



# IGBNEWS

Achievements, awards, and information about the IGB community

Volume 6, 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

### Welcome back to IGB Pizza Party

September 18, 2013

12:00 p.m. — 1:00 p.m.

Array Cafe

IGB Students, Faculty, and Staff

Ticket Required

Tickets are available at the IGB Reception Desk  
in the Gatehouse 9/9 – 9/16  
(during regular business hours)

### IGB Seminar (CDMC)

September 24, 2013

12:00 p.m.

612 Institute for Genomic Biology

Chuan He, PhD

*Director, Institute for Biophysical Dynamics  
Professor, Department of Chemistry  
The University of Chicago*

**"Reversible RNA and DNA Methylation in  
Biological Regulation"**

### Pioneers in Genomic Biology Lecture Series (GNBP)

October 8, 2013

12:00 p.m.

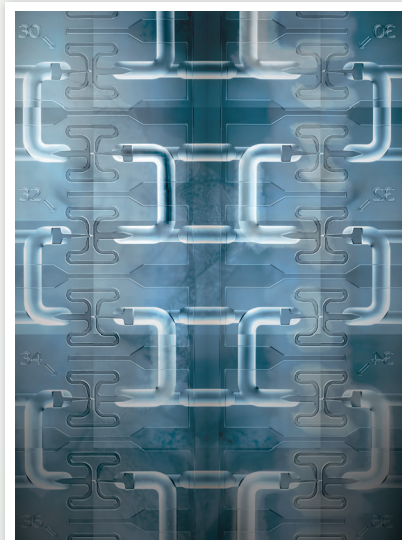
612 Institute for Genomic Biology

Charles F. Aquadro, PhD

*Charles A. Alexander Professor of Biological  
Sciences, Professor of Population Genetics in the  
Department of Molecular Biology and Genetics,  
Joint appointment in the Department of Ecology and  
Evolutionary Biology, Director of the Cornell Center  
for Comparative and Population Genomics  
Cornell University*

**"Sex, Flies and Conflict: The Molecular  
Evolution of Germline Stem Cell Genes in  
*Drosophila*"**

## Image of the Month



This month's image, "Fluidigm C1™ High Throughput Single-Cell Gene Expression and Single-cell mRNA Sequencing Chip," was provided by Mark Band, Director of Functional Genomics at the Roy J. Carver Biotechnology Center. The image was taken with the LSM 710 DIC.

## IGB News

Share your news with the IGB. Send your story ideas to [nvasi@illinois.edu](mailto:nvasi@illinois.edu)

# Illinois Researchers Advance Understanding of Schistosome Reproduction

*Ancient Egyptian mummies revealed that humans have been hosting parasitic flatworms called schistosomes for more than 5,000 years. Today the parasites continue to plague millions of people across the world, causing roughly 250,000 deaths each year.*

The schistosome reproductive cycle results in exponentially more schistosomes each generation. Not only do the adults lay hundreds to thousands of eggs each day but the larval schistosomes are able to clone themselves thousands of times, with each clone capable of developing into an egg-producing adult.

Researchers at the University of Illinois quickly realized that one key to controlling schistosomes is being able to control their incredibly prolific life cycle. In a recent study published in the journal *eLife*, Illinois researchers have come one step closer to understanding the unique mechanisms that allow schistosomes' germinal cells, stem cells that multiply into other types of cells, to create thousands of clonal larvae that can then infect humans.

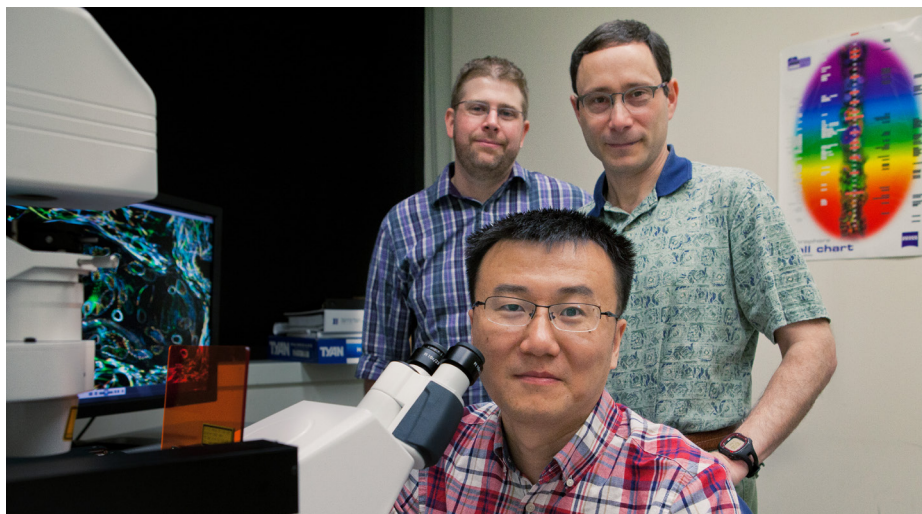
### The Disease

This work adds to our understanding of the basic biology of schistosomiasis, a chronic disease caused by schistosome parasites, that robbed at least 243 million people of their productivity in 2011.

"People don't feel well, and so they are not productive in their work," said James Collins III, a postdoctoral researcher in the Department of Cell and Developmental Biology (CDB) at Illinois. "This disease keeps them from being able to realize their full potential, and in turn, they remain poor and are exposed to more diseases like schistosomiasis, which are ultimately diseases of sanitation. It's a disease of poverty that also perpetuates poverty."

Schistosomiasis can result in abdominal pain, diarrhea, and blood in urine or feces. The parasite's eggs, and not the parasite itself, cause these symptoms and others. The bloodstream carries many of the eggs to the liver and other areas of the body where they can trigger a massive immune response.

"When you look at people who have a high level of infection, you see many holes in their liver,"



» IGB Fellow Bo Wang (front) with Phil Newmark (right) and James Collins (left) are studying the unique mechanisms that allow schistosomes' germinal cells to create thousands of clonal larvae that can then infect humans.

said Phillip Newmark, a Professor of Cell and Developmental Biology at Illinois, an Investigator of the Howard Hughes Medical Institute, and an affiliate of the Regenerative Biology and Tissue Engineering research theme at the Institute for Genomic Biology. "Where there was an egg, a hole is formed where the tissue has been destroyed by the host immune system's inflammatory response."

### The Life Cycle

Every day for decades, adult schistosomes can lay hundreds to thousands of eggs. Their life cycle starts over when the eggs are excreted from the human host through urine or feces. When the eggs contact water, they hatch out "miracidia" that seek out the snail intermediate hosts.

Inside the correct species of snail, the miracidia become sporocysts, essentially sacs filled with germinal cells, that undergo clonal expansion, making tens to hundreds of thousands of copies of themselves in the form of "cercariae." The fast-swimming cercariae are shed from the snail, and search for human hosts who find themselves in cercariae-infested fresh water.

"They are attracted by the fatty acids in your skin," said Collins. "In the lab, you can leave your thumbprint on a plastic petri dish, and all the cercariae will swarm to your thumbprint and try to penetrate the plastic."

Once they find a host, they are able to burrow

through the skin and enter the bloodstream. Inside the body, they migrate to specific sites in the human host, mature into male or female worms, and find mates with whom they will live, paired together "in copula." If left undetected, they will continue mass producing eggs for decades.

### The Research

Illinois researchers are approaching this important problem from a unique perspective, using developmental biology (the study of how organisms grow and develop) and applying the lessons they have learned from studying planarians, non-parasitic relatives of schistosomes.

"When researchers are just focused on targeting diseases and developing drugs, they may wind up limiting their opportunities by not really understanding the biology of the system," Newmark said. "I think fundamental, curiosity-driven research is still vital for developing long-lasting solutions. If anything comes of this, it will be because we were asking very fundamental questions about these parasites, based upon our knowledge of their free-living cousins, the planarians."

The team's research was motivated by the idea that stem cells seem to be key to schistosomes' ability to live within humans, but also to their ability to live and clone themselves within their snail hosts.

They discovered that germinal cells possess a molecular signature—a collection of expressed genes—that is similar to that of neoblasts (adult



## Monthly Feature cont.

stem cells) that allow planarians to regrow missing body parts. Among these genes, they identified some that are required for maintaining the germinal cell population.

This evidence suggests that schistosome larvae may have evolved by adapting a developmental program used by non-parasitic flatworms in order to rapidly increase their population—essentially giving them the opportunity to reproduce twice within their life cycle, once asexually inside snail hosts and once sexually inside human hosts.

Illinois researchers believe they can apply this newfound developmental knowledge to future

studies that may lead to ways to control, or even eradicate, schistosomes. They have already discovered that they can make the reproductive system of a planarian disappear by removing the function of a neuropeptide; eventually, they hope to do the same in schistosomes.

Still, there's much to still be learned, says Collins. "We have really only scratched the surface of understanding the basic biology of these organisms. In order to be able to treat this disease, we need to know more about the organisms that cause it. That's one of our main motivations for this work."

First author Bo Wang, a postdoctoral fellow at the

IGB, said the obvious next step will be to further characterize these schistosome cells on a genomic level. "We really need to improve our understanding of schistosome stem cells," Wang said. "We still don't understand all the mechanisms that really make them unique, that really make them have this tremendous capacity to proliferate, or reproduce."

The National Institutes of Allergy and Infectious Diseases (NIAID) funded this study. Wang was also supported by the IGB, who sponsored his fellowship. The work was reported in the July 30, 2013 issue of *eLife* (<http://dx.doi.org/10.7554/eLife.00768>). ■

## Monthly Profile

### Rod Mackie Microbes—The Unseen Majority

Forty-five years ago, when Rod Mackie first began studying anaerobic microbes in cow and sheep guts, they were understood and appreciated only by a small audience of scientists and nutritionists. He had no idea how very popular and significant they would become.

Today, of course, researchers have realized that microbes are everywhere and their ecology, physiology and genetics are the subject of intense investigation.

"I never imagined, when I started out, that microbes would be so hot," Mackie says. "They are the unseen majority, they've become visible."

Much of that visibility is the result of sequencing technology, which has enabled researchers to sequence genes of microbes without having to cultivate them.

"When I started no one thought about using DNA for research," says Mackie, who grew up in present-day Zimbabwe. "It was all about cultivation. No one knew who was there without being able to grow them."

Cultivating anaerobes, as compared to aerobic bacteria, is more difficult and tedious, requiring specialized techniques; they grow slowly and many are killed dead by a whiff of oxygen. But for many processes, from dairy cow nutrition to bio-fuel production, anaerobic microbes drive the bus, so it is important to be able to study them.

Mackie, not one to step away from a challenge, became proficient at cultivating anaerobes. This process is so difficult that, for every one thousand labs working on *E. coli* DNA there is only one

anaerobic lab, Mackie estimates.

These days, thanks to sequencing technology, many labs can study microbial genes, even those of anaerobes, without culturing them. Mackie, however, believes information gained that way is not as complete.

"Cultivating microbes and sequencing them are intricately linked," he says. "You can't do a complete piece of work if you can't grow them. We are not just using molecular biology to do our research, we understand the system and can isolate and grow anaerobes. Because we can grow them, we can take DNA from a single organism and see how it works, based on its genome."

Mackie's association with the University of Illinois began in 1978 when he came to the University of Illinois as a post-doctoral student to work with preeminent anaerobic microbiologist Marvin Bryant.

"We were in the vanguard, developing techniques and establishing principles of biochemistry in strict anaerobes," says Mackie of his work with Bryant and others at Illinois. Mackie joined the faculty full time in 1988 and joined the IGB at its inception.

These days, Mackie is sitting in the catbird seat; his expertise, combined with the growing significance of and interest in microbes—both aerobic and anaerobic—means he can follow wherever his capacious curiosity leads him. His office floor is carpeted with three-foot-tall towers of paper, testament to the number of projects he's undertaking. Luckily, Mackie, grandfather of a teenager and



» Professor Mackie on the volcanic rim of a crater lake, on the island of Genovesa in the Galapagos

lifelong runner, also has the energy of a much younger man.

"I don't have a job, I have a passion," says Mackie.

Given his expertise in cultivating anaerobes found in the rumen gut, it was an easy and logical step to mine those microbes for the enzymes that break down plant cell walls. But in addition to enzyme discovery, Mackie has investigated microbial ecology—how microbes interact with one another— aerosol microbiology of the indoor environment, horizontal gene transfer, gene evolution, and even the evolution of herbivory in reptiles.

Mackie's passion lies in discovering the whole story of a given microbe.

## Monthly Profile cont.

"I don't want to just sequence lots of stuff, I want to sequence the genome of an organism and I want to use it to answer questions in biology," he says. "I'd be happy if we had only one sequence but we knew how and why that organism worked."

His passion for the "whole story" extends to understanding how microbes interact and influence one another. To that end, he, fellow IGB faculty member Isaac Cann, and EBI graduate student Dylan Dodd ran experiments looking at all the transcripts (mRNA) of a given organism as it depolymerizes a specific material.

Those experiments showed "what strategies a bug uses to degrade an insoluble polymer," says Mackie.

They also used this approach to look at a mixture of organisms they've both cultivated and sequenced to see how the transcript changes with other microbes in the mix. In this way they can determine how microbes in a given community interact. Sequencing the DNA from a mass of unidentified microbes cannot provide the same information.

Understanding how microbes interact led Mackie also to wonder about the origins of life. Mackie is part of a major NASA initiative, in which IGB is a

key collaborator, to study the origin and evolution of life anywhere in the universe.

Mackie and his colleagues will use a microfluidic device in which they can establish steep environmental gradients under controlled conditions. The device allows them to look at changes in a very small space at a very rapid pace, making it easier to see how the genomes of cells and simple communities respond to changes in their environment.

Meanwhile, Mackie, having worked around livestock all his life, became curious about the impact of agriculture on the environment. He began to study the aerosolized microbiology inside large livestock barns. He wanted to know how abundant and diverse certain genes are, specifically antibiotic resistant ones. Mackie found that different livestock were associated with a distinct airborne microbial community. He hopes this information might enable better management strategies to make these environments healthier for both livestock and humans working there.

As a result of this work Mackie became interested in the role microbes play elsewhere in the environment, including among plants. He began to investigate how what happens above ground, in a plant, gets translated into below-ground changes in microbial populations. Mackie gradually devel-

oped ideas, tools, and technologies to understand those linkages. At just about that time EBI was formed, along with its ecosystem sustainability research area.

"I could play there," he realized.

And he does. By way of microbes, Mackie looks at what happens to carbon and nitrogen cycles in the soil where second-generation biofuel crops are grown.

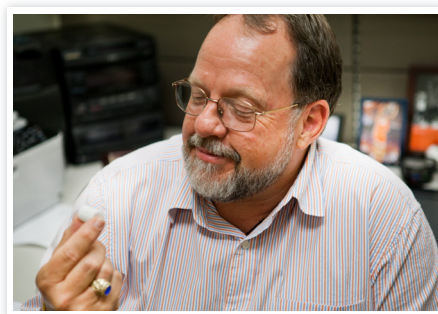
"You know what screws up the works the worst?" he asks. "Fertilizer!"

In the course of thinking about microbes in the environment, combined with a lifelong interest in wildlife, Mackie became curious about the rare occurrence of herbivory in reptiles. Only iguanas, turtles and tortoises are herbivorous. So off he headed to the Galapagos Islands, to study the marine and terrestrial iguanas. Using gut and fecal samples he has worked to understand how a given microbial community might enable a reptile to be herbivorous. At which point he became curious about aquatic mammals, and extended his study to the manatee.

There is no telling where Mackie's curiosity will take him next, but rest assured, microbes will be involved. ■

## Research

### 3D-printed Splint Saves Infant's Life



» Professor of Animal Sciences Matt Wheeler

Half a millennium after Johannes Gutenberg printed the bible, researchers printed a 3D splint that saved the life of an infant born with severe tracheobronchomalacia, a birth defect that causes the airway to collapse.

While similar surgeries have been preformed using tissue donations and windpipes created from stem cells, this is the first time 3D printing has been used to treat tracheobronchomalacia—at least in a human.

Matthew Wheeler, a University of Illinois Professor of Animal Sciences and member of the Regenerative Biology and Tissue Engineering research theme at the Institute for Genomic Biology, worked with a team of five researchers to test 3D-printed, bioresorbable airway splints in porcine, or pig, animal models with severe, life-threatening tracheobronchomalacia.

"If the promise of tissue engineering is going to be realized, our translational research must be 'translated' from our laboratory and experimental surgery suite to the hospital and clinic," Wheeler said. "The large-animal model is the roadway to take this device from the bench top to the bedside."

For more than 40 years, pigs have served as medical research models because their physiology is very similar to humans. In addition to tracheobronchomalacia, pigs have been biomedical models for muscular dystrophy, diabetes, and other diseases. The team chose to use two-month-old pigs for this study because their tracheas have similar biomechanical and anatomical properties to a growing human trachea.

"Essentially, all our breakthroughs in human clinical medicine have been initially tested or perfected in animal models," Wheeler said. "Through the use of animal models, scientists and doctors are able to perfect techniques, drugs, and materials without risking human lives."

First, Wheeler sent a CT scan of a pig's trachea to Scott Hollister, a professor of biomedical engineering at the University of Michigan. Hollister used the CT scan and a 3D CAD program to design and print the splints. These devices were made from an FDA-approved material called polycaprolactone or PCL, which Wheeler has used in more than 100 large-animal procedures.

Next, Wheeler developed a strategy to implement the device and U-M associate professor of pediatric otolaryngology Glenn Green carried out the surgical procedure. After the splint was placed, the pigs' tracheobronchomalacia symptoms disappeared.

"All of our work is physician inspired," Wheeler said. "Babies suffering from tracheobronchomalacia were brought to ear, nose and throat surgeons, but they didn't have any treatment options. They turned to us to engineer a cure."

Read the full story at <http://bit.ly/1dm2KLZ> ■

## A Myriad of Open Questions After Myriad Genetics Ruling

One of this summer's most anticipated Supreme Court decisions came in June with the Association for Molecular Pathology v. Myriad Genetics ruling. Myriad had patented the locations and sequences of the BRCA1 and BRCA2 genes after it found that mutations in these genes greatly increased an individual's risk of developing breast and ovarian cancer. The suit centered on the question of whether a human gene is patentable. Speaking for a unanimous court, Justice Thomas

declared "we hold that a naturally occurring DNA segment is a product of nature and not patent eligible merely because it has been isolated, but that cDNA is patent eligible because it is not naturally occurring."

The ruling, which invalidated the use of patenting genes, still leaves open many questions, such as where the line may be drawn between what is and is not considered 'naturally occurring'. To help clarify some of the major questions surrounding the current state of US Intellectual Property

law, the Office of Technology Management will be hosting a panel of expert lawyers and faculty to discuss what the Myriad ruling means for researchers. Mark your calendars!

**November 1**

**1090 Lincoln Hall**

**Noon**

(Pizza will be served at 11:45)

Have any IP or patent questions?

Contact the OTM's IGB liaison,

Mark Scott, at [mjscott2@illinois.edu](mailto:mjscott2@illinois.edu) ■

## Around the IGB

### Testimony

#### IGB Director Gives Congressional Testimony on Value of Brain and Behavior Research

Gene Robinson, Director of the IGB, served as one of five witnesses who gave testimony at the House of Representatives Subcommittee on Research and Technology Hearing in Washington, D.C. on the subject "The Frontiers of Human Brain Research." He spoke in support of President Obama's BRAIN initiative, a new research effort to better understand the brain and reveal new methods for treatment and prevention of brain disorders such as Alzheimer's, schizophrenia, autism, and epilepsy.

In his testimony, Dr. Robinson used his laboratory's work on the molecular basis of honey bee brain function and behavior as an example to demonstrate the value of basic neuroscience research, and how it leads to development of applications in areas such as human health. He stressed the importance of basic research on behavior as well as the brain, study of diverse animal models, and interdisciplinary collaboration, the latter particularly for the development of new tools for neuroscience research.

See the 5 minute presentation from Dr. Robinson, as well as links to the full testimony video and complete article, at <http://bit.ly/1ce0KZV> ■

### IGB Fellowship

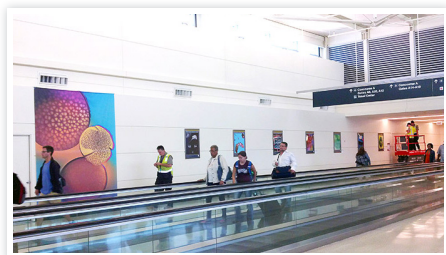
#### Become an IGB Fellow

The Institute for Genomic Biology at the University of Illinois at Urbana-Champaign offers a number of fellowships for truly exceptional young scholars who have completed their Ph.D. within the last several years, and are looking for a stimulating and supportive interdisciplinary environment to carry out independent and collaborative research in the field of genomic biology. IGB Fellows will typically spend two years conducting research in one of several research themes in the Institute, and ideally this research will also overlap with two or more of these thematic areas. A personalized mentoring plan will be developed for each Fellow.

We are now accepting applications for new Fellows. Please fill out the application form at <http://www.igb.illinois.edu/content/fellows-application> ■

### Art of Science

#### New Exhibit at Midway Airport Features Images of IGB Research



Midway Airport passengers stuck on dreaded layovers can pass the time by experiencing 12 pieces from the "Art of Science: Images from the Institute for Genomic Biology" art exhibit.

The exhibit, located past security in Concourse A,

features images used in the Institute's innovative research projects that address significant problems facing humanity related to health, agriculture, energy and the environment.

Two 10-foot banners and 10 pictures are featured, illustrating the microscopic subjects that researchers are able to capture through the Institute's Core Facilities, which provides faculty and students from across the Urbana campus and east-central region resources for biological microscopy and image analysis.

This exhibit was made possible in part by the Chicago Department of Aviation. Some images from the Art of Science 3.0 exhibit are also on display at the I-Hotel and Conference Center in Champaign. The Art of Science 4.0 exhibit will be held April 3-7, 2014 at the indi go Artist Co-Op gallery, with an opening reception on April 3. ■

### CEM

#### Registration Options

The Certificate in Entrepreneurship and Management (CEM) is a program for entrepreneurially minded students and postdoctoral associates interested in understanding the issues in scientific and high technical start-up ventures.

Registration for the CEM One-Year Program has passed, but students interested in the Kauffman FastTrac TechVenture course can still apply by December 13, 2013.

For more information and complete instructions on how to register or apply for scholarship, visit <http://www.igb.illinois.edu/ceb/> ■



# Around the IGB

## Events

### IGB Hosts Full Summer of Events

Over the past several months the IGB hosted a number of exciting new and returning events:



#### Pollen Power! Summer Camp

Nearly 30 girls attended the Institute for Genomic Biology's weeklong summer camp devoted to the science of pollen. Campers studied past and future plant responses to climate change using pollen, toured state-of-the-art campus research labs and facilities, conducted real-world pollen research, and created video presentations using a green screen and teleprompter.



#### Summer Internship for Native Americans in Genomics (SING)

More than a dozen students from across North America attended the weeklong SING workshop to discuss the potential, as well as the risks, for genomic research in Native American communities. Participants learned not only about recent Native American genomic studies and genetic legal cases, but also the skills that are required to conduct real-world genomic research from DNA extraction to DNA sequence analysis.



#### 2013 International Symposium on C4 and CAM Plant Biology

Leaders in the genomics, evolution, ecology and ecophysiology of C4 and CAM plants spoke in front of a sizable group at the 2013 C4/CAM Symposium, in the context of food crops, biofuels and natural ecosystems. Attendees were also able to tour the EBI Energy Farm and visit the SoyFACE experimental facility. ■

## Call for Proposals

### Multidisciplinary Research Seed Funding

The Institute for Genomic Biology (IGB) is pleased to announce a call for proposals for Multidisciplinary Research Seed funding. The goal of this new IGB initiative is to seed new research projects that will lead to new multi-investigator, multidisciplinary external funding within the IGB. A maximum of three proposals will be funded.

Deadline for proposals is October 15, 2013.

For more information please visit

<http://bit.ly/1g0IPnc> ■

## Supercomputer

### IGB Faculty Granted Access to Blue Waters

Four researchers at the IGB have been granted access to the Blue Waters supercomputer, capable of sustained performance at 1 petaflop. A petaflop is the measure of computer processing speed that is equal to a thousand trillion floating-point operations per second.

Isaac Cann, Professor of Microbiology and Animal Sciences and Deputy Director of the Energy Biosciences Institute, joins Professor of Bioinformatics Gustavo Caetano-Anolles, technical lead in genome informatics Christopher Fields, and Victor Jongeneel, the director of HPCBio (High-Performance Biological Computing) and IGB's Director of Bioinformatics in using one of the most powerful supercomputers in the world. ■

## Welcome

### Welcome back to IGB Pizza Party

**Wednesday, September 18**

**Noon – 1:00pm**

**Array Café**

All IGB Students, Faculty, and Staff are invited to join us for a welcome back to the IGB pizza party in Array Café.

Tickets are required, so don't forget to pick one up! Tickets are available at the IGB Reception Desk in the Gatehouse during regular business hours from September 9 through September 16. ■

## iGEM Team

### iGEM Presentation

**Wednesday, Sept. 25**

**3:00pm – 4:00pm**

**612 IGB**

Help support and critique the International Genetically Engineered Machine (iGEM) team in preparation for the regional competition at the University of Toronto. This year's overall goal is creating a "super" bacteria that breaks down L-Carnitine in a safer alternative metabolic pathway than typical gut bacteria. ■

## Giving



### Walk of Life

Contributing to the Walk of Life is a unique opportunity to simultaneously support our mission and become a permanent part of IGB history.

Visit [www.igb.illinois.edu/about/giving](http://www.igb.illinois.edu/about/giving) or contact Melissa McKillip for additional information at [mmckilli@illinois.edu](mailto:mmckilli@illinois.edu). ■

## Awards

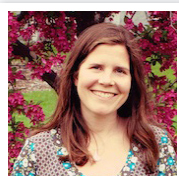
### Center for Advanced Study Professors



Nigel Goldenfeld, Stephen Long, and Jonathan Sweedler have been named as CAS Professors. Appointment as a CAS Professor is one of the university's

highest academic honors, and reflects the outstanding contributions made by these faculty in their respective areas of interest. ■

### Lisa Ainsworth



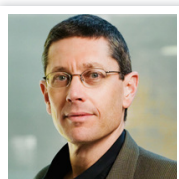
Lisa Ainsworth was selected to join the American Society of Plant Biologists (ASPB) Executive Committee as an elected member. ■

### Paul Hergenrother



Paul Hergenrother was selected by the University of Illinois as the Kenneth L. Rinehart Jr. Endowed Chair in Natural Products Chemistry. ■

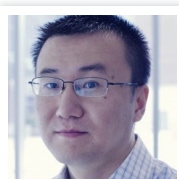
### Gene Robinson



Gene Robinson has been chosen to receive the iBIO Institute's 2013 iCON Innovator Award. The award recognizes excellence in both teaching and scholarship of

biotechnology in Illinois. ■

### Bo Wang

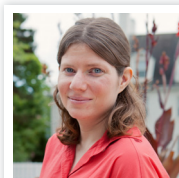


Bo Wang received a Career Award at the Scientific Interface by the Burroughs Wellcome Fund, designed to support those seeking to merge their education in engineering,

computation or mathematics with an academic career in the biological sciences. ■

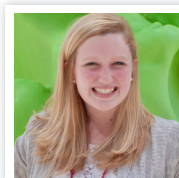
## New Arrivals

### Claudia Lutz



Claudia Lutz has joined the IGB as a media communications specialist in the Communications office. She contributes as a science writer on a wide variety of projects, as well as helping to expand the IGB's public outreach and education efforts. She recently received her Ph.D. in Neuroscience from the University of Illinois. ■

### Claire Sturgeon



Claire Sturgeon has joined the IGB as a media communications specialist in the Communications office. Claire holds a bachelor's degree in agricultural communications with a minor in crop and soil management from the University of Illinois. She functions as a science writer covering the research and faculty developments taking place at the IGB. ■

## ADMINISTRATIVE NEWS

### University Library

#### Announcements from the University Library

With the start of the new academic year, there are a few important announcements that just can't wait for the next IGB newsletter ...

##### New Life Sciences & Engineering Librarians

The University Library has four new science and engineering librarians available to assist and collaborate with researchers:

- Peg Burnette ([phburn@illinois.edu](mailto:phburn@illinois.edu))  
Biomedical Sciences Librarian
- Kelli Trei ([ktrei2@illinois.edu](mailto:ktrei2@illinois.edu))  
Biosciences Librarian
- Erin Kerby ([ekerb@illinois.edu](mailto:ekerb@illinois.edu))  
Veterinary Medicine & Life Sciences Librarian
- Christie Wiley ([cawiley@illinois.edu](mailto:cawiley@illinois.edu))  
Engineering Research & Data Services Librarian

##### Apply for Funds to Purchase Datasets

The University Library's Data Purchase Program (<http://www.library.illinois.edu/sc/datagis/purchase/description2013.html>) allows UIUC faculty and graduate students to apply for funds (\$5,000 or less) to acquire numeric and spatial data for their research. The full announcement (<http://www.library.illinois.edu/sc/datagis/purchase/fullannouncement2013.html>) explains eligible datasets,

the selection criteria, the application process, and other requirements. The application deadline is October 7, 2013, and awards should be announced by December 1, 2013.

##### Workshops to Improve Research and Information Management Skills

The University Library has released the Savvy Researcher Workshop schedule for fall 2013 (<http://illinois.edu/calendar/list/4068>). The free workshops are usually 50 minutes and cover a variety of tools and topics to improve research and information management skills. Below are some of the sessions that might be of particular interest to researchers in IGB, but be sure to look at the online schedule for a complete list of sessions, with details and registration links.

- Your research rights: Ownership awareness to maximize the impact
- Intro to data management
- Survey of resources for biomedical sciences
- Getting organized with Mendeley
- Drowning in citations and PDFs? EndNote can help!
- How to build a great poster ■

# Operations & Facilities

## Inventoried Assets

All inventoried University assets over \$500 are assigned a University property tag (PTag) and examined every two years year in accordance with University Business and Financial Policies and Procedures. The Institute for Genomic Biology is conducting its 2013 biennial inventory. Besides meeting this statutory requirement, physical inventory provides the best mechanism available for the IGB to meet the equipment custodianship responsibilities delegated to our department.

- It is **important** to inform the IGB when you move any equipment to another IGB room or campus location, when you have items at home or off-campus, or when you decide to "scrap" or surplus any asset. Please email [facilities@igb.illinois.edu](mailto:facilities@igb.illinois.edu) with updated information when an asset is moved to a different location, located at home or off-campus, or request submission to OBFS for scrap or surplus.
- If any asset is located at an off-campus location, you must complete a loan equipment form, which is kept on file and will be renewed annually. Contact [facilities@igb.illinois.edu](mailto:facilities@igb.illinois.edu) for the form. You may be asked to bring the item to IGB during the biennial inventory process.
- If you are responsible (referred to as equipment manager or custodian) for any IGB asset and will be leaving the IGB, it is again very important to inform IGB Facilities of your departure. The database must be updated with a new equipment manager or custodian for auditing and biennial inventory purposes.
- Any equipment, specifically desktop and laptop computers, purchased from any University funding source will need to be returned to the department in which it was purchased prior to your departure from the University. The University does not sell equipment, including computers and laptops, purchased with University funds to faculty, staff, students, or the general public. If the department determines the computer is no longer needed, it will be sent to University surplus to redistribute to another department.

If any questions, please contact [facilities@igb.illinois.edu](mailto:facilities@igb.illinois.edu) or Kathy Millage at [kmillage@igb.illinois.edu](mailto:kmillage@igb.illinois.edu).

## Locked Out of Your Office?

What to do if you accidentally become locked out of the IGB building or your IGB office:

During business hours - see the IGB receptionist or call 4-2999

After business hours - call 3-0340 for public safety. You will need to show ID and confirm that you belong in the building when assistance arrives.

## IGB Security Reminders

With the holidays approaching, please be reminded to take extra care when entering the IGB both via the exterior doors during off-hours and interior doors leading into secured spaces within the IGB at any time.

Do not let unknown people into the IGB or secured spaces. Anyone needing access should be directed to Operations and Facilities for prox card or key access permissions.

Be aware of people loitering around the doors and grabbing the door before it closes behind you to gain access. Absolutely NO doors should be propped open – this compromises IGB security.

We should all be observant of our surroundings and report any suspicious behavior immediately by calling 9-911 from a Campus phone.

The University of Illinois Public Safety website has helpful information regarding personal safety, as well as other topics of interest: <http://www.dps.uiuc.edu/universitypolice/campusafety.html>

## Bicycle Parking

Bicycle parking is provided in the plaza racks and on the northeast side of the building. These are the only areas designated for bicycle parking at the IGB. Bicycles parked in any other location (i.e. inside the building, near building entrances, railings, etc.) may be removed without warning.

## Retrocommissioning (RCx)

In FY13, the IGB building underwent retrocommissioning. Following is some information about RCx at Illinois, taken from the F&S website:

What is Retrocommissioning at Illinois?

Retrocommissioning is an in-depth analysis of a building's HVAC systems and controls with a view to restoring or optimizing conditions for energy conservation, sustainability, and client comfort satisfaction.

Why is Retrocommissioning important?

Deferred maintenance is taking a toll on campus buildings and this backlog of maintenance is proven to waste energy and consume university finances. RCx is a dedicated effort to help the campus address this formidable challenge.

To read a detailed report about RCx at the Institute for Genomic Biology, please visit: <http://www.fs.illinois.edu/docs/default-source/retro/institute-for-genomic-biology-.pdf> ■

## Safety

### Proper Disposal of Sharps

A **sharp** is any item having corners, edges, or projections capable of cutting or piercing the skin that is contaminated with biohazardous material.

Broken glassware is not considered a sharp **unless it is contaminated with biohazardous material**. Glassware with sharp edges or points contaminated with biohazardous material must be disposed into a sharps container.

Sharps should be handled cautiously due to the potential hazards involved. To determine what other items are considered a "sharp", refer to the box at the bottom of this page online: <http://www.dr.illinois.edu/bss/factsheets/sharps.aspx>

In order properly handle and dispose of an item that is considered a sharp, first obtain an approved sharps disposal container from Campus Stores. These containers are closable, puncture resistant, leak-proof on the sides and bottoms, and available in 1-quart, 2-gallon, and 8-gallon sizes. Sharps disposal containers must be easily accessible to laboratory personnel and located as close as feasible to the area where sharps are used. When discarding sharps:

- Never bend, shear, break, or recap disposable needles or remove from disposable syringes.
- Immediately following use, place the item into the sharps disposal container.
- Never reach into the sharps disposal container.
- Never empty the contents of the sharps disposal container into another container.
- Never remove the lid from the container.
- Never overfill a sharps disposal container; no materials should be sticking out the top.
- Sharps containers are considered full when material is at the 2/3 full mark on the container.
- Never force materials into a sharps disposal container.

When a sharps disposal container is full, go to the Division of Research Safety (DRS) web site <http://www.dr.illinois.edu/sharps/> and complete the online Sharps Collection Request form. The container will generally be picked up within three working days of the request. ■



## Communications

### News Coverage

The Communications office is happy to announce the addition of two science writers to our group, Claudia Lutz and Claire Sturgeon (see their short bios on page 7). We are now able to offer greater news coverage to the IGB community. If you have new research or an event you'd like to promote, have an upcoming paper that will be published, received new funding or engaged in outreach with the community, we can help publicize that information. Our office also maintains an account with EurekAlert!, the online news service operated by AAAS, which allows us to share news with top science outlets across the country. Contact [nvasi@illinois.edu](mailto:nvasi@illinois.edu) for more information.

### Twitter

Are you following the IGB on twitter? Don't miss any of the fascinating topics that emerge from our feed - follow [@IGBillinois](https://twitter.com/IGBillinois) today. ■

## Business

### Business Meals for Employees and Guests

#### Allowable for:

**Recruitment** - Meals or refreshments provided during meetings with non-employees or potential students, related to their possible employment at or admission to the University.

**Business Meetings** - University business discussions held between one or more University employees AND one or more visitors from an outside entity.

**Hospitality Events** - An event honoring distinguished guests who are not University employees. May include meals or receptions for faculty from other universities, members of external organizations, and/or visiting dignitaries. Dignitaries typically visit at the invitation of the University to participate in seminars, speaking engagements, and related events.

#### Amount Limits

**Breakfast** - \$25 per person

**Lunch** - \$40 per person

**Dinner** - \$60 per person

**Refreshments and Reception** - \$25 per person

**Alcohol** - \$20 per person

#### Allowable Fund Types

State (for business meetings and recruitment only); gift, institutional, service plan, or self-supporting if the event is directly related to generation of the funds revenue. Convocation or graduation events may be funded by the Chancellor's or President's Public Function funds.

#### How to Purchase

Do NOT purchase business meals with a University P-Card. Make the purchase using:

- T-Card
- Purchase Order
- Reimbursed personal funds – Consult Request Reimbursement for Domestic or International Employee Travel and Business Meals ■

## Recent Publications

Bernacchi CJ, Bagley JE, Serbin SP, Ruiz-Vera UM, Rosenthal DM, Vanloocke A. Modelling C-3 photosynthesis from the chloroplast to the ecosystem. *Plant Cell Environ.* 2013;36(9):1641-1657.

Lamboy JA, Kim H, Dembinski H, Ha T, Komives EA. Single-molecule FRET reveals the native-state dynamics of the I kappa B alpha ankyrin repeat domain. *J Mol Biol.* 2013;425(14):2578-2590.

Li S, Ha SJ, Kim HJ, et al. Investigation of the functional role of aldose 1-epimerase in engineered cellobiose utilization. *J Biotechnol.* 2013.

Zhu X-, Wang Y, Ort DR, Long SP. e-photosynthesis: A comprehensive dynamic mechanistic model of C3 photosynthesis: From light capture to sucrose synthesis. *Plant Cell Environ.* 2013;36(9):1711-1727.

Feng X, Zhao H. Investigating glucose and xylose metabolism in *saccharomyces cerevisiae* and *scheffersomyces stipitis* via 13C metabolic flux analysis. *AICHE J.* 2013;59(9):3195-3202.

Præsteng KE, Pope PB, Cann IKO, et al. Probiotic dosing of *ruminococcus flavefaciens* affects rumen microbiome structure and function in reindeer. *Microb Ecol.* 2013:1-10.

Lee W-, Nan H, Kim HJ, Jin Y-. Simultaneous saccharification and fermentation by engineered *saccharomyces cerevisiae* without supplementing extracellular  $\beta$ -glucosidase. *J Biotechnol.* 2013;167(3):316-322.

Belcher CM, Punyasena SW, Sivaguru M. Novel application of confocal laser scanning microscopy and 3D volume rendering toward improving the resolution of the fossil record of charcoal. *PLoS ONE.* 2013;8(8).

Weisgerber DW, Kelkhoff DO, Caliar SR, Harley BAC. The impact of discrete compartments of a multi-compartment collagen-GAG scaffold on overall construct biophysical properties. *J Mech Behav Biomed Mater.* 2013;28:26-36.

Kim S-, Seo S-, Jin Y-, Seo J-. Production of 2,3-butanediol by engineered *saccharomyces cerevisiae*. *Bioresour Technol.* 2013;146:274-281.

Sun N, Zhao H. Seamless correction of the sickle cell disease mutation of the HBB gene in human induced pluripotent stem cells using TALENs. *Biotechnol Bioeng.* 2013.

Ha T. Single-molecule approaches embrace molecular cohorts. *Cell.* 2013;154(4):723-726.

Keymer DP, Kent AD. Contribution of nitrogen fixation to first year *miscanthus*  $\times$  *giganteus*. *GCB Bioenergy.* 2013.

Niziolek OK, Berenbaum MR, Delucia EH. Impact of elevated CO2 and increased temperature on japanese beetle herbivory. *Insect Sci.* 2013;20(4):513-523.

Yang SK, Shi X, Park S, Ha T, Zimmerman SC. A dendritic single-molecule fluorescent probe that is monovalent, photostable and minimally blinking. *Nat Chem.* 2013;5(8):692-697.

Wang B, Collins III JJ, Newmark PA. Functional genomic characterization of neoblast-like stem cells in larval schistosoma mansoni. *eLife.* 2013;2013(2).

Li-Byarlay H, Li Y, Stroud H, et al. RNA interference knockdown of DNA methyltransferase 3 affects gene alternative splicing in the honey bee. *Proc Natl Acad Sci U S A.* 2013;110(31):12750-12755. ■



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