

# IGB NEWS

Upcoming Events  
Monthly Profiles  
Happenings at IGB

Image Of The Month

IP @ IGB

Department Announcements

Volume 8, Number 4

## UPCOMING EVENTS

### IGB Pioneers Seminar (ReBTE)

*Opportunities and Pitfalls in Translating Promising Medical Concepts to the Marketplace*

August 25, 2015, 12:00 p.m.

612 Carl R. Woese  
Institute for Genomic Biology

Arthur J. Coury, PhD  
Northeastern University, Boston, MA  
Department of Chemical Engineering

### IGB Seminar

TBA

September 8, 2015, 12:00 p.m.

612 Carl R. Woese  
Institute for Genomic Biology

Susanne von Bodman, PhD  
National Science Foundation  
Program Director, Cluster Leader  
Systems and Synthetic Biology Cluster  
Division of Molecular and Cellular Biosciences

### Symposium Honoring Carl Woese, IGB Renaming

*Looking in the Right Direction: Carl Woese and the New Biology*

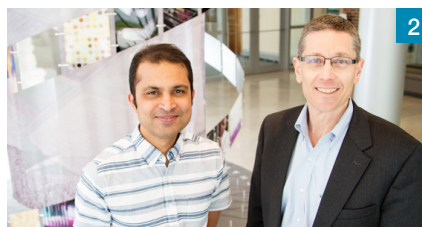
September 19-20, 2015

Alice Campbell Alumni Center  
601 S. Lincoln Avenue  
Urbana, IL

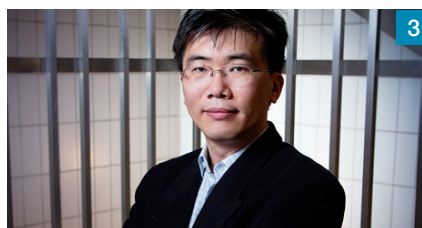
To mark the renaming of our Institute, IGB is holding a symposium to highlight historical aspects of work on microbiology, evolution and molecular biology as researched by Carl Woese and colleagues, as well as some of the most exciting modern research directions that have been inspired or impacted by his work and ideas.

Public lecture Friday, September 18  
Penny Chisholm, Lee and Geraldine Martin  
Professor of Environmental Studies, MIT

## FEATURED NEWS



Gene Regulation Underlies Social Complexity in Bees



Taekjip Ha elected to NAS, AAAS

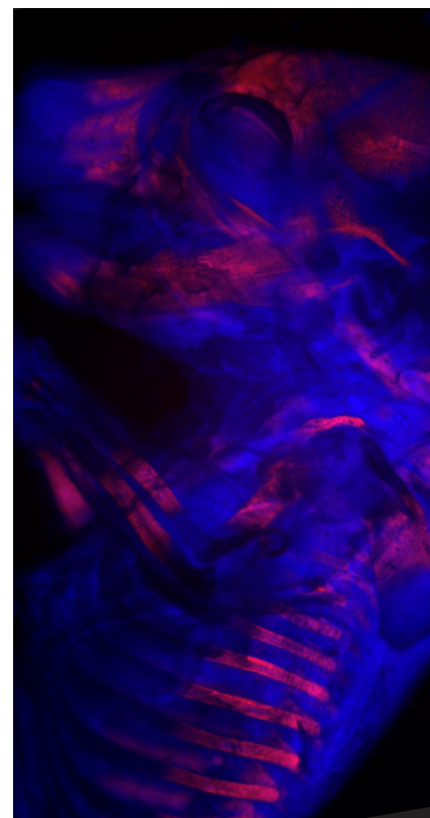


Are We Exterminating One African Elephant by Not Recognizing Two?



On the Grid: Happenings at IGB

## IMAGE OF THE MONTH

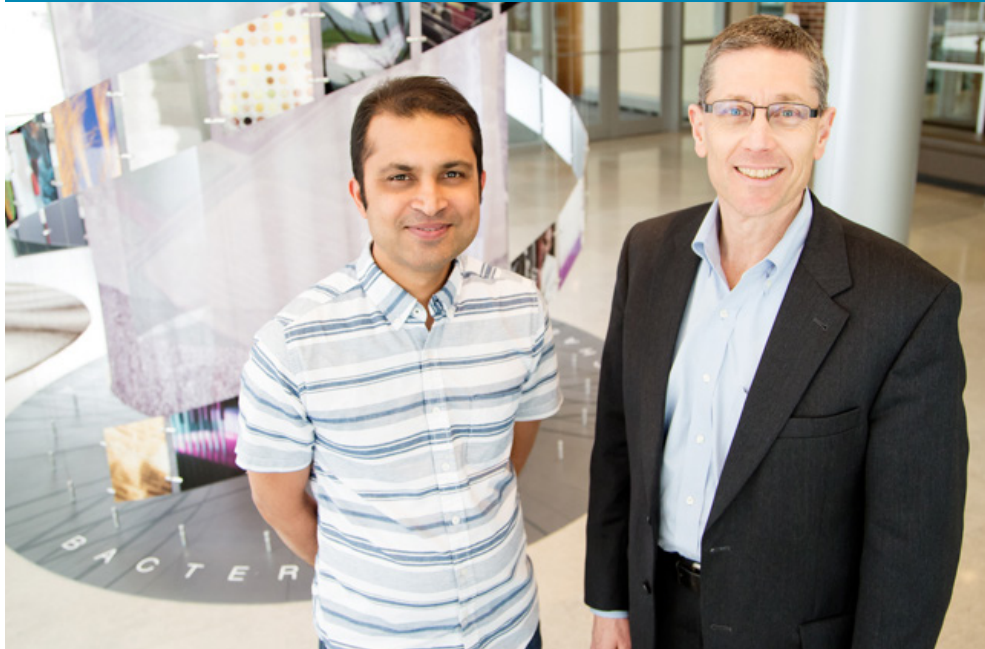


This month's image features an embryonic mouse fetus on day 17.5, which has been cleared and stained with Alcian blue and Alizarin red. It was imaged with the Axio Zoom V16 stereomicroscope using Zen Pro 2012 software.

This image is provided courtesy of Daniel Urban of the Karen Sears Lab.

### IGB News

Share your news with the IGB. Send ideas on stories, articles, and features to [nvasi@illinois.edu](mailto:nvasi@illinois.edu).



## Study: Gene Regulation Underlies the Evolution of Social Complexity in Bees

Explaining the evolution of insect society, with sterile society members displaying extreme levels of altruism, has long been a major scientific challenge, dating back to Charles Darwin's day. A new genomic study of 10 species of bees representing a spectrum of social living – from solitary bees to those in complex, highly social colonies – offers new insights into the genetic changes that accompany the evolution of bee societies.

The new findings are reported in the journal *Science*.

By sequencing and comparing the genomes of 10 bee species that vary in social complexity, the researchers made three important discoveries.

"First, there is no single road map to eusociality – the complex, cooperative social system in which animals behave more like superorganisms than individuals fending for themselves," said Gene Robinson, a lead on the study who is a professor of entomology and the director of the Carl R. Woese Institute for Genomic Biology. "In this study, we found that independent evolutionary transitions in social life have independent genetic underpinnings."

The second insight involved changes in the evolution of gene regulation: As social complexity increased, so did the speed of changes to parts of the genome involved in regulating gene activity, located in the promoters of the genes, the researchers report.

By contrast, evolution seems to have put the brakes on changes in many parts of the genome that code for the actual proteins, Robinson said. Similarly,

there was an increase in DNA methylation as social complexity increased, which also means enhanced gene regulatory capacity, he said.

*IGB faculty member Saurabh Sinha, a professor of computer science (above, left), Director and professor of entomology Gene Robinson, and an international consortium of 52 scientists used comparative genomics to discover the evolution of bee society is associated with increases in the complexity of gene regulation.*

"It appears from these results that gene networks get more complex as social life gets more complex, with network complexity driving social complexity," Robinson said.

A third major finding was that increases in social complexity were accompanied by a slowing, or "relaxation," of changes in the genome associated with natural selection. This effect on some genes may be a result of the buffering effect of living in a complex, interdependent society, where the "collective ge-

nome" is less vulnerable to dramatic environmental changes or other external threats, Robinson said.

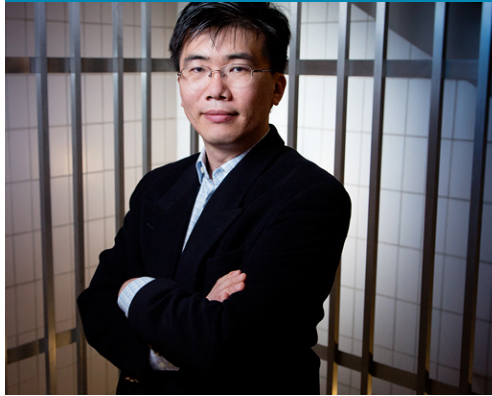
"These results demonstrate once again that important new insights into evolution can be obtained by using genomes as history books," Robinson said. "We have now learned what genetic changes have occurred during the evolution of the bees, notable for their elaborate societies and essential pollination services." ■

**Written by Diana Yates. Photo by L. Brian Stauffer.**



*Eusociality in bees ranges from small colonies with sterile worker bees and a reproductively active queen to far more complicated super-organism groups made up of thousands of individuals with highly specialized roles.*





*Taekjip Ha is the Edward William and Jane Marr Gutgsell Endowed Professor of Physics and the Cellular Decision Making in Cancer theme leader at the IGB. He uses physical concepts and experimental techniques to study fundamental questions in molecular biology.*

## Taekjip Ha elected to National Academy of Sciences, American Academy of Arts and Sciences

Physics professor Taekjip Ha has been elected to the National Academy of Sciences, one of the highest professional honors a scientist can garner. He was among 84 new members and 21 foreign associates announced by the Academy on April 28, including fellow Illinois professors Renée Baillargeon, Gary Dell, Steve Granick, Catherine Murphy and John A. Rogers.

“National Academy memberships are among the highest academic honors our nation bestows,” said Phyllis M. Wise, the chancellor of the Urbana-Champaign campus. “These faculty members are recognized today as leaders in biophysics, chemistry, engineering, molecular biology and psychology. This is a great day for these scholars and for our campus.”

Ha is the Edward William and Jane Marr Gutgsell Endowed Professor, a Howard Hughes Medical Institute Investigator, a professor in the Beckman Institute and the Cellular Decision Making in Cancer theme leader in the Carl R. Woese Institute for Genomic Biology at Illinois. He also is co-director of the National Science Foundation-funded Center for the Physics of Living Cells at the U. of I.

Professor Ha uses physical concepts and experimental techniques to study fundamental questions in molecular biology. He has developed new techniques that have enhanced the study of individual molecular interactions. His most recent work uses single-molecule measurements to understand protein-DNA interactions and enzyme dynamics.

Ha is a recipient of the Ho-Am Prize (2011), the Bárány Award of the Biophysical Society (2007), an Alfred P. Sloan Foundation Fellowship (2003), a Cottrell Scholar Award (Research Corporation, 2003), a Young Fluorescence Investigator Award of the Biophysical Society (2002) and a Searle Scholar Award (2001). He was named a University Scholar

at the University of Illinois in 2009, and he is a fellow of the American Physical Society.

“Congratulations to all six of our newly elected National Academy of Sciences members. They are clearly innovators and leading scholars in their respective disciplines, and this recognition is well-deserved,” said Ilesanmi Adesida, the provost and vice chancellor of academic affairs at Illinois. “We are all

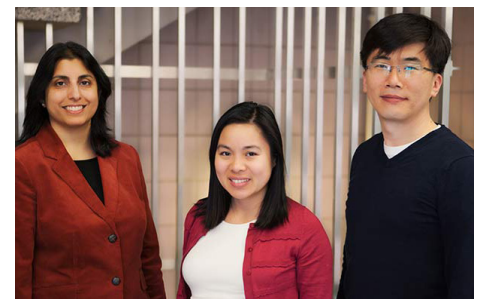
*“National Academy memberships are among the highest academic honors our nation bestows,” said Phyllis M. Wise, the chancellor of the Urbana-Champaign campus. “These faculty members are recognized today as leaders in biophysics, chemistry, engineering, molecular biology and psychology. This is a great day for these scholars and for our campus.”*

proud to call them our colleagues here at Illinois.”

The National Academy of Sciences is a private organization of scientists and engineers dedicated to the furtherance of science and its use for the general welfare. Founded in 1863, the academy acts as an official adviser to the federal government, upon request, in any matter of science or technology.

Ha has also been elected to the American Academy of Arts and Sciences, one of the longest-standing honorary societies in the nation. He will join psychology professors J. Kathryn Bock and Gary S. Dell with the other new members in an American Academy of Arts and Sciences induction ceremony in October in Cambridge, Massachusetts. ■

**Written by Claire Sturgeon. Photo by L. Brian Stauffer.**



*Ha, with Jaya Yodh, Research Assistant Professor and CPLC Director of Education and Outreach, and Thuy Ngo, graduate research assistant, reported last month in Cell how DNA's sequence causes it to be coiled and uncoiled much like a yoyo. The researchers found that the DNA is actually very asymmetric, like the string wrapped around a yoyo. Pulling on one end of DNA will simply tighten the coil while pulling on the other will cause it to uncoil. The research has shown it is easier for the cell's protein-making machinery to read from the “weak” end of the nucleosome that uncoils more easily.*

## RESEARCH



Associate Professor of Animal Sciences Alfred Roca, left, with Research Specialist Yasuko Ishida

# Are We Exterminating One African Elephant by Not Recognizing Two?

Within the past week, Thailand officials seized seven tons of ivory, representing the slaughter of hundreds of African elephants for illegal trade. While recent reports say that poaching far exceeds population growth, some conservation groups contend that population growth in some regions compensates for poaching losses in others, despite the fact that each area is populated by a different species of African elephant.

“By not recognizing two species, these organizations may be condemning the African forest elephant to extinction,” said University of Illinois Animal Sciences Professor Alfred Roca, who co-authored the recent literature review “Elephant Natural History: A Genomic Perspective.” Roca is also a member of the Carl R. Woese Institute for Genomic Biology.

“The two African elephants diverged about six million years ago,” said Roca, a leading expert in the genetic differences between the two species. “It’s like saying, ‘We increased the lion population, which will more than make up for the fact that tigers are going extinct.’”

To put that six-million-year difference in perspective, humans and chimps diverged about the same time (some experts estimate six to eight million years ago), while humans and Neanderthals split just half to three quarters of a million years ago.

Citing a need to protect hybrids and encompass all populations, the International Union for Conservation of Nature (IUCN) recognizes one species of African elephant (*Loxodonta africana*), which is listed as vulnerable. Yet the IUCN goes on to imply that population growth in Eastern and Southern Africa outweighs losses in Central Africa:

Although elephant populations may at present be declining in parts of their range, major populations in Eastern and Southern Africa, accounting for over two thirds of all known elephants on the continent, have been surveyed, and are currently increasing at an average annual rate of 4.0% per annum (Blanc et al. 2005,

2007). As a result, more than 15,000 elephants are estimated to have been recruited into the population in 2006 and, if current rates of increase continue, the number of elephants born in these populations between 2005 and 2010 will be larger than the currently estimated total number of elephants in Central and West Africa combined. **In other words, the magnitude of ongoing increases in Southern and Eastern Africa are likely to outweigh the magnitude of any likely declines in the other two regions** [emphasis added] (IUCN Red List account of *Loxodonta africana*).

“They are not recognizing the forest elephant as a separate species despite all the research that has definitively established this,” said Roca, referring to 15 years of genetic and morphological (physical) studies that have confirmed that there are two species of African elephants, dozens of which are cited in the literature review.

“Many other conservation groups do not differentiate between the two species,” said Ronald Nowak, author of *Walker’s Mammals of the World*, which will include the two species in the next edition. “The species are not shown as separate entities on the official United States List of Endangered and Threatened Wildlife or on the appendices to the Convention on International Trade in Endangered Species (CITES).”

Today experts recognize African savanna elephants, or *Loxodonta africana*, which are found in Eastern and Southern Africa, and African forest elephants, or *Loxodonta cyclotis*, which are found in Central and West Africa where poaching pressures are the most severe.

“To my knowledge, all the evidence, now a very large amount, supports two species, and no evidence supports one or more than two species,” said Nick Georgiadis, a co-author of the review, and research scientist at the Puget Sound Institute. “And it’s not as if the DNA evidence contradicted prior non-DNA evidence. There never was any objective evidence sup-

porting one species, just a few subjective preferences that became dogma.”

The review’s authors argue that the two species of African elephants must be “treated as distinct units for conservation” and go on to discuss how genetics can influence conservation, including the use of DNA forensics to trace the origin of confiscated ivory.

More than 20,000 African elephants are killed every year for their ivory, according to an analysis by CITES MIKE Program (Monitoring the Illegal Killing of Elephants). In the last decade, one study has shown that Central Africa has lost 62 percent of its elephants; that’s more than half of the forest elephant species.

“While the IUCN continues to recognize only one species, such deep genetic divergence makes it very easy to distinguish forest from savanna elephant ivory,” said Georgiadis.

Researchers use DNA forensics to help conservation and law officials understand the strategies used to smuggle ivory across borders to black markets in Asian countries, including Thailand, Vietnam and China. Officials can use this knowledge to allocate limited funds for interventions in areas under poaching pressure or along the trade route.

“But until China and other countries do something to crack down on the ivory trade,” Roca said, “all the forensics in the world aren’t going to stop elephants from being poached.”

The review “Elephant Natural History: A Genomic Perspective,” which is available online (DOI: 10.1146/annurev-animal-022114-110838), was also co-authored by University of Illinois’ Yasuko Ishida, a research specialist; Adam Brandt, a post-doctoral research associate; Neal Benjamin, a veterinary student; and Kai Zhao, a graduate student. ■

Written by Claire Sturgeon. Photo by Kathryn Coulter.



## PROFILE



# IGB Fellows Program: Spanning the Themes, Strengthening the Connections

The IGB offers a number of fellowships for truly exceptional young scholars who have completed their PhD within the last several years and are looking for a stimulating and supportive interdisciplinary environment to carry out independent and collaborative research. The IGB Fellows work within and among the research themes at the IGB, creating a hub of interaction that fosters a cohesive intellectual community. The current cohort of Fellows is presented here.

### Farhan Chowdhury



Farhan Chowdhury is interested in cellular mechanics and mechanobiology; specifically, how mechanical forces, stress,

and strain influence the physiological functions of cells. He received his Ph.D. in Mechanical Engineering from the University of Illinois at Urbana-Champaign under the direction of Professor Ning Wang. His dissertation work focused on force-directed fate decision making of embryonic stem cells. Using an in vitro system with embryonic stem cells, he determined that externally applied forces lead to cell differentiation, suggesting a possible role of forces during embryo development.

He became an IGB Fellow in May 2012 and has been working with Professor Taekjip Ha and members of the Cellular Decision Making in Cancer (CDMC) research theme, using single molecule approaches to investigate the underlying molecular and biophysical mechanism of highly tumorigenic tumor repopulating cells. To determine the conditions under which these cells are likely to invade the body, the researchers are investigating the genetic and physical properties of these cells, how they correlate with each other, and if there is any crosstalk

between them and the external microenvironment.

Chowdhury is also working on a single molecule approach to understand the relevance of forces in Notch signaling pathways for which he is developing novel low-molecular tension gauge tethers that can detect signal activation very precisely. Notch signaling is an evolutionarily conserved pathway in multicellular organisms that regulates cell-fate determination during development and maintains adult tissue homeostasis.

### Seema Mai Ehsan



Seema Ehsan received her Ph.D. in Chemical Engineering from the University of California, Irvine in 2014 under the direc-

tion of Steve George. She became an IGB fellow in the Regenerative Biology and Tissue Engineering (ReBTE) theme in November 2014.

Her research is in the field of tumor engineering, which is a cross between tissue engineering and tumor biology. Drug testing relies mainly on cell culture models or expensive animal models that have limited relevance to actual patients. Tumor engineering makes use of tissue engineering concepts and advanced biomaterials and other relatively new technologies to create more sophisticated models that come closer to mimicking what is happening in the human body. These models will be used for advanced drug testing.

For her dissertation, Ehsan built vascularized colon cancer models, which are tumors that have been flushed with blood vessels. At the IGB, she will transition to brain cancer, working with Brendan Harley on models for glioblastoma multiforme, a particularly aggressive tumor.

### Dipti Nayak



Dipti Nayak received her Ph.D. from the Department of Organismic and Evolutionary Biology at Harvard University

in November 2014 under the guidance of Professor Christopher J. Marx. Her dissertation focused on using experimental evolution to study metabolism and stress response in microorganisms that grow on reduced single-carbon compounds (methyloolithotrophs). By growing bacteria, which reproduce rapidly, in flasks, it is possible to understand evolutionary processes as well as the physiology and genetics of the bacteria.

Nayak joined the Biocomplexity (BCXT) theme in December 2014. She will study the physiology and evolution of methanogenic archaea. Specifically, she is interested in syntrophy, the phenomenon where two species come together and each lives off the products of the other. The archaea can eat only a limited number of compounds so they form a "consortium" with bacteria that can eat complex carbon substrates and break them down into compounds that the archaea can eat. In return, the archaea draws down the concentration of the gas that becomes toxic to the bacteria.

For her research, Nayak will use genetic engineering to create archaea that can eat complex carbons and compare it to a synthetic consortium of a bacteria and archaea, thus using experimental evolution to understand the costs/benefits of each system by evolving them simultaneously in the same environment.

*cont. page 6*

# IGB Fellows Program:

## Spanning the Themes, Strengthening the Connections

Brian San Francisco



Brian San Francisco received his Ph.D. in Plant and Microbial Biosciences from Washington University in St. Louis in

2013 under the direction of Robert Kranz. His dissertation research was focused on elucidating the molecular mechanisms underlying the biosynthesis of cytochrome c, a protein that carries electrons in respiratory pathways and that appears in all organisms and all species.

He became an IGB fellow in the Mining Microbial Genomes (MMG) theme in January 2014 and is working alongside members of the Enzyme Function Initiative (EFI), a large collaborative consortium funded by NIH that includes the University of California-San Francisco and the Albert Einstein College of Medicine in New York. The goal of the EFI is to develop strategies for the rapid and accurate annotation of genomes and gene sequences.

San Francisco works with John Gerlt, who leads the EFI, to identify and characterize new microbial metabolic pathways. He is focusing on identifying novel bacterial pathways for metabolism of ethanolamine, an important molecule found in a variety of microhabitats in nature. Ethanolamine is the second-most-abundant head group for phospholipids, a class of lipids that are a major component of all cell membranes. Using high-throughput screening to determine which proteins bind to this substrate and then using computational biology and bioinformatics techniques to examine the genomes of all organisms available, the team was able to find the genes that allowed them to assemble a new pathway.

Michael Saul



Michael Saul received his Ph.D. in Zoology from the University of Wisconsin-Madison in May of 2014 under the direction

of Stephen Gammie. His dissertation research used neurobiological, genomic, and computational tools to elucidate molecular pathways contributing to the behavioral phenotype of a complex animal model for bipolar disorder.

Saul joined the Gene Networks in Neural & Developmental Plasticity (GNDP) theme as an IGB Fellow in the summer of 2014. He has two primary lines of research. For the first, he is working on a Simons Foundation project with Lisa Stubbs, Gene Robinson, Alison Bell, Saurabh Sinha, and Jian Ma to determine what happens to the genomics inside

the brain during or shortly after certain social circumstances—specifically, social challenge and social opportunity for honeybees, mice, and stickleback fish.

His second project builds on his Ph.D. research, which involved working with a line of mice that was selectively bred for certain behavioral characteristics. Theme affiliate Justin Rhodes, who works at the Beckman Institute, has large datasets from work with mice that have been selectively bred for high voluntary wheel running behavior. These high-runner mice have been used to study exercise addiction, but they might also be used to gain insights on motivation. The project compares brain gene expression in the high-runner mice to that of control mice with the same breeding history and no selection.

Tong Si



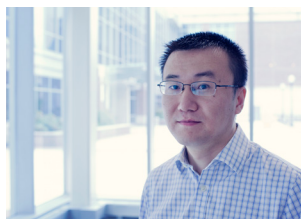
Tong Si received his Ph.D. in Chemical Engineering in 2014 from the University of Illinois at Urbana-Champaign under the

direction of Professor Huimin Zhao. His dissertation was focused on the development of metabolic and genome engineering tools in *Saccharomyces cerevisiae* (baker's yeast) for biotechnology applications. He developed the RNAi-assisted Genome Engineering (RAGE) method to construct comprehensive genome-scale libraries for continuous improvement of yeast strains.

He became an IGB fellow in September 2014 in the Biosystems Design (BSD) theme. He is working on developing an automated genome engineering platform. For this, he is using the Illinois Biological Foundry for Advanced Biomanufacturing (iBioFAB) integrated with high-throughput analysis such as mass spectrometry imaging to create and screen for microbial mutants that overproduce value-added chemicals.

This work will make an important contribution to the theme's research activities. The effort on lab automation may enable a paradigm shift in the field of synthetic biology by greatly accelerating the cycle of design, build and test in engineering biological systems.

Bo Wang



Bo Wang received his Ph.D. in Materials Sciences from the University of Illinois at Urbana-Champaign in 2011 under

the direction of Steve Granick. His dissertation was focused on using single molecule/particle imaging

to elucidate transport phenomena in complex fluids ranging from entangled polymers to living cells.

He became an IGB fellow in August 2011 and has worked with members of the Regenerative Biology and Tissue Engineering theme to understand the cellular organization and decision making in regeneration and development. Specifically, his research has focused on stem cells in two types of flatworms, the free-living planarian and the parasitic schistosome.

The two types of worms are evolutionarily related and have highly abundant stem cells that allow them to address different challenges. Planarian can regenerate after essentially any kind of injury; schistosomes are highly successful parasites that go through a complex life cycle that maximizes transmission through two obligate hosts, one of which is human. Wang's research has focused on comparing the stem cells of the two types of worms. The abundance of the stem cell populations makes these cells experimentally tractable. The knowledge gained from this fundamental research ultimately may be applicable to improve human health.

Scott Woolbright



Scott Woolbright received his Ph.D. in biology from Northern Arizona University under the direction of Tom Whitham.

His dissertation research involved quantitative trait loci (QTL) mapping and candidate gene identification of cottonwood (*Populus*) leaf chemistry traits as part of a highly collaborative "genes to ecosystem" approach aimed at investigating the community and ecosystem consequences of trait variation in foundation species. He also conducted population genetic surveys of highly isolated and stands of cottonwoods from "sky island" mountain ranges of the Great Basin and Mojave deserts.

Woolbright has continued with his research on isolated plant species living in environments that have changed from that in which they typically live, also known as climate relicts. Since joining the Genomic Ecology of Global Change theme in June 2012, he has been using relicts as natural laboratories to understand how ecological communities are affected by climate change. Using genomic technologies, he has investigated climate-driven changes in species interactions at the gene level. This research makes an important contribution to basic community and ecosystem research, and it also has significant implications for ecological conservation and restoration. ■

*Written by Susan Jongeneel. Photos by Kathryn Coulter.*



# ON THE GRID HAPPENINGS AT THE IGB

## AWARDS



### A. BRYAN ENDRES

A. Bryan Endres, Associate Professor of Agriculture and Consumer Economics (Energy Biosciences Institute) was among the faculty to receive the American Agricultural Economics Association Distinguished Extension/Outreach Program Group Award from the College of Agricultural, Consumer and Environmental Sciences.



### JAMES O'DWYER

James O'Dwyer, Assistant Professor of Plant Biology (Biocomplexity) has been selected for a Simons Foundation Investigator Award. The Simons Investigators program provides a stable base of support for outstanding scientists, enabling them to undertake long-term study of fundamental questions.



### VIJAY SINGH

Vijay Singh, Professor of Agricultural and Biological Engineering (Genomic Ecology of Global Change) received the American Association of Cereal Chemists International Excellence in Teaching Award from the College of Agricultural, Consumer and Environmental Sciences.



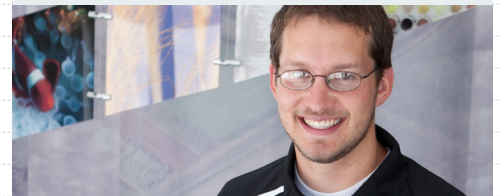
### JIAWEI HAN

Jiawei Han, Abel Bliss Professor of Engineering (Gene Networks in Neural & Developmental Plasticity) received the Engineering Council Award for Outstanding Advising.



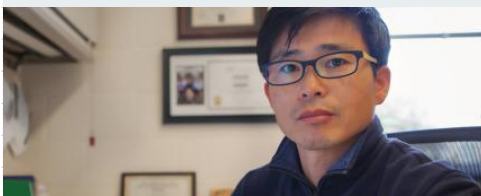
### GENE ROBINSON

Gene Robinson (Director) was appointed to the Board of Scientific Advisors (BSA) of the National Courts and Sciences Institute (NCSI), a judicially governed science and technology institute providing special training to state and federal court judges, Native American court judges, and administrative law judges of federal and state executive agencies and independent regulatory agencies.



### BERKLEY WALKER

Berkley Walker (Postdoc, USDA/ARS, Ort Lab) received an Alexander von Humboldt Fellowship to conduct independent research with a host lab in Düsseldorf, Germany for two years.



### DOKYOUNG LEE

DoKyoung Lee, Professor of Crop Sciences (Energy Biosciences Institute) received the North American Colleges and Teachers of Agriculture Educator Award from the College of Agricultural, Consumer and Environmental Sciences.



### SANDRA RODRIGUEZ-ZAS

Sandra Rodriguez-Zas, Professor of Animal Sciences (Gene Networks in Neural & Developmental Plasticity) received the Senior Faculty Award for excellence in research from the College of Agricultural, Consumer and Environmental Sciences.



### DEREK WILDMAN

Derek Wildman, Professor of Molecular and Integrative Physiology (IGB Faculty) has received the International Federation of Placenta Associations (IFPA) Award in Placentology, bestowed for contributions to the field of placentology by established investigators within 20 years of receipt of their terminal degree.

# ON THE GRID HAPPENINGS AT THE IGB

## IGB RENAMING CELEBRATION AND SYMPOSIUM

LOOKING  
IN  
THE  
RIGHT  
DIRECTION

**CARL  
WOESE**

AND THE NEW BIOLOGY

**09.19 – 20, 2015**

**ALICE CAMPBELL ALUMNI CENTER**

→ [GO.ILLINOIS.EDU/NEWBIOLOGY](http://GO.ILLINOIS.EDU/NEWBIOLOGY)

### **SYMPOSIUM TO HONOR CARL R. WOESE, DISCOVERER OF LIFE'S THIRD DOMAIN**

Looking in the Right Direction: Carl R. Woese and the New Biology, to be held on September 19-20, 2015 at the Alice Campbell Alumni Center, will celebrate the work of this renowned scientist by showcasing some of the most exciting up-and-coming advances in genomic biology, and will commemorate renaming the Carl R. Woese Institute for Genomic Biology (IGB) in his honor.

This symposium will highlight some of the most exciting modern research directions in genomic biology that have been inspired or impacted by Woese's work and ideas, encompassing microbiology, evolution and even synthetic biology. Penny Chisholm, Lee and Geraldine Martin Professor of Environmental Studies, Massachusetts Institute of Technology, one of the world's foremost experts on marine microbiology will also deliver a public lecture on Friday night, September 18, 2015.

For more information about the symposium, and to register, please visit: <http://conferences.igb.illinois.edu/woesenewbiology>.

Registration is free and open to the public.

## FELLOWS SYMPOSIUM



### **IGB FELLOWS SYMPOSIUM**

Thank you to all who attended this year's IGB Fellows Symposium. The symposium was very successful and had a high level of attendance, with over 250 faculty, students and staff making an appearance. An excellent selection of talks were given throughout the day, including keynote speaker Dr. Bonnie Bassler of Princeton University, who filled both conference rooms to capacity, and even attracted viewers to stay and watch her talk in Array Cafe.

Our gratitude to the speakers, poster presenters, and everyone who attended the talks and poster session. Special thanks to the Fellows, especially co-chairs Michael Saul and Brian San Francisco, and to the events staff, communications group, and CNRG members for all their effort and hard work. Events such as this are an opportunity to bring the campus together and demonstrate the amazing breadth and depth of our research community.

## GIVING



### **WALK OF LIFE**

Walk of Life pavers are the perfect way to commemorate a special event, like graduation. For a paver to be installed, please contact Melissa McKillip at [mmckilli@illinois.edu](mailto:mmckilli@illinois.edu).

More information can be found at [www.igb.illinois.edu/about/giving](http://www.igb.illinois.edu/about/giving).

## SUMMER CAMP



### **POLLEN POWER! CAMP**

Monday, July 6 through Friday, July 10  
9 a.m. to 5 p.m.

Registration for the third Pollen Power camp at IGB is now open! It is a week-long day camp for girls entering 7th and 8th grade in the fall of 2015 to learn about the biological sciences.

Pollen Power will provide an opportunity for girls to study plant responses to climate change. Campers interact with university professors and female grad student counselors. The cost per camper is \$350 and scholarships are available. The cost is \$25 if the camper meets NSF's requirement of being a member of an underrepresented population as defined by the NSF or qualifies for a reduced/free lunch.

More information and registration is available at <http://pollensummerncamp.illinois.edu/> or contact Sara Haag, Camp Coordinator, at [pollenpower@igb.illinois.edu](mailto:pollenpower@igb.illinois.edu).



# DEPARTMENT ANNOUNCEMENTS

## OPERATIONS & FACILITIES

### PLAZA PAVER REPLACEMENT PROJECT

LPS Pavement Company will begin replacing the damaged tan & red pavers on the IGB plaza Tuesday May 26. They will bring in equipment, a dumpster and pallet of plaza pavers. They anticipate this work to be completed in 3 days, weather permitting.

When necessary, the contractor will post signs directing people to enter through the Gatehouse entrances. Please observe the contractor signage and the warning yellow tape around the work areas. Any questions, please contact [facilities@igb.uiuc.edu](mailto:facilities@igb.uiuc.edu).

### IGB CONDUCTING 2015 BIENNIAL INVENTORY

The IGB has begun 2015 biennial inventory. All inventoried University assets over \$500 are assigned a University property tag (PTag) and examined every two years in accordance with University Business and Financial Policies and Procedures. IGB Operations and Facilities staff, including our student worker, will access offices and labs to examine assets without disruption of the day-to-day operations at the IGB. You may also be contacted by email for asset confirmation. 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. 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).

### Is it possible for me to purchase my computer or laptop when I leave the University?

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. Computer assets purchased with IGB funds should be returned to the IGB Computer Network and Resource Group in Room 2626 IGB (2nd floor Gatehouse). The University does not sell equipment, including computers and laptops, purchased with University funds to faculty, staff, students, or the general public.

### What is the University policy if I'm using University equipment off campus or transporting my laptop between work and home?

In accordance with the University of Illinois Office of Business and Financial Services (OBFS) Policies and Procedures, Section 12 – Property Accounting, an Equipment Loan To Employees and Students Form must be completed annually for any University asset being used primarily off campus. Primarily is defined as more than 50% time or transporting between work and home, in case lost or stolen. It is especially important this form is completed and on file for laptops, iPads, or small electronics, which are targets of theft. If you need to complete an equipment loan form, please contact Kathy Millage at 265-8022 or [kmillage@igb.illinois.edu](mailto:kmillage@igb.illinois.edu). Please keep in mind that when loaned University equipment is no longer needed to perform work off campus, it should be returned to the University department from which it was borrowed. ■

## UNIVERSITY LIBRARY

### IMAGE OF RESEARCH COMPETITION

Given that the IGB Art of Science event is in its fifth year, you might also be interested to know about another opportunity to share a visual representation of your research. The Image of Research is a multidisciplinary competition open to graduate and undergraduate students at the University of Illinois at Urbana-Champaign. The annual competition, which just concluded its second year, is co-sponsored by the Library's Scholarly Commons and the Graduate College. The 2015 graduate and undergraduate prize winners were just announced in April. You can see the winning entries and all other entries in the Image of Research Exhibit (<http://imageofresearch.omeka.net/>).

As you continue your research, keep this opportunity in mind and watch for calls to submit an image next academic year. ■

## BUSINESS

### FY16 BENEFIT CHOICE ENROLLMENT FOR UNIVERSITY OF ILLINOIS EMPLOYEES

The FY16 Benefit Choice period will begin on Friday, May 1, 2015 and end on Monday, June 1, 2015 with an effective date of July 1, 2015.

Please visit the NESSIE website at <http://nessie.uihr.uillinois.edu/> for Benefit Choice news and announcements. UPB has scheduled three Benefit Choice information sessions on campus during the month of May 2015. The sessions will cover the benefit changes that take effect July 1, the changes that employees can make during the Benefit Choice period, general benefit information and a Q & A. Registration is NOT required.

Below is a list of the scheduled informational sessions offered by University Payroll & Benefits Services (UPB):

First Session	Second Session	Third Session
Wednesday, May 6	Tuesday, May 12	Friday, May 22
Begins at 2 p.m.	Begins at 10 a.m.	Begins at 2 p.m.
Ikenberry Commons	Beckman Institute	Bevier Hall
SDRP Multipurpose	Auditorium 1025	Room 180
Room 2025 Room A,B & C	405 N. Matthews	905 S. Goodwin
301 E. Gregory	Urbana, IL 61801	(Goodwin and Gregory Drive)
Champaign, IL 61820		Urbana, IL 61801

These events are approved events under Civil Service Policy and Rules, Rule 11.12. Employees may be released from work to attend a session, University operations permitting, and subject to prior supervisor approval.

Questions? Send an e-mail to [benefits@uillinois.edu](mailto:benefits@uillinois.edu) or contact the University Payroll and Benefits Services office at (217) 333-3111. ■

## RECENT PUBLICATIONS

Please include your connection to the IGB in your author byline when submitting publications, as it will greatly help track potential newsworthy items and increase the possibility of coverage.

Comstock MJ, Whitley KD, Jia H, et al. Direct observation of structure-function relationship in a nucleic acid-processing enzyme. *Science*. 2015;348(6232):352-354.

Braundmeier AG, Lenz KM, Inman KS, et al. Individualized medicine and the microbiome in reproductive tract. *Front Physiol*. 2015;6:97.

Anderson RE, Sogin ML, Baross JA. Biogeography and ecology of the rare and abundant microbial lineages in deep-sea hydrothermal vents. *FEMS Microbiol Ecol*. 2015;51(1).

Nishitani WS, Alencar AM, Wang Y. Rapid and localized mechanical stimulation and adhesion assay: TRPM7 involvement in calcium signaling and cell adhesion. *PLoS One*. 2015;10(5):e0126440.

Locke AM, Ort DR. Diurnal depression in leaf hydraulic conductance at ambient and elevated [CO<sub>2</sub>] reveals anisohydric water management in field-grown soybean and possible involvement of aquaporins. *Environ Exp Bot*. 2015;116:39-46.

Nixon SE, Gonzalez-Peña D, Lawson MA, et al. Analytical workflow profiling gene expression in murine macrophages. *J Bioinformatics Comput Biol*. 2015;13(2).

Ferreira CR, Jarmusch AK, Pirro V, et al. Ambient ionisation mass spectrometry for lipid profiling and structural analysis of mammalian oocytes, preimplantation embryos and stem cells. *Reprod Fertil Dev*. 2015;27(4):621-637.

Allen JM, Miller MEB, Pence BD, et al. Voluntary and forced exercise differentially alters the gut microbiome in C57BL/6J mice. *J Appl Physiol*. 2015;118(8):1059-1066.

Arslan S, Khafizov R, Thomas CD, Chemla YR, Ha T. Engineering of a superhelicase through conformational control. *Science*. 2015;348(6232):344-347.

Mukherjee A, Weyant KB, Agrawal U, Walker J, Cann IKO, Schroeder CM. Engineering and characterization of new LOV-based fluorescent proteins from *chlamydomonas reinhardtii* and *vaucheria frigida*. *ACS Synth Biol*. 2015;4(4):371-377.

Wertin TM, Reed SC, Belnap J. C-3 and C-4 plant responses to increased temperatures and altered monsoonal precipitation in a cool desert on the colorado plateau, USA. *Oecologia*. 2015;177(4):997-1013.

Kim S, Sung J, Foo M, Jin Y-, Kim P-. Uncovering the nutritional landscape of food. *PLoS One*. 2015;10(3):e0118697.

Lian J, Zhao H. Reversal of the beta-oxidation cycle in *saccharomyces cerevisiae* for production of fuels and chemicals. *ACS Synth Biol*. 2015;4(3):332-341.

Amato KR, Raguet-Schofield M, Righini N, et al. Determinants of the gut microbiota of mesoamerican howler monkeys (*Alouatta pigra* and *A. palliata*). *Am J Phys Anthropol*. 2015;156:69-69.

Bader AC, Malhi RS. A case study on the multiple components of identity. *Am J Phys Anthropol*. 2015;156:74-75.

Gomez AM, Rothman JM, Petrzalkova K, et al. Diet-microbe co-metabolic interactions in wild primates reveal clues on human evolution. *Am J Phys Anthropol*. 2015;156:149-149.

Kuzawa C, Chugani HT, Grossman LI, et al. The high metabolic costs of human brain development help explain the unusually slow body growth of human childhood. *Am J Phys Anthropol*. 2015;156:196-196.

Malhi RS. Studying the evolutionary history of native north americans. *Am J Phys Anthropol*. 2015;156:211-212.

Mallott EK, Clausing E, Malhi RS. Use of high-throughput sequencing to investigate white-faced capuchin prey choice. *Am J Phys Anthropol*. 2015;156:212-212.

Owings AC, Hughes CE, Rogers MP, Cybulski JS, Malhi RS. Maternal and paternal population history of indigenous individuals in british columbia. *Am J Phys Anthropol*. 2015;156:244-244.

Perry G, Kistler L, Godfrey LR, et al. Nuclear genome sequences from the extinct subfossil lemurs *Palaeopropithecus ingens* and *Megaladapis edwardsi*. *Am J Phys Anthropol*. 2015;156:251-251.

Rogers MP, Lee KN, Galbarczyk A, Jasienska G, Malhi R, Clancy KBH. CYP19A1 methylation: Life history factors' effects on the genome. *Am J Phys Anthropol*. 2015;156:269-270.

Wildman DE, Rutherford JN. Comparative placental ecology at the maternal-fetal interface. *Am J Phys Anthropol*. 2015;156:324-324.

Witt KE, Malhi RS. Complete mitogenome sequencing of late woodland domesticated dogs from janey B. goode. *Am J Phys Anthropol*. 2015;156:327-327.

Zhang Q, Doroghazi JR, Zhao X, Walker MC, van der Donk WA. Expanded natural product diversity revealed by analysis of lanthipeptide-like gene clusters in actinobacteria. *Appl Environ Microbiol*. 2015.

Xiao H, Bao Z, Zhao H. High throughput screening and selection methods for directed enzyme evolution. *Ind Eng Chem Res*. 2014;54(16):4011-4020.

Arauz E, Aggarwal V, Jain A, Ha T, Chen J. Real-time observation of lipid-protein interactions in crude cell lysates with single-molecule resolution. *Mol Biol Cell*. 2014;25. ■



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