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2017

# The Department of Plant and Soil Science NEWSLETTER



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## New Faculty Hire: Rosalyn Shim

**Rosalyn Shim** has been named an assistant professor of plant breeding and genetics with Texas Tech's Department of Plant and Soil Science, and officially stepped into her new post on April 1.

Dr. Shim indicated that she is interested in continuing her research efforts in molecular breeding, domestication genetics and germplasm development by wide hybridization. Specifically, she wants to focus on the development, molecular characterization and agronomic evaluation of wild crop species-derived genetic resources for value-added traits that can be used to improve existing crop varieties.

Alongside this, Dr. Shim would like to concentrate on elucidating the genetics of preferential chromosome transmission from the wild to the cultivated crop species. Findings from such research would form the basis for more effective and widespread utilization of wild relatives of crops as a reservoir of important genes for crop improvement.

One of her primary goals at Tech is to work with the current faculty to further advance the graduate and undergraduate programs for plant breeding and genetics.

"Plant breeding has come a long way from a simple practice of visual selection for desirable traits to allele shuffling to create favorable recombinations," she said. "Recent and rapid developments in genomics are quickly shifting breeding paradigms towards a more precise utilization of genetic variation for crop improvement. It's important that we are training 21st century breeders that are abreast with such

developments while having a solid foundation of the basics of plant breeding."

Prior to joining the Tech faculty, Dr. Shim served as an assistant professor at the Bioscience and Biotechnology Center's Laboratory of Plant Molecular Biosystem at Nagoya University-Furocho, Nagoya and was stationed for the most part at the International Rice Research Institute in the Philippines as a Visiting Research Fellow. She worked as a postdoctoral fellow at the Bioscience and Biotechnology Center, and a consultant for the Japan International Cooperation Agency.

In addition, she worked as an assistant scientist at the T.T. Chang Genetic Resources Center in the International Rice Research Institute, and editor with the Plant Sciences Team-CAB International Project in the Information Analyst Corporation.

Dr. Shim received her bachelor's degree and master's degree in genetics from the University of the Philippines-Los Banos (Laguna, Philippines). Her doctorate in agricultural sciences is from the Nagoya University-Furocho (Nagoya, Aichi, Japan). She also currently serves as an Honorary Scientist and Advisor on Agricultural Science and Technology in Rural Development Administration of the Republic of Korea.

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



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## Grant & Research Update

Dr. **Mark Burow** was recently awarded a grant through NIFA for the “Development of Advanced Physiological and Molecular Markers for Stress Tolerance in Peanut.”

Peanut is an important crop in Texas- almost 300,000 acres were planted in 2016. Texas is the second leading producer of peanuts in the U. S., with most of the peanut acreage in Texas within 100 miles of Lubbock, where peanuts are grown using irrigation from the declining Ogallala Aquifer. For the long-term sustainability of agriculture in the region, development of crop varieties that can be grown profitably with less irrigation water is needed.



This work is a project involving researchers at **Texas Tech (Mark Burow)**, the USDA-ARS in Lubbock (Paxton Payton, James Mahan) and Oklahoma (Rebecca Bennett, Kelly Chamberlin), Oklahoma State University (Ning Wang), and Virginia Tech (Maria Balota), bringing together a wide range of expertise.

The basis of our work is the hypothesis is that an integrated approach of plant physiological analysis and DNA marker-assisted selection is better than measurement of yield alone, allowing us to measure and combine different plant responses for tolerance to water deficit. We expect to develop physiological and DNA markers for tolerance to water deficit in peanut, and that these will be used for development of new varieties. Work will be done in Texas, Oklahoma, and Virginia, environments that are representative of different peanut growing regions in the U. S.



Work to be done involves 4 objectives:

- (1) Test new, high-throughput technologies for measuring plant responses to water deficit stress in the field. This will be done by (a) field-scale infrared imaging using high-resolution cameras; (b) LiDAR (laser scanning) methods on carriage for evaluations of plant canopy characteristics; (c) and red-green-blue (RGB) and hyper spectral camera derived vegetation indices on drones and mobile carts.
- (2) Develop machine-learning and big data management and processing approaches to analyze large amounts of sensor data related to water deficit stress and plant canopy traits.
- (3) Test the sensing technologies on the U.S. peanut minicore collection; compare the high-throughput technologies with older screens for accuracy and time savings; and compare the new technologies with yield and quality characteristics.
- (4) Develop DNA-based single nucleotide polymorphism (SNP) markers for selection of phenotypic responses to abiotic stresses. This will be done by genome-wide association studies (GWAS) on the minicore collection using gene chip-based SNP markers and identification of additional markers for tolerance to water deficit stress.



This work is important, because previous work in peanut has demonstrated that trait-based approaches are superior to selection of yield alone for breeding for tolerance to water deficit stress. Newer, high-throughput methods are needed to make these methods more practical for evaluating large numbers of breeding lines. We have already identified a small number of microsatellite DNA markers for tolerance to water deficit stress, and these are being used for selection of new peanut varieties. Adding newer physiological and SNP markers will help in developing newer peanut varieties for growers and make production more sustainable in the longer term. This is important also to Texas Tech, because it brings state-of-the-art research methods to the department, and provides experience in these for graduate and undergraduate students.

# Faculty News

Instructor **Russell Plowman** is the newest member of the Texas Superstar Plant Selections Board. The Texas Superstar Program identifies strong and stunning plant that perform well across Texas. Trials are conducted at several locations encompassing a variety of soils, temperatures and precipitation levels. The Texas Tech trials help to identify ornamental plants which withstand the large temperature extremes, limited rainfall and high pH soils. Mr. Plowman's landscape installation and experience is a valuable asset to the board.



Dr. **Venu Mendu** received the CASNR New Faculty Award for 2017.

Dr. **Jyostna Sharma** has been awarded the 2017 Bernie E. Rushing, Jr. Faculty Distinguished Research Award.

Dr. **David Weindorf** was selected as the Soil Science Society of America Fellow for 2017. Dr. **Weindorf** was also awarded the Presidential Award from the Soil Science Society of America for 2017.

Dr. **Weindorf** and the production team are pleased to announce the release of the companion film "Between Earth and Sky - An Arctic Soils Perspective" - which is freely available on YouTube. This film is a much more technical look at arctic soils and is designed as a training film for soil scientists and ecologists working in the arctic. Please check it out and share it far and wide - again it is free and available for anyone to watch! Link: <https://www.youtube.com/watch?v=5q1Y33vII8M&feature=youtu.be>

The following presentations, publications, and book chapters were published during the last quarter:

- Latuso, K.D., R.F. Keim, S.L. King, **D.C. Weindorf**, and R.D. DeLaune. 2017. Sediment deposition and sources into a Mississippi River floodplain lake; Catahoula Lake, Louisiana. *Catena* 156:290-297. Doi: 10.1016/j.catena.2017.04.020
- Chakraborty, S., **D.C. Weindorf**, C.A. Weindorf, B.S. Das, B. Li, **B. Duda**, S. Pennington, and **R. Ortiz**. 2017. Semi-quantitative evaluation of secondary carbonates via portable X-ray fluorescence spectrometry. *Soil Science Society of America Journal*. doi:10.2136/sssaj2017.01.0019
- Chakraborty, S., **D.C. Weindorf**, C.A. Weindorf, B.S. Das, B. Li, **B. Duda**, S. Pennington, and **R. Ortiz**. 2017. Semi-quantitative evaluation of secondary carbonates via portable X-ray fluorescence spectrometry. *Soil Science Society of America Journal*. doi:10.2136/sssaj2017.01.0019
- Wang, D.D., Y. Yan, X. Li, X. Shi, Z. Zhang, **D.C. Weindorf**, H. Wang, and S. Xu. 2017. Influence of climate change on soil organic carbon in Chinese paddy soils. *Chinese Geographical Science* Doi: 10.1007/s11769-017-0868-8.
- **Cushman, K. R.**, M. B. Burgess, E. T. Doucette, G. A. Nelson, and C. S. Campbell. 2017. Species Delimitation in Tetraploid, Apomictic *Amelanchier* (Rosaceae). *Systematic Botany*. 42(2):234-256.
- **S. Liyanage\***, **R.S. Dassanayake**, **A. Bouyanfif**, E. Rajakaruna, L. Ramalingam, N. Moustaid-Moussa, **N. Abidi**. Optimization of cryostat temperature conditions for trans-reflectance mode FTIR microspectroscopic imaging of biological tissues. *MethodsX*, 4 (2017) 118-127.
- **Y. Hu**, O. Hamed, R. Salghi, **N. Abidi**, S. Jodh, R. Hattab. Extraction and Characterization of Cellulose from Agricultural Waste Argan Press Cake, *Cellulose Chemistry and Technology*, 51(3-4) (2017) 263-272.
- **R.S. Dassanayake**, C. Gunathilake, A. Dassanayake, **N. Abidi**, M. Jaroniec. Amidoxime-Functionalized Nanocrystalline Cellulose-Mesoporous Silica Composites for Carbon Dioxide Adsorption at Ambient and Elevated Temperatures, *Journal of Materials Chemistry A*, 5 (2017) 7462-7473.
- A. Messali, H. Lgaz, **R. Dassanayake**, R. Salghi, S. Jodeh, **N. Abidi**, O. Hamed. Guar gum as efficient non-toxic inhibitor of carbon-steel corrosion in phosphoric acid medium: Electrochemical, surface, DFT and MD simulation studies. *J. of Molecular Structure*, in press.
- S. Gordon and **N. Abidi**. *Cotton Fibers, Characteristics, Uses, and Performances* (ISBN 978-1-53610-913-9, LCCN 2017006949 (ebook) Nova Publisher, 2017.
- **N. Abidi**, *Dyeing of Cotton Fibers*. In: *Cotton Fibers, Uses and Performances*, Nova Publisher. (ISBN 978-1-53610-913-9, LCCN 2017006949 (ebook) Nova Publisher, 2017.
- **R. Dassanayake**, **N. Abidi**, *Cellulose derived aerogels*. In: *Cotton Fibers, Uses and Performances*, Nova Publisher. (ISBN 978-1-53610-913-9, LCCN 2017006949 (ebook) Nova Publisher, 2017.
- **Y. Hu**, **S. Acharya\***, **N. Abidi**. Acetic acid as a pre-catalyst to promote cellulose dissolution (poster). 253rd American Chemical Society Meeting and Exposition, April 2-6, 2017, San Francisco, CA.
- **Y. Hu**, **N. Abidi**. Different size-unified cellulose nanocrystals obtained via a multistage separation. 253rd American Chemical Society Meeting and Exposition, April 2-6, 2017, San Francisco, CA.
- **S. Acharya\***, **Y. Hu**, **N. Abidi**. Insight into mild condition dissolution of high molecular weight cellulose in ionic liquid based solvent system. 253rd American Chemical Society Meeting and Exposition, April 2-6, 2017, San Francisco, CA.
- **P. Wansapura\***, **N. Abidi**, **R. Dassanayake**, A. Hamood, P. Tran. Preparation of cellulose and chitin-CdTe quantum dots films and antibacterial effect on *Staphylococcus aureus* and *Pseudomonas aeruginosa*. 253rd American Chemical Society Meeting and Exposition, April 2-6, 2017, San Francisco, CA.
- **S. Liyanage\***, **A. Bouyanfif\***, L. Ramalingam, N. Moustaid-Moussa, **N. Abidi**. FTIR microspectroscopy imaging reveals changes in adipose tissues and liver induced by high-fat diet 253rd American Chemical Society Meeting and Exposition, April 2-6, 2017, San Francisco, CA.

Important Dates

July:

- 11: Summer II Classes Begin
- 12: Last day to add a course for Summer II
- 31: Last day to drop a course for summer II

August:

- 9: Last day of classes
- 10-11: Final Exams
- 12: Commencement
- 23: Faculty on duty
- 25: PSS New Graduate Student Orientation
- 28: First day of fall classes
- 31: Last day to add a class

September:

- 4: University holiday/ Offices closed

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 & Staff News

Diann Merriman, PSS Academic Advisor, was awarded the 2017 President's Excellence In Academic Advising Award.

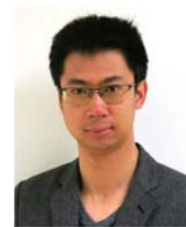


Joseph Burke, current M.S. student, was awarded the Gary "Pete" Peterson Dryland Soil Management Scholarship from the Soil Science Society of American. The scholarship is worth \$5,00 and is aimed to encourage students to pursue research and careers in dryland soil management.



Misha Manuchehri, recent PhD graduate, was awarded the George Tereshkovich Outstanding PhD award in PSS.

Li Li, MS student, was awarded the Gerald O. Mott Meritorious Graduate Student in Crop Science by the Crop Science Society of American.



PSS undergraduate student, Robert Soliz, won "Best of Show" at the San Antonio Wine Guild for his 2016 Vermentino Dry in the Grape Dry Category.

The following students graduated in the May 2017 Commencement Ceremonies:

Bachelor's degree recipients: Lauren Behrmann, Amanda Bogart, William Cole Carter, James Coleman, Jonathan Davis, Ashlynn Fix, Savanna Allen Frazier, Cullen Grooms, Morgan Hector, Cody Kimbro, Parker Patrello, Meagan Riley, Zachary Ross, Joshua Singleton, Luke Stutler, Kori West.

Master's degree recipients: Nicholas Gallington, Kelsey House, Roshan Kulkarni, Li Li, Richard Roper, Jacobo Sanchez, Sandi Thu, Cole Watts

PhD degree recipients: Lisa Baxter, Chenhui Li, Curtis Schaefer.

## PSS Upcoming Event

The Turf Field Days will be held on July 7th, for professionals, and July 8th for homeowners. The Field Days will be held at the Quaker Farm.

**PROFESSIONAL TURFGRASS MANAGEMENT FIELD DAY 2017**

Department of Plant and Soil Science

Free Registration and Lunch!

Friday, July 7      Quaker Ave Research Farm  
 7:30 am-12:00 pm      2nd St. & Quaker Ave  
 Follow Signs Near 4th and Quaker to Farm Entrance

TURF, LANDSCAPE, & POLLINATOR RESEARCH OPEN HOUSE

FREE "COME AND GO" EVENT!

July 8th 8:00 a.m.- 12:00 p.m.  
 Quaker Research Farm  
 2nd St. and Quaker Ave.  
 Follow Signs near 4th and Quaker to Farm Entrance