



April
May
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The Department of Plant and Soil Science NEWSLETTER



this issue

Top Story **P.1**

Grants & Research Update **P.2-3**

Faculty News **P.4**

PSS Student News **P.5**

Yang Hu Named PSS Research Assistant Professor

Yang Hu, an expert in agricultural and biological engineering, has been named a research assistant professor in renewable bioproducts with Texas Tech's Department of Plant and Soil Science, according to officials within the College of Agricultural Sciences and Natural Resources. He officially stepped into his new post on Dec. 1.

Hu indicated that he is interested in continuing his research efforts in developing multifunctional renewable bioproducts. One of his primary goals here at Tech is to work to continue the growth and success of the research opportunities in renewable bioproducts from industries and federal government, as well as explore next-generation bio-based products and cutting-edge technologies to develop bioproducts. He will be based at Tech's Fiber and Biopolymer Research Institute. The 110,000-square-foot facility is equipped and staffed to conduct research and development activities ranging from small-scale testing through large-scale manufacturing. Located six miles east of the main campus, its fundamental objective is to foster greater use of the natural fibers and increase textile manufacturing in Texas.

Prior to joining the Tech faculty, Hu worked as a postdoctoral research associate at the Tech institute. He also served as an

associate research fellow with the Chinese Academy of Sciences in Shenzhen, China, and a biomaterials engineer at

Trellis Earth Products in Wilsonville, Oregon. He worked as a college lecturer at the Wuhan Bioengineering Institute in Wuhan, China.

Hu received his bachelor's degree in chemistry from Huazhong Agricultural University-Wuhan, China. His master's degree in processing engineering of agricultural products is from the Chinese Academy of Agricultural Sciences-Beijing, China. His doctorate in agricultural and biological engineering is from Pennsylvania State University-University Park. He is a member of the American Chemical Society, Society for Biomaterials, American Society for Testing and Materials, and the American Society of Agricultural and Biological Engineers.

Narrative written by Norman Martin in the CASNR Dean's Office



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Grant & Research Update



Dr. Benildo G. de los Reyes, Professor of Plant Genomics and Bayer CropScience Chair at Texas Tech's Department of Plant and Soil Science was recently awarded a research grant by the National Science Foundation's Plant Genome Research Program. The project will elucidate the role of regulatory RNA, DNA methylation, and associated network rewiring in transgressive segregation for stress tolerance in rice.

Transgressive segregation is observed when quantitative traits of progenies derived from genetically diverse parents are either superior or inferior to both parents. Dr. de los Reyes believes that this phenomenon has a potential of creating novel physiological attributes that were not achieved during the first Green Revolution, if its genetic determinants can be elucidated and if transmission through generations can be accurately monitored by genomics-enabled plant breeding. Furthermore, he believes that transgressive phenotypes is one solution to the grand challenge to agriculture in the 21st century. Modern plant breeding needs to create climate-resilient crop varieties that will ensure global food supply amidst the burgeoning impacts of climate change, steady depletion of natural resources, and rapid population growth.

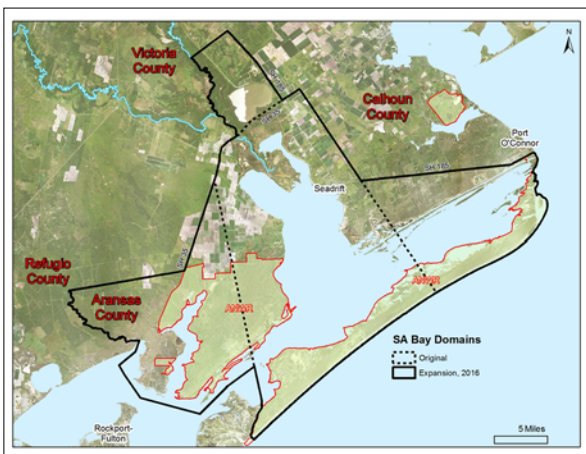
Using a tractable functional and evolutionary genomics system such as the genus *Oryza* (rice), Dr. De los Reyes and his team of four graduate students working on different aspects of the project (Ai Kitazumi, Jake Gendron, Isaiah Pabuayon, Austin Dryer) are testing the hypothesis that novel physiological attributes exhibited by transgressive recombinants from crosses between modern cultivars and heirloom varieties (*O. sativa*), and those derived from inter-species crosses (cultivated species *O. sativa* x wild species *O. officinalis*) are genetic gains brought about by ideal complementation of the best genomic or epigenomic features from each parent. Dr. de los Reyes further hypothesized that novel genomic configurations in recombinants lead to functional complementation, epistasis, and elaboration of genetic and biochemical networks. Aided by state-of-the-art genomics technology, the team is probing into the intricacies of three molecular mechanisms. They are examining the extent by which the patterns of DNA methylation in transgressive recombinants differ from the parental methylomes, and how such variation configures gene expression patterns that did not exist in the parents. They are also examining the possibility that novel physiological traits are brought about by complementation between non-coding regulatory RNA molecules from one parent and their downstream targets from the other parent, acting either at the level of post-transcriptional gene silencing or RNA-directed DNA methylation. Lastly, the team is investigating the epistatic interactions among stress-related transcriptional regulators and their impact to regulon restructuring and elaboration in transgressive recombinants.

Dr. de los Reyes collaborates with scientists from the National Institute of Genetics of Japan, National Institute of Agrobiological Sciences of Japan, and the International Rice Research Institute in the Philippines to achieve the goals of this ambitious project.



Grant & Research Update Cont.

San Antonio Bay is one of the six major bays on the Texas Coast. The bay complex is a valuable commercial and recreational fishing area and the surrounding marshes provide habitat for many species of shorebirds and waterfowl and serve as the primary wintering ground for the endangered whooping crane. The productivity and species diversity of the bay and surrounding marshes are sensitive to proper mixing of fresh and saltwater. The major source of freshwater into the bay is from the combined discharge of the Guadalupe and San Antonio Rivers. Higher flows decrease the salinity of the bay and marshes, and salinity increases when flows are lower. This salinity dance, along with tidal levels and storm surges, is of critical importance to the well-being of the animal and plant species of the bay complex.



The marshes that occur along the edges of San Antonio Bay are critical habitats and major filters for the bay complex. Yet the dynamics of these marshes are poorly understood, especially as to how they respond to variations in salinity in response to changes in river discharge. In 2011, Dr. Terry McLendon, Research Professor in the Department of Plant and Soil Science, began building an ecological simulation model for the entire San Antonio Bay complex, including surrounding uplands, marshes, open bay, and barrier island, with funding provided by the San Antonio River Authority. An application of the EDYS (Ecological Dynamics Simulation)

model, the model domain includes about 225,000 acres divided into about 560,000 cells. Each cell covers a 40 m x 40 m area (0.4-acre). For each cell, the model contains soil, vegetation (by plant species), and water components, each of which change on a daily basis based on changes in rainfall, tides, and storm events. More intensive modeling (1 m x 1 m cells) is included for the key marsh areas.

Dr. Terry McLendon recently received a grant of \$ 189,000 from the San Antonio River Authority to continue the modeling work in 2016. He is assisted in this project by Dr. J.D. Booker in the Department of Plant and Soil Science and Ms. Cindy Pappas and Dr. Allison Pease in the Department of Natural Resources Management. The 2016 funding will provide for 1) expansion of the spatial footprint of the model to include all of the Aransas Natural Wildlife Refuge and adjacent portions of Aransas and Lavaca Counties, adding another 192,000 acres to the model, 2) inclusion of clam, shrimp, crab, and oyster components into the model, and 3) continued collection of field data to validate the model. The US Army Corps of Engineers is also providing an additional \$ 84,000 of in-kind support for one of their staff, Dr. Cade Coldren, to assist with the project and work.



Save the Date!!

Dr. Auld's retirement reception will be on Sunday, May 22nd, 2-4 p.m. at the PSS Greenhouse. Invitations will be sent out shortly, but please mark your calendars to attend!

A Golden ADDY Award was received for Trailer #1 of "Between Earth and Sky" (<https://www.youtube.com/watch?v=IHGCdII91sg>). Trailer #2 will be released on Earth Day (April 22). World premiere of the finished film will be at the Sundance Film Festival in Park City, UT in January, 2017.

The Texas Tech Turf Club will be holding their 4th Fundraiser 4-man Scramble Golf Tournament at Meadowbrook Golf Club in Lubbock on Friday, April 29, 2016. We will be having a shotgun start at 9 am and all participants will get a hamburger buffet. It is \$50 per person or \$200 per team. If you would like to be a hole sponsor and play in the tournament it will be \$250. If you are interested, please contact Dr. Joey Young

PSS News

Dr. **David Weindorf** won 1st place in the Photo contest with the Professional Soil Scientist Association of Texas.

Dr. **David Weindorf** was recently approved and promoted by the Board of Regents to full professor in the Department of Plant and Soil Science.

Dr. **Cynthia McKenney** was selected as a recipient of the President's Excellence in Teaching Award for 2016, she will be honored at the Faculty Honors Convocation on Thursday, April 21, 2016 at 3:30 p.m.

Dr. **Eric Hequet** was designated a Horn Professor, the highest distinction a faculty member can receive from the University, by the Texas Tech University System Board of Regents during its latest meeting. Dr. Hequet is an internationally-recognized leader in cotton fiber research and the current chairman of the University's Department of Plant and Soil Science. Established in 1966, the designation is named after Paul Horn, the first president of Texas Tech. The professorship recognizes scholarly achievement and outstanding service to Texas Tech. Of the 86 members recognized as Horn Professors, 32 are still on the faculty.



U.S. Fulbright Scholar to Belgium, Dr. **Nouredine Abidi** visited Greece March 7-11, 2016. At the request of his host institution, Ghent University, Dr. Abidi taught for one week at Pireaus University of Applied Sciences as part of an European Textile Engineering Advanced Master (called E-TEAM). He also gave a seminar for faculty and students at the Department of Textile.

He was also invited to attend Ghent University celebration of 199 years anniversary ceremony. He met the current University Rector, Vice Rector and the former Rector



Texas Tech University will participate in a \$2.4 million study directed by Colorado State University that will examine the long-term sustainability of the Ogallala Aquifer. Dr. **Chuck West**, the Thornton Distinguished Chair in the Department of Plant and Soil Science and director of the CASNR Water Center in the College of Agricultural Sciences and Natural Resources, will direct the Texas Tech contingent. Texas Tech received \$211,000 from the grant, awarded by the United States Department of Agriculture's Agriculture and Food Research Initiative. West said this project brings together the latest science and technology in water management in crops and soils and groundwater hydrology with an evaluation of policy and economic impacts. The effort also includes outreach to promote adoption of water-saving irrigation methods. The consortium members have exceptional track records of research and extension education in the region, and this project strengthens our collaborations to extend the life of our shared groundwater resources.

The following presentations and publication were made in the last few months:

- **Kelly, B., Hequet, E. F.**, (2016). Extracting Cotton Fiber Maturity and Fineness Parameters from the AFIS Length Distribution. Beltwide Cotton Conference.
- **Weindorf, D.C.**, S. Chakraborty, J. Herrero, B. Li, and C. Castañeda. 2016. Simultaneous assessment of key arid soil parameters via fused PXRF-VisNIR data. *European Journal of Soil Science* 67(2):173-183. doi: 10.1111/ejss.12320.
- **Weindorf, D.C.**, S. Chakraborty, J. Herrero, B. Li, C. Castañeda, and A. Choudhury. 2016. Simultaneous assessment of key arid soil parameters via fused PXRF-VisNIR data. *European Journal of Soil Science* 67(2):173-183. doi: 10.1111/ejss.12320.
- **Weindorf, D.C.**, and S. Chakraborty. 2016. Portable X-ray fluorescence spectrometry analysis of soils. In: XXX (ed.). *Methods of soil analysis*. Soil Science Society of America, Madison, WI. p. 1-8. doi:10.2136/vzj2015.09.0132.
- R.S. Dassanayake, C. Gunathilake, **T. Jackson**, M. Jaroniec, **N. Abidi**. CO₂ Capture using Activated Aerocellulose Monoliths at Low and Ambient Temperatures. *Cellulose*, . DOI 10.1007/s10570-016-0886-1.
- C. Gunathilake, R.S. Dassanayake, **N. Abidi**, M. Jaroniec. Amidoxime-Functionalized Microcrystalline Cellulose-Mesoporous Silica Composites for Carbon Dioxide Sorption at Elevated Temperatures. *J. Mater. Chem. A*. 10.1039/C6TA00261G.

Important Dates

April:

7-25: Advanced registration for fall 2016
25-26: Graduate Program Review
26: Open registration for fall 2016

May:

10: Last day of classes
11: Individual Study Day
12-17: Final exams
20-21: Commencement
22: Dr. Auld's Retirement reception
30: Memorial Day, all university offices are closed.

June:

7: Summer 1 classes begin
8: Last day to add a course for summer 1.
10: Last day to drop a course with no penalty.
27: Last day to drop a course with academic penalty.

If you have questions or comments regarding any information on this newsletter, or to be removed from the PSS distribution database, please contact Christi Chadwell, Communications and Recruiting Coordinator, Christi.chadwell@ttu.edu

PSS Student News

Deepika Mishra won the graduate student poster award at the Beltwide Cotton Conference in January in New Orleans titled "Genetic mapping of fiber quality traits in upland cotton using SSR marker," with authors Deepika Mishra, Bralíe Hendon, Robert Imel, Krishan M Rai, Kari Hugie, Wayne Smith, Venugopal Mendu, Eric F Hequet and Dick L. Auld.

Misha Manuchehri won second place oral presentation at the Weed Science Research Conference with a presentation titled "Auxin Technology in High Plains Cotton." Misha also won second place in the oral presentation at the SWSS PhD Oral Contest with the Weed Science Society of America in San Juan, PR, in February with a presentation titled "Weed Management with Enlist™ in Texas High Plains Cotton."

The Department of Plant & Soil Science, Texas Tech University is hosting a visiting graduate student, **Mary Luz Yaya Lancheros** from Colombia. Mary is pursuing her Ph.D. in biological sciences from Pontificia Universidad Javeriana in Bogota Colombia. Mary learned about **Dr. Mendu's** research from his publications and webpage. Dr. Mendu's lab is working on the bioinformatics analysis and also on plant cell wall biosynthesis including lignin characterization. During her training at Tech, Mary will analyze transcriptome data and learn molecular and biochemical techniques required for her Ph.D. project. Both institutions will publish the research data generated and co-author the publications. The project will lead to future collaboration with Wilson Teran



Perez lab (Mary's major advisor) in Colombia.

The following graduate student presentations were made at the Beltwide Cotton Conference in January:

- **Ayele, A., Hequet, E. F., Kelly, B.** (2016). Within-Plant Variation in the Number of Cotton (*Gossypium hirsutum*) Fibers per SEED Surface Area. Beltwide Cotton Conference.
- **Lamichhane, S., Hequet, E. F., Kelly, B.** (2016). An Evaluation of Cotton Fiber Cross-Sections with the Fiber Image Analysis Software (FIAS). Beltwide Cotton Conference.
- **McCormick, K., Hequet, E. F., Kelly, B.** (2016). Calibration of the High Volume Instrument (HVI) Elongation Measurement. Beltwide Cotton Conference.

TTU Soils Judging Team will compete in the national collegiate soils judging contest (April 4-8) in Manhattan, KS (Kansas State University, host). The team is coached by Dr. **David Weindorf**, assisted by graduate student **Bogdan Duda**. Team members are **Jennifer Romero, Morgan Hector, Delaina Pearson, Trey Roach, and David Brockman**.

Delaina Pearson, undergrad PSS student, won the Professional Soil Scientists Association of Texas Scholarship of \$1,500.

Alumni Spotlight

David Becker is the Head of Cotton Breeding for Bayer CropScience. Becker grew up on a family farm near Lubbock where he developed a lifelong appreciation for cotton production and agriculture. He holds BS, MS, and PhD degrees in Agronomy from Texas Tech University. While attending graduate school from 1996 to 2001, he managed the Texas Tech University Research farm. In 2001 he accepted a position with Bayer CropScience as cotton breeder and station manager at Lubbock. Becker accepted responsibility for managing the US cotton breeding program in 2008 and now holds the position Head of Cotton Breeding for Bayer CropScience with management responsibilities internationally, and is located in Lubbock.

PSS Graduate Program Review

The PSS Graduate Program review will be held on April 25-26. A schedule of events will be sent out soon.