cell adhesion, you need two proteins that stick together and you stick them to the plasma membrane, and voila, you should have cell-cell adhesion. So why do we need so many other proteins attaching to it?"

She wants to create a map that describes how these proteins interact. A map like this could help scientists better understand these interactions and how they affect cell behavior.

Another goal of Tang's research is to think more about the physical side of cell-cell interaction. Physical forces inside the cell can influence its neighbors through cell-cell adhesion, and sometimes they can even change gene transcription, the first step in gene expression. All of these changes can eventually alter the cell's behavior and the property of the whole tissue.

But these forces are difficult to measure, and the tools for doing so are limited. Tang is working on designing new biosensors that can monitor molecular forces between cells. These tools can tell us how cells use forces to "talk" to each other.

"I think that's something that we need to go to in the future," she said. "That would be nice to have young people to help bring in new ideas and build new tools to study it."

Tang believes one way to make this happen is to encourage biology students to think about the physical properties — not just the chemical factors — that regulate the cell. She is developing a new biology course that incorporates physical principles and biochemical theories to explore ways to think about cell biology.

Tang is used to approaching open questions like these. In her opinion, taking on uncharted areas and seeing gradual results until finally finding something new is one of the best parts of being a scientist.

"The experience is exhilarating, when you discover something," she said. "Nobody has seen it before you. That feeling is addictive." ■

Written by Emily Scott. Photo courtesy of Department of Cell and Developmental Biology.

ON THE GRID
HAPPENINGS AT THE IGB

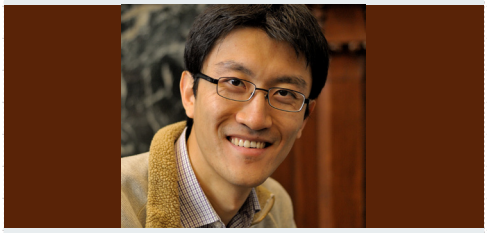
AWARDS

MARTIN BURKE, ANDREW LEAKEY, SAURABH SINHA

Martin Burke, Professor of Chemistry (MMG), Andrew Leakey, Associate Professor of Plant Biology (GEGC), and Saurabh Sinha, Professor of Computer Science (GNDP/BSD) were named University Scholars, recognizing excellence in teaching, scholarship and service.

OLGICA MILENKOVIC

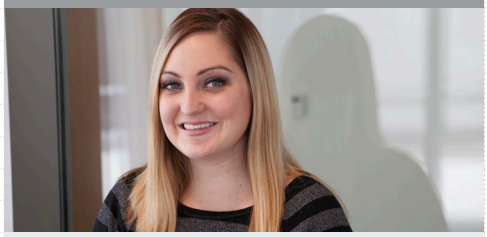
Olgica Milenkovic, Professor of Electrical and Computer Engineering (GNDP/BSD/ONC-PM), was named a Fellow of the Institute of Electrical and Electronics Engineers (IEEE) for contributions to genomic data compression.



DAVE ZHAO

Dave Zhao, Assistant Professor of Statistics (GNDP/CGRH) was named a recipient of the Lincoln Excellence for Assistant Professors (LEAP) Award by the College of Liberal Arts & Sciences at the University of Illinois, for scholarly productivity and contributions to the educational mission of their departments and the college.

NEW ARRIVALS



MADISON HUCKSTEP

Madison Huckstep has joined the IGB as an Account Technician I, working with the Communications and Outreach Group. She graduated from Illinois State University in 2016 with a BS in Business Administration. Previously, she worked for CCRS in Bevier Hall as an Office Assistant.

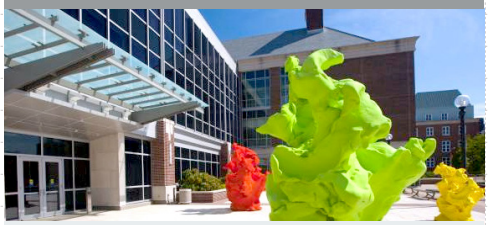
TRACI JOHNSON

Traci Johnson has joined the IGB as a Grants and Contracts Specialist working in the Business Office. Traci transferred from the University of Illinois Foundation where she focused on working with gift funds. She received her BA from the University of Illinois in 2011 with a focus on Agricultural Communications.

LORI MCLAIN

Lori McLain has joined the IGB as a BAA-Business & Procurement Specialist, working in the Business office. Lori transferred from the College of Veterinary Medicine where she was also a Business & Procurement Specialist. She received her BS at Millikin University in 2010 and has worked with the University for over 5 years.

RETREAT



IGB RETREAT

The IGB Retreat will take place on April 14, 2018 within the building. Faculty members only, please use the following link to RSVP for the retreat so we have accurate attendance numbers:
http://www.igb.illinois.edu/igb-retreat-rsvp

SPECIAL ISSUE

MAYANDI SIVAGURU

Mayandi Sivaguru, Associate Director of IGB's Core Facilities, has edited a special issue of Wiley Online Library's Microscopy Research and Technique, with work featured on the cover. Read the full issue at http://onlinelibrary.wiley.com/doi/10.1002/jemt.v81.2/issuetoc.

IGB MAGAZINE

BIOMARKER

Biomarker, the annual IGB magazine, now available. Download a copy from http://go.igb.illinois.edu/BiomarkerVol11.

DEPARTMENT ANNOUNCEMENTS

COMMUNICATIONS

NEW TEMPLATE

An revised version of the IGB powerpoint template is now available, with preformatted slides for titles, content, section breaks, metrics, and more. Visit the Communications page on the IGB website to download the file, which will be updated regularly: https://www.igb.illinois.edu/facilities-services/communications.

SPEAKING WITH THE MEDIA

As an IGB member you may be approached for an interview or some other form of news coverage regarding your research. A short guide to assist you for these occasions is available at https://www.igb.illinois.edu/resources/speaking-media. Feel free to contact Nicholas Vasi at nvasi@illinois.edu if you have any questions. ■

OPERATIONS & FACILITIES

EMERGENCY PREPAREDNESS

The University Police Department produced a video related to emergency preparedness and the concept of "Run, Hide, Fight." While we hope never to need to deploy this concept, we encourage you to watch the two minute video in the spirit of being well-prepared.

The video can be found at http://police.illinois.edu/emergency-preparedness/run-hide-fight/.

There are clear and simple takeaway messages for those of us in the research enterprise – and the most important may be to simply learn about your building. Research is conducted in a variety of settings across campus and off campus, at all hours of the day and night. Taking a minute to review exits, storm refuge areas, areas of rescue assistance and evacuation assembly areas could save lives in an emergency. ■

BUSINESS

ON-LINE W2 & 1042-S AVAILABLE NOW

If you have consented to receive your form W-2 and /or 1042-S electroinically, it is now available. Below are the instructions to retrieve your form.
Access to Electronic Form W-2/1042-S/1095-C for Active Employees
To access the form employees should follow these steps:

1. Go to the System HR website.
2. Select the Pay tab.
3. Click the link W-2/1042-S/1095-C Tax Statement.
4. Click the Access Tax Forms green button.
5. Log in using your NetID and Password.
6. Enter your Personal Identification Number (PIN) or create one.
7. Click Submit.
8. Click Continue.
9. Once on the W-2/1042-S/1095-C Tax Statement Consent Forms page, Click Continue.
10. Click on the link for the 2017 form you want to retrieve.
11. Your Form W-2/1042-S/1095-C will display on the screen.

If you have any questions you may contact University Payroll & Benefits Customer Service by phone at 217-265-6363 or email payinq@uillinois.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.

Pence, B. D., Ryerson, M. R., Cruz, A. G. B., Woods, J. A., & Shisler, J. L. (2018). Voluntary wheel running does not alter mortality to or immunogenicity of vaccinia virus in mice: A pilot study. *Frontiers in Physiology*, 8(JAN), [1123]. DOI: 10.3389/fphys.2017.01123

Manandhar, M., & Cronan, J. E. (2018). A canonical biotin synthesis enzyme, 8-amino-7- oxononanoate synthase (BioF), utilizes different acyl chain donors in Bacillus subtilis and Escherichia coli. *Applied and Environmental Microbiology*, 84(1), [e02084-17]. DOI: 10.1128/AEM.02084-17

Vlčková, K., Shutt-Phillip, K., Heisterman, M., Pafčo, B., Petrželkov, K. J., Todd, A., ... Gomez, A. (2018). Impact of stress on the gut microbiome of free-ranging western lowland gorillas. *Microbiology (United Kingdom)*, 164(1), 40-44. [000587]. DOI: 10.1099/mic.0.000587

Huntsman, H. D., Rendeiro, C., Merritt, J. R., Pincu, Y., Cobert, A., De Lisio, M., ... Boppart, M. D. (2018). The impact of mechanically stimulated muscle-derived stromal cells on aged skeletal muscle. *Experimental Gerontology*, 103, 35-46. DOI: 10.1016/j.exger.2017.12.012

Liu, J., Sharma, A., Niewiara, M. J., Singh, R., Ming, R., & Yu, Q. (2018). Papain-like cysteine proteases in Carica papaya: Lineage-specific gene duplication and expansion. *BMC Genomics*, 19(1), [26]. DOI: 10.1186/s12864-017-4394-y

RECENT PUBLICATIONS cont.

Kelliher, J. L., Radin, J. N., Grim, K. P., Solórzano, P. K. P., Degnan, P. H., & Kehl-Fie, T. E. (2018). Acquisition of the phosphate transporter NptA enhances *Staphylococcus aureus* pathogenesis by improving phosphate uptake in divergent environments. *Infection and Immunity*, 86(1), [e00631-17]. DOI: 10.1128/IAI.00631-17

Erickson-Bhatt, S. J., Mesa, K. J., Marjanovic, M., Chaney, E. J., Ahmad, A., Huang, P. C., ... Boppart, S. A. (2018). Intraoperative optical coherence tomography of the human thyroid: Feasibility for surgical assessment. *Translational Research*. DOI: 10.1016/j.trsl.2017.12.001

Marcu, L., Boppart, S. A., Hutchinson, M. R., Popp, J., & Wilson, B. C. (2018). Biophotonics: The big picture. *Journal of Biomedical Optics*, 23(2), [021103]. DOI: 10.1117/1.JBO.23.2.021103

Moreno-Mayar, J. V., Potter, B. A., Vinner, L., Steinrücken, M., Rasmussen, S., Terhorst, J., ... Willerslev, E. (2018). Terminal Pleistocene Alaskan genome reveals first founding population of Native Americans. *Nature*, 553(7687), 203-207. DOI: 10.1038/nature25173

Boppart, S. A., Brown, J. Q., Farah, C. S., Kho, E., Marcu, L., Saunders, C. M., & Sterenborg, H. J. C. M. (2018). Label-free optical imaging technologies for rapid translation and use during intraoperative surgical and tumor margin assessment. *Journal of Biomedical Optics*, 23(2), [021104]. DOI: 10.1117/1.JBO.23.2.021104

Milner, D. J., Bionaz, M., Monaco, E., Cameron, J. A., & Wheeler, M. B. (2018). Myogenic potential of mesenchymal stem cells isolated from porcine adipose tissue. *Cell and Tissue Research*, 1-16. DOI: 10.1007/s00441-017-2764-z

Crossley, W. A., Luan, S., Allison, J. T., & Thurston, D. L. (2018). Optimization problem formulation framework with application to engineering systems. *Systems Engineering*. DOI: 10.1002/sys.21418

Tang, S., Tang, L., Lu, X., Liu, H., & Moore, J. S. (2018). Programmable Payload Release from Transient Polymer Microcapsules Triggered by a Specific Ion Coactivation Effect. *Journal of the American Chemical Society*, 140(1), 94-97. DOI: 10.1021/jacs.7b11022

Rosenberger, C. L., & Chen, J. (2018). To Grow or Not to Grow: TOR and SnRK2 Coordinate Growth and Stress Response in Arabidopsis. *Molecular Cell*, 69(1), 113-125.e6. DOI: 10.1016/j.molcel.2017.12.013

Johnson, C. L., Schwarb, H., Horecka, K. M., McGarry, M. D. J., Hillman, C. H., Kramer, A. F., ... Barbey, A. K. (2018). Double dissociation of structure-function relationships in memory and fluid intelligence observed with magnetic resonance elastography. *NeuroImage*, 171, 99-106. DOI: 10.1016/j.neuroimage.2018.01.007

Wang, J., Xu, Y., & Boppart, S. A. (2017). Review of optical coherence tomography in oncology. *Journal of Biomedical Optics*, 22(12), [121711]. DOI: 10.1117/1.JBO.22.12.121711

Monroy, G. L., Won, J., Spillman, D. R., Dsouza, R., & Boppart, S. A. (2017). Clinical translation of handheld optical coherence tomography: Practical considerations and recent advancements. *Journal of Biomedical Optics*, 22(12), [121715]. DOI: 10.1117/1.JBO.22.12.121715

Nakayasu, E. S., Burnet, M. C., Walukiewicz, H. E., Wilkins, C. S., Shukla, A. K., Brooks, S., ... Payne, S. H. (2017). Ancient regulatory role of lysine acetylation in central metabolism. *mBio*, 8(6), [e01894-17]. DOI: 10.1128/mBio.01894-17

Wickland, D. P., Battu, G., Hudson, K. A., Diers, B. W., & Hudson, M. E. (2017). A comparison of genotyping-by-sequencing analysis methods on low-coverage crop datasets shows advantages of a new workflow, GB-eaSy. *BMC Bioinformatics*, 18(1), [586]. DOI: 10.1186/s12859-017-2000-6

Cressiot, B., Greive, S. J., Si, W., Pascoa, T. C., Mojtabavi, M., Chechik, M., ... Wanunu, M. (2017). Porphyrin-Assisted Docking of a Thermophage Portal Protein into Lipid Bilayers: Nanopore Engineering and Characterization. *ACS Nano*, 11(12), 11931-11945. DOI: 10.1021/acsnano.7b06980

Si, T., Chao, R., Min, Y., Wu, Y., Ren, W., & Zhao, H. (2017). Automated multiplex genome-scale engineering in yeast. *Nature Communications*, 8, [15187]. DOI: 10.1038/ncomms15187

Guo, X., Xie, X., Ren, J., Laktionova, M., Tabachnikova, E., Yu, L., ... Liaw, P. K. (2017). Plastic dynamics of the Al0.5CoCrCuFeNi high entropy alloy at cryogenic temperatures: Jerky flow, stair-like fluctuation, scaling behavior, and non-chaotic state. *Applied Physics Letters*, 111(25), [251905]. DOI: 10.1063/1.5004241

Monroy, G. L., Pande, P., Nolan, R. M., Shelton, R. L., Porter, R. G., Novak, M. A., ... Boppart, S. A. (2017). Noninvasive *in vivo* optical coherence tomography tracking of chronic otitis media in pediatric subjects after surgical intervention. *Journal of Biomedical Optics*, 22(12), [121614]. DOI: 10.1117/1.JBO.22.12.121614

Caetano-Anollés, D., & Caetano-Anollés, G. (2017). Commentary: History of the ribosome and the origin of translation. *Frontiers in Molecular Biosciences*, 3(JAN), [87]. DOI: 10.3389/fmolb.2016.00087

Klein, J. A., Grenz, J. R., Slauch, J. M., & Knodler, L. A. (2017). Controlled activity of the Salmonella invasion-associated injectisome reveals its intracellular role in the cytosolic population. *mBio*, 8(6), [e01931-17]. DOI: 10.1128/mBio.01931-17

Xue, C., & Goldenfeld, N. (2017). Coevolution Maintains Diversity in the Stochastic "kill the Winner" Model. *Physical Review Letters*, 119(26), [268101]. DOI: 10.1103/PhysRevLett.119.268101

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