

PLPM | BESC

DEPARTMENT OF PLANT PATHOLOGY AND MICROBIOLOGY & BIOENVIRONMENTAL SCIENCES
College of Agriculture and Life Sciences Texas A&M University

NEWSLETTER

Spring Semester 2011

PLPM GOES GLOBAL



A journey of a thousand miles starts with a single step. In the case of the journey of collaboration between PLPM researchers and their colleagues from a Chinese university, that single step was a lunch meeting in the fall of 2010. That lunch led to a springtime trip to China for several PLPM researchers.

Last fall, a group of department heads and a vice president from Huazhong Agricultural University (HUAZ) in Wuhan, China visited Texas A&M. It was during that visit that researchers from the PLPM department and the visiting researchers found common ground. They soon recognized an opportunity to combine their research and teaching interests to help control agricultural disease in the United States and China.

At breakfast the following day, the vice president of HUAZ invited faculty from the College of Agriculture and Life Sciences to participate in a joint symposium to be held in spring of 2011 at HUAZ. Several faculty members accepted that invitation and traveled to China during Spring Break, a time chosen to avoid interfering with teaching their classes.

On March 11, after planning and last minute paperwork, a group of nine researchers from four departments in the College of Agriculture and Life Sciences traveled to China for the HUAZ symposium. Six of the faculty members represented PLPM (Leland S. Pierson, Young Ki Jo, Libo Shan, Joshua Yuan, Won-Bo Shim and Xiofeng Wang). The other faculty members joining the symposium were Ping He (Biochemistry / Biophysics), Keyan Zhu Saltzman (Entomology) and Elizabeth Pierson (Horticultural Sciences).

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Leland S. (Sandy) Pierson III, Professor

Texas is currently undergoing turmoil due to anticipated budget reductions. The effects of these reductions on all levels of education in the state are frightening. Texas A&M has been exploring different ways to meet our projected reductions. The Department is being especially hard hit, resulting in losses in department-wide support staff and changes in faculty appointments. These reductions come during a time when the federal budget is also severely constrained, with reduced availability of competitive grants on which faculty depend to support their students and research programs. These research programs directly impact Texas agriculture and the success of our students by enabling our faculty to bring cutting-edge research and future directions into the classroom. These reductions come at a time when agriculture must learn how to produce more food over the next 40 years than the total that has been produced to date in order to feed the projected 9 billion people by 2050. As Dr. Norman Borlaug stated so eloquently, *"Almost certainly, however, the first essential component of social justice is adequate food for all mankind."* Department faculty continue to pursue collaborations nationally and internationally. This issue describes a trip by several faculty to China over Spring Break to visit two major Chinese universities with the goals of establishing collaborative teaching and research programs for reducing crop diseases. Ongoing efforts to reduce crop diseases, such as those by Dr. Marty Dickman's group to reduce banana losses due to fungal pathogens, are discussed. The increasingly important role of bioinformatics in biological research is also discussed, as is a new 'Research Experience for Undergraduates' program funded by a NSF grant awarded to Dr. Carlos Gonzalez and Dr. Paul de Figueiredo. We also salute our recent BESC majors and our PLPM graduate students! 🐼



Four of the faculty members arrived at a Beijing airport nearly deserted because all flights from Japan had been canceled due to the catastrophic earthquake and tsunami. From there, they traveled to Fafzhou for a one-day symposium at the Fujian Agricultural and Forestry University (FAFU), to Xiamen and then to Wuhan for the symposium at HUAZ. They joined the other five faculty members at HUAZ where they presented talks and listened to presentations by HUAZ researchers.

The presentations at HUAZ and FAFU helped highlight further areas for potential collaboration, and thanks to the success of the symposium, both HUAZ and FAFU have shown interest in continuing their relationship with PLPM researchers at Texas A&M. PLPM is currently working with both institutions to support two upcoming trips: in May, Won-Bo Shim and Daniel Ebbolle will travel to FAFU to give a two-week course on fungal-plant interactions and in August Won-Bo Shim and Mike Kolomiets will travel to HUAZ to give a two week long intensive course on host-pathogen interactions. The eventual plan is to work toward providing opportunities for A&M students to study in China and for Chinese students to come to College Station to study.

Plant Pathology and Microbiology department head Leland (Sandy) Pierson says the trip was an overwhelming success professionally. Of course, no trip would be complete without at least a little time for fun. Despite their busy schedules, the faculty members were able to visit China's Three Gorges Dam complex. "We had many wonderful experiences, and were impressed by the excellent science and facilities at both universities," Pierson says. 🐼

For more information about FAFU, visit <http://www.fjau.edu.cn/english/index.php>.

MORE PICTURES FROM CHINA



COMING DOWN FROM THE IVORY TOWER



Banana crops damaged by a fungal disease

To say that researchers are busy would be an understatement. Between projects, grant writing and in the case of those in academia, teaching, there is little time for things like reaching out to the public. However, while this is often overlooked, communicating science to the public is becoming increasingly important. “We have to get out of the ivory tower,” Plant pathology and microbiology professor Marty Dickman says.

As a professor, and Director of the Borlaug center for plant genomics and one of this year’s AAAS Fellows, Dickman is no stranger to communicating to those outside of the lab. He says it’s important to explain what goes on in the lab as much as possible. “We can’t ignore the public.”

Of the many projects Dickman works on, those related to transgenic, or genetically modified, organisms are the ones most potentially interesting to the public. And the controversy surrounding transgenic organisms is an example of what can happen when researchers fail to do outreach. Transgenic crops are already out there, largely because of advantages—pest resistance, for example—that they have over traditional crops. “Transgenic seeds are more expensive, but farmers keep buying them,” Dickman says. “That should tell you something.”

Unfortunately, perception is reality when it comes to transgenic organisms, and one of the misconceptions that the public has is that researchers are working to create new and wildly exotic crops. In reality, however, researchers are after small improvements. “You don’t have to hit a home run,” Dickman says. “A small tweak can give you significant gains.”

“We want the public to be informed of what we do.”

An example of one of those small tweaks is increasing cold resistance in sugarcane. A single day of below freezing temperatures will kill sugarcane, so it can’t be grown in most of Texas. But make a few changes, and you might be able to vastly increase the amount of land where you can grow the crop, which can then be used as sugar for biofuel.

Other incremental changes include increasing drought and salt tolerance of crops and making them more resistant to insect pests and disease. Biofortification, producing food crops that have additional value in food crops, is another goal of transgenics. “We want to get better food to people,” Dickman says.

The scientists researching these issues obviously find them exciting, but to those outside of the lab, field or greenhouse, the subject may not be as interesting. “Stuff with public appeal, such as feeding hungry people, is probably most appealing to the public,” Dickman says. “We want the public to be informed of what we do.”

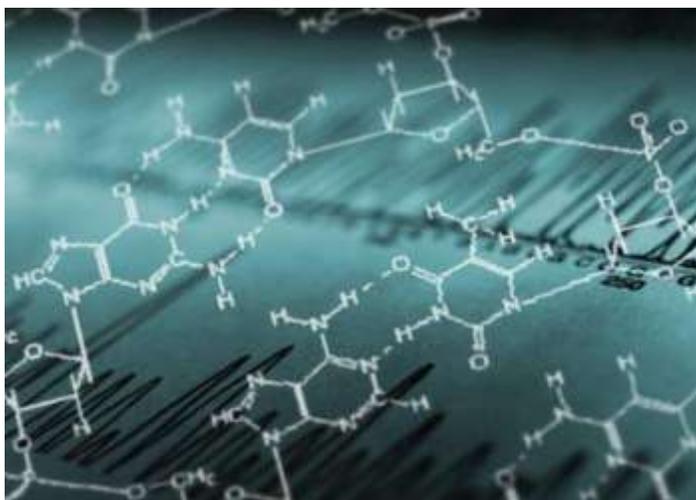
Outreach can take many forms, from newspaper editorials to public talks, but Dickman says his best outreach experiences have always been in elementary school classrooms. “Talking to young people is great because kids are not shy,” Dickman says. He shows off interesting parts of his work to show that science is fun. “Once they see how cool science can be, they’re with you.” He says the wonder many students show is why he got into science in the first place.

No matter the form of outreach, however, the most important thing scientists need to keep in mind is their audience. A paper for a scientific journal will be different from an opinion piece in the newspaper, and both are dramatically different from public talks and classroom visits. “You need to know who you’re talking to,” Dickman says. 🐼

BIOINFORMATICS: DNA AND DATABASES

Over the past few decades, computer technology has changed the way we do scientific research. And one field where this is most obvious is genomics. Bioinformatics, the intersection of computing, statistics and biology, came into being in the late 1970s and in the past 10 years has exploded in popularity both as a field of research and as a tool. For plant pathology and microbiology professor Joshua Yuan, bioinformatics is the latter. "My vision of bioinformatics is more of a service to biological research," Yuan says. He and other researchers at the Borlaug center use bioinformatics to support their work in plant genomics and biofuel research. "Developing algorithms is not our focus," Yuan says. "We're using bioinformatics as a tool."

The main question behind bioinformatics, Yuan says, is how to use the technology to interpret and analyze data. "We're looking at protein enzyme structure," he says. "There aren't a lot of tools that do that, so we're building new ones." Yuan and his colleagues write computer software for examining enzymes using a programming language called Python. They chose this language over others because it is good at processing strings of text, integrates well with a variety of statistical software packages and can handle large sets of data.



As genomic research expands so does the amount of data collected. Gene sequencing technology has made collecting, storing and manipulating that information all but impossible without the help of specialized computer hardware and software. Yuan was first introduced to these technologies in the late 1990s when his research had him dealing with microarrays. These tools changed the way researchers analyzed genes and Yuan had to quickly learn how to work with such data. "I took a lot of classes," he says.

Now, years later, not only is Dr. Yuan working with bioinformatics, he is teaching his own classes on it. Every fall, he teaches a course on genome informatics in which students learn how to analyze large-scale genomics information. Yuan says this graduate-level course is both informative and intensive. "It would make undergraduates' lives miserable."

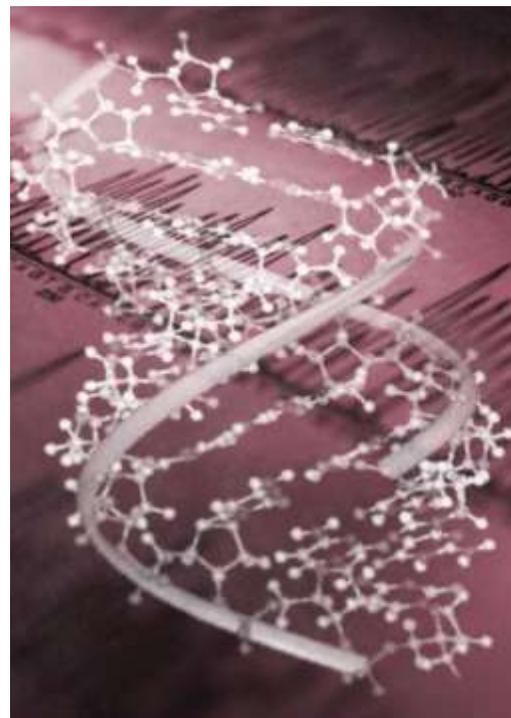
"The need for bioinformatics is growing exponentially."

DNA AND DATABASES

This single course is one of the few examples of bioinformatics education going on at Texas A&M. Despite the increasing use of such technology in biological research, the university still lacks a formal bioinformatics program. “The need for bioinformatics is growing exponentially,” Yuan says. “And it’s unfortunate that A&M doesn’t have a graduate program.” An obvious solution would be to create a program, but Yuan says organizing one would be difficult. Bioinformatics is interdisciplinary by nature, and getting the biology, computer science, statistics and other departments to agree on curriculum would be challenging.

Challenges aside, Yuan sees the potential for a future graduate program in bioinformatics. “There is a demand for a program bridging biology and bioinformatics research,” he says. “We need to respond to that demand.” 🐼

For more information about genomics research and bioinformatics, contact Dr. Joshua Yuan at syuan@neo.tamu.edu.



DEPARTMENT NEWS

An experience to remember

This summer, PLPM professors Carlos Gonzalez and Paul de Figueiredo will run a research program for undergraduates interested in plant pathology. Thanks to a grant from the National Science Foundation – Research Experience for Undergraduates program and support from the College of Agriculture and Life Sciences, this 10-week course will give students an opportunity to pursue independent research related to the interaction of plants and microbes, particularly in the areas of global food security, sustainability and next generation biofuel research.

In the program, students will get to discuss the newest developments in the field, participate in research meetings and work with researchers from a variety of fields. Students will also benefit from a GRE preparation course and networking opportunities. 🐼

For more about this REU program, contact:
Dr. Carlos Gonzalez (cf-gonzalez@tamu.edu) or
Dr. Paul de Figueiredo (pjdefigueiredo@tamu.edu)

Promoting the practice

Several students from the Plant Pathology and Microbiology and Bioenvironmental Sciences department were initiated into Gamma Sigma Delta, The Honor Society of Agriculture. In a ceremony on April 13 at the College Station Conference Center, PLPM students Montana Moeller, John Sorkness, Eli Borrego and Vanessa Vaughn were among 160 students from around Texas A&M University to be welcomed into the organization. In addition, BESC student Catherine Kobylinski was honored as an Outstanding Graduating Senior by Gamma Sigma Delta. Congratulations to these students for the recognition of their hard work and dedication.



Riding in Style



Students and faculty from PLPM can now make the trek between the Peterson building and the Borlaug Center in style. Thanks to efforts led by Dr. Pierson, the PLPM department now has an electric golf cart that will help shorten the amount of time needed to get between the two poles of plant pathology research at Texas A&M. 🐾

Senior merit awards

Three BESC students were selected to receive senior merit awards this semester. Congratulations go out to Montana Moeller, Megan Srubar and Catherine Kobylinski.



From left: Dr. Sam Murdock, Montana Moeller, Megan Srubar, Catherine Kobylinski and Dr. Leland Pierson

Congratulations to Dr. Dickman!

Congratulations are in order for PLPM professor Marty Dickman. He was selected as a 2011 AAAS fellow for his “excellence in research in the genetics and molecular biology of fungal plant interactions.” AAAS, the American Association for the Advancement of Science, is an international non-profit organization with a mission of promoting science around the world. This is the second year in a row that a PLPM faculty member has won the AAAS Fellowship, with Clint Magill winning in 2010. “We have a good department,” Dickman says. “That’s what back to back awards would say.” 🐾



ANRP Washington DC internship

Last fall, BESC student Sarah Butler took part in the ANRP Washington, D.C. internship program. Sarah worked in Representative Chet Edwards’ office.



Dr. Sam Murdock with ANRP intern Sarah Butler

GRANTS AND AWARDS

PLPM and BESC faculty continue to win grants for their groundbreaking research and novel teaching efforts:

- Dr. Carlos Gonzalez received grants of \$687,588 from Otsuka Pharmaceutical for research on Pierce's Disease and a \$339,080 REU grant from NSF for the REU program "The Plant-Microbe Interface: A Summer Undergraduate Research Program.
- Dr. Young-Ki Jo received a \$200,000 grant from the South Korean government for research on using cold plasma and silver nanoparticles for removing seed borne pathogens in rice.
- Dr. Mike Kolomiets is in line to receive a \$485,863 three-year NSF grant for the collaborative research project: "Signal perception and cellular mechanisms governing oxylipin mediated maize – fungal crosstalk."

CONGRATULATIONS GRADUATES!

The past semester saw the graduation of xx BESC seniors and xx PLPM graduate students.
We wish them the best of luck with their future endeavors.

Graduated BESC majors:

Silas Adams	Sunaina Kanojia
Price Almon	Abigail Lozano
Rosa Alvarado	Viridiana Martinez
Mina Baratifar	Ben Meadows
Jonathan Barge	Montana Moeller
Delba Barrios	Minh Nguyen
Samantha Braun	Chelsea Proeschel
Eileen Cassidy	Sarah Raschke
James Cato	Howard Sonnier
William Cook	Megan Srubar
Celeste Fernandez	Abhiram Thatipelli
Michael Henderson	Anuj Vyas

Graduate students:

Yongson Park
Paulomi Basu-Thaker
Dawoon Chung



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