



Myakka

Myakka ('my-yak-ah' - Seminole word for "big waters") gives a special identity to our department, as it is also the name of Florida's State Soil, Myakka fine sand. The State of Florida has the largest total acreage of Myakka fine sand (sandy, silicious, hyperthermic Aeric Alaquod) on flatwood landscapes.

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Soil &
Water
SCIENCES

Climate Conference



A Message from the Chair

The end of the fall semester, and its proximity to the end of the calendar year, make this a good time to reflect on what has been accomplished and what still needs to be achieved. I'm pleased with the Soil and Water Sciences Department's (SWSD) continued progress in many areas. Most importantly, we continue to grow.

For the Fall 2021 semester, enrollment in our undergraduate Soil and Water Sciences major increased 27%. While we are proud of that growth, we still need to boost our numbers in the SWS major. There was a slight dip in enrollment for the Interdisciplinary Studies: Environmental Management in Agriculture and Natural Resources major, which SWSD administers. Still, we have nearly 100 students pursuing that undergraduate degree, on-campus and online. Our graduate student ranks increased 22% from Fall 2020 to 2021. We suspect this is a result of better promotion and increased interest in our online master's degree option, our decision to end the GRE requirement for admissions, and easing of COVID-19 restrictions and a decline in the number of cases on-campus.



Likewise, we continue to grow our faculty. Two assistant professors will join SWSD in 2022. Dr. Ebrahim Babaeian will be our resident expert on soil physics. Dr. Márcio Nunes will focus on tropical soils. We are eager for them to arrive and begin developing their teaching and research programs.

Dr. Babaeian is currently a research assistant professor at Arizona State University. He earned his graduate degrees from Tarbiat Modares University in Tehran, Iran. His research focuses on the modeling of land surface variables and processes based on proximal and remote sensing observations, and the application of remotely sensed observations for soil, water, and crop management in agriculture, modeling crop water demand, and drought.

Dr. Nunes is a postdoctoral research associate at the USDA-ARS in Ames, Iowa. He earned his M.S. at Federal University of Pelotas and his Ph.D. at University of São Paulo. His focus is on soil physics and soil health in both tropical and temperate soils. His research has helped establish definitive methods for soil health assessment and scoring. He has already established an extensive network of international collaborations.

We hope you enjoy this issue of Myakka. Our cover story is a first-person account of the recent COP26 climate conference, which Kariel Stuart attended. The Interdisciplinary Studies: Environmental Management of Agriculture and Natural Resources major represented her home country of The Bahamas. She is a perfect example of an interdisciplinary student! At the same time, Kaile Zhang is a successful graduate student we are featuring. He is doing interesting soil research on nutrient cycling and crop productivity. In our alumni spotlight, you will read about the unique career path of Greg Gensheimer (Ph.D. 1985).

As always, please reach out to us anytime. You can contact me at mwhiles@ufl.edu. We hope your 2021 has been successful. On behalf of the SWSD, I wish you a healthy and prosperous 2022!



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The mission of the UF/IFAS Soil & Water Sciences Department is to provide knowledge and science-based solutions for addressing food security, public health, and protection of natural resources and environment in Florida, the nation, and the world.

Undergraduate student attends COP26 UN climate change conference

Kariel Stuart, a third year student majoring in Interdisciplinary Studies: Environmental Management in Agriculture and Natural Resources, participated in the annual climate change conference in Glasgow, Scotland. The Freeport, Grand Bahama, native was nominated because of her past involvement in environmental issues and passion for the issues related to climate change. She has also seen what climate change has done to her island nation. Here is Kariel's account of her week at the conference and what drives her to be involved in climate talks:

Hurricane Dorian

On September 1st, 2019, not even a full two weeks after I moved to Gainesville for University, my home was flooded and destroyed by Hurricane Dorian. We lost members of our community, we lost our hospital, our airport is still not fully up to code, and our infrastructure still has not been upgraded enough to withstand another storm like her. Dorian sat on top of my island for 41 hours at Category 5 wind speeds. I am very glad that my parents knew when to leave and find shelter, but my house was flooded and destroyed along with all the memories that were once there.

As much as I wanted to, I couldn't go home right away and honestly, I would have been more of a burden than of help to them. Another mouth to feed, and only salt water was running through the taps for a long time, so I'd have been using the very little fresh water available at the time. Instead, from here, I ran fund raisers and assisted in food drives until I could go back during the Christmas and Spring Break. This was when I did oil spill water sampling and site cleanup, as a crude oil tank had spilled on the Eastern end of Grand Bahama Island during the storm.

Getting the Invitation

I was nominated to attend COP26 based on several factors. After graduating high school, I received a scholarship award from The Bahamas Ministry of Education. That being said, my studies in this field, and consistent involvement in community service, have not gone unnoticed.



Kariel Stuart

In total, I have represented my country in the United Nations Headquarters three times. Once was representing my high school due to an invitation from The Ministry of Foreign Affairs. The following two times were for Model United Nations events.

I was told several people recommended me as Climate Change Youth Ambassador, and am truly grateful that the work I've done thus far has influenced the community enough to have made notable impact. I realize the weight of this opportunity and plan to take full advantage of the amplified voice it gives not only me, but the younger generation and all people on the frontlines of climate change.

Attending the Conference

On one hand, it's been a beautiful experience. I was able to learn so much more about climate change and how it affects others. I've also been able to share my perspective and leave a shadow imprint on people from all over the world, making connections that will last a lifetime. On the other hand, it's painful to hear these stories and extremely frustrating to know that we've been having this conversation on a UN platform since 1992-- yet the situation continues to get worse.

One of the most impressionable interactions I had was with the Mayoress of Freetown in Sierra Leone. My impression of her speech at a panel event on Urban Informality & Inequality was unlike anything I've ever experienced. I was absolutely inspired by every word she spoke and it's amazing how she was able to increase morale and implement methods that were convenient to the context of their situation.

I also attended seminars regarding proposals from the global assembly, ways to reengineer the planet, enhancing our natural environment, impacts on the agricultural and aquatic scene, and in general speaking with our government officials about how Dorian affected me and the changes I would like to see in my own community. I was the youngest person present in the delegation, so my main concern was trying to convey the youth perspective and the fear it brings us being left behind with the worst of what's to come.

Climate Change and The Bahamas

The Bahamas is one of the most at risk nations in regards to the consequences of climate change. With sea levels predicted to rise to at least a metre by 2100, it leaves 80% of the total land mass at risk of being submerged. Our coastal ecosystems are also being detrimentally affected by multiple factors including, but not limited to, rising temperatures, clearing of land, and construction on beaches. Most small island developing nations are faced with similar threats because they need funds and the tourist industry is the most lucrative. So, what do we do? This is a cycle of poverty-- a system in motion that will stay in motion without an opposing force.

As equally as we are at risk of erasure from climate change, we are a huge piece in resolving factors contributing to it. The nations facing the brunt of these issues are contributing the least

to it. The Bahamas' emissions equate to 0.001 percent of the total, but our coral reefs and forests act as carbon sinks and natural barriers from the impacts of storms and surges.

We are one of many nations that contribute more to the solution than we do to the problem. As our reefs diminish, they are more impaired and unable to continue absorbing carbon emissions for the planet. The Bahamas needs debt forgiveness and/or money to be able to repair the damages inflicted on our natural systems, as well as to erect structures with materials able to withstand the hurricanes that threaten us every year.

Small island developing nations are not in a position to maintain their resources because the immediate priority is finding money to put food on the tables, which brings the core issue back to needing industrialized countries to take accountability for their part in the issue. Our goals are for adaptation, mitigation, finance for loss and damages, and ultimately to find a plan for the longevity of our planet. By requesting funds and assistance, we're not asking for charity, we're asking for what we deserve. What we all deserve — a chance to see the future together.



Kariel Stuart in Glasgow, Scotland, outside the COP26 UN climate change conference.

COP26 Takeways

To be able to hear the plans and perspectives of nations from all around the world was truly an eye-opening experience, that's absolute. I was able to meet a lot of interesting people and was introduced to numerous possible solutions for adaptation and mitigation—both on a ground level and a political one. However, history rarely fails to repeat itself. This is not the first Conference of the Parties. This was not the first United Nations Conference on Climate Change. Headlines called this event our “Last Best Chance Against Climate Change” but the world has been vociferous of its climate-induced wounds for decades now, and should continue to talk about ways to evade its danger and move forward.

I do think this conference gives hope for inciting conversation and increasing public engagement. We need more people to care if we want a real shot at meeting our climate change goals. Conferences like this one provide a large platform capable of showcasing more of the parts of world we would never have been exposed to without it. COP26 was a chance for everyone to see how people are being affected beyond the lengths of our own personal experiences. Coverage is what is needed to connect human experiences to the tragedies we see on the news. It shows policymakers and large corporations the real extent of their carbon footprints. While some are beginning to acknowledge and make minimal changes, we need policy changes and funding towards this cause to be prioritized.

I'm not opposed to some degree of political involvement through my career. It may be needed, and I'm willing if that proves to be the case because policy change is crucial in the grand scheme of things. Changes can't be made without education about the systems that prevent it, so experience in science politics may be a necessary factor. Still, my passion lies in doing ground level work. Research and community service is my priority and I'd like to continue my studies at a graduate level after my gap year.

Sharing with UF students

I am being an advocate through Instagram! I'm working on creating another platform to spread awareness of these issues, but for now I upload the most major of my career experiences to @karieldanaestuart on Instagram.

The more I study in this field, as I get to know more about the world and the different issues all of our nations face, I now have a passion to work towards preserving not only my nation, but the entire world in any way I am able because it's going to take all of us to restore things to balance. Everyone has a role to play.

While it's taken some seriously discouraging moments to get here, I'm enjoying the road to figuring out what my role is. After graduating, I plan to take a gap year and get involved in environmental crisis response projects around the world. I'd then like to begin graduate level studies, my end goal being to start an Environmental Crisis Response and Research Center.

Dr. Ann Wilkie awarded the 2021 VP Promise Award

Dr. Ann Wilkie, research professor of bioenergy and sustainable technology in the Soil and Water Sciences Department (SWSD), is the recipient of the 2021 VP Promise Award. Wilkie is the inaugural winner of the award, from the UF/IFAS Office of the Dean for Research. The Promise Award recognizes Wilkie's exceptional mentorship of undergraduate students.



"At UF/IFAS, we value the mentorship of our young scientists, and Dr. Wilkie's program has been a shining example of that objective," said Dr. Robert Gilbert, dean for research.

Wilkie has mentored more than 75 interns through the UF/IFAS Summer Research Internship Program over the past two decades. She has also guided 16 University Scholars through their original research – from planning and data collection to analysis and publication of results.

"Dr. Wilkie's nomination by our office was met with resounding praise from the leadership of the College of Agricultural and Life Sciences and IFAS, as well as your department chair and the intern alumni with whom we made contact," Gilbert added.

Wilkie leads the [BioEnergy and Sustainable Technology \(BEST\) Lab](#) where undergraduate students help investigate and develop biological processes to sustainably remediate wastes, power our civilization, and provide nutrients for agriculture. Current focus includes diverting food waste from landfills for greenhouse gas emissions reduction and nutrient-rich compost production as well as cultivating algae for carbon capture and utilization.

"Through the BEST Lab, Ann offers opportunities for undergraduate students to conduct individual research projects in the lab and hands-on field work in the Student Compost Cooperative facilities and gardens," said Dr. Matt Whiles, professor and chair of the SWSD. "This is the ideal experience for an undergraduate student and Ann makes that happen for so many at UF."

Dr. Scott Angle, UF/IFAS vice president, said Dr. Wilkie's work with undergraduates allows those students to go out and make significant contributions almost immediately after graduation.

"Professor Wilkie favors a quote attributed to W.B. Yeats that I was struck by: 'Education is not the filling of a pail, but the lighting of a fire,'" Angle added. "I think that really well describes what we do when we work with students, especially through internships. Congratulations, Professor Wilkie, and thank you for all that you do."

Graduate Student Research Spotlight

Dissertation title: Long-term impacts of sod-based rotation (SBR) on soil communities, biologically-mediated nutrient cycling, and crop productivity

Kaile Zhang (Ph.D. 2022)

Topic

Kaile Zhang is studying sod-based rotation (SBR) systems, a system where a perennial grass (bahiagrass) is included in a traditional cotton-peanut rotation. Specifically, he wants to understand the dynamics of soil biota, such as bacteria, fungi, and nematodes, and their interaction and the mechanisms they perform in the soil in response to different types of rotation systems

Research Questions

If we integrate bahiagrass into the conventional peanut-cotton rotation system, could the diversity and community of soil microbes be altered and subsequently benefit crops to tolerate environmental stress and management practices, as well as increase yields?

If so, who are these microbes and what microbial-mediated mechanisms regulate such benefits?

Growing up in China, Kaile Zhang was exposed to agriculture at a young age. His grandparents farmed several acres of rice each year.

“I remember when I was in primary school, my grandparents would ask relatives to help them plant, fertilize, and harvest the rice,” Zhang said. “Normally, I was there to watch them how to work or try to plant rice for fun.”

While he couldn't help much with the work back then, now Kaile is working to help farmers increase their yields and boost soil health. He is studying [sod-based rotation](#) (SBR) systems. The SBR system is basically planting bahiagrass for two years, rotating to peanuts for a year, followed by cotton the next year. You then go back to bahiagrass.

“My research aims to understand how long-term SBR affects microbial-triggered soil nutrient cycling and crop productivity,” Zhang explained.

Kaile authored a [review paper](#) with his advisor, Dr. Sunny Liao, and co-advisor, Dr. Gabriel Maltais-Landry, which found that temporal crop diversity enhances primary productivity.

“Crop rotation can stimulate above and below ground interactions, which affects carbon allocation, rhizodeposition, and the growth of rhizome microbiome,” Zhang explained.

“Stronger above-belowground interactions will intensify ecological connections between microbial and faunal interactions among roots, rhizosphere, and bulk soil.”

He has another journal article in review based on his dissertation research. From a three-year cotton-root microbiome study, Kaile found that SBR mainly increased the cotton-root fungal diversity. The rotation assembled more beneficial microbial communities in cotton roots.

“These beneficial microbial communities are positively correlated to cotton yield across the three years,” Zhang said. “So, overall, these studies can improve our understanding of the microbial mechanisms in terms of how SBR can increase cash crop yield.”

While the results indicate SBR can increase yields, there is a question of economics.

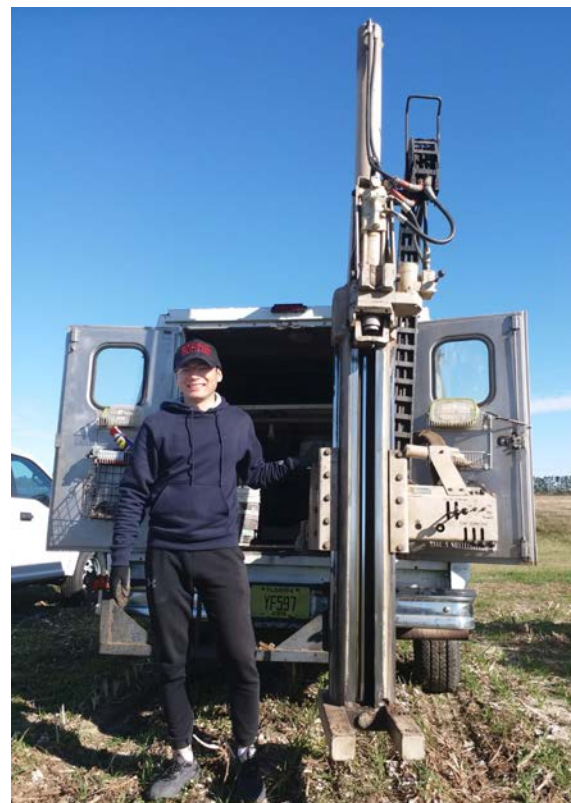
“We used a two-year bahiagrass rotation, but this may be unacceptable for the farmer – i.e., two years without growing a cotton or peanut cash crop. But Bahiagrass can be used as hay or feed for cattle, so it could balance out, but it depends on the specific context,” Zhang said. “From an ecological standpoint, it’s beneficial for farmers to grow bahiagrass for a year because it improves soil health.”

The Southern Sustainable Agriculture Research and Education program (SSARE) within the USDA has taken notice of his work. In 2020, Kaile developed a research proposal on SBR, focused on beneficial microbes, specifically the fungi *Mortierella*. He wanted to know how it regulates nitrogen transformations from the soil to the plant. SSARE is supporting two years of field research on this topic.

“Their recognition of my research and my hard work definitely motivated me to keep going on and study further in this area,” he said.

Kaile also credits his advisors’ support for keeping his research on track.

“All researchers face difficulties in academic life, such as performing experiments, data analysis, and writing manuscripts. When I encounter problems and it’s difficult to solve it by myself, I always discuss it with Sunny or



Kaile Zhang with the Geoprobe used to collect deep soils at his SBR field, North Florida Research and Education Center. (photo provided)

Gabriel,” Zhang said. “They are always happy to help me address those difficulties.”

Dr. Sunny Liao, assistant professor of soil microbial ecology, calls Kaile a high-achieving student with a great passion for science.

“I am pleased to find that through his Ph.D. work, Kaile has grown from a junior scientist to a microbiologist,” Liao added. “It is enjoyable to find Kaile collecting hundreds of his baby fungi from his field sites. He gets excited very easily by discovering the mysterious pigments produced from some of his baby isolates and the potential ability of some to use these metabolites/enzymes they produce to change soil chemistry.”



Kaile Zhang examines soil collected from a rhizobox at the North Florida REC.
(photo by Sunny Liao)

Dr. Gabriel Maltais-Landry, assistant professor of sustainable nutrient management systems, believes Kaile’s work is providing a better idea of what microbes are present in SBR systems relative to traditional cotton-peanut systems, and what those microbes do.

“We have several years of data showing that SBR increases yields and can lead to other soil benefits, but the role soil microbes play in driving these benefits remained unclear,” Maltais-Landry added. “Linking microbial communities to function is certainly among the topics of greatest interest in agricultural sciences, and Kaile’s work is providing really useful information on that. We won’t have all the answers by the time he graduates, but it’ll be a good start to help us better understand the role microbes play in these systems, and how we can manage them to maximize benefits.”

“Soil microbes are so mysterious,” Zhang said. “They are so tiny that we cannot see them with just our eyes, but they can drive a variety of soil functions, such as driving nutrient cycling, helping the soil and plants improve stress tolerance, etc. This is amazing and compelling!”

Awards, Honors, & Recognition

Soil and Water Sciences Department Awards Recipients

Graduate Students (advisor in parenthesis)

Quantitative Environmental Soil Science Pedometrics Award

Perse Mungofa (Schumann & Grunwald)

V.W. Carlisle Fellowship Award

Perse Mungofa (Schumann & Grunwald) and Qudus Uthman (Kadyampakeni & Nkedi-Kizza)

George J. Hochmuth Education Enrichment Award

Juma Bukomba (Lusk)

Sam Polston Fellowship Award

Kaile Zhang (Liao & Maltais-Landry)

William Robertson Fellowship Award

Miurel Brewer (Kadyampakeni & Kanissery) and Leandro Vieira-Filho (Silveira)

Ben Skulnick Fellowship Award

Rachel Fenn (Kadyampakeni & Kanissery)

Biogeochemistry Graduate Fellows Award

Ryan Champiny (Lin), Audrey Goeckner (Reisinger), and Gabriela Reyes (Smyth & Reynolds)

Undergraduate Students (advisor in parentheses)

Donald A. Graetz Education Award

Corinne Bregman (Curry/Enloe/Sisk) and Kariel Stuart (Curry/Enloe/Sisk)

Fredrick Smith Award

Paula Sanchez-Garzon (Curry/Enloe/Sisk)

George J. Hochmuth Education Enrichment Award

Kendall Breland (Bonczek/Sisk) and Zoe Spielman (Curry/Enloe/Sisk)

Outstanding Undergraduate Award

Roberto Ortez (Curry/Enloe/Sisk)

College of Agricultural and Life Sciences Scholarship Recipients

Soil and Water Sciences Graduate Students (advisor in parenthesis)

William C. and Bertha M. Cornett Fellowship

Kaile Zhang (Liao & Maltais-Landry), Franky Celestin (Lin & Mylavarapu), and Leandro O. Vieira-Filho (Silveira)

Doris and Earl Lowe and Verna Lowe Scholarship

Alexandra Bijak (Reynolds), Qudus Uthman (Kadyampakeni & Nkedi-Kizza), Clayton Nevins (P. Inglett and Strauss), Jamila Roth (Reynolds), and Audrey Looby (Martin and Reynolds)

M. Glenn and A. W. Morton Scholarship

Barbara Cory (Deitch)

Awards, Honors, & Recognition

Soil and Water Sciences Undergraduates (Advisor: Bonczek)

Doris and Earl Lowe and Verna Lowe Scholarship

J.P. Prescott and Amber Lopez

College of Agricultural and Life Sciences Scholarship

Maria Fletcher

Branan Scholarship

Kendall Breland

Ted C. Prosser Memorial Scholarship

Kendall Breland

Interdisciplinary Studies: Environmental Management in Agriculture and Natural Resources Undergraduates (Advisors: Curry/Enloe/Sisk)

Doris and Earl Lowe and Verna Lowe Scholarship

Justus Jones, Cordelia Collinson, Zoe Spielman, Bella Brush, Paula Sanchez Garzon, Nevaeh Renwick, and Mia Cabrera

Florida Rural Rehabilitation Corporation Off-Campus Scholarship

Caitlyn Claverie, Roberto Ortez, and Caroline Pride

Juice Products Association (JPA) Scholarship

Kassandra Coulsey

Qudus Uthman (Kadyampakeni & Nkedi-Kizza) and **Yasmeen Saleem** (Kadyampakeni) have been selected as *Encompass Scholars*. The program is designed to connect under-represented STEM students, science, and mentorship within the American Society of Agronomy, the Crop Science Society of America, and the Soil Science Society of America.

Samuel Kwakye (Kadyampakeni) placed fifth in the Ph.D. student poster competition in the “Soil Fertility and Plant Nutrition Division and the Nutrient Management and Soil and Plant Analysis Division” at the National ASA/CSSA/SSSA meetings.

Tanyaradzwa Chinyukwi (Kadyampakeni) received the Florida State Horticultural Society Student Travel Scholarship. She presented on “Evaluation of Varied Fertilization Rates on Root Growth and Distribution of HLB-Affected Valencia Orange Trees.”

Juma Bukomba (Lusk) and **Suman Jumani** (Deitch) received a Certificate of Outstanding Merit from the UF College of Agricultural and Life Sciences and UF International Center. They were recognized for “exceptional contributions of international students not just academic achievements but also other ways in which the students have distinguished themselves, made a substantial impact, and contributed to UF’s international profile and engagement.”

Awards, Honors, & Recognition

Samuel Kwakye (Kadyampakeni) received the Best Paper Award for the Citrus Section of the Florida State Horticultural Society. His paper was titled “Influence of Elevated Manganese Rates on Growth Parameters, Nutrient, and Biomass Accumulation of HLB-Affected Citrus Trees in Florida.”

Juma Bukomba (Lusk) was awarded second runner up in the Florida Ag Expo Student Poster Contest. His poster was titled “Understanding Nitrogen Dynamics and its Fate in Inorganic Forms in Sandy Soils under a cover crop system in Florida.”

Roberto Ortez (Curry/Enloe/Sisk) received the Karen and Mike Stuart Scholarship from the Florida Fruit and Vegetable Association (FFVA) and the R. Eldred Carpenter, Jr., Memorial Scholarship from the Florida Fertilizer and Agrichemical Association (FFAA).

Pommary Kem (Curry/Enloe/Sisk), a technical sergeant at MacDill Air Force Base, received the maintenance group *NCO of the Quarter Award* for the second quarter of 2021 and a Commendation Medal for meritorious service.

FACULTY

Dr. Matt Deitch, assistant professor of watershed management, and **Dr. Gabriel Maltais-Landry**, assistant professor of sustainable nutrient management systems, each received a 2021 CALS Innovation in Teaching Award. Students nominate faculty for this award, which recognizes innovation, excellence, and effectiveness of course material and teaching methods. Deitch teaches *Watershed Planning and Management* and *Conservation Hydrology*. Maltais-Landry teaches *Environmental Nutrient Management* and *Global Agroecosystems*.

Dr. Sam Smidt, assistant professor of watershed science, was named an associate editor for *Journal of Environmental Management*.

STAFF

Dr. Yuchuan Fan and **Dr. Marta Kohmann**, postdoctoral associates, received travel awards from the Soil and Water Sciences Department for having the top two presentations in the inaugural SWSD Post-Doc Lightning Talk Presentation.



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Please consider a donation to our Program Enhancement Fund and support students' activities, travel, and awards as well as the Soil and Water Sciences Research Forum. Learn how you can make a difference:
bit.ly/SWS_Enhancement_Fund

NIFA-sponsored research in the Soil & Water Sciences Department

The USDA's National Institute of Food and Agriculture (NIFA) doles out millions of dollars for research that advances agriculture-related sciences. As a land-grant partner institution, the University of Florida is eligible to apply for NIFA funding. Recently, several SWSD faculty members have received grant awards through NIFA. The research dollars aim to improve organic vegetable production, sub-tropical tree fruit, and data science in soil health.



Gabriel Maltais-Landry, assistant professor of sustainable nutrient management systems
NIFA project: Quantifying the nitrogen cycling benefits of different cover crops across different Florida organic vegetable production systems
Grant amount: \$496,271

One key practice in sustainable agriculture is the use of cover crops that replace bare fallow periods when no crops would typically be grown. Originally meant to reduce soil erosion, cover crops are now also used to control weeds and other pests. Additionally, they provide nutrient cycling benefits – the main focus of this study.

“This project is specifically focused on vegetables, which we grow here in Florida in the fall, winter and spring,” Maltais-Landry said. “Our cover crops, then, grow mostly during the hottest and wettest part of the year in these vegetable systems. This is different from most other U.S. systems when cover crops are typically grown during cooler months.”

His research team, led by Dr. Ariel Freidenreich, a postdoctoral associate, will plant three cash crops that are representative of important vegetable types grown in Florida: bok choy, zucchini squash, and bell pepper. These have different nitrogen demand and different growth forms. Sunn hemp, a legume, will be the main cover crop. Farmers like to use it because it reduces nematodes in the soil, and it could also add nitrogen to the soil through biological fixation. So, research trials will use Sunn hemp grown alone or in combination with other cover crops. This variation will show if mixtures could extend the duration of nitrogen release during cover crop decomposition. The team will also look into how much of that nitrogen goes to the next crop, in addition to measuring impacts on soil health indicators, soil microbes and nematodes.

“It’s not just about the nitrogen and cover crops, though. We’ll also compare nutrient management approaches,” Maltais-Landry explained. “One is based on composted manure because that’s often what organic farmers rely, just for the sake of cost. The other is a more integrated approach that uses different fertility sources.”

He said the team is harvesting the first round of cash crops, after the first summer of cover crops. The experiment will be repeated for summer-fall 2022.



Sarah Strauss, assistant professor of soil microbiology
NIFA project: Traditional and novel soil health
indicators for sub-tropical tree fruit
Grant amount: \$495,707

How do changes in soil health impact citrus and other sub-tropical tree crops? The research team will examine how quickly soil health can change in Florida's sub-tropical sandy soils and how specific changes in soil health might impact yield.

“Our goal is to find out what cover crops do to soil health in Florida groves,” Strauss said. “While there’s a lot of interest in soil health right now, much of the research and metrics for assessing it are not based on sub-tropical sandy soils like we have in Florida. To determine if soil health is improving, growers need to know what the best parameters are to measure. That includes determining which indicators are the most useful for monitoring the soil health of tree crops.”

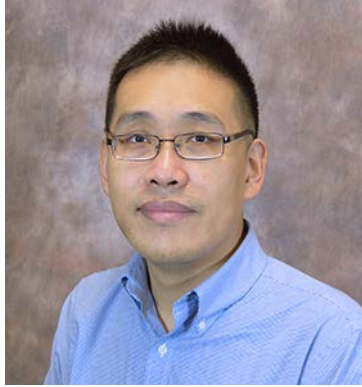
Improving soil health will hopefully improve productivity. However, sometimes impacts aren’t seen for several years. Strauss and her team want to know what indicators can be measured only once a year or more frequently that might show progress even if yield hasn’t changed yet. This would provide critical grove management information to growers faster.

The team will first measure soil physical, biochemical and microbial parameters involved in carbon, nitrogen and phosphorus cycling at two Florida citrus groves. This will provide a detailed assessment of the changes to the soil environment and microbial groups with cover crops. After measuring cover crop impacts on soil in the groves, scientists will see which soil health indicators can carry over to non-citrus settings. They will also share Florida-specific information with producers.

“In Florida, we can keep cover crops growing between the rows of trees all year,” Strauss pointed out. “So, metrics for how quickly things change in the soils for a tree with cover crops may be very different than in a vegetable or cotton field.”

Strauss said they will also compare results with some commercial soil tests to see how indicators relate to what is currently commercially available. Many commercial tests may not provide suggestions or recommendations specific to tree crops.

“Ultimately, this study will provide a list of meaningful soil health indicators that Florida producers can use to meet their unique needs in sub-tropical tree fruit systems,” she said. “Growing crops in Florida’s sandy soils is challenging, so if we can give producers an efficient, useful management tool, we want to do that.”



Yang Lin, assistant professor of soil health
NIFA project: Data science training for future leaders
in soil health research and extension
Grant amount: \$243,500

There is a shortage of data scientists in the fields of soil and water sciences. A team led by Dr. Yang Lin is recruiting graduate students from underrepresented communities who will go through a data-focused degree program.

“Data science plays a central role in translating the increasingly diverse, complex, and large soil datasets into actionable management practices.” Lin said. “That big data will sustain and improve soil health and help agriculture.”

The goal is to recruit a cohort of four master’s students and one doctoral student through the *National Needs Graduate Fellowship (NNF) Program*. Fellows will be recruited from historically underrepresented groups with focus on Black, Latinx, and indigenous American communities. The NNF grant will cover Fellows’ stipend, and UF/IFAS College of Agricultural and Life Sciences (CALs) will support Fellows with tuition waivers.

“We are excited to begin this project that will bring data analytics together with soil and water sciences,” Lin said. “Equally important are the underrepresented students who will take part in the program and have a clear path towards a job in data sciences, soil sciences, and water sciences upon graduation.”

Existing curriculum and new courses, such as *Soil Health and Data*, will prepare the students for careers in soil health research and extension. There will also be summer “Data Bootcamps” for the students.

“They will conduct team-based research in data and soil sciences,” Lin explained. “Also, our extension service program will allow them to develop a variety of education tools, including extension publications, for stakeholders.”

The five Fellows are expected to begin the data science training program in Fall 2022.

Learn more about our research:
soils.ifas.ufl.edu/research/

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UNIVERSITY of FLORIDA





Research briefs

Dr. Julie Meyer, assistant professor in microbial ecology and bioinformatics, has been awarded a new grant from the National Science Foundation to investigate the response of coral microbiomes to low oxygen conditions (hypoxia) that are exacerbated by climate change in tropical regions. The project is in collaboration with Dr. Andrew Altieri in UF's Engineering School of Sustainable Infrastructure & Environment and Dr. Rachel Collin of the Smithsonian Tropical Research Institute in Panama. Key questions include comparing the microbiomes of different coral species with varying resilience to low oxygen conditions and determining if and how the microbiome plays a role in this resilience.

Dr. Jehangir “Jango” Bhadha, assistant professor of soil, water, and nutrient management, has joined a national research effort to promote phosphorus sustainability across the United States. North Carolina State University will lead the team and work under the funding auspices of the National Science Foundation-Science and Technology Center (NSF-STC) in the newly established Science and Technologies for Phosphorus Sustainability (STEPS). One objective aims to facilitate a 25% reduction in human dependence on mined phosphates and a 25% reduction in phosphorus losses to soil and water resources within 25 years. STEPS funding is a five-year, \$25 million grant that is renewable for an additional five years.

Dr. Davie Kadyampakeni, assistant professor of citrus water and nutrient management, is working with colleagues at the UF/IFAS Citrus REC on regional management strategies for Asian citrus psyllid and HLB prevention in commercial groves and residential plantings. They will compare new tools that are intended to support young tree establishment that are currently available. At the same time, the team will develop management recommendations for each tool for both audiences. The work is funded with a grant from the USDA National Institute of Food and Agriculture (NIFA) Emergency Citrus Disease Research and Extension Program.

Dr. Mary Lusk, assistant professor of urban soil and water quality, has been awarded a new grant from the Tampa Bay Estuary Program. The project is called “Up in the Air and Down in the Water” and will research connections between atmospheric pollutants and water quality in Tampa Bay over the next two years. The grant is in collaboration with the Mote Marine Lab Red Tide Institute in Sarasota.

Alumni Spotlight: Greg Gensheimer's career path that brought him back to nature



Greg Gensheimer

Greg Gensheimer (Ph.D. 1985) has always enjoyed being active. He grew up playing ice hockey in his hometown of Pittsburgh, Pennsylvania. But Greg found that swimming, fishing, and playing soccer in sunny Florida were excellent pastimes to keep him busy while a graduate student in the Soil and Water Sciences Department.

“I would swim laps in Florida Pool or even play some water polo,” Gensheimer said, recalling his love of being active outdoors. Even collecting field samples in the hot, humid summer with a lab mate is remembered as a good time.

Greg came to UF after earning a bachelor's degree in wildlife biology and a master's degree in soil science at West Virginia University. He thought about starting his

career, but an eye-opening interview with a mining company in Wyoming and the prospect of a \$11,000 per year job in Kentucky pushed him to pursue a Ph.D.

“I got here and wanted to do phosphate mine reclamation. I was under the impression that there was a unified group of researchers working on that, but it wasn't the case,” Gensheimer said. “There were maybe half a dozen professors, all working on their own things, in different departments.”

After some ups and downs with choosing a project, Greg decided his dissertation research would focus on using a geostatistical method known as Kriging.

“We received permission to work on a reclaimed phosphate mine near Mulberry, Florida. I wanted to create a sampling method and figure out the variability of phosphate mine soil, because you couldn't map it like you can a regular soil.”

Greg did the bulk of his sample collection with a fellow student from Holland, Jacob Boss, who was in Dr. Mary Collins' lab.

“He's a great guy and he went with me – in the middle of summer – to drag a Giddings (hydraulic) probe all over the place to punch lots of holes,” Gensheimer said. “And that's what my dissertation was based on. I learned a ton.”

Blowing off steam

As the doctoral program went on, Greg was looking for new ways to take a break from school and get outside. Joining a soccer league was one answer. He was placed on a company team with employees of ESE, an environmental consulting firm with an office in Gainesville.

“In between games, I got to know them and talked about my work,” he remembers. “They invited me to come for a formal interview and in Spring 1984, I started working part-time.”

Greg went full-time with ESE later that fall. He was trying to complete his dissertation too. He does not recommend any Ph.D. student follow that path.

“I would work my nine-to-five, or six o’clock, and then drive to campus and stay until two in the morning. I’d go home and then do it all over again,” Gensheimer said. “I took Saturdays and Sunday mornings off but would be back at it later on Sunday.”

While the schedule was grueling, Greg found support from his fellow students. One was Eric Flaig. They shared a graduate student office in McCarty Hall and, for a short time, were roommates.

“Greg is a gregarious fellow. He’s easy going and always has a smile,” Flaig said. “But he’s a worker. He’d take on projects and get them done. I remember he worked a lot of late nights.”

Another McCarty officemate was Mark Seyfried.

“I remember we went fishing one time off a bridge near the coast,” Seyfried said. “Greg caught a ton of them. We went to his relative’s house and had a giant fish fry.”

Seyfried said the graduate students were like an extended family. He recalls spending Thanksgiving together at least once and inviting Greg to his wedding.

Career

In one way, Greg Gensheimer was in a good position at the end of his doctoral program. He already had a full-time job and was enjoying success in it. But he admits he was burnt out working more than 40 hours a week and trying to prepare for his dissertation defense. While it was tough, he earned his Ph.D. and could focus on his job with the consulting firm.

“ESE was a big company – about 1,000 employees. In one year, I brought in 10% of its revenue, just by myself because I brought in my own projects,” he said.

In 1993, several of his projects were winding down and his brother had a unique proposition for him.

“He was at a mutual fund company in Pittsburgh and PNC Bank there had hired environmental experts, so the mutual fund company said if PNC needs an expert, maybe we do too,” Gensheimer said. “My brother said, ‘Don’t you do this kind of stuff? I think the company wants to hire you.’”

Greg was interested and took the job. Unfortunately, it didn’t work out.

“The junior execs who hired me didn’t tell the senior execs what they were doing,” he said. “At that time, the liability was potentially so significant that the seniors weren’t going to get in at all.”

He moved into insurance but realized quickly that was not going to last. Then another door opened. Someone in the company’s 401k group told Greg they needed help.

“They asked what I knew about 401k investments. I said, I have one. Then they asked, ‘What do you know about writing proposals?’ I told them I can do that,” Gensheimer said. “It took a long time to learn the product, because it’s just like talking soil physics to somebody in the insurance business – what are you talking about? What does that word mean?”

Eventually, the company he was working for shut down sales. He moved on, landed a job at SunTrust, and headed back to Florida. But it wasn't long until his brother called him again.

"My brother started a company in 1999. I refused to move back to Pittsburg, but I went up there for the summer of 2000 to help them take the business plan and make it work," he said. "In 2006, the venture capital folks, who really owned the company, sold it to an insurance business in Oregon. That's where I ended up and that's where I retired in 2019 as an investment advisor."

Back to Nature

Before he retired, Greg had a side job of sorts. He helped create the Green Mountain Scenic Byway in 2002. It is a 501(c)3 non-profit that creates economic development opportunities through nature, heritage, and recreation-based tourism. It was needed, just as the housing boom in central Florida was about to explode.

"Through community planning, I can work on the scenic byway and we're not controlling growth, but we can try to guide growth, so we have a sense of place and a sense of community," Gensheimer said. "If we do things the right way and bring tourists into the area, and sustainable recreation, then they're going to leave their money behind so it's economic development."

By the late-2000s, the housing bubble burst and developers were out of business. Greg and his community partners saw the opportunity to try to bring in trails.



The scenic overlook at Lake Apopka.
(photo from Green Mountain Scenic Byway)

"I got onto the Lake County Land Acquisition Advisory Committee, and I was chairman of that for a couple of years. I was just trying to buy properties to save greenspace for the county," he said. "About that time, St Johns River Water Management District was getting close to ending the pesticide clean-up within the 20,000 acres of farmland along the Lake Apopka North shore and they were about to open it up to the public. We started working with anybody and everybody to put trails out there. Now we have 20,000 acres with trails all through the place."

The crowning jewel, in Greg's mind, is the trailhead and scenic overlook on the northwest side of Lake Apopka.

"We wrote a grant and got \$800,000. Lake County pitched in another \$400,000 or \$500,000. It's a great facility," he said. "It makes me feel good. I look at it and I think, I built that."

"His tower is something else and it's a pretty park," Eric Flaig said of the trailhead. "Greg's roots are in wildlife, so he's back to his roots after spending years away from it."

"If I hadn't taken a couple of soil science classes in college, I don't know what I'd be doing, so keep your options open," Gensheimer advised. "In my wildest dreams, I never ever imagined I'd be a 401k person, but I like solving problems and helping people. You just never know. Allow yourself opportunities to see what's out there."

Congratulations

Summer 2021 Graduates

Advisor(s) in parenthesis

Ph.D.

Victor Guerra (Mackowiak & Dubeux)

Clayton Nevins (P. Inglett & Strauss)

Nan Xu (Bhadha & Mylavarapu)

M.S.

Heather Donnelly (Smyth)

Jung-Chen Liu (Mackowiak & Blount)

Vaasuki Marupaka (Mylavarapu)

Amanda Rodriguez (Nair)



Congrats!

Congratulations

Summer 2021 Graduates

Advisor(s) in parenthesis

B.S. Interdisciplinary Studies: Environmental Management in Agriculture & Natural Resources

(Advisors: Curry, Enloe, and Sisk)

Samuel Bowling

Erin Downey

Megan Hammond

Benjamin Luchka

Charla Markesteyn

Guillermo Melendez Gonzalez

Erika Sakers

Bryce Tawil

Kyle Thayer

Soil & Water Sciences Minor

(Advisor: Bonczek)

Kyle Thayer

SWSD WELCOMES OUR NEW STUDENTS!

Ph.D. Students

Advisor(s) in Parenthesis

Xue Bai (Bhadha & Smidt)

Franky Celestin (Lin & Mylavarapu)

Yaslin Gonzalez (Bacon & Maltais-Landry)

Noel Manirakiza (Bhadha & Lin)

Yuheng Qiu (Li)

Caroline Buchanan (Judy)

Justina Dacey (Smyth & Reisinger)

Miriam Gutierrez (Bhadha)

Jenna Reimer (Smyth & Reisinger)

Yasmeen Saleem (Kadyampakeni)

M.S. Students

Advisor(s) in Parenthesis

Alejandro Arteaga Garcia (Grunwald)

Connor Blais (Bhadha)

Benjamin Grubbs (Wilson)

Adam Kotin (Maltais-Landry)

Amy Kiley Napoles (Mackowiak)

Kristen Ramsey (Osborne)

Vanesa Rostan (Wilson)

Mohkam Singh (Bacon & Sharma)

Brandon Vulgamore (Daroub)

Dylan Barr (Lusk)

Natalie Carter (Daroub)

Bridgette Hattle (Daroub)

Kayleen Meinen (Fujimoto)

Chelsea Pearson (Maltais-Landry)

Sierra Richardson (Reisinger)

Devon Rutledge (Kadyampakeni)

Alton Smith, Jr. (Fujimoto)

Tasmeena Yousuf (Sharma)

Elaine Beauvis (Strauss)

Ashley Colon (Bhadha)

Jillian Kimmel (Daroub)

Alexander Miranda (Sharma)

Michael Pierce (Daroub)

Monika Ross (Daroub)

Jess Schoen (Osborne)

Xinya Yang (Judy)

B.S. Soil & Water Sciences Students

Advisor: Bonczek

Lee Ducharme

Laura Kleckner

Maria Fletcher

Amber Lopez

Alexander Hensel

Savannah Wright

B.S. Interdisciplinary Studies: Environmental Management in Agriculture and Natural Resources Students

Advisors: Curry, Enloe, and Sisk

Lizzy Adikes

Johnathan Ballou

Cameron Delgado

Daniel Gutierrez

Christopher Kimble

Jorge Perez

Robert Sierzega

Lily Willingham

Winnie Augustin

Jacob Chaires

Jason Doe

Giuseppe Masiero Caldas

Jonathan Marks

Jack Purkerson

Ryan Warner

Camila Zalazar

Sofia Aviles

Samantha Cote

Marissa Gibson

Kevin Miranda

Maria Reyes-Leon

Ashlyn Ritz

Rebekah Warrick

In Memoriam

Dr. Arthur “Art” G. Hornsby passed away on April 30, 2021, at the age of 81 in Gainesville, Florida. Hornsby was a successful soil scientist and extension specialist who made great contributions to the field of soil physics. He began his professional career with the U.S. Environmental Protection Agency before taking a job in 1983 with what is now the UF/IFAS Soil and Water Sciences Department. Hornsby mentored many undergraduate and graduate students during his 19-year career at UF.

Gilbert “Wade” Hurt passed away on August 13, 2021, at the age of 76. Wade was a devoted soil scientist for 37 years. He had a long career with what is now the USDA Natural Resources Conservation Service, where he began as a soil mapper and eventually became the State Soil Scientist of Florida. Wade retired from federal service in 2007 and accepted a courtesy appointment with the UF/IFAS Soil and Water Sciences Department, where he guest-lectured, taught classes on hydric soils, and served on graduate student committees until 2020.

Dr. Frederick “Fred” Rhoads, passed away on September 10, 2021, at the age of 85. He started his career as a soil surveyor in Mississippi and then Texas during which time he earned his master’s and doctoral degrees. In 1966, Fred began his long tenure with the UF/IFAS North Florida Research and Education Center in Quincy. He eventually retired from the University of Florida after 35 years as a professor of soil and water sciences.

Retirements



Greg Means

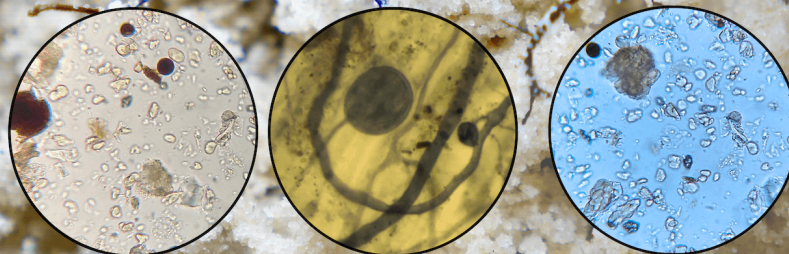
Greg Means, biological scientist, retired in August after 37 years of service with the UF/IFAS Soil and Water Sciences Department. Greg split his time with the department and in the lab of Dr. Rao Mylavarapu. While he was a scientist, Greg did many different jobs through the years. In addition to assisting dozens of graduate students with their field research, Greg helped with the statewide Certified Crop Adviser program. He developed training materials, distributed them to the centers, coordinated the Gainesville center, graded the tests, and developed the statistics. Greg was also good at drawing graphic illustrations, several of which are now part of our extension and research publications. We wish him the best in his well-deserved retirement!



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to enhance plant growth and
nutrient cycling.

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