

PLSC Productivity

NEWS FROM THE DEPARTMENT OF
PLANT & SOIL SCIENCES



UNIVERSITY OF DELAWARE
**AGRICULTURE &
NATURAL RESOURCES**

Chair's Corner

Welcome to the first newsletter issue of the 2021-2022 academic year. We welcomed another large (for PLSC) freshmen and transfer student class of 23 this fall. The Landscape Architecture major has continued to grow to 65, outpacing our accreditation-required studio space by five students. The LA faculty will be coming up with some measures to restrict students from transferring in from other internal majors. It is great to be a popular “found” major and we will use this as an opportunity to focus on quality. Speaking of quality in the LA major, we are pleased to welcome Lori Athey as a new instructor. Lori has been a landscape architect in Delaware for 30 years and brings a wealth of landscape plant materials knowledge to our programs.



Many of our classrooms and labs are at full capacity, with our students masked-up and ready to learn. We are at 100% in-person in PLSC, with a focus on teaching labs outside as much as possible. The students and faculty have been very creative and resilient, offering world-class instruction while keeping everyone safe. I applaud them all!

This summer many of our students were finally able to have in-person internships, with our organic vegetable farm, Fresh to You, employing seven interns, while UDBG had five. Some of these students will be giving a presentation as part of their PLSC-required-for-credit internship — 19 students will be giving internship presentations in the Plant Science and Sustainable Food Systems Internship course (PLSC364) this semester; see page 3. My thanks go out to generous donors and Blue Hen-loyal employers for their support of our student work experiences.

Our faculty-led research programs did not skip a beat during COVID in terms of grant funding success and graduate student recruiting. PLSC faculty brought in 18 new graduate students this fall, covering their stipend and tuition via prestigious USDA, NSF, NASA, etc., grants. This is our largest class of new graduate students in five years! Read inside about two of our soil science faculty (Deb Jaisi, Don Sparks) who received international honors recently and another, Jeff Fuhrmann, who has served UD brilliantly for 35 years!

Cooler nights of early fall are finally here, signaling the premier time to rejuvenate your lawn from a summer of record heat. Rejuvenation can be as intense as core aerating, seeding, fertilizing, and watering to just fertilizing. Now is the time to feed your lawn to promote root growth without causing a surge in shoot growth. Any nitrogen fertilizer, organic or synthetic, works great at this time of year. Have a wonderful, safe, and healthy fall.

Honorifics



Dr. Deb Jaisi, associate professor of environmental biogeochemistry, was recently named a fellow of the International Association of Advanced Materials (IAAM). His award is in the “environmental and green nanotechnology” area of the IAAM. Dr. Jaisi describes the research that earned him this honor: “Research on the fate of nanoparticles was a major stream of my work before joining UD. My most-cited publications are on the transport of carbon nanotubes. Note that carbon nanotubes and graphene (carbon nanotubes are cylindrical fullerenes) are considered the most promising advanced material for innovation and sustainability. Our most recent research efforts are centered on resource recovery (phosphorus from various agricultural wastes) and green synthesis (synthesis into a nanofertilizer). The work has tracked considerable attention in Europe (where all phosphorus fertilizers are imported and resource recovery is the central research emphasis), the U.S., and around the globe. This research has been published as three papers in American Chemical Society journals and is highlighted on a cover page of the ACS journal *Agricultural Science and Technology*. Furthermore, the outcomes are presented in two keynote talks and three invited talks in conferences. Continued work on doping of micronutrients and tuning the product to tailor plants’ need of phosphorus has provided more exciting outcomes, which were presented in the fellow lecture.” (Group photo courtesy of Dr. Jaisi. He is flanked by fellow fellows!)



Earlier this year Dr. Donald L. Sparks, professor of soil and environmental chemistry in PLSC, current Unidel S. Hallock du Pont Chair, and recently-retired Director of the Delaware Environmental Institute, received the 2021 Philippe Duhaufour Medal given by the European Geosciences Union. EGU's Soil System Sciences Division established the award for "distinguished contributions to soil science, defined in its widest sense." Dr. Sparks is only the second American to win this award since its inception in 2005. The nomination cited his "groundbreaking research on soil processes influencing plant available potassium levels within soils" and said "He has pioneered the application of chemical kinetics to soils and soil minerals, including development of widely used methods." The nomination also cited Sparks' "seminal papers on soil carbon dynamics," and said that "Sparks has changed our understanding of and our approach to studying soils, providing a legacy of innovation and advancement."



Faculty Highlights

Editors' note: So much good news about our faculty and their groups has come out in our UD press, space does not allow for a lengthy description. If you are interested to read more about these headlines, please search www.udel.edu/udaily or email mpautler@udel.edu for the UDaily links.

August 2021:

Dr. Angelia Seyffferth: Keeping Arsenic out of Rice — Dr. Seyffferth is featured in this story in the *Proceedings of the National Academies of Sciences* on her ground-breaking research aimed at reducing arsenic presence in rice. She explains what the readily-available material of rice husk has to offer.

September 2021:

Dr. Rodrigo Vargas: The proceedings of the workshop, "*Exploring a Dynamic Soil Information System*," was recently published by the National Academies of Sciences. For over 1.5 years Dr. Vargas worked as part of the organizing committee for this March 2021 workshop. The goal: To work towards obtaining "an accurate picture of changes in the soil resource over time. Such an understanding can only be developed by collecting comprehensive data about soils and the various factors that influence them in a way that can be updated regularly and made available to researchers and others who wish to understand soils and make decisions based on those data."

The following grants were awarded this summer to our talented PLSC faculty and their UD colleagues.

<u>Principal Investigator(s)</u>	<u>Title/Topic</u>	<u>Sponsor</u>
Dr. Jung-Youn Lee Dr. Jeffrey Caplan	Plasmodesmata and Chloroplasts in Integrative Defense Signaling	National Science Foundation
Dr. Rodrigo Vargas	Software Ecosystem for kNowledge diScOverY: A Data-Driven Framework for Soil Moisture Applications	National Science Foundation
Dr. William Matthaeus (Physics) Dr. William Meng	Characterizing Stress Tolerance of Leafy Greens to CO ₂ , Humidity, and Radiation	NASA
Dr. Gordon Johnson	Research on New and Reemerging Vegetables for Processing in Delaware	USDA
Dr. Gordon Johnson	Extension Program Assistant for On-farm Readiness Reviews and Grower Trainings	Department of Health and Human Services
Dr. Kyle Davis <i>and others</i>	Characterizing the Global Illicit Trade in Energy-Critical Materials Using Machine Learning, Remote Sensing and Qualitative Research	National Science Foundation
Dr. Mark VanGessel	No-till Production for Spring Vegetables on Two Scales	USDA
Dr. Alyssa Koehler	Integrated Approaches to Reduce Yield Loss Due to Root-Knot Nematodes in Lima Bean Production	UD Research Foundation
Dr. Kyle Davis	Global Mapping of Crop Climate Resilience	General University Research Program

Faculty Spotlight

Let's hear from someone whose mild-mannered way has not changed over the 35 years that he has been in PLSC — but he packs a punch as a teacher, advisor, mentor, and researcher!

Dr. Jeff Fuhrmann, Professor of Soil and Environmental Microbiology



When did you first come to UD and why?

I came to UD in mid-1985. I am originally from Oceanside, CA, just north of San Diego. I received my B.S. in Forest Science (soil science) from Humboldt State University in Arcata, CA, at the north end of the state. Moving east, I obtained my M.S. in Forestry (forest soil microbiology) and Ph.D. in Soil Science (agronomic soil microbiology) from NC State University. I then looked for a faculty position while holding a brief postdoc position at NCSU. At the time, there were just two professor positions available in my field at universities in the U.S. I applied to UD and, while interviewing, fell in love with the area. Thankfully, I was hired and have very much enjoyed my time here.

How did you progress in your work over all of these years?

My M.S. and Ph.D. research examined the ecology of rhizobia, soil bacteria that form symbioses with leguminous plants and thereby supply the host plant with nitrogen from the atmosphere (as opposed to the use of commercial fertilizers). My doctoral research, in particular, examined the rhizobia that associate with soybean, and it is that general area of research that has maintained my interest over the years. Along the way, I also conducted research on the general microbial ecology of soils. In recent years, my research has expanded into the study of viruses that infect soybean rhizobia. This arose from my association with the Virus Ecology and Informatics Lab (VEIL) which is co-led by Drs. Eric Wommack and Shawn Polson. It has been truly rewarding to be part of this stimulating research group. My commitment to teaching has similarly expanded over the past decade. In addition to my graduate course in soil microbiology, I have taught introductory soil science for many years and, more recently, a freshman-level course on soils and sustainability. I am enormously passionate about the need to protect and enhance soils, as they are the foundation for our very survival on Earth. I do my best to instill at least some of that passion in the students I teach. I am also very proud to be associated with the publication of a leading textbook on soil microbiology – Principles and Applications of Soil Microbiology – now in its third edition (published just this year). I have been a co-editor on all three editions, as well as being an author of two chapters. Again, I hope that my efforts help instill a deeper appreciation of soils in students and professionals who use the textbook.

Undergraduate Student Highlights

Undergraduates enrolled in Dr. Susan Barton's Plant Science and Sustainable Food Systems Internship course in PLSC gain work experience and then share details by giving a presentation. Below are the most recent interns and where they worked.

<u>Employer</u>	<u>Undergraduate(s)</u>	<u>Employer</u>	<u>Undergraduate(s)</u>
Architerra PC	Alec Betters	Landcare	Declan Martin
Axton's Landscape and Nursery	Anthony Raimondo	Living Laboratory Research	Nick Bruce Candice Huntley Mike Welsh
Coastal Resiliency Design Studio	Delaney Pilotte	North Creek Nurseries	Michael McGowan
Glenstone Museum	Josh Gallin	Ruppert Landscape Company	Dan Hearne
Goodstay Center	Eduardo Limon-Cortez	UD Botanic Gardens	Austin duPlanti Josh McDevitt Juliahna Mistretta
Grand Teton Lodge Co.	Cole Garrett	UD Fresh to You Farm	Dave Griffin
HMD (Shanghai) Engineering Consultancy Shenzhen	Anqi Zhang	Village of Fork Branch, Lenape	Elisabeth Davis Kenly Velasquez

Events and Outreach

The UDBG 2021 summer interns, from left: Casey Bellanca, Ashlin Davis, Austin duPlanti, Juliabna Mistretta, Andrew Hill, and Josh McDewitt. (Photo courtesy of Rick Darke)



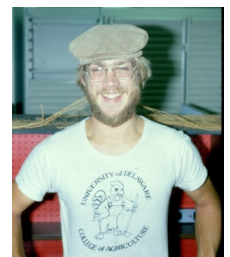
UDBG News:

The UDBG enjoyed a successful summer welcoming a super group of interns, joining forces with The Newark Partnership to host “Knowing Newark” showcasing the trial garden, hosting an Open Garden for members and donors where the UDBG interns served as the docents, and holding the final sale of the year. Four of the interns are continuing to assist in the garden, especially for the completion of the new planting along Roger Martin Lane. The UDBG will undergo a significant change after the September 30, 2021 retirement of Melinda Zoehrer. While well-deserved, she will be sorely missed. For those who have not heard the news, retired professor of horticulture Dr. Charles Dunham passed away peacefully on July 1, 2021. He was instrumental in the creation of the Clark Garden, which is the founding garden of the UDBG along Route 896 in front of Townsend Hall. He was continually proud of the ongoing development of the UDBG and when the garden at the south entrance of Townsend Hall was planted, it was named in his honor.

PLSC JEDI News: The summer 2021 book club on Lessons from Plants by Dr. Beronda Montgomery concluded with an enjoyable outdoor discussion on the UD Fresh to You Farm! Email mpautler@udel.edu if you are interested in the PLSC JEDI committee.

Ready – Set – Grow!

Let’s see what has grown for an alum! *Martin N. Culik* writes: “I graduated from UD in 1978 with a B.S. in Plant Science. While attending UD, I worked part-time during the school year and full-time during the summers for DuPont in their research greenhouses and farm in Newark. I also conducted a research project at UD in the summer of 1977 with Dr. William Liebhardt. After graduation from UD, I headed west and completed a M.S. degree in Agronomy at the University of Nebraska (UNL) in 1980. I then worked in soil microbiology for the USDA Agronomy Research Group at UNL. Following this work, I took on a position as agronomy research coordinator at the Rodale Research Center in Pennsylvania (now the Rodale Institute). Working again with Dr. Liebhardt at Rodale, my first assignment was to establish the Farming Systems Trial (FST). This research continues to this day in its 40th year; Rodale describes it as ‘the longest-running side-by-side comparison of organic and conventional grain cropping systems in North America.’ Following several years at Rodale, I spent almost 20 years as an Extension agent in Wisconsin and New York, working with the agriculture industry with crop decision making, watershed management, public policy education, and community development. In the past 15 years, I leveraged my agricultural education and experience to effectively work with renewable energy companies and landowners across the country developing wind, solar, carbon sequestration, and commercial battery storage projects. I retired in July, 2021.” (Photos courtesy of Martin Culik)



We encourage alumni to send us news to keep us informed! A new job, a promotion, a personal or professional award... they are all accomplishments we want to know! Email a note or a press release, including your graduation year, to mpautler@udel.edu. We are also seeking to showcase alumni stories and highlight the career paths of our former students to current and prospective students and their families. Provide a photo and description of your career path from your PLSC education to your current job (250-word limit) to mpautler@udel.edu.

Back Porch Business

[Make a gift to the Plant & Soil Sciences Department](http://www.udel.edu/makeagift/plsc) (www.udel.edu/makeagift/plsc) to support student success. Gifts to the department provide funding for student travel to research and professional development events as well as stipends for undergraduate summer research and Extension Scholars. You may also give to the College of Agriculture and Natural Resources or another PLSC program by selecting “Other” and searching for the fund you wish to support. Contact Dan Sarkissian, Sr. Director of Development, College of Agriculture and Natural Resources at 302-831-4595 or djs@udel.edu with any questions or concerns.

Edited by Maria Pautler, Research Associate and Erik Ervin, Chair
Department of Plant & Soil Sciences

531 S. College Avenue | Newark, DE 19716
Phone: 302-831-2534
<http://canr.udel.edu/plsc/>

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