



IGBNEWS

Achievements, awards, and information about the IGB community

Volume 4, Number 6



Featured News

- p. 2 IGB, SIB Receive Major NSF Training Grant
- p. 3 Monthly Profile
- p. 4 Around the IGB
- p. 5 Administrative News

{Upcoming Events}

Pioneers in Genomic Biology Lecture Series

November 15, 2011

12:00 p.m.

612 Institute for Genomic Biology

Michael Snyder, PhD

Professor and Chair of Genetics

Director, Stanford Center for Genomics and Personalized Medicine, Stanford University, Stanford, CA

"Adventures in Personal Genomics and Whole Omics Profiling"

Illinois Workshop on Regenerative Biology and Tissue Engineering

November 18, 2011

9:30 a.m. - 4:30 p.m.

612 Institute for Genomic Biology

The workshop will feature keynotes and presentations by faculty from UIUC and UIC, as well as a poster session.

IGB Donut Day

December 14, 2011

8:30 a.m.

Array Café

Pioneers in Genomic Biology Lecture Series

November 29, 2011

12:00 p.m.

612 Institute for Genomic Biology

Sarah Highlander, PhD

Associate Professor, Department of Molecular Virology and Microbiology

Baylor College of Medicine, Houston, TX

"Microbial Genomes for Metagenomics"

America Invents Act Discussion

November 29, 2011

2:30 p.m. - 4 p.m.

2nd Floor Break room, IGB main building

Discussion surrounding the impact the AIA law will have on the intellectual property originating from this campus. Coffee and snacks will be served.

Thanksgiving Break Hours

November 21-23, 2011

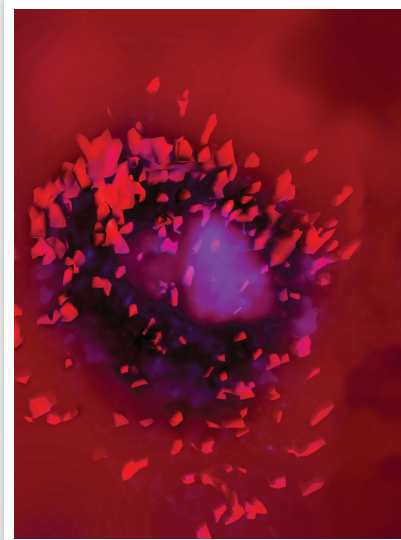
IGB Administrative Offices open regular hours,

8:30 a.m. - 5:00 p.m.

November 24 & 25, 2011

IGB Administrative Offices will be closed.

{Image of the Month}



This month's image, "Deficiency in Omega-3 Fatty Acids and Acrosome Biogenesis," was made by Timothy Lee Abbott in the Manabu T. Nakamura Lab. The image were 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

Institute For Genomic Biology, School Of Integrative Biology Receive Major NSF training grant

The National Science Foundation has awarded the Institute for Genomic Biology (IGB) and the School of Integrative Biology a \$3.2 million training grant. NSF's Integrative Graduate Education and Research Traineeship (IGERT) is a highly regarded grant program that was founded in 1998 and has, thus far, provided interdisciplinary research training to approximately 5,000 graduate students.

The University of Illinois grant, Vertically Integrated Training With Genomics (VInTG), will provide support for as many as 30 graduate students over the next five years. Students will learn ways to both ask and answer the big research questions of the coming decades, says principal investigator Andrew Suarez, associate professor of Animal Biology and Entomology and IGB affiliate.

VInTG will address two “grand challenges” in biology: How do genomes interact with the environment to produce biological diversity? and How are biological systems integrated from molecules to ecosystems? Answering these questions will help both science and society determine how to maintain food security under climate change; how to integrate genetics and ecology to study emerging infectious diseases; and how organisms’ responses to climate change influence biodiversity and ecosystem function.

“We think this vertically integrated approach will shed light on these kinds of grand challenges,” says Suarez.

VInTG will focus on what Suarez calls “back to the future” approaches. Over the past several decades graduate training and scientific research generally has become highly specialized. This approach resulted in major advances, particularly in the genomic and bioinformatics fields. As a result, with hundreds or even thousands of animal and plant genome sequences becoming available, nearly all levels of biological inquiry are becoming “genome-powered.” Consequently, Suarez and his co-PIs, Gene Robinson (Department of Entomology), Carla Cáceres (Department of Animal Biology and Program in Ecology, Evolution and Conservation Biology), Sandra Rodriguez-Zas (Department of Animal Sciences), and Owen McMillan (Smithsonian Tropical Research Institute), believe the time is ripe to integrate



» Andrew Suarez, with co-PIs Gene Robinson, Carla Cáceres, & Sandra Rodriguez-Zas

these fields with a more traditional, taxonomic approach.

Through the grant, graduate students will study an organism or group of organisms from its genome to its evolution, ecology and behavior. This means that graduate students interested in biological fieldwork on a given organism will also learn about genomic tools that are available, and those interested in benchwork and bioinformatics will conduct biological fieldwork in order to put that research in a broader, species-specific context.

With this approach students will have a comprehensive knowledge of their organisms, says Suarez.

“We don’t want to train students to generate huge amounts of data without knowing what questions they are really asking,” says Suarez. “We want to train field biologists who know how to collect data with the genomic resources available in their mind and to train bench scientists and bio-informaticians to know about their organism.”

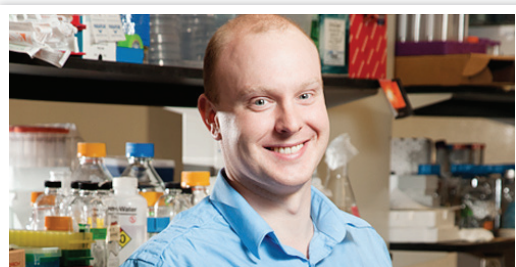
In addition to being interdisciplinary, the program will have students working in research teams, rather than individual students interacting with individual advisers. Students are eligible to apply for two years of funding and will take specific classes that emphasize vertical integration.

The Smithsonian Tropical Research Institute (STRI), one of the world’s premier tropical research institutes, is a partner in the grant and will host students at their research facility in Panama. Students will have access to STRI’s large, diverse and long-term study sites and databanks for a wide variety of organisms and ecosystems in Panama.

This is the third IGERT the University of Illinois has received in the past three years, and the first going to a biology program. ■

“ We don’t want to train students to generate huge amounts of data without knowing what questions they are really asking,” says Suarez. “We want to train field biologists who know how to collect data with the genomic resources available in their mind and to train bench scientists and bio-informaticians to know about their organism. ”

{Monthly Profile}



Doug Mitchell: Outfoxing Toxins

For investigator Doug Mitchell, receiving a \$1.5 million, five-year NIH Director's New Innovator Award was like putting turbo thrusters on his research. Mitchell, an assistant professor of chemistry, works on targeting toxin-making pathways in bacteria. By disrupting that pathway he disarms the microbe rather than killing it.

"The waters we're wading into are completely unexplored," says Mitchell, member of the IGB research theme Mining Microbial Genomes. "My group is attempting to lay the groundwork for 21st century antibiotics."

Mitchell's lab uses chemical methods to understand the molecular basis of virulence. Once they understand the biosynthetic pathways that manufacture toxins, then they seek to disrupt that pathway. The goal is to develop antibiotics that do not exert selective pressure on the bacteria to develop resistance and that are species specific.

A major problem with current antibiotics is that they wipe out, not only the bacteria causing harm, but also those beneficial ones that, for example, live in the human digestive tract.

"When we take antibiotics we kill the good bacteria too," notes Mitchell. "That leaves you prone to secondary infections."

By targeting specific toxin biosynthetic pathways Mitchell hopes to disarm only those harmful bacteria. In addition, by not actually killing those bacteria there is theoretically less selective pressure for them to develop resistance to the drug.

The New Innovator Award recognizes early-career investigators who are exploring bold ideas that "have the potential to catapult fields forward and speed the translation of research into improved health," according to the NIH. Disarming rather than killing bacteria is just one such high-risk, high-reward idea.

"It was gratifying to know that, by receiving this award, my senior colleagues agree that our ideas are worthy of pursuit," says Mitchell. "In a way, this award is a validation of our research direction. It also allows me to expand the lab and recruit the best students and postdocs."

"The funds help us push this work forward as fast as humanly possible," adds Mitchell. "I don't feel quite as resource limited anymore. And it opens doors that would have been shut to us otherwise."

With these funds, Mitchell's lab can double or even triple their efforts. He will be able to not only buy more equipment and supplies but also to hire several more doctoral students.

"Personnel is number one," he says. "You can't do anything unless you have the right people. One challenge is getting the right person on the right project and maintaining everyone's motivation over the long-term."

Of course, another challenge facing researchers focused on developing new antibiotics is that it often can take 10-15 years to get FDA approval for a novel drug, and then takes only about two years before bacterial resistance begins to cause significant problems in the clinic.

"That's not sustainable," says Mitchell. "I don't know what the score is exactly, but we're losing. So how do we beat them?"

In addition to targeting toxin production pathways, Mitchell also is identifying and characterizing compounds that do actually kill bacteria, but exhibit the remarkable ability to be selective for pathogens.

"Those troublemakers are the bacteria you really want to get rid of. An added benefit is that as your emerging therapy becomes more narrow spectrum, the slower you will encounter rampant resistance," he says.

The Mitchell group has focused their efforts on a collection of compounds known as TOMMs (thiazole and oxazole modified microcins). As a group they hold great promise in developing new classes of antibiotics and other treatments. As part of this effort, Mitchell's group is mining genomes to find new TOMMs with antibiotic potential.

But there is so much to learn about how TOMMs are biosynthesized that, while Mitchell's ultimate goal is to develop novel antibiotics, much of his research is focused on more fundamental questions. Consequently, another part of Mitchell's lab is looking at the mechanistic chemistry of how bacterial enzymes actually synthesize the toxins. These unexplored areas have already revealed unique structures and biological functions, including a novel chemical reaction in biology.

Although getting a drug to market is far down the road, Mitchell couldn't be happier to be where he

is right now. He credits IGB's strong infrastructure and collegial, highly interactive atmosphere, as well as the world-renowned chemistry and microbiology programs that consistently bring in the best students for making Illinois "the best place to carry out this research." ■

{Fellowship}

Meet the IGB's Newest Fellow



Hsiao-shan Yang is the newest young scientist in the IGB Fellows program. Yang joined the Business, Economics and Law of Genomic Biology (BioBEL) theme in 2011.

After earning her bachelor's and master's degrees in economics from National Taiwan University in Taipei, Taiwan, she studied at the University at Buffalo, State University of New York, where she received her master's in math in 2010 and a Ph.D. in economics in 2011.

The IGB Fellows program provides an opportunity for recent Ph.D.s or students in their final year of predoctoral study in any of the research areas encompassed by the Institute to spend several years doing independent research before launching formal academic or industrial careers.

Yang said she chose the University of Illinois and the IGB because of the outstanding reputation in academia. She said she was drawn to the large data resources available in BioBEL.

"I am also impressed by all faculty members' willingness to provide a good learning environment for post-doc fellows," she said.

Yang's dissertation focused on the effects of productivity and industry evolution on manufacturing firms' product diversification decision. She will work closely with BioBEL theme leaders to explore issues in university-industry technology transfer, industry evolution, product diversification, and the growth and regulations in biotechnology industry.

"Applying my knowledge from econometrics training on the research projects using the rich data resources, I truly believe that I will gain valuable experience in BioBEL," she noted. ■

OTM

Jen Rice joins OTM, looking to help IGB faculty

Providing IGB faculty with information about patents, licensing and commercialization is the goal of the Office of Technology Management's (OTM) newest Associate Technology Manager, Jen Rice.

Rice, who joined the OTM this fall, recently received her Ph.D. in Microbiology from the University of Illinois. After graduating from Boston University with a B.A. in Biochemistry and Molecular Biology, she came to Illinois to pursue her doctoral studies in Microbiology with Dr. Cari Vanderpool. Rice researched bacterial gene regulation by nucleic acids and participated in the NIH Infection Biology training program.

The OTM manages the intellectual property generated by research and educational activities at the University, and the office encourages innovation, enhances research, and facilitates economic development through the transfer of intellectual property.

Rice, who will focus on the life sciences at OTM, says her love of science and research led her into the world of microbiology but she didn't want to become an academic professor. While interning at the OTM as a Commercialization Analyst, she says she found her career niche. Now, in her new position, she will work first-hand with faculty to help them submit disclosures about their research, apply and obtain patents on their behalf, and help market their research to facilitate commercialization.

She said she wants to expand on the area of molecular biology tools such as novel ways to manipulate DNA. "I enjoy working for the university and seeing the research that faculty is doing," she said. "I want to help faculty show the broad applications of that research."

Rice encourages people who have an invention to meet with her because there are many funding sources available. "I want to help faculty get more comfortable with the process," she says. "I can help answer questions about patenting and what is available to them. The University is about the pursuit of knowledge. We want to help others with their ideas, market them, move toward commercialization, and help spread that invention to other people."

She hopes to assist faculty in thinking about unique ways to market their innovative ideas. Faculty can schedule a meeting with Rice to learn more about the process and to submit a



disclosure, which is the first step toward commercialization.

Rice and OTM's Patent Coordinator, Brad Edwards, will host an OTM Coffee Break from 2:30-4 p.m. Nov. 29 on the second floor break room in the main IGB Building. Rice said the coffee break will include an open discussion about the America Invents Act, which is the new

patent reform that was recently passed.

While Rice's office is located in the Ceramics Building, she also has an office in the IGB Gatehouse, Room 146. She and Michael Burton, a Commercialization Analyst intern, will conduct office hours from 9 to 11 a.m. in Room 146. She can be reached at jenrice@illinois.edu or (217) 244-1275. ■

Learn about how America Invents Act impacts patents

The "America Invents Act" (AIA) represents the most momentous change to the United States patent system since 1952. Signed into law on September 16, 2011, the AIA was created to speed up the patent process, encourage further innovation, and generate new jobs.

The Office of Technology Management (OTM), recognizing the impact this law will have at Illinois and the intellectual property originating from our campus, has compiled a list of impor-

tant aspects of the AIA, including the dates each of the provisions will become effective. This information is available at otm.illinois.edu/news.

In addition, OTM will host a coffee break to discuss the AIA on Nov. 29 from 2:30 to 4 p.m. in the break room on the second floor of the IGB main building. Coffee and snacks will be served. If you cannot attend this event but have additional questions, please contact Jen Rice at jenrice@illinois.edu. ■

CEM

The Certificate in Entrepreneurship and Management (CEM) for Life Scientists is a program for entrepreneurially minded MD, DVM, PhD students, and Post-Doctoral Associates in the life sciences who are interested in understanding the business, economic, and legal issues in life science start-up ventures. Participants who have the science skills to do groundbreaking research will learn about the business savvy needed to

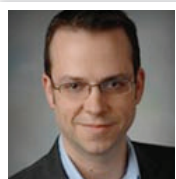
bring discoveries to market.

Scholarships and internships are available upon request. If this program is for you, please consider registering soon, space is limited. Registration deadline is January 15, 2012. Further details about the program, syllabus, application forms and payment options will be available later this month at www.igb.illinois.edu/cem. ■

{Around the IGB}

New Arrivals

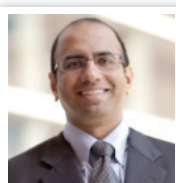
Kristopher Kilian



Professor Kristopher Kilian has joined the IGB as an affiliate in the Regenerative Biology and Tissue Engineering (ReBTE) Research Theme. Professor Kilian

is an Assistant Professor in the Department of Materials Science and Engineering.

Raj Echambadi



Professor Raj Echambadi has joined the IGB as a faculty member in the Business, Economics and Law of Genomic Biology (BioBEL) Research Theme. Profes-

sor Echambadi is an Associate Professor in the Department of Business Administration.

Madhu Viswanathan



Professor Madhu Viswanathan has joined the IGB as a faculty member in the Business, Economics and Law of Genomic Biology (BioBEL) Research Theme. Professor

Viswanathan joined the Department of Business Administration at the University of Illinois in 1990 where he is now a full professor.

Brent Roberts



Professor Brent Roberts has joined the IGB as an affiliate in the Genomics of Neural and Behavioral Plasticity (GNBP) Research Theme. Professor Roberts is a member of

the Department of Psychology at the University of Illinois.

Bobby Alexander

Bobby Alexander joins the IGB Business office. He will be assisting in monthly account reconciliation of IGB funds and will help oversee the processing of IGB employee reimbursements.

Holiday

Halloween Party

A spooktacular thank you to the social committee for putting together a successful, fun-filled party.



Best Costume Winners include (in alphabetical order):

- Angry Bird
- Astronaut
- Cleopatra
- Dragon Twins
- Little Lamb

Awards

Service Award Lunch

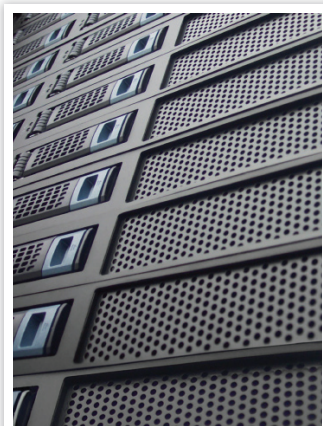


Congratulations to the IGB staff who received service awards, and thank you to those who attended the award lunch. We are proud to recognize the contributions you have given, and had several members who celebrated reaching 25 years of service. ■

ADMINISTRATIVE NEWS

{CNRG}

Storage



The IGB is developing a new storage system based off IBM's GPFS storage system to better facilitate storage across systems in the IGB. This will allow for files to be written to one system and instantly be able to be accessed on another system. Additional benefits include more speed and more storage (200TB of storage space). This should be a boon to those whom we host private machines for and those who use several of our clusters.

Related to the GPFS service addition are some fairly large changes in store for the clusters at the IGB. Shortly before the winter break, we will hopefully begin the process of combining all of our clusters (computation, lm-cluster, and classroom) together into one large cluster. This larger cluster will then have several queues that will be representative of the clusters today. When logging into the new biocluster, you will have to choose which queue (memory, computation, or classroom) for job submission.

Additionally, we have made the difficult decision to move away from the SGE queuing system to a queuing system based off PBS-torque. This means current users of the cluster will have to learn a new way to submit their jobs and check their status. This decision was not an easy one, and was mainly derived from Sun's lack of commitment to the package, and additional services we will be announcing in the future. To facilitate the transition to this new queuing system, we will be holding several classes on how to use this system in room 607, using the new system on the classroom cluster. ■

Building Evacuation Plan

Evacuation is required any time a condition exists which would pose a significant danger to the personnel working within the IGB. An evacuation will occur primarily when the fire alarm sounds. An evacuation could also be initiated in the event of a large chemical spill or natural disaster. The evacuation process can be initiated when an evacuation announcement is made by the IGB evacuation coordinator (The evacuation coordinators are the Theme safety contacts or the IGB Safety Coordinator). A university official (Police Officer, Firefighter, etc.) could also give the orders to evacuate the IGB.

The designated Emergency Evacuation Assembly Area is the sidewalk on the East side of the Morrow Plots.



When the building alarm sounds or an evacuation signal is given:

1. Remain calm.
2. 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.
3. Notify others in the area of the alarm if they did not hear it.
4. Exit the building via the nearest safe exit route. Walk; do not run. Never open doors that feel hot to the touch or attempt to travel through smoke-filled or hazardous areas. Use a different exit.
5. Most safe exit routes are the corridors with the brown "cork type" flooring (left).
6. **Do not use elevators to exit.**
7. Evacuate away from the IGB Building to the designated evacuation assembly area by the Morrow plots and report to your theme safety contact. Do not stay on the pavers in front of the IGB building!
8. Wait at evacuation assembly area for directions.
9. Do not reenter the building until emergency staff gives the "all clear" signal. ■



Easy Search ≠ Complete Search

Do you use the Library's "Easy Search" mechanism? This resource is located on the Library's Gateway page: <http://www.library.illinois.edu/>

While a helpful tool, Easy Search may not be doing a comprehensive, in-depth search of the resources that are available. For a more comprehensive literature search:

- Click on the "Advanced Search" option, which is located to the right of the Easy Search input box. You'll be able to choose to search for databases specifically in the Life Sciences, or Health Sciences, or Business, or Engineering – choose as many subject areas as are appropriate. If you don't use the subject-specific option you will miss searching some key resources. Bookmark the Advanced Easy Search: <http://search.grainger.uiuc.edu/searchaid2/searchassist.asp>
- Advanced Easy Search still may not search all relevant electronic resources, including SciFinder, the PubMed interface for Medline (<http://www.library.uiuc.edu/orr/get.php?instid=406312>), or specialized resources, so consider these options as well.

What other resources exist for best searching practices?

- Start with one of the science library websites, e.g., the Biotechnology Information Center (<http://www.library.illinois.edu/biotech/>)
- Take a look at the Guide to Selected Indexes for Molecular Biology & Biotechnology Topics: <http://www.library.illinois.edu/export/biotech/docs/Flyer-BiotechIndexes.pdf>
- Contact Katie Newman, 2130 IGB, at 265-5386 or florador@illinois.edu. ■

{Communications}

Photography



Are you holding an event, having a distinguished guest visit, installing new lab equipment, or something else notable? If you would like to schedule a photographer please contact Nick Vasi at nvasi@igb.illinois.edu. ■