



IGB NEWS

Achievements, awards, and information about the IGB community

Volume 3, Number 5



Featured News

- p. 2 Monthly Profile: Nathan Price
- p. 3 IP @ IGB: Diamond v. Chakrabarty
- p. 4 Awards and Publications
- p. 5 Security Risks of Social Media

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}

Meet and Greet: Entrepreneurs in Residence

Wednesday August 25, 2010

11:00 a.m. - 12:00 p.m.

IGB Conference Center Room #612

EnterpriseWorks and the Illini Entrepreneur Center have hired local experienced entrepreneurs to assist startups and inventors with business matters such as business development, attracting investment, and engagements with industrial clients. The program helps fill early management guidance for startups and help inventors determine a path for starting their business.

IGB Seminar

Tuesday, August 31, 2010

12:00 p.m.

IGB Conference Center #612

Michael Fischbach, Ph.D.
*Department of Bioengineering and Therapeutic Sciences,
University of California, San Francisco, CA*

"A gene-to-molecule approach to the discovery and characterization of natural products"

Energy Farm Tour

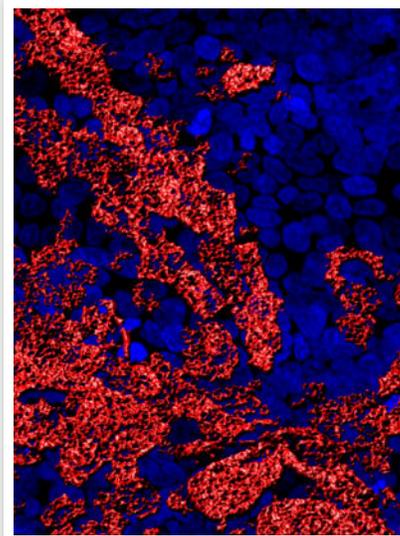
Thursday, September 9, 2010

9:30 a.m. - 12:00 p.m.

Join faculty and staff from the Energy Biosciences Institute for a tour of the 320-acre energy farm on Thursday, Sept. 9. EBI faculty will share their field-based research, and there will be presentations on agronomy, biofuels law, entomology, and more.

The Energy Farm is located 1.3 miles south of Windsor Road on Philo Road in Urbana. Parking is available on site.

{Image of the Month}



This month's Image of the Month, "LS174T cells expressing sulfo Lea antigen," was made by Jennifer Croix from Rex Gaskins' Lab using the Zeiss 710 LSM Confocal Microscope.

IGB News

IGB News resumes publication this month. Send your story ideas to mme@illinois.edu



Nathan Price: Filling in the Gaps with Systems Biology

As a student, Nathan Price had always preferred “quantitative science,” like engineering, to biology. But even so, he had “a definite sense that, going forward, biology was where things were happening.”

So the day Price heard Bernhard Palsson talk about “systems biology”—a synergy between high-throughput experimental biology, with its vast data sets, and large-scale computational modeling of complex networks—he realized he had found his calling.

Palsson, professor of bioengineering at University of California San Diego and founder of the UCSD Systems Biology Research Group, spoke of the possibility of new mathematical modeling that would uncover deep principles of how cells evolve. Systems biology, “a really quantitative approach to biology, is exactly what I’ve always wanted to do,” Price says.

So he spent five years as a graduate student working with Palsson and another two years working with Lee Hood, at the Institute for Systems Biology in Seattle, before arriving at the University of Illinois as an assistant professor of chemical and biomolecular engineering and a member of the IGB.

Using the systems biology approach, Price can represent an entire cell’s chemical conversions (i.e. what it metabolizes and what the resulting metabolites are) in a big matrix, enabling researchers to understand the complex network of interactions within a cell. Much of the data comes experimentally, and then Price fills in the missing

pieces with the help of a model he builds from that experimental data.

Because of Price’s expertise in systems biology, he frequently teams up with a domain expert, enabling him to be involved in many different kinds of projects. Currently, for example, Price is working with microbiologists Bill Metcalf, an expert in methanogens, and Rachel Whitaker, an authority in environmental microbiology, to build genome-scale metabolic and regulatory networks for the methanosarcina species, the only known anaerobic methanogens to use all three known metabolic pathways for methanogenesis. Their

“I love collaborating because I learn so much and get to know so many people. I often work with one of the world’s experts on some subject I may not know much about and they are interested in teaching me about their domain, because we are working toward a common goal, so that becomes fun.”

efforts will emphasize how microbial communities interact with the environment and affect the global carbon cycle.

Price also is collaborating with Gene Robinson to perform meta-analysis of gene expression data from the brains of honey bees, linking genomics and social behavior.

“I love collaborating because I learn so much and get to know so many people,” Price says. “I often

work with one of the world’s experts on some subject I may not know much about and they are interested in teaching me about their domain, because we are working toward a common goal, so that becomes fun.”

Price is one of many systems biologists who believe their field has the potential to help revolutionize medical care by harnessing massive amounts of data. Price notes that there are already gadgets that enable people to monitor their bodies, from distances walked and calories burned to hours slept and blood sugar levels. This is an arena, Price believes, in which information will continue to increase exponentially.

In the near future, Price says, we might be able to use blood measurements to monitor a wide range of proteins, metabolites, and other molecules. Since blood circulates throughout the body, coming into contact with all tissues and every cell in the body, it is an ideal vehicle to carry information to a monitor.

“All of those cells secrete proteins and other molecules into the blood so you have potential signals coming from every part of your body that come into play,” he says.

How one measures those molecules is, of course, an enormous challenge, but one that Price is happily undertaking. One of Price’s projects, for example, will ultimately monitor molecules in the blood for the presence of brain disease. So far, he and his colleagues have genetic information from brain tissue for 10 different diseases of the brain, including glioblastoma, Alzheimer’s, and Parkinson’s. They have written algorithms that have identified a critical set of between 70 and 80 genes. By knowing the proteins expressed by those genes in brain tissue, these algorithms can

predict with 90 percent accuracy what disease the patient has or whether they are disease free.

In order to be able to use that algorithm in the context of blood tests—rather than having to access brain tissue—Price and his colleagues are working to determine which of the proteins made by those genes appear in the blood, and what concentrations indicate the presence of a given brain disease. The next step would be to design reagents to isolate those proteins from the blood

»» Monthly Profile cont.

and retrain the algorithms to the blood concentration of those proteins. This will ultimately result in a set of blood protein markers that represent the “health state” of the brain.

Price also is working on doing the same thing for the liver and the lungs, working his way through the various organs of the body in this way.

This achievement, to figure out how to both measure

and interpret concentrations of thousands of proteins, is a long way off and will not be easy or simple, but if Price’s efforts pay off, he will have had a hand in building models to monitor those metabolites and raise the alarm if some appear off kilter.

“We would have access to different kinds of information, some easy, some harder to measure,” he says. “Medicine in the future can take a droplet

of blood, run it through a micro chip, measure the concentration of proteins and other molecules, and output an electrical signal with that information. We’re interested in how to understand the information you are looking at. How do you take it and convert it into a diagnosis? That’s a really, really hard problem.” ■

{IP @ IGB}

Diamond v. Chakrabarty: “Anything under the sun made by man”¹



June 16, 2010 marked the 30th anniversary of the landmark patent case, *Diamond v. Chakrabarty*. This case opened the door for patent protection for “man-made” life and helped the growth of the biotechnology industry in general. Politics aside, this decision is recognized as a milestone and has spurred investment and innovation in biotechnology for improved health, food, and fuel.

Dr. Ananda Chakrabarty was working as a microbiologist at General Electric in Schenectady, NY. In 1972, he filed a patent application (assigned to General Electric, Co.) with 36 claims related to the invention of “a bacterium from the genus

Pseudomonas containing therein at least two stable energy-generating plasmids, each of said plasmids providing a separate hydrocarbon degradative pathway.”² Chakrabarty’s patent had three types of claims: process claims (method of producing the bacteria), claims for an inoculum comprised of a carrier floating on water, and claims to the bacteria themselves. The patent examiner allowed the first two types of the claims, but rejected claims for the bacteria. This decision was based on the grounds: 1) micro-organisms are products of nature and 2) since they are living, they are not patentable subject matter under 35 U.S.C. § 101.³

Chakrabarty appealed the rejection of these claims to the Patent Office Board of Appeals. The Board supported the patent examiner. The United States Court of Customs and Patent Appeals, however, overturned this decision in favor of Chakrabarty, stating “the fact that micro-organisms are alive is without legal significance for purposes of the patent law.”⁴ At this point, Sidney A. Diamond, the Commissioner of Patents and Trademarks, appealed to the Supreme Court.

In a 5–4 ruling, the court ruled in favor of Chakrabarty, and upheld the patent, holding that:

“A live, human-made micro-organism is patentable subject matter under 35 U.S.C. § 101. Respondent’s micro-organism constitutes a ‘manufacture’ or ‘composition of matter’ within that statute.”

Chief Justice Warren E. Burger wrote the deci-

sion; he was joined by Justices Stewart, Blackmun, Rehnquist, and Stevens. Burger wrote that the question before the court was a narrow one—the interpretation of 35 U.S.C. § 101, which says:

“Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefore, subject to the conditions and requirements of this title.”

The Court held that the terms “manufacture” and “composition of matter” are to be given a broad construction and noted that Title 35 contains no ambiguity. However, the court noted that the judiciary must be cautious when contemplating expanding patent law to new areas that Congress had not foreseen.⁵

The dissenting opinion was written by William J. Brennan, who was joined by Justices White, Marshall, and Powell. Brennan’s dissent focused on the argument that there is evidence in the legislative record that the United States Congress did not intend living organisms to be patented, especially since genetic technology was unforeseen when Congress enacted § 101. The Patent and Trademark also argued that the court should reject the patenting of living organisms as against public policy.

In celebration of this landmark case, the University will host a two-day event this September 21 and 22 honoring Chakrabarty, a University of Illinois Chicago professor, and his groundbreaking work. Check out the schedule of events online:

<http://go.illinois.edu/DvsC> ■

1 By Kathryn Cowles, MS. Kathryn is a PhD Candidate in the Department of Animal Sciences and is a Commercialization Analyst Intern for the Office of Technology Management, specializing in life sciences technologies. Kate holds office hours at IGB in Room 2602 (Gatehouse) on Tuesdays and Thursdays from 9 a.m. to 2 p.m. During this time she is available to answer questions about intellectual property and technology transfer. Questions can also be sent to her directly via email: kcowles2@illinois.edu.

2 447 U.S. 305 1980

3 447 U.S. 306 1980

4 http://en.wikipedia.org/wiki/Diamond_v._Chakrabarty (Accessed 9 Aug 2010)

5 <http://blog.para-gen.com/2008/06/43/diamond-v-chakrabarty.html> (Accessed 9 Aug 2010)

New Arrivals

Erik Sacks has joined the EBI. He will lead a project entitled "Genetics and Pre-commercial Breeding of Perennial Bioenergy Grasses: Establishing a New EBI Program"

Pat Brown has joined the EBI. He will lead a project entitled "Perennial Feedstock Genomics." ■

More New Arrivals

Congratulations to:

- Lisa Ainsworth and Andrew Leakey, who welcomed daughter Hazel on June 18, 2010.
- Chris Rao, who welcomed a daughter on June 22, 2010.
- Rachel Shekar and husband Anoop, who welcomed twin daughters Asha and Mira on July 17, 2010. ■

On Campus

State Driver and Vehicle Services

Illinois Secretary of State Jesse White's office will be on campus Wednesday, August 25 and Wednesday, September 29 to provide certain driver and vehicle services to students, faculty, and staff of the University. These services include renewing driver's licenses or state IDs, purchasing annual vehicle license plate stickers, and registering to be an organ and tissue donor.

White's office will be providing these services on campus from 9:30 a.m. to 3:00 p.m. at the Illini Union in room 314 (3rd floor north) on August 25 and in room 407 on September 29.

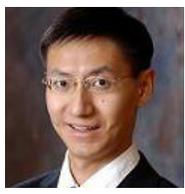
For more information and a complete list of acceptable forms of identification, visit the Secretary of State's website at www.cyberdriveillinois.com. ■

Contacting Facilities

Please send issues/questions/problems related to facilities at IGB to facilities@igb.uiuc.edu instead of sending them to a specific staff member in Operations and Facilities. This will ensure a more efficient response to your message, since multiple staff members are copied on these emails. ■

Publications

Zhong Highlighted in *Nature*



Sheng Zhong's research paper on gene regulatory networks in embryonic development was featured in the Research Highlight section of *Nature*. Zhong is Assistant Professor of Bioengineering and part of the GBB and ReBTE research themes. ■

Genelist Analyzer Paper Published in *BMC Bioinformatics*



Bruce Schatz, in partnership with the Department of Computer Science, published an article entitled "Identifying over-represented concepts in gene lists from literature: a statistical approach based on Poisson mixture model" in the 2010 issue of *BMC Bioinformatics*. The research represents a major collaboration between the Institute for Genomic Biology and the Department of Computer Science on a flagship NSF bioinformatics project. ■

Robinson's Bee Study Published in *Genes, Brain and Behavior*



Gene Robinson's paper "Distance-responsive genes found in dancing honey bees" was published in the August issue of *Genes, Brain and Behavior*. The study examined how bees communicate with one another on how far they have traveled to find food. The paper is available to read online at <http://onlinelibrary.wiley.com/doi/10.1111/j.1601-183X.2010.00622.x/abstract>. Robinson is the leader of the GBB theme. ■

Awards

IGB Wins Graphic Design Awards



The University & College Designers Association (UCDA) has recognized two of the IGB's print brochures with awards of excellence. The Institute for Genomic Biology at a Glance: Where Science Meets Society brochure and the EBI's 2009 Annual Report both received "Awards of Excellence" awards for their superior graphic design in the Development Information/Fundraising and Annual Report/Donor Report categories, respectively.

The UCDA Design Competition recognizes the best of the exceptional design work done to promote educational institutions. This year, judges evaluated nearly 1,300 entries and gave out just 205 awards. ■

Presentations



Madhu Khanna presented at a congressional briefing on the Biomass Crop Assistance Program June 21-22 in Washington, D.C. Her presentation covered land use and greenhouse gas mitigation effects on the biomass crop assistance program. Khanna is a professor in the Department of Agricultural and Consumer Economics and conducts research for both the Energy Biosciences Institute and the Institute of Genomic Biology. ■

Energy Conservation

Please help conserve energy. If you do your part we can significantly reduce our energy and utility consumption.

LABORATORY SPECIFIC ITEMS:

- All thermostat settings (limits) for offices, labs, support rooms, and open areas will be set per the campus "Energy Use Policy" for summer cooling and winter heating. Please inform us if this impacts your specific equipment and/or research in certain rooms.
- Shut down all hoods, biological safety cabinets, controlled environmental rooms, plant growth chambers, refrigerators, freezers and other laboratory equipment that is not being used.
- Close all hood sashes when not performing work in the hood.
- Defrost all freezers, and perform maintenance regularly to save energy and allow the freezers to perform more efficiently.
- Shut down unused vacuum systems.
- Review water conservation methods for your lab and support rooms.
- Purchase energy efficient and/or water efficient laboratory equipment when possible.
- Consolidate and share under-used energy consuming equipment.
- Evaluate the use of plastics vs glassware.

BUILDING ITEMS:

- All thermostat settings (limits) for offices, conference rooms, teaching rooms, and open/public areas will be set per the campus "Energy Use Policy" for summer cooling and winter heating. Please inform us if this impacts your specific equipment and/or research in certain rooms.
- Turn off lights in unoccupied offices, rooms, and open areas, including under cabinet task lighting.
- Lower all exterior wall shades during the day from April through September to reduce heat gain in your office.
- Eliminate the use of space heaters.
- Shut down your computer(s) at the end of the day if you are not using the IGB backup service.
- Power off your monitor(s) when you leave your desk to go to lunch or a meeting.
- Turn off or unplug all office equipment such as fans, radios, scanners, fax machines, copiers, and non-networked printers, etc. ■

Third Floor Artwork Installed



The largest portion of the commissioned art project "BCL/IGB," is now installed on the third floor. This mural joins the first portion of the project, a reading library installed last January on the opposite wall.

The mural tells the story of University of Illinois's Biological Computer Laboratory, an interdisciplinary effort located in the College of Engineering from 1958-1974. The lab's primary focus was cybernetics, with an emphasis on accounting for life, consciousness, and memory in a variety of organisms. As this work owed no small part to the history of how others have explained biological life, reproduction, and inheritance, the mural tells the story of the lab by relating significant events and publications in the histories of cybernetics, genetics, and the world at large.

Kevin Hamilton, an artist and associate professor of Art and Design at the University of Illinois at Urbana-Champaign, created "BCL/IGB." The piece was funded by the Illinois Capital Development Board's Art-in-Architecture Program, as part of the original construction project. ■

ADMINISTRATIVE NEWS

{Computer and Network Resource Group}

Security Risks of Social Media



While social media is a great way to keep in touch with friends and update family, it also can be a way in which hackers can steal your private information. Taking a few extra privacy measures will keep your information safe.

Criminals are using websites like Facebook and MySpace to gather information about users to break into online bank accounts, steal credit card information, or assume identities. Information provided on online profiles is used to help guess your password, but also can be used to find answers to your password security questions, allowing criminals to reset your password. For instance, you may have setup a password security question of "What town were you born in?," yet this information is often shared on Facebook profiles.

The good news is that most social media sites allow you to limit who can read certain information about you. Check your Facebook, MySpace, and other account security settings to make sure that your information is private.

Go through your friends list and remove people whom you don't know that well, and be cautious about adding people to these lists. Additionally, if you have a Wikipedia page or are a public figure, be sure that the answers to your security questions are not published. You can also pick more obscure security questions, like "What show did you watch after school in 5th grade?"

If you have any questions or concerns about social media and internet privacy, contact CNRG. ■

{Biotechnology Information Center}

PubMed My Bibliography Updates



As of July 23, NIH-funded PIs must use the NCBI/PubMed My Bibliography tool to track their publications rather than entering them manually through eRA

Commons. My Bibliography is part of the My NCBI toolbox in PubMed: www.library.uiuc.edu/orr/get.php?instid=406312. Current eRA Commons users can link their eRA Commons account to My Bibliography.

Beginning October 22, eRA Commons will no longer display citations manually entered. By that date, all citations must be added to My Bibliography so that they will continue to appear in eRA Commons.

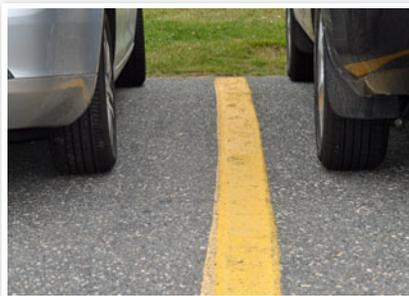
If you save searches or create email alerts in PubMed, you already have a My NCBI account; use that log-in to assure that all of your My NCBI activities are under one account.

The NIH offers a step-by-step guide to help you use My Bibliography: era.nih.gov/ncbi/how-to_steps.cfm. Additionally, the National Library of Medicine (NLM) has created a tutorial on how you can use My Bibliography to check the Public Access compliance status of your papers: www.nlm.nih.gov/pubs/techbull/jf10/jf10_myncbi_redesign.html.

To learn more about the NIH Public Access Mandate, please visit the Guide to the NIH Public Mandate: Creating your MyNCBI Bibliography: uiuc.libguides.com/content.php?pid=8114&sid=1085759. You can also contact Biotechnology Librarian Katie Newman at 265.5386 or florador@illinois.edu. ■

{Facilities and Operations}

Parking Changes



The following IGB parking changes are now effective as of August 1:

- We will no longer have any visitor spaces on Mathews Avenue.
- We will have two visitor parking spaces available in parking garage F-29. Permits are required at all times

and are reserved through facilities@igb.illinois.edu.

- We will have one visitor parking space near the IGB dock. Permits are required at all times and are reserved through facilities@igb.illinois.edu.
- The University Police tickets vehicles parked at locations marked "No Parking." Parking your car at the dock during off-hours subjects you to ticketing and/or towing.
- Cars parked in any of the IGB reserved spaces without a current IGB-issued permit are subject to ticketing and/or towing.

If you have any questions regarding the IGB parking policy, please contact IGB Operations and Facilities at facilities@igb.illinois.edu. If you have questions regarding parking on campus or obtaining a university parking permit for parking in a nearby lot, please contact the Facilities and Services Parking Department at 333-3530 or visit www.parking.illinois.edu. ■

Exit Paperwork

Leaving the IGB? Make sure you complete an IGB Exit Form. These are available from your theme secretary, the IGB receptionist, or on the IGB website. If you have keys to return, make sure you complete a Key Reimbursement Form to get your \$20 key deposit sent to you.

For questions about exit paperwork, contact Kathy Millage at kmillage@igb.illinois.edu. ■

{Safety}

Sink Drain Disposal



Please pay careful attention to what you are disposing of in the sink, including sinks in the glass wash rooms and support rooms. Some items can plug up the drain or cause damage to the pipes, while others are dangerous to you, employees, students, and the environment. Some of the items that should not be poured down the drain include:

- Molten agar
- Liquid nitrogen
- Liquid gelatin
- Any organic or inorganic chemicals
- Animal fats
- Automotive antifreeze
- Vegetable oil
- Any petroleum product

This list is provided to you as a guide and certainly does not contain all items prohibited from being poured down the drain. Most of the agars, animal fats, gelatin, and vegetable oils should be solidified and disposed of as solids. Chemicals and petroleum products should be put in an appropriate waste container and picked up by DRS.

Unused liquid nitrogen should be safely returned to the container. If this is not possible, it can be allowed to evaporate in a well-ventilated area. The key to safe liquid nitrogen use is to only take what you are going to use up in a short amount of time.

If you have questions about disposal of a product, contact the Safety Office at 244-8346. More information about waste disposal can be found at: www.drs.illinois.edu/css/guidesplans/wasteguide/chapter4.aspx?tbID=gp. ■

{Business}

Procurement Code Changes

Changes in the Illinois State Procurement Code effective July 1, 2010, significantly impact procurement procedures at the University of Illinois. The following important changes are known at this time; additional information will be provided as it becomes available.

NON-CONFORMING ORDERS

State law and University policy require that a contract and/or purchase order be issued in advance of receiving goods and/or services. Purchase orders and contracts serve many purposes, including supporting the issuance of payments to vendors. A non-conforming order is a purchase request or contract submitted after goods and/or services have been solicited or received. New procedures are now being implemented for non-conforming orders.

In the future, before payment will be authorized for a non-conforming order, department heads will need to submit a letter to the Purchasing Division describing the circumstances for the order, and the vendor will be required to sign a release form. Non-conforming orders are out of compliance with law and policy, and in certain cases, especially those involving state funded purchases, the University may not be able to process payment for a non-conforming order.

Please inform all faculty and staff in your unit of the need to provide their business office as much notice as possible for anticipated purchases. Depending upon the type of purchase, a business office may need a few hours, a few days, or several months to comply with state law and University policy. For example, it can take only a few minutes to place an order with a vendor with whom the University already has a contract, such as a vendor with a catalog in the University's online shopping application known as iBuy. However, it can take months to purchase goods and services that require a competitive solicitation (such as the purchase of expensive research equipment or consulting services).

SOLE SOURCE PURCHASES

Public hearings must now be held for all sole source purchases above the bid limit prior to the award being made to a vendor. A sole source purchase is a purchase of goods and services determined to be available from only one provider. The new requirement for a public hearing for these purchases will necessitate an additional two or three weeks of advance notice to the Purchasing Division.

PURCHASING OVERSIGHT AND AUTHORITY

As provided in the amended Procurement Code, the Executive Ethics Commission of the State of Illinois has recently appointed a Chief Procurement Officer (CPO) for Higher Education. The CPO will "exercise all procurement authority created by the Code" including appointing a State Purchasing Officer (SPO) for each campus. The role of the SPO is defined as exercising

procurement authority at the direction of the CPO. In addition, the SPO is required to act independently (not from the direction of the University). The SPO will review all purchases to oversee compliance with all applicable laws and policies and ensure expenditures are "in the best interest of the State of Illinois."

These structural changes and other requirements of the revised Code will likely add to the processing time for many purchases, and units should be prepared to answer questions about purchase requests that have not been asked in the past. The Purchasing Division will make every effort to streamline the new procedural requirements; however, more than ever, please plan ahead to avoid delays that could negatively impact research and operations in your unit.

Additional details about procedures related to non-conforming orders, sole source procurements, and other changes will be provided to business offices. If you have questions, contact Mike Devocelle, Director of Contracts and Purchases, or Cathy Reisner, Senior Associate Director of Purchasing, at 333-3505. ■

{Core Facilities}

New Imaging Tool

The Core Facilities has acquired an ImageQuant LAS 4000 biomolecular imaging system. The LAS 4000 uses a 16 bit CCD camera to capture chemiluminescence, fluorescence, and transmitted light images of gels. Variable imaging areas, illumination sources, and filters make this a versatile imaging system for gels and blots. An image quantification package can be used for automated lane analysis. Want to try it out for yourself? Contact Donna Epps in Core Facilities for training at dlepps@illinois.edu. ■

{Communications}



Become a fan of the IGB on Facebook. Stay up-to-date on research, events, and specials in the Array Café. Search for "Institute for Genomic Biology." ■



IGB News is published every month by the IGB Communications Office
Contact: Melissa Edwards • E: mme@illinois.edu • P: 217.333.0873
www.igb.illinois.edu