Department of Plant and Soil Science

Newsletter

JAN-FEB-MAR 2019 Edition

New Faculty Hire- Matthew Siebecker has been named an assistant professor of applied environmental soil chemistry with Texas Tech's Department of Plant and Soil Science. He officially stepped into his new research and teaching post on Jan. 1.

The Massachusetts native and adopted Delawarean looks forward expanding his new program here at Texas Tech. He will head up the Environmental Soil Chemistry research group, which will investigate how fundamental soil chemical processes can be extrapolated and applied to field scale environmental problems. Specifically, he is interested in the reactions and fate of heavy metal and metalloid contaminants (e.g., nickel, zinc, arsenic, and chromium) and agricultural nutrient cycling (phosphorus and potassium). Siebecker comes from a background in both fundamental and applied environmental soil chemistry with postdoctoral experience in chemical oceanography, where he participated on marine research cruises to study sediment geochemical cycling of iron and manganese.

One of his primary goals here at Tech is to expand the knowledge and use of advanced, high-energy synchrotron radiation techniques to tackle modern environmental challenges related to soil science and soil environmental geochemistry. Challenges include heavy metal fate and transport, the effects of climate change induced flooding on soil contaminant mobility, and soil organic carbon interactions with iron and manganese oxides and phyllosilicate clays. These advanced techniques in conjunction with traditional wet chemistry experiments carried out in the laboratory provide necessary information and data to address modern environmental challenges.

When asked about the current challenges in the field, Siebecker said, "When I consider the field of environmental soil chemistry, there is no better nor difficult time to be here than now. We are using cutting edge technology to address real world problems such as the effects climate change, flooding, and drying on soil contaminants and soil chemical processes, such as adsorption, dissolution, surface precipitation, and redox.

"These reactions occur on a wide breadth of time scales, from milliseconds to years. With the additional pressure to preserve soil and soil health, understand the global carbon cycle, and mitigate heavy metal and contaminant transport, we must carry out high quality, high impact research. Additionally, we must promote our findings in a concise, intelligible manner to the public and policymakers."

Prior to taking his present position, Siebecker served as a postdoctoral research associate with the Delaware Environmental Institute at the University of Delaware-Newark, and a postdoctoral research associate in chemical oceanography with the School of Marine Science and Policy at the University of Delaware-Lewes.

Siebecker received his bachelor's degree with a double major in environmental sciences and plant and soil sciences from the University of Massachusetts-Amherst. His doctorate in Environmental Soil Chemistry is from the University of Delaware-Newark. He is a member of the Geochemical Society, Soil Science Society of America, and the American Chemical Society. He is fluent in Spanish and spent time in both Chile and Costa Rica.

Narrative and Photo by Norman Martin- College of Agricultural Sciences and Natural Resources

Faculty News

New Orleans, LA.- At the 2019 Beltwide Cotton Improvment Conference, **Dr. Eric Hequet** was selected as the 2018 receipient of the annual Cotton Genetics Research Award by the Joint Cotton Breeding Committee. The Joint Cotton Breeding Committee consists of representatives from the National Cotton Council (NCC), the United States Department of Agriculture (USDA), state experiment stations, cotton incorporated and commercial breeders. This prestigous award, having been established in 1961, is given to those who exemplify and have helped pioneer the cotton industry through their extensive research of the crop.

New Orleans, LA.- Dr. Katie Lewis recieved the Dr. J. Tom Cothren Outstanding Research in Agronomy/Physiology/ Soil Science award at the 2019 Beltwide Cotton Conference. The honor is awarded to an individual researcher each year at the beltwide conference, who has proved to be outstanding in their area of research as well as having shown strong teaching and advising programs.

College Station, TX- Dr. Wenwei Xu was presented with the Texas A&M AgriLife Research Director's Research Scientist of the Year award. Xu recived this honor for his outstanding achievements in his research and and innovations with the corn crop.

Dr. Mendu and **Dr. Burow** have received $300,000 from USAID-Peanut lab for peanut aflatoxin research. Aflatoxins are the most potent mycotoxins produced by Aspergillus flavus infection and pose a serious health hazard to the consumers of peanuts and peanut products. Use of aflatoxin contaminated peanut cake will accumulate the toxin in livestock and poultry which will ultimately reach humans through consumption of these products. Aflatoxins have been linked to liver diseases, acute hepatic necrosis, resulting in cirrhosis or hepatocellular carcinomas and loss of value in international trade for peanuts contaminated with it. Peanut is produced and used in many countries without any aflatoxin contamination test due to the lack of effective policy and/or diagnostic facilities. Hence, developing low aflatoxin contamination peanut lines will help in reducing their entry into the food chain. The TTU team is collaborating with the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) scientists located in India (Dr. Hari Kishan Sudini, Rajeev Varshney) and Niger (Dr. Hamidou Falalou) on this project.

Publications:

- Teixeira, A.F.S., D.C. Weindorf, S.H.G. Silva, L.R.G. Guilherme, and N. Curi. 2018. Portable X-ray fluorescence (pXRF) spectrometry applied to the prediction of chemical attributes in Inceptisols under different land uses. Ciência e Agrotecnologia 42(5):501-512.
- Rawal, A., S. Chakraborty, B. Li, K. Lewis, M. Godoy, L. Paulette, and D.C. Weindorf. 2019. Determination of base saturation percentage in agricultural soils via portable X-ray fluorescence spectrometer. Geoderma 338:375-382.
- Deb, S., D. Kumar, S. Chakraborty, D.C. Weindorf, A. Choudhury, P. Banik, D. Deb, P. De, S. Saha, A.K. Patra, M. Majhi, P. Naskar, P. Panda, and A. Hoque. 2019. Comparative carbon stability in surface soils and subsoils under submerged rice and upland non-rice crop ecologies: A physical fractionation study. Catena 175:400-410.
- Braden, I.S., A.J. Ashworth, and C.P. West. 2019. Spatial soil nutrient-plant-herbivore linkages: A case study from two poultry litter-amended pastures in Northwest Arkansas. Agrosystems, Geosciences and Environment 2:180036.
- Dhakal, M., C.P. West, S.K. Deb, G. Kharel, and G.L. Ritchie. 2019. Field calibration of PR2 capacitance probe in Pullman clay-loam soil of Southern High Plains. Agrosystems, Geosciences and Environment 2:180043.
- Bhandari, K.B., C.P. West, D. Klein, and S. Subbiah. 2019. Essential oil composition of 'WW-B.Dahl' old world bluestem [Bothriochloa bladhii] grown in the Texas High Plains. Industrial Crops and Products 133:1-9.
- Xiong, Yedan., C.P. West, C.P. Brown, and P.E. Green. 2019. Digital image analysis of old world bluestem cover to estimate canopy development. Agronomy Journal 111: [In press]
- Rupinder K Saini, Sukhbir Singh (2019) Use of natural products for weed management in high-value crops: An overview: American Journal of Agricultural Research 4:25. DOI: 10.28933/ajar-2018-11-2808.
- Rupinder K Saini, Sukhbir Singh (2019) Contribution of cover crops and reduced tillage systems for weed management in organic vegetable production: American Journal of Agricultural Research 4:24. DOI: 10.28933/ajar-2018-11-2705.
- Neupane, J., W. Guo. 2019. Agronomic Basis and Strategies for Precision Water Management: A Review. Agronomy. 9(2), 87.

Student News

Student Highlight: Gabriella Hale

As a first generation student, **Gabriella Hale** has always found her education to be increasingly important. With two young children of her own, this Junior Horticulture student has a "desire to do everything in [her] power to provide a positive future for [her]family and for [herself]", Hale stated.

Hale started her journey in higher education with the Department of Plant and Soil Science in 2014 as a distance horticulture student. She found the flexibility of an online program helped her, at the time, in meeting her personal and family goals. However, upon acceptance into the Honors College here at Texas Tech, she and her family packed up and made their way to the Hub City in time for the Fall 2018 semester. Hale has now transitioned into campus life, while taking on some additional academic endeavors.

In addition to her acceptance in the Honors College, Hale has been presented with the unique opportunity to conduct research with mentors in our department and develop a dissertation thesis in her final undergraduate year. Having already begun her research with Dr. Glen Ritchie, Hale will soon add to her work load by continuing her reseach in Dr. Venugopal Mendu's lab. This additional research in Mendu's lab is thanks, in part, to Hale's acceptance into the McNair Shcolars Research Program; a program geared toward graduate school preparation. She hopes that with her succeful completion of the McNair research program, in combination with publishing her dissertation thesis and graduating with a designation of highest honors, that she will have a highly competitive edge for her ultimate goal of being accepted into a plant genetics doctoral program.

With her eventual extensive knowledge of plant genetics, coupled with her passion for plant science, Hale believes the industry will have much to offer her. She hopes to one day operate a greenhouse on the Texas Hill Country ranch she owns with her husband. She believes the education she gained from her research work and traditional courses, will aid greatly in their greenhouse entrepreneurship endeavor.

While juggling family, career and academics can often be an overwhelming and daunting task, Hale contribtues her continued success to the immense support she has recieved from her husband, as well as her academic mentors.

A group of our Ph.D. and Masters students travelled to New Orleans, LA for the 2019 Beltwide Cotton Conference and competed in the poster competitions. Four of our students came home with awards from these competitions. In the Masters poster competition, **Jacob James** and **Brice DeLong** placed first and second, respectively. In the Ph.D. poster competition, **Ray White** was awarded first and **Zach Hinds** was awarded second place.

Soils Across Latitudes

A group of our Ph.D. and Masters students attended the Soil Science Society of America (SSSA) meeting in San Diego, CA. Along with the many workshops and gatherings they attended, many of them competed in the Student Oral Presentation and Poster Competitions. **Geeta Kharel** came out in the top five in her division. **Meagan Riley** won third place in the Wetlands Division. **Rael Otuya** came home with the second place prize in the Soil Biology and Biochemistry division.

Grace Ogden took home second place in the section II Masters poster competition for the Weed Science Sociey of America.

Kyle Russell won second place in the section III Masters oral presentation competition for the Weed Science Society of America.

Delaney Foster was elected secretary of the Southern Weed Science Society of America (SWSS) Graduate Student Organization

Geeta Kharel was awarded the Preston and Ima Smith Graduate Fellowship by the Texas Tech University Graduate School.

Plant and Soil Science graduate student, **Shelby Young**, has been awarded a Fulbright grant. As a Fulbright grant recipient, **Young** will have the opportunity to conduct research in Australia. Her major academic advisor is Dr. Glen Ritchie.

PSS Seminar Series

Each semester the department invites scholars, researchers and professionals in the plant and soil sciences, and agricultural industries to speak with the department as part of our seminar series.

January 31, 2019- Dariusz P. Malinowski, Ph.D.; Texas A&M AgriLife Research-Vernon

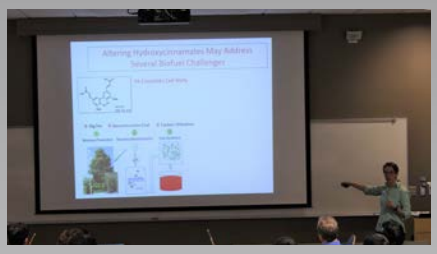
Dr. Malinowski, plant physiologist at the Texas A&M AgriLife Research station in Vernon, delivered a seminar entitled: "Summer-dormant Cool-season Perennial Grasses: New Forages Resilient to Climate Fluctuations in the Southern Great Plains". Malinowski's research focuses on "adaptation mechanisms of forages in semi-arid environments of the Southern Great Plains"(Texas A&M AgriLife).

February 7, 2019- Paul B. Thompson, Ph.D.; W.K. Kellogg Professor of Agriculture, Food and Community Ehtics at Michigan State University

Dr. Thompson of Michigan State University, delivered a seminar entitled: "Four Archetypes for Future Food Systems". Thompson serves as a faculty member in multiple departments including, Philosophy, Community Sustainability & Agriculture, and Food and Resource Ethics. His research focuses on philosophy and ethics in the topics of food and agriculture

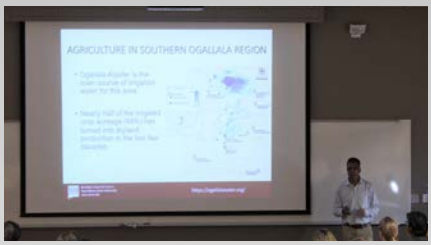
February 22, 2019- Megha N. Parajulee, Ph.D.; Texas A&M AgriLife Research-Lubbock

Dr. Parajulee, Texas A&M AgriLife researcher and adjunct faculty member for the Plant and Soil Department at Texas Tech, delivered a seminar entitled: "Cotton Integrated Pest Management in Texas: History, Livelihood, Science and Technology". Parajulee's research focuses on cotton entomology and pest management in relation to cotton production.



February 28, 2019- Laura Bartley, Ph.D.; Department of Microbiology and Plant Biology at the University of Oklahoma

Dr. Bartley delivered a seminar entitled: "Harnessing Grass Cell Wall Synthesis and Breakdown to Improve Biofuel Production". Bartley's research focuses on illuminating the regulation and breakdown of plant cells, specifically grass cell walls, at the University of Oklahoma.

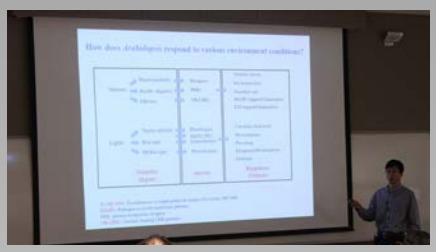


March 7, 2019- Rajan Ghimire, Ph.D.; Agricultural Sciences Center, Clovis, New Mexico State University

Dr. Ghimire's seminar entitled: "Approaches to improve Soil Health and Resilience in Southern Ogallala Aquifer Region", discussed research being administered at the Clovis facility, soil health indicators, and the status of the Ogallala Aquifer.

March 21, 2019- Todd Campbell, Ph.D.; USDA- Agricultural Research Service; Florence, SC

Dr. Campbell of the USDA Coastal Plains Soil, Water, and Plant Research Center in Florence, SC, delivered a seminar entitled: "Something Old, Something New: Resources for Cotton Improvement". Campbell's seminar focused on cotton improvement in the introduction and exploitation of new genetic variation, and discussed the approaces he and his research team are taking in terms of long-term cotton improvement.



March 28, 2019- Ning Yuan, Ph.D.; Post-doctoral Research Associate, Texas Tech University

Dr. Yuan, Post-Doc in Dr. Mendu's lab, delivered the seminar entitled: "Signal Transduction Pathways in Arabidopsis thaliana". Yuan graduate with his Ph.D. from Clemson University in 2016. His research experience has primarily been in plant molecular biology, tissue culture and proteins.

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

Department of Plant and Soil Science

Texas Tech University

Box 42122
Lubbock, TX 79409
Phone: 806.742.2838
Fax: 806.742.0775
www.pssc.ttu.ed