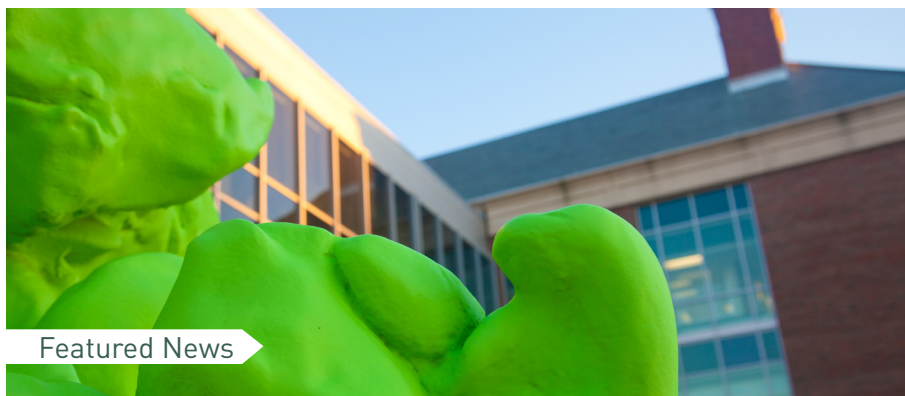




IGBNEWS

Achievements, awards, and information about the IGB community

Volume 4, Number 7



Featured News

p. 2 Osher Lifelong Learning Institute

p. 3 Monthly Profile

p. 4 Around the IGB

p. 5 Administrative News

{Upcoming Events}

Pioneers in Genomic Biology Lecture Series

January 24, 2012

12:00 p.m.

612 Institute for Genomic Biology

Clyde A. Hutchison III, Ph.D.

*Professor Emeritus of Microbiology, The University of
North Carolina at Chapel Hill*

*Distinguished Investigator, The J. Craig Venter Institute,
Rockville, MD*

“Building and Installing a Synthetic Genome”

Innovation and Commercialization Seminar

January 31, 2012

12:00 p.m.

612 Institute for Genomic Biology

Lesley Millar

*Director, Office of Technology Management (OTM),
UIUC*

Jen Rice, PhD

Associate Technology Manager, OTM, UIUC

Laura Frerichs

Director, Research Park, UIUC

**“Technology Commercialization
Case Studies - From Disclosure to Start-up”**

Holiday Break Hours

December 24, 2011 —

January 2, 2012

Exterior doors will be locked and a valid IGB prox
card is required for entry.

Array Cafe Hours

December 26, 2011 —

January 2, 2012

The cafe will be closed during the break. The cafe
will resume regular hours, from 8:00 a.m. - 3:00
p.m., on January 3, 2012.

Donut Day

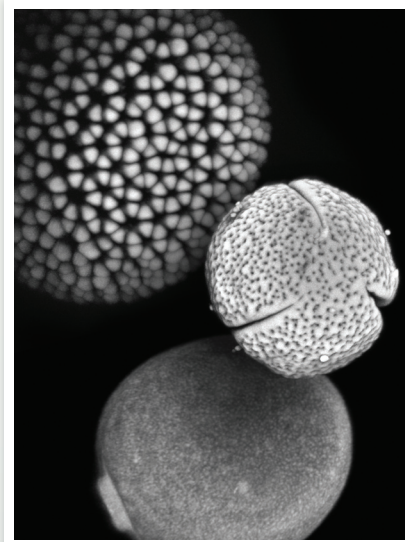
January 27, 2012

8:30 a.m.

Array Cafe

Coffee and donuts while supplies last!

{Image of the Month}



This month's image, “Shapes and Surface Textures of Pollen,” was made by Luke Mander in the Surangi Punyasena Lab. The image was taken using the Zeiss LSM 710 confocal microscope.

IGB News

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

Citizen Scientists Paired with Researchers in New Program

Working in a lab environment provides great opportunity to collaborate and learn from colleagues of a different background, and now an even broader experience is taking place. Sharon Gray, a Ph.D. student with Dr. Andrew Leakey's group since 2008, and Jo Pride, are taking part in a new program being offered by the Osher Lifelong Learning Institute (OLLI) at the University of Illinois at Urbana-Champaign.

OLLI is part of a national network that recognizes learning has no age limits and provides its members with exciting courses, a wellness program, and educational trips, as well as small-group discussion opportunities, a meeting place and special events.

Pride was one of a dozen older adults from the Illinois chapter of OLLI that took part in a pilot program called Citizen Scientist that placed them in campus research laboratories. Gray and Pride are working together on research that is looking into the effects of elevated levels of carbon dioxide and how they play a role in the growth of soybeans, on the leaves and the roots.

OLLI Director Kathleen Holden, Gene Robinson, Interim Director of the Institute for Genomic Biology, and Beckman Institute Director Art Kramer worked to jointly fund the program that matches graduates students with a Citizen Scientist. Robinson said they wondered what it would be like to have an OLLI member embedded in a laboratory as a Citizen Scientist.

Geena Skariah, an OLLI Fellow and coordinator of the Citizen Scientist program, said she was skeptical when they discussed placing older adults into a lab setting and having them conduct experiments. "But I am now a believer," she said. "It can be done. And, I have learned how to better explain my research to laypeople because of this program."

For Pride, learning about growing soybeans and studying the effects of carbon dioxide on them,

When Pride's husband passed away she moved to Illinois to be closer to her children. Her son told her about OLLI and she was ready to get involved. When not conducting experiments or recording data at the IGB, Pride volunteers with the Champaign County Forest Preserve District at Lake of the Woods in Mahomet where she helps children plant vegetables and works with them in the discovery garden.



» Citizen Scientist Jo Pride with Sharon Gray, Ph.D. student

legume, medicago truncatula, to investigate the root structure of the plant and determine how the root growth changes with higher and lower levels of carbon dioxide.

“It is fantastic what goes on in this lab. I am so impressed by what happens here. Sharon and I have been working side by side, and I'm just trying to learn.”

"It's been great to see what goes on in this environment," Pride said. "This has been a learning process for me. I hope I'm offering something. Sharon has been a good teacher because she has taught me a lot."

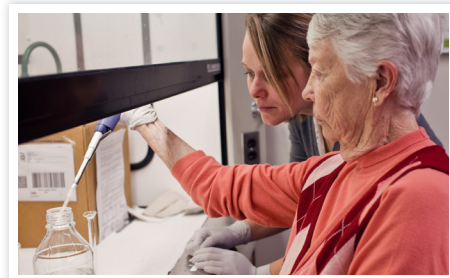
Leakey looks forward to that process continuing with Pride and other participants in the OLLI program. "Jo has re-invigorated our lab group by reminding us of the fascination with nature that led many of us into scientific research originally," Leakey said. "In addition, Sharon has benefited from explaining to Jo about her research and its potential benefit to society - a key skill for scientists today."

Robinson said he was pleased with the progress of the first OLLI citizen scientist program and hopes they can expand the program in the future. "We are creating ambassadors for science and for the university," he said. "We're enriching the experience of the OLLI scientists, and we are enriching the laboratories, their functions, and their abilities." ■

Pride, who works with Gray one time each week for two hours, says when she walked into the lab, which is part of the Genomic Ecology of Global Change theme at the IGB, she felt very welcome and not in the way. "It is fantastic what goes on in this lab," she says. "I am so impressed by what happens here. Sharon and I have been working side by side, and I'm just trying to learn."

Gray notes that Jo is a quick learner. "Jo questions why I am doing something which then helps me explain the research and why we are doing an experiment," she says. "When I didn't know the answer or couldn't fully explain why we were doing something, then we would look it up together and find out together."

In the lab, Gray and Pride have been growing a



was a natural fit for this long-time gardener. As a young wife and mother, Pride says when she was raising her family she was an avid gardener but did not work outside the home and never studied science.



Bryan White: The Surprising Role of Microbes in Our Gut

Bacteria infest our bodies, and that is a good thing, except for when it is not, says Bryan White, professor of animal sciences and a member of the IGB host-microbe systems theme. White and many of his colleagues are investigating the possibility that some bacteria in the large intestine are responsible for a dizzying array of both autoimmune diseases, such as rheumatoid arthritis and celiac disease, as well as some cancers. The challenge is to identify which bacteria and what other factors are involved.

“The gut is the largest organ of the immune system,” says White. “We think gut microbes might be associated with multiple sclerosis, rheumatoid arthritis, even lupus.”

White and his colleagues are working in close collaboration with external partners, including the Mayo Clinic, in Rochester, Minn. Their work is part of a strategic alliance between the two institutions to develop and strengthen technology based healthcare. The Mayo has the clinical research, data, and expertise, says White, and Illinois is a computational powerhouse.

“For example, the Mayo has a huge collection of medical records but how do you query those records to gather data about diseases? You have to put together computational models to do that. That’s one place where we come in,” he says.

In addition, White, together with Victor Jongeneel, senior research scientist at both IGB and National Center for Supercomputing Applications (NCSA), is working to strengthen Illinois’s expertise in human genetics and computation, in part by developing a new IGB theme. The theme, Computational and Genomic Medicine, may be active as early as next summer. The theme also will work closely with NCSA to develop ways to help doctors visualize and interpret medical data, and then explain it to patients.

“We are trying to build a comprehensive program in medical genomics,” says White.

White’s expertise is in the microbiome, whether of humans, other primates, or mice, and how that microbial community interacts with its host. Microbes connected to human hosts are both multifarious and multitudinous; a given individual has 10 times as many microbes as human cells.

White and his colleagues are investigating whether and which bacterial metabolites are correlated with various colorectal cancers, what role bacteria play in autoimmune diseases and even how the microbiome of the vaginal tract affects early-term births.

“I couldn’t do any of this by myself,” notes White. “This is all team-driven science, which is what makes it fun.”

Colorectal cancer

It appears that, as in the case of *Helicobacter pylori* causing gastric ulcers, certain microbes or a collection of different types of microbes (“community structures”) in the intestine can be correlated with colon cancer.

“We know microbial metabolites or organisms are correlated with colon tumors,” says White.

“There are lots of different types of colorectal cancers. We are interested in understanding the difference between tumors found on the ascending or descending colon and within those locations that also differ in terms of pathology.”

Understanding how those tumors are stimulated by microbial metabolites might shed light on how to screen for, treat, predict and prevent these cancers, says White. Current biomarkers are blood in the stool, but once that appears, cancer is fully present. The only preventative tool is a colonoscopy, which is invasive.

“The low-hanging fruit is a non-invasive biomarker,” says White. “Our long-term goal is to

understand what promotes cancers and then try and prevent it all together.”

Autoimmune Disease

White and his colleagues also are investigating the role of bacteria or community structures in autoimmune diseases, specifically celiac disease and rheumatoid arthritis.

In the case of celiac disease, a gluten-based allergy, the trigger is clearly related to gluten. But White believes there is a common trigger for all gut-based autoimmune diseases. He predicts it’s something on the cell surface that the immune system recognizes. Michael Miller’s group in food science and human nutrition along with colleagues at the Mayo Clinic are looking at the gluten protein to see if they can figure out which part of the molecule is the trigger for celiac disease.

“Do some bacteria have something that looks just like this little part of gluten?” says White. “If so, that could be the trigger.”

In studying celiac disease White and his colleagues must use human models, but they have developed mouse models for rheumatoid arthritis. The mice have human histocompatibility complexes in them and have been bred to be either resistant or sensitive to collagen-stimulated arthritis. While the disease is far more common among women, men experience more severe symptoms. It has been shown that the microbiome of those suffering from rheumatoid arthritis is different in men and women, and the transgenic mice share that pattern.

Using these models White and his colleagues have been able to identify some microbes and community structures that influence sensitivity to rheumatoid arthritis. Ultimately, White would like to find probiotics—“good” microbes—that outcompete these bad guys,” to prevent the onset of rheumatoid arthritis, which, once triggered, is irreversible.

Another surprising pattern in autoimmune disease also implicates the role of the microbiome. Children who are delivered by elective caesarean appear to have much higher rates of autoimmune diseases later in life than those who were delivered vaginally or by caesarean but after the mother’s amniotic sac has broken, introducing microbes to the infant.

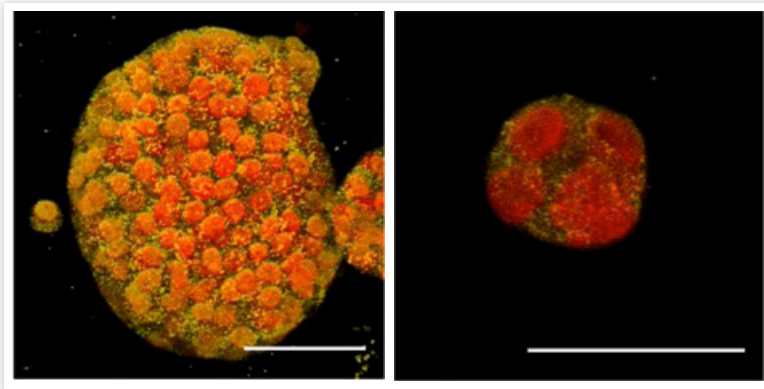
There are, clearly, many more questions than answers when it comes to the relationship between microbes and their human hosts, but the answers lie in better understanding that relationship. The more we learn about the human microbiome, the greater the potential for treating and preventing a surprising array of human diseases. ■

{Research}

3D Tumor Spheroids

In a recent paper published in the journal *Biomaterials*, IGB faculty member Hyunjoon Kong from the Regenerative Biology and Tissue Engineering research theme discusses the importance of three dimensional (3D) tumor spheroid models in biomedical tools for both fundamental and applied cancer studies. Yet current models do not account for different levels of cancer malignancy. His study has reported that the mechanical rigidity of a hydrogel plays a significant role in regulating the phenotypes of cancer cells adhered to the gel surface. This finding suggests that matrix rigidity should also modulate the malignancy of 3D tumor spheroids. Findings have shown that hepatocellular carcinoma cells encapsulated in a fat-like, softer hydrogel formed malignant cancer spheroids, while cells cultured in a liver-like, stiffer gel formed compact hepatoids with suppressed malignancy.

Research into the hydrogel, and the 3D tumor spheroids, will provide a much better understand-



» Hepatocarcinoma Clusters controlled by matrix rigidity
(Left: Cluster formed within a soft matrix, Right: Cluster formed within a rigid matrix)

ing of the emergent behaviors of various cancer cells and how better to regulate them.

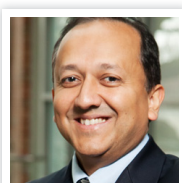
The paper, "A cell-instructive hydrogel to regulate malignancy of 3D tumor spheroids with matrix rigidity," was also authored by Youyun Liang, Jaehyun Jeong, and Ross J. DeVolder from

the Department of Chemical and Biomolecular Engineering; Chaenyung Cha, Department of Chemistry; Fei Wang, Department of Cell and Developmental Biology; and Yen Wah Tong, Department of Chemical and Biomolecular Engineering, National University of Singapore. ■

{Around the IGB}

Fellows and Associates

Two IGB members named AAAS Fellows



Congratulations to Wilfred van der Donk, MMG faculty, and Rashid Bashir, ReBTE affiliate, who were recently elected fellows of AAAS, along with 6 other Illinois faculty members.

CAS Associates and Fellows



And congratulations to Hyunjoon Kong, ReBTE faculty, as a new Center for Advanced Study 2012-13 Fellow, and Sheng Zhong, CDMC faculty, as a new Center for Advanced Study 2012-13 Associate, pending boards of trustee approval. ■

Holiday Toy Drive

Toys for Tots



Congratulations to those who participated in our recent toy drive to benefit Toys for Tots. Theme winners for the most donations were:

1st place
Admin—29 toys donated

2nd place
MMG—9 toys donated

3rd place
EBI—5 toys donated

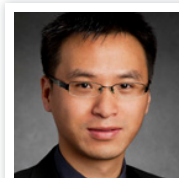
BCXT, BioBEL, and CDMC donated 2 toys each.

GEGC and ReBTE donated 1 toy each.

Thank you and Happy Holidays! ■

New Arrivals

Ting Lu



Professor Ting Lu has joined the IGB as an affiliate in the Biocomplexity Research Theme. Professor Lu is an Assistant Professor in the Department of Bioengineering. ■

Award

Genome Technology's Sixth Annual Young Investigators



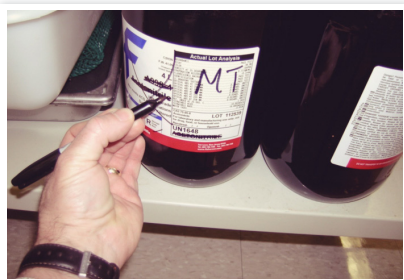
Jian Ma, CDMC faculty, was named one of *Genome Technology* magazine's Young Investigators, as nominated by senior principal investigators in their field. Ma's profile, Investigating Genomic Alterations, is available online at <http://goo.gl/XV9de> ■

ADMINISTRATIVE NEWS

{Safety}

Decontamination of Empty Chemical Bottles

Empty containers must be decontaminated before they are recycled or disposed. All containers should be emptied as much as possible prior to decontamination.



NOTE: If the container contained a material listed on the Acute Discarded Waste List (<http://goo.gl/Fh1SP>), the wash/rinse MUST be saved and disposed through the DRS chemical waste disposal program.

Solvents

Water soluble solvents: rinse twice with water, then completely fill with water and empty to displace vapors. Allow to drain. Before disposing of the container remove the lid and write on the container's label "EMPTY" or "MT." Dispose of empty containers as regular trash.

Solvents not soluble in water: wash with a detergent or rinse twice with a water-soluble solvent such as acetone, then completely fill with water and empty to displace vapors. Allow to drain. Solvents (other than water) used for cleaning must be collected and disposed as chemical waste, they cannot go down the drain! Before disposing of the container remove the lid and write on the container's label "EMPTY" or "MT." Dispose of empty containers as regular trash.

Acids

Neutralize the liquid residues using sodium or potassium carbonate or bicarbonate. Rinse several times with water. The rinse water may be disposed

down the drain. Before disposing of the container remove the lid and write on the container's label "EMPTY" or "MT." Dispose of empty containers as regular trash.

Bases

Neutralize the liquid residues using citric acid. Rinse several times with water. The rinse water may be disposed down the drain. Before disposing of the container remove the lid and write on the container's label "EMPTY" or "MT." Dispose of empty containers as regular trash.

Other liquids

Rinse the container twice with water, then completely fill the container with water and empty to displace vapors. Allow the container to drain. All rinse water may be disposed down the drain. Before disposing of the container remove the lid and write on the container's label "EMPTY" or "MT." Dispose of empty containers as regular trash.

Solids

Water soluble chemicals: rinse twice with water, then completely fill with water and empty. Allow to drain. Before disposing of the container remove the lid and write on the container's label "EMPTY" or "MT." Dispose of empty containers as regular trash.

Organic material not soluble in water: wash with a detergent or rinse twice with a water-soluble solvent such as acetone, then completely fill with water and empty. Allow to drain. Solvents (other than water) used for cleaning must be collected and disposed as chemical waste, they cannot go down the drain! Before disposing of the container remove the lid and write on the container's label "EMPTY" or "MT." Dispose of empty containers as regular trash. ■

{Operations and Facilities}

{Communications}

Videos



Did you know the IGB has an official YouTube channel? It is located at <http://www.youtube.com/user/IGBillinois>, also accessible via the link at the bottom of the IGB website. We are always looking to add more content to our channel, so if you have videos you would like to include, please contact Nick Vasi at nvasi@igb.illinois.edu. ■

Holiday Building Hours

The IGB building will be closed December 26 – January 2. This means that all exterior doors will be locked and all card access doors will require entry with a valid IGB prox card. Please take care when entering or leaving the IGB not to allow someone you do not recognize into the IGB. If they don't have a prox card they cannot enter the IGB during this time.

If you notice any urgent building issues (water leaks, CT room temperature problems, etc.) please call 333-0340 for the F&S Service Office. This number is answered by Public Safety during off-hours and they will be able to assist you. Emails sent to facilities@igb.uiuc.edu during this time will not be immediately addressed.

IGB Shipping and Receiving will be closed December 26 – January 2. No packages or mail will be received or sent during this time period.

Array Cafe will be closed December 26 – January 2.

If you are in the building when it is closed, please turn off all lights when you leave your area. ■

{Biotechnology Information Center }

Data Management Plan Assistance

In 1999 the U.S. Office of Management and Budget Circular A-110 (www.whitehouse.gov/omb/circulars_a110) was amended to require that Federal granting agencies ensure that all data produced under an award will be made available to the public through the procedures established under the Freedom of Information Act (FOIA). Agencies such as NSF, USDA, NIH, NASA, EPA, DOE, and others, are implementing this requirement in different ways. The University of Minnesota Library has pulled together links for the various agency policies on this website: www.lib.umn.edu/datamanagement/funding.

Aside from the issue of needing to create a data management plan for your data in order to comply with grant proposal requirements, there are many other reasons you will benefit from creating a plan. For example, you will increase the life expectancy of the data; your data will have increased visibility; you will be able to reuse your own data more efficiently; your data may facilitate new discoveries by others; and, having the data publicly available decreases duplication of effort. The MIT Libraries have put together a listing of nine reasons why you should consider creating a management plan: libraries.mit.edu/guides/subjects/data-management/why.html



If you'd like some advice on creating a data management plan, please contact Sarah Williams, the Life Sciences Data Services Librarian (scwillms@illinois.edu; 333-2416; Funk Library). Although Sarah is housed in the Funk library, her constituency really extends across campus and includes all researchers on campus who are engaged in any kind of agricultural, biological, medical, or veterinary research.

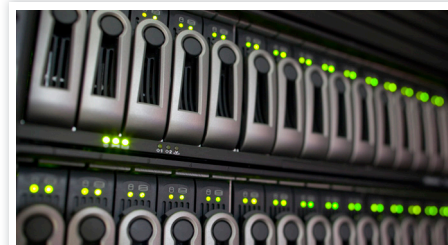
Among the services that Sarah is offering:

- Providing a data management presentation to labs or departments
- Identifying potential stable repositories for data
- Providing consultation on creating or implementing a data management plan
- Meeting with researchers to create a data curation profile for a research project.

You will also find useful links and information on her website, Life Sciences Data Services, www.library.illinois.edu/lldata/. ■

{CNRG}

Winter Break Server Room Outage



During winter break (December 26-30) there will be construction in the IGB server room that will result in an outage of many of our services. All clusters, backup systems, and non-essential systems will be powered down for this week-long

upgrade. Our intention is to keep the basic mail, authentication, web serving, and file serving services up if possible, but they might be affected for short periods of time as well.

This construction will improve the reliability and capacity of the cooling in our server room as well as adding some additional rack space. This should be the last major construction to take place in the server room for some time.

If you have any questions or concerns, please contact Daniel Davidson, Director of CNRG, at daniel@igb.uiuc.edu. ■



IGB News is published every month by the IGB Communications Office
Contact: Nick Vasi • E: nvasi@igb.illinois.edu • P: 217.333.0873
www.igb.illinois.edu