



IGB NEWS

Achievements, awards, and information about the IGB community

Volume 5, Number 5



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Welcome!

If you are new to the IGB this semester, welcome. If you've been away from the IGB for the summer, welcome back.

{Upcoming Events}

David Gottlieb Memorial Lecture Pioneers in Genomic Biology Lecture Series

September 18, 2012

12:00 p.m.

612 Institute for Genomic Biology

Chaitan Khosla, PhD

*Professor, Departments of Chemistry, Chemical Engineering, and Biochemistry
Stanford University*

"Assembly Line Biosynthesis of New and Old Polyketide Antibacterial Agents"

Innovation and Commercialization Seminar

September 25, 2012

12:00 p.m.

612 Institute for Genomic Biology

Jen Rice

Associate Technology Manager, OTM, UIUC

Brad Edwards

Technology Manager and Patent Coordinator, OTM, UIUC

iGEM Team Presentation

September 26, 2012

12:00 p.m.

612 Institute for Genomic Biology

The International Genetically Engineered Machine (iGEM) competition is dedicated to the advancement of synthetic biology and the development of open community and collaboration. The 2012 iGEM Illinois undergrad team will practice its presentation in preparation of the regional competition in Pittsburgh in October. Please attend and give feedback to strengthen the team's presentation.

Genome Day

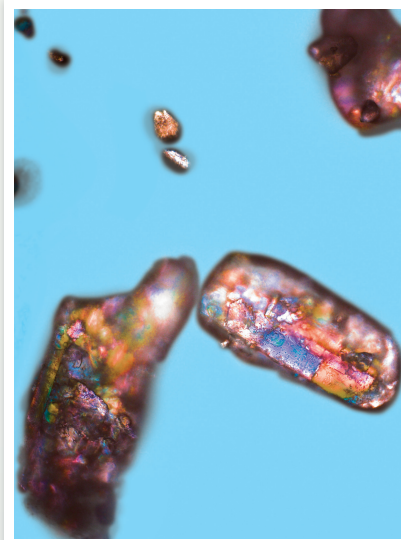
November 3, 2012

1:00 p.m. — 5:00 p.m.

Orpheum Children's Science Museum
346 North Neil, Champaign

A day to educate all ages about genomes, genes, and DNA! Free and open to the public.

{Image of the Month}



This month's image, "Birefringence of Glucose Monohydrate," was made by Sarah Scholl from the Shelly Schmidt Lab, Food Chemistry.

The image was taken with the Zeiss Apotome Fluorescence Microscope.

IGB News

Share your news with the IGB. Send your story ideas to nvasi@illinois.edu

Improving Drought-Resistance of Biofuel Grasses



» IGB faculty member and co-PI Andrew Leakey, with PI and Director of the Enterprise Institute for Renewable Fuels Tom Brutnell

a video about the research: http://youtu.be/prM_p1jkmNk

Because SoyFACE has developed ways of simulating drought stress, differing CO₂ concentrations, and elevated temperatures, it provides the perfect outdoor lab to test *Setaria* under a number of stressors. By planting a genetically diverse selection of *Setaria* plants, Leakey's lab can compare the genetic markers of those that do well under drought stress to those that do poorly, allowing them to identify target genes for stress resistance.

Meanwhile, Director of the Enterprise Rent-A-Car Institute for Renewable Fuels Tom Brutnell will pursue genetic dissection of drought response in *S. viridis*. Brutnell, who is serving as Principal Investigator on this grant, will work with colleagues using computational and synthetic biology tools to produce one of the most extensive molecular characterizations of plant growth to date. In doing so, they will generate candidate genes to improve closely related bioenergy grasses, improving their yields and water efficiency.

The U.S. Department of Energy has awarded a five-year, \$12.1 million grant to a multi-institutional effort to develop drought-resistant grasses for use in biofuels. The Donald Danforth Plant Science Center in St. Louis will lead the initiative with researchers from the Carnegie Institution for Science, the University of Illinois at Urbana-Champaign, the University of Minnesota and Washington State University.

The grant is timely, said U. of I. plant biology professor and IGB faculty Andrew Leakey, whose lab will receive \$1.8 million of the funding. "The Midwest is in the midst of one of the worst droughts in decades," he said, "and anything scientists can do to enhance a crop's ability to endure such conditions will be a boon to agriculture in general."

The 2012 drought season is on pace to be the most severe since the 1930s, due to a combination of extreme heat, lack of precipitation, and a mild winter. Over 60% of the country is currently in a state of drought, including all of Illinois.

Drought is the number one limiting factor of crop yields, and will continue to be of concern in relation to diminishing global water supply and climate change. Determining how to best engineer bioenergy crops for increased heat and drought resistance will make them more practical to produce and more attractive to farmers, guaranteeing an adequate supply.

The new research will focus on *Setaria viridis*, a grass that is closely related to next-generation biofuel feedstocks such as *Miscanthus* and switchgrass, as well as corn and wheat. *S. viridis* is



» Researchers will simulate drought stress, differing CO₂ concentrations, and elevated temperatures through the use of the SoyFACE facility.

particularly amenable to genetic analysis, allowing for ease of transformation and characterization of traits.

Leakey and his colleagues at Illinois will lead field experiments on a variety of *Setaria* plants to determine the genetic basis of drought tolerance in these and other closely related plants. Watch

"The opportunity to use the newest genomic and genetic tools available on this project provides an incredible opportunity for us to advance our understanding of the genes that confer drought tolerance to some C4 crops such as *Miscanthus* and switchgrass," Leakey said. "Given the importance of C4 crops for fuel and food and the likelihood that droughts like those seen this year will become more frequent as the result of climate change, that's an exciting prospect." ■

Hyunjoon Kong: New Tools Help Grow New Tissue



» Hyunjoon Kong's work with hydrogels led to the successful creation of new vascularization.

A good vascular network is a key in tissue regeneration. Without an adequate supply of blood, which both delivers nutrients and carries away waste products, tissue cannot heal. Creating a functional vascular network has been a major challenge in the tissue regeneration field, and it is one that Hyunjoon Kong has undertaken, with some significant, recent success.

"It's not new to try to recreate the vascular network but the challenge has been how can we spatially organize the network in order to let them be functional to provide oxygen, nutrients to the tissue and take certain wastes from the tissue?" says Kong, professor of chemical and biomolecular engineering and a member of IGB's Regenerative Biology and Tissue Engineering theme.

The human vascular network is very regular and highly organized; the spacing between blood vessels is critical. The vascular network must have only .3-.5 millimeters between blood vessels in order to reach every cell. With that spacing it takes one or two seconds for the oxygen to diffuse to the center of the tissues, but if vessels are even a millimeter apart the blood flow takes too long to reach the tissues and they die.

"Up until now there was no proper tool to control spacing at a sub-micrometer scale," says Kong.

Based on biological findings that certain protein

molecules, growth factors, orchestrate to stimulate formation of new blood vessels, which naturally form a regular and properly spaced network, Kong determined that he could harness this process. He and his students coated some fibers (an FDA-approved, biodegradable polymer) with the growth factor, put it on some tissue, and demonstrated that new blood vessels grew in the same pattern that the proteins were put into.

"If we put the fiber on a tissue, after seven days new blood vessels were growing," says Kong.

Following that proof-of-concept result, Kong's group worked to control the pattern in which the blood vessels grew.

"We were intrigued by controlling the spatial organization in a more elaborate manner, so we tried to make the blood vessel grow in a different pattern with regular spacing," he says.

To try and grow blood vessels in different patterns, Kong's group used hydrogels, which Kong has been developing for the past decade. These hydrogels mimic the extra-cellular (ECM) matrix, and are comprised of polysaccharides and synthetic polyethylene glycol, and water. Hydrogels promote cell growth and vascularization in vivo.

Because the vascular network is made of multiple proteins, rather than only one, Kong simply embedded live cells into the hydrogel. The cells make all the necessary proteins, and do so in a more sustained manner than other methods, says Kong. While this might seem like an obvious approach, Kong's work is, in fact, the first effort to use live cells for a project of this type.

Kong collaborated with Dr. Rashid Bashir and Dr. Jimmy Hsia to introduce micro-sized holes or channels in the hydrogel to direct the flow of larger molecules, like the growth factor proteins.

"The spatial organization of the proteins is key to vascular spacing, along with hydrogel properties," he says.

When this bandage made of hydrogel infused with live cells is put on tissue, the new blood vessels grow in the shape of those channels in the hydrogel, following the pattern of where the growth factor congregates. Kong successfully created new vascularization in the shape of the hydrogel stamp.

These results were widely reported and Kong even got some phone calls from patients with serious wound care issues and vascular diseases. This was the first time that had ever happened to him. He hopes that his work will eventually help people

like the ones who called him.

In a second, related project Kong is developing a way to detect a compromised vascular network — in the heart, for example, or the kidney — image it and then deliver drugs to improve the network. This "theranostic" approach combines diagnostics with therapy.

“We were intrigued by controlling the spatial organization in a more elaborate manner, so we tried to make the blood vessel grow in a different pattern with regular spacing.”

Leaky blood vessels excrete plasma and white blood cells into extra vascular space, causing inflammation and abnormal biotransport, leading to various diseases such as, kidney dysfunction. Diagnosing these leaky vessels will help prevent and control vascular disease. NIH awarded Kong an RO1 grant for this project.

"Many people are interested in ways to detect vascular problems earlier and then cure the area in advance before they have to implant a stent or do by-pass," he says.

Kong's approach, in collaboration with Dr. Sanjay Misra at the Mayo Clinic in Rochester, Minn., is based on the observation that leaky blood vessels overexpress certain protein molecules. Kong's group is working to modify a nanoparticle to bind to those protein molecules and thus identify areas where the vascular network is damaged. The nanoparticle also will be hollow so it will be better for imaging contrast and also be able to deliver drugs. In addition, the particle is elliptical, which slows the particle down enough to make it better able to bind to the target proteins as it courses through the blood vessels. This was, says Kong, a happy accident. "We were trying to make it spherical," he says with a grin.

Kong's success has not gone unrecognized: This year he received the Engineering Dean's Award for Research Achievement and was nominated as a fellow of the Center for Advanced Studies on campus; in 2011 the Korean Institute for Chemical Engineers gave him the Young Investigator Award; in 2009 he received the CAREER Award from the National Science Foundation; and in 2008 he received the scientist development grant from the American Heart Association. ■

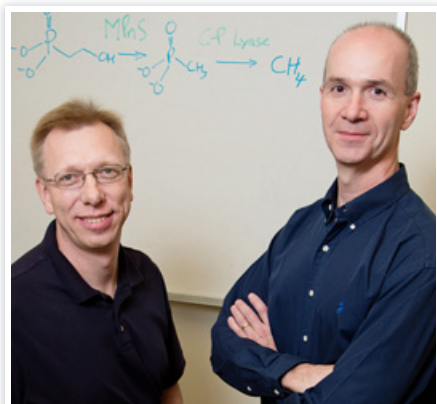
{Research}

Study identifies prime source of ocean methane

Up to 4 percent of the methane on Earth comes from the ocean's oxygen-rich waters, but scientists have been unable to identify the source of this potent greenhouse gas. Now researchers report that they have found the culprit: a bit of "weird chemistry" practiced by the most abundant microbes on the planet.

Many microbes produce phosphonates to thwart their competitors. Phosphonates mimic molecules the microbes use, but tend to be more resistant to enzymatic breakdown. The secret of their success is the durability of their carbon-phosphorus bond.

"We're looking at all kinds of antibiotics that have this carbon-phosphorus bond," said University of Illinois microbiology and Institute for Genomic Biology professor William Metcalf, who led the study with chemistry and IGB professor Wilfred van der Donk. "So we found genes in a microbe that we thought would make an antibiotic. They didn't. They made something different altogether."



» Wilfred van der Donk and William Metcalf

The findings, published in the journal *Science*, will help those modeling the geochemistry of the ocean to understand climate change, Metcalf said.

Read the entire article at here:

<http://www.igb.illinois.edu/news/study-identifies-prime-source-ocean-methane> ■

{Office of Technology Management}

New OTM intern will help with patents and commercialization



Mirth Hoyt, an intern at the Office of Technology Management (OTM), is working with Jen Rice, an associate technology manager with OTM, to provide patenting and commercialization assistance for the IGB.

Hoyt, who has a degree in chemistry from the College of William and Mary in Williamsburg, Virginia, said she chose a degree in science because she believes it "can help solve some of society's problems." After earning her bachelor's degree, she enrolled at the University of Illinois and received her Ph.D. in organic chemistry and now is working toward her MBA at Illinois.

Rather than follow a traditional career in research, Hoyt says she wants to "facilitate research and innovation, including corporate sponsorship of research and incorporation of University intellectual property."

Interning at OTM was a natural fit for Hoyt because she's interested in how the transfer of research and advanced knowledge to corporations happens. As an OTM intern, Hoyt will assist IGB faculty with the patenting and commercialization process.

"My main goal is to reach out to faculty at the IGB to inform them about patenting, licensing, and commercialization opportunities available," she said. "I will be available to answer their questions, and, I hope, to make them more comfortable with the process."

When not working at the OTM or in class studying for her MBA, Hoyt volunteers with Retired Greyhounds as Pets, an organization with a Champaign-Urbana chapter that rescues racing greyhounds. As the owner of a greyhound, she says she wants to introduce people to the breed.

"People are surprised to find out that they are calm, loving, obedient dogs who don't need any more exercise than a typical breed of dog," she says. "Mine does a really good imitation of a rug for about 22 hours of the day."

For more information about OTM or to meet with Hoyt or Rice, visit them at the IGB Gatehouse, Room 146 or contact (217) 244-1275. ■

{IP @ IGB}

Patent Applications

Did you know there's more than one kind of patent application?

- **Utility** – an application for a U.S. utility patent. A utility patent is issued for new and useful processes, machines, manufactures, or compositions of matter. Most of University of Illinois' patented technologies are covered by utility patents.
- **Design** – an application for a U.S. design patent. This patent application covers ornamental design for a useful object e.g. automobile hood or iPod user interface.
- **Plant** – an application for a U.S. plant patent. The plant must be invented or discovered AND be asexually reproduced e.g. orchid plant *Oncidium Heaven Scent* 'Sweet Baby'.
- **Provisional** – a U.S. application that has a lifetime of one year. It serves to lock in a filing date and never can mature into an issued patent, so an applicant must submit a non-provisional patent application (such as a utility or PCT) within the lifetime of the provisional patent.
- **PCT** – an international application that locks in a global filing date for countries in the PCT (Patent Cooperation Treaty). The PCT does not become a granted patent, so a U.S. or foreign patent application must be filed within 30 months of filing a PCT.
- **Foreign** – an application filed in the patent office of a foreign country. Often a PCT is filed prior to filing a foreign patent.

Want to know more?

Contact Mirth Hoyt at mhoyt2@illinois.edu at the Office of Technology Management: www.otm.illinois.edu

Open House

Please join the Office of Technology Management at our Open House on October 11. The Office of Technology Management is here to protect your intellectual property and deliver your innovations efficiently and effectively to the marketplace and society.

We work with researchers and entrepreneurs from all corners of campus, on projects ranging from biotechnology to electronics, and mobile apps to educational tools and creative works.

Please join us and learn how we can move your ideas forward into products and services that improve lives and create businesses.

October 11, 2012

3:00 - 5:00 pm

Illini Union, South Lounge ■

{Around the IGB}

Conference

3rd Pan American Congress on Plants and Bioenergy

Biofuel feedstocks were the topic of discussion at the 3rd Pan American Congress on Plants and Bioenergy, from the established sugarcane ethanol industry in Brazil to the emerging prospects of algae. Organized by the Energy Biosciences Institute, the four-day conference was held in July at the iHotel at the University of Illinois and featured speakers from around the world.

Marcos Buckeridge, the Scientific Director of the Brazilian Bioethanol Science and Technology Center, discussed the history and future of sugarcane ethanol in Brazil, the most established bioenergy industry in the world.

Prairie cordgrass was also discussed, including a well researched strain taken from France. "When we talk about bioenergy crops, we are always talking about sustainability," said EBI scientist D.K. Lee. "And native plants are very sustainable."



In addition to hearing over 30 presentations, the conference attendees also toured the EBI Energy Farm and the Eastern Illinois Renewable Bioenergy Facility. "We know that making biofuels from plant material is possible, we know that nature does these steps, so in the end we should be able to get there," said Steve Long, Deputy Director of the EBI and professor of crop sciences. "Hearing all these scientists talk, we're getting close." ■

Awards

University Scholars



Elizabeth Ainsworth and **Phillip Newmark** have been named as University Scholars, recognizing the university's most talented teachers, scholars and researchers. ■

Ryan Bailey



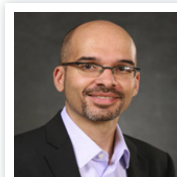
Ryan Bailey has been named one of the world's top young innovators by Technology Review, honoring the top innovators under the age of 35. ■

Alison Bell



Alison Bell received the 2012 Young Investigator Award from the Animal Behavior Society for significant contributions to the field of animal behavior. ■

Christopher Rao



Christopher Rao was named Outstanding Young Researcher from the American Institute of Chemical Engineers, Computing and Systems Technology Division. ■

New Arrivals

Princess Imoukhuede

Professor Princess Imoukhuede joins the IGB as an affiliate in the Regenerative Biology and Tissue Engineering Research Theme. Professor Imoukhuede is an Assistant Professor in the Department of Bioengineering. She received her B.S. degree in Chemical Engineering from the Massachusetts Institute of Technology and her Ph.D. degree in Bioengineering from the California Institute of Technology. Her current research applies systems biology to study clinically relevant questions in cancer and cardiovascular disease. ■

Christine Ashikyan

Christine joins the IGB as a Grants and Contracts Specialist, responsible for sending out the monthly statements for all EBI related grants, as well as other post-award activities. She received her BA from Eastern Illinois University. ■

ADMINISTRATIVE NEWS

{Operations & Facilities}

New IGB Conference Room

The new conference room on the third floor of the lab building is now available for reservations via the space reservation form (<http://www.igb.illinois.edu/facilities-services/igb-conference-space-request-form>). This room has seating for 14 around the table and is equipped with a Monopad (giant touch tablet). Training on how to use this piece of equipment can be scheduled through space@igb.uiuc.edu. ■

Bicycle Parking

The IGB has added additional bicycle parking on the south end of the plaza. If this area is full, there are additional loops on the north side of the lab building. Bicycles parked in other locations (along plaza railing, light poles, etc.) will be removed. As a reminder, bicycles are not allowed in the building. ■

{Safety}

Fire Alarms

Fire alarm testing and an evacuation drill at the IGB are scheduled for September.

F&S is scheduled to test the fire alarm system at the IGB during the week of September 24th through September 28th. The activation of the alarm horns and strobes will occur on Wednesday, September 26th, at 9:00 AM.

This year we are planning to conduct a full building evacuation drill at the same time that we test the fire alarm horns and strobes. The following information outlines the procedures during alarm testing and a building evacuation.

Why Fire Alarm Systems Should Be Regularly Tested

The main function of a fire alarm system is to save lives. In conjunction with other fire control equipment such as fire doors and fire rated walls, a fire alarm system will allow anyone inside the building plenty of time to safely leave the premises and for the Fire Department to arrive and contain the fire.

To ensure that the fire alarm system is functioning correctly it must be tested and maintained on a regular basis. Like all things, fire alarm systems will decay and suffer from natural damage.

To ensure that the system works as intended and is kept in the best condition possible, Facilities and Services (F&S) inspects and, if necessary, repairs the system on a regular basis. A full test of the alarm horns and strobes must be carried out once a year to ensure everything is working correctly.

What should you do when the building alarm sounds or an evacuation signal is given:

- Remain calm.
- Exit the room and:
 - Quickly shut down any hazardous operations or processes and render them safe, if it is possible to do so. If an unsafe situation

exists that will not allow a shutdown before evacuating, report this to the theme safety contact.

- Take jackets or other clothing needed for protection from the weather.
- Close windows and doors, but do not lock doors as you leave.
- Leave room lights on.
- If you are away from your room when the alarm sounds, you should exit the building immediately and not return to your room. If an unsafe situation exists in your room, report this to the theme safety contact.
- Notify others in the area of the alarm if they did not hear it.
- Exit the building via the nearest safe exit route.
- Most safe exit routes are the corridors with the brown "cork type" flooring.
- **Do not use elevators to exit**
- Evacuate away from the IGB Building to the designated evacuation assembly area by the Morrow plots. Do not stay on the pavers in front of the IGB building!
- Wait at evacuation assembly area for directions.
- Do not reenter the building until emergency staff gives the "all clear" signal. ■



{Business}

TEM Post Go-Live Open Lab Sessions



Sign up for the Travel Expense Management (TEM) system Post Go-Live Open Lab Sessions.

This is a great opportunity to get hands on experience and work out your problems with a UPay Expert.

Space is limited, please sign up early!

Tuesday Oct 16th, 1:30 p.m. to 3:30 p.m.

Tuesday November 13th, 9:30 a.m. to 11:30 a.m.

Register at: <http://training.obfs.uillinois.edu/index.cfm?campus=o>

Both sessions will be held at:

Fire Service Institute, Room 1040
11 Gerty Drive, Building 1261, MC-675
Champaign, IL 61820

(Attendees may park in the Fire Service Institute parking lot at no charge)

Description: Are you live with the TEM System? Have you created Expense Reports or gone through the Review/Approve steps and need additional assistance with specific processes? If so, register and attend a TEM Open Lab and workout your problems with a UPay Expert!

The Open Lab is not a training session. This session is available to those currently live and working in TEM and is designed to help you with your specific issues with the System. If you are interested in attending a Open Lab, the following are requirements for admission:

You must be live in the TEM System and set up with a login

You must bring documents or Expense Report numbers to process or discuss

You must be familiar with the TEM Resource Page

You must register for the TEM Open Lab

You must enter your specific questions in the comment box, located under the date options, within the Course Registration Page

The TEM Open Lab is not a training session and is only available to those who are live with TEM. If you are not currently using TEM, please wait until you go-live and experience the benefits of the system before attending a TEM Open Lab.

The TEM Resource Page: <http://www.obfs.uillinois.edu/tem-resources/> ■

{University Library}

On-Site Library Support for the IGB



Although Katie Newman retired this summer, the IGB will still have on-site library support. Sarah Williams, the Life Sciences Data Services Librarian, is at the IGB six hours each week. For the fall semester, Sarah's hours are: Mondays 1:00-3:00 p.m., Tuesdays 12:00-2:00 p.m., and Fridays 9:00-11:00 a.m. She will be sharing office space in 2130 IGB, although she is also happy to make office and lab visits.

Sarah is available to assist researchers with library or data needs. Please contact her if, for example, you need assistance tracking down a citation, accessing library resources, or configuring research alerts. Data services is an emerging area of support from the University Library, and Sarah is interested in working with researchers to help them manage and preserve their data.

In addition to maintaining the Life Sciences Data Services site (<http://www.library.illinois.edu/lldata/>), which includes a feed for life sciences data news, Sarah can:

- Identify potential repositories to submit or acquire data
- Provide consultation on creating or implementing a data management plan
- Provide a data management presentation

When Sarah is not at the IGB, she is at the Funk Library (<http://www.library.illinois.edu/funkaces/>), and she is happy to help researchers outside of her scheduled IGB hours.

Sarah can be reached at scwillms@illinois.edu. ■

{Communications}

Seminar / Conference Website Checklist

With the semester underway you may find yourself in the position of having to organize an online presence for a seminar, conference, or other type of event hosted by the IGB. We've provided a checklist to help guide the process to determine a URL, identify what content areas are needed, what information should be collected, and other helpful tips.

Located on the IGB website <http://www.igb.illinois.edu/content/seminarconference-website-checklist> at and also accessible via the home page under the Resources section, this guide can remove the confusion on what is required to create a site and help move your project forward. ■

{Recent Publications}

Su X, Zhang J, Mackie RI, Cann IKO. Supplementing with non-glycoside hydrolase proteins enhances enzymatic deconstruction of plant biomass. *PLoS ONE*. 2012;7(8).

Metcalf WW, Griffin BM, Cicchillo RM, et al. Synthesis of methylphosphonic acid by marine microbes: A source for methane in the aerobic ocean. *Science*. 2012;337(6098):1104-1107.

Donovan MP, Nabity PD, DeLucia EH. Salicylic acid-mediated reductions in yield in *nicotiana attenuata* challenged by aphid herbivory. *Arthropod-Plant Interact*. 2012:1-8.

Balakrishnan CN, Lin Y-, London SE, Clayton DF. RNA-seq transcriptome analysis of male and female zebra finch cell lines. *Genomics*. 2012.

Gomez A, Luckey D, Yeoman CJ, et al. Loss of sex and age driven differences in the gut microbiome characterize arthritis-susceptible 0401 mice but not arthritis-resistant 0402 mice. *PLoS One*. 2012;7(4):e36095.

Kim IJ, Blanke SR. Remodeling the host environment: Modulation of the gastric epithelium by the helicobacter pylori vacuolating toxin (VacA). *Front Cell Infect Microbiol*. 2012;2:37.

Mao Y, Yannarell AC, Davis SC, Mackie RI. Impact of different bioenergy crops on N-cycling bacterial and archaeal communities in soil. *Environ Microbiol*. 2012.

Lai M-, Jeong JH, Devolder RJ, Brockman C, Schroeder C, Kong H. Ellipsoidal polyaspartamide polymersomes with enhanced cell-targeting ability. *Adv Funct Mater*. 2012;22(15):3239-3246.

Prins P, Goto N, Yates A, et al, eds. Sharing programming resources between bio* projects through remote procedure call and native call stack strategies. ; 2012 *Methods in Molecular Biology*; No. 856.

Vagstad AL, Bumpus SB, Belecki K, Kelleher NL, Townsend CA. Interrogation of global active site occupancy of a fungal iterative polyketide synthase reveals strategies for maintaining biosynthetic fidelity. *J Am Chem Soc*. 2012;134(15):6865-6877.

Lee W-, Seo S-, Bae Y-, Nan H, Jin Y-, Seo J-. Isobutanol production in engineered *saccharomyces cerevisiae* by overexpression of 2-ketoisovalerate decarboxylase and valine biosynthetic enzymes. *Bioprocess Biosyst Eng*. 2012:1-9.

Gonzalez-Gutierrez G, Lukk T, Agarwal V, Papke D, Nair SK, Grosman C. Mutations that stabilize the open state of the *erwinia chrysanthemi* ligand-gated ion channel fail to change the conformation of the pore domain in crystals. *Proc Natl Acad Sci U S A*. 2012;109(16):6331-6336.

Zangerl AR, Miresmailli S, Nabity P, et al. Role of arthropod communities in bioenergy crop litter decomposition. *Insect Sci*. 2012.

Kim SY, Ju K-, Metcalf WW, Evans BS, Kuzuyama T, Van Der Donk WA. Different biosynthetic pathways to fosfomycin in *pseudomonas syringae* and *streptomyces* species. *Antimicrob Agents Chemother*. 2012;56(8):4175-4183. ■