

# 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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**FLORIDA**



**SOIL, WATER, AND  
ECOSYSTEM SCIENCES**

# A Message from the Chair

Greetings, from the Department of Soil, Water, and Ecosystem Sciences!

As you can see from the cover of Myakka, we have a new name. Why did we add “ecosystems” to the name? We feel that better reflects the breadth of research, teaching, and Extension activities across our department and programs. Faculty members and students in the DSWES are engaged in a wide array of research and educational activities including agroecosystem and ecosystem services management, landscape and watershed ecology and management, coastal ecosystem ecology and restoration, biogeochemistry, management of urban ecosystems, and the restoration and preservation of natural ecosystems. Most of the research, teaching, and Extension activities in the department focus on ecosystem scales. Including “ecosystem” in the departmental name also integrates soil and water, which are the foundations of ecosystems.



We believe the new name will enhance student recruitment, particularly at the undergraduate level, as “soil and water sciences” does not resonate with many of today’s students. Alternatively, “ecosystem” and related terms like “ecosystem services” are more appealing and more closely linked to the many career options and higher education opportunities available for students graduating from DSWES programs. Most faculty members and students in the department do not currently identify as soil scientists or water scientists per se; most have broader views of their research, teaching, and Extension activities, and the name change will convey this. For those who do identify as soil or water scientists, keeping both “soil” and “water” reflects their programs and expertise. Faculty members discussed the potential name change during a faculty meeting and a subsequent vote showed 91% supported the move.

Our current students have shown enthusiastic support for the proposed name change. Beginning in the fall of 2019, I asked graduate students during exit interviews about the proposed name change. Their responses were overwhelmingly positive. Similarly, shortly after I arrived, I had two lunches with groups of undergraduate students, and they also were positive and enthusiastic about the addition of “ecosystems” to the name. We hope you also agree that our new name is an appropriate fit!

Please enjoy this issue of Myakka. On the following pages you will learn about our newest faculty member, marvel at the career of another who is retiring, and be proud of the accomplishments of our students and alumni. Feel free to contact us anytime. You can reach me at [mwhiles@ufl.edu](mailto:mwhiles@ufl.edu).

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The mission of the UF/IFAS Department Soil, Water, and Ecosystem Sciences 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.

## Dr. Pedro Sanchez retires

After more than 60 years dedicated to improving the management of tropical soils, Dr. Pedro Sanchez is retiring from the UF/IFAS Department of Soil, Water, and Ecosystem Sciences (SWES). He came to UF in 2016 as a research professor. He also holds positions as a core faculty member in the UF/IFAS Food Systems Institute and an affiliate faculty member of both the UF Center for African Studies and Latin American Studies.

“When I started my career, there was so much I wanted to do. Now, I look back and think – I did all that?” Sanchez said. “Then, I knew it was time to consider retiring.”

Born and raised in Havana, Cuba, he learned about agriculture on the family farm and fertilizer business. He came to the United States to attend Cornell University. He would earn all three of his degrees there. In 1968, he began his academic teaching and research career at North Carolina State University and stayed there until 1991. After that, he served as director general of the World Agroforestry Centre (ICRAF) in Nairobi, Kenya, for a decade. Sanchez also spent 14-years at Columbia University before coming to UF.

“I wanted to bring back tropical soils as a focus of the department here and I’m happy to say that has happened,” he said.

Specifically, Sanchez has taught a Tropical Soils Management course for graduate students and was able to complete the second edition of his textbook, *Properties and Management of Soils in the Tropics*. The book is being translated into Spanish, French, and Brazilian-Portuguese. He and other colleagues have made repeated trips to Africa with a focus on soil health. Sanchez has also been instrumental in building a relationship between UF/IFAS and Federal University of Lavras (UFLA) in Brazil.

“Pedro Sanchez brought to UF/IFAS an inspiring example of how to change the world through agriculture,” said J. Scott Angle, UF’s senior vice president for agriculture and natural resources and the leader of UF’s Institute of Food and Agricultural Sciences. “His reputation opened doors for us around the world that may yet result in future partnerships and breakthroughs in the grand challenge of feeding the world.”

Dr. Jack Payne, retired UF senior vice president for agriculture and natural resources, hired Sanchez in 2016. Payne approached him after hearing rumors that Sanchez was interested in the Food Systems Institute that UF/IFAS was creating.

“He had a great career – World Food Prize laureate and MacArthur Award winner – so he definitely fit in the category of preeminent



Dr. Pedro Sanchez



Dr. Jack Payne and Sanchez talk before meeting with UFLA administrators in May 2019.

scientist,” Payne said. “We were lucky to get Pedro and his wife, Cheryl. They both brought legitimacy to the Institute.”

Dr. Cheryl Palm is a professor of soil biological and ecological processes in the Agricultural and Biological Engineering department. Payne said both are great scientists and great people who are passionate about their work and improving the environment.



Sanchez in Ghana with representatives of the Ministry of Agriculture in Ghana (right) and the African Development Bank. (Photo provided)

The list of honors Sanchez has received is long. In addition to the 2002 World Food Prize and being named a MacArthur Fellow in 2004, he is a member of the National Academy of Sciences, anointed elder of the Luo community of western Kenya, and holds four honorary degrees.

Even though he has accomplished much, there is something left unfinished. Sanchez wanted to connect with his native Cuba.

“One regret is that we could not build a relationship with Cuba,” he said. “Some of that was out of our control, due to government relations. I hope that is something UF/IFAS can do in the future.”

His retirement does not mean an end to the work he has done in tropical soils. Plans are in place to sustain and grow research and teaching in that area. Dr. Marcio Nunes will join SWES this fall as an assistant professor of tropical soils.

“I’m happy a new faculty member is coming to carry on with the work,” Sanchez said. “I look forward to helping Marcio settle in here. I also want to take him to Africa to meet the key collaborators.”

“Pedro has accomplished so much in the six years he has been at UF,” said Dr. Matt Whiles, professor and chair of SWES. “The relationships he has with researchers around the world have benefited our students and faculty and will also help our new tropical soils faculty member build his program. The class Pedro taught is very popular with graduate students. We are proud to have been his home base for the final phase of his career.”

Sanchez and Palm, who is also retiring from UF/IFAS, are staying in Gainesville, but have not decided where to settle in one of Florida’s coastal areas, yet. He plans on keeping in touch with the department. However, spending time with his children and grandchildren – as well as fishing – will be priorities now.



Sanchez and Dr. Cheryl Palm (third from right) in Zambia. (Photo provided)

## **Golmar Golmohammadi, Assistant Professor Watershed Hydrology and Biogeochemistry**

Dr. Golmar Golmohammadi is the newest member of the UF/IFAS Department of Soil, Water, and Ecosystem Sciences.

In January, she started her job as an assistant professor of soil and water sciences at the UF/IFAS Range Cattle Research and Education Center near Ona (Hardee County) to start a program called “Watershed Hydrology and Biogeochemistry.”

Golmar completed her Ph.D. in hydrologic modelling from McGill University in Montreal. She continued her educational experience by serving as a postdoctoral fellow at the University of Guelph. Since then, she has served in the academic and private sectors as a research associate/lecturer for the University of Guelph and for Aquafor Beech Ltd. in Canada.

Through these efforts Dr. Golmohammadi helped implement strategies of best management practices and selection of alternative solutions to best protect watersheds. In most of her work, she has developed hydrological models, while considering water quality, ecological aspects of the watershed and the interactions between ecological and hydrological components of each watershed.

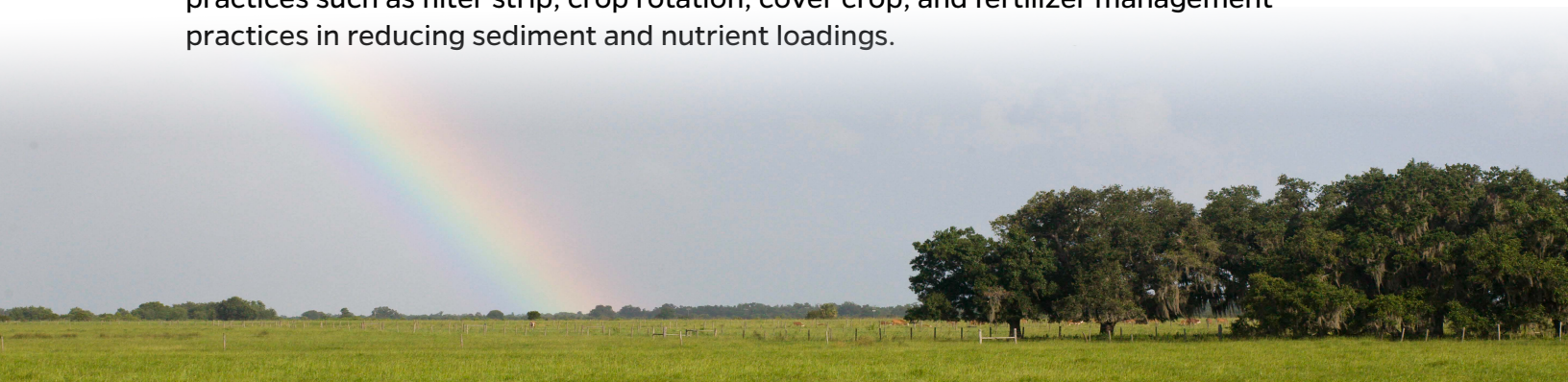
Golmar’s research and Extension programs will focus on watershed-scale management of soil and water resources of grazinglands throughout central and southern Florida including Southwest Florida.

One of the main objectives of this program would be to conduct a long-term evaluation of the effectiveness of BMPs on cattle ranches in central and southern Florida. The program can inform cattle producers about the environmental and economic benefits of providing water quality enhancements on private ranches as well as conservation easements in Central and South Florida. The program’s research emphasis will be on hydrologic processes including water management and hydrologic field and modeling studies of contaminant transport, transformation, and fate processes.

The program will work on sustainable water management practices to conserve water considering water quality and quantity, with a goal to identify realistic and sustainable solutions. The efforts will be placed to evaluate the effectiveness of various conservation practices such as filter strip, crop rotation, cover crop, and fertilizer management practices in reducing sediment and nutrient loadings.



Dr. Golmar Golmohammadi











# FACULTY

Yuncong Li, professor of soil and water quality, was elected as a Fellow of the American Association for the Advancement of Science (AAAS).

Pedro Sanchez, research professor of tropical soils, was appointed by President Biden to the President's Committee on the National Medal of Science.

Dr. Ann Wilkie, research professor of Bioenergy and Sustainable Technology, was co-author of a High Impact journal article, selected by the UF/IFAS Dean for Research Office as one of ten articles for special recognition.

Association of Natural Resources Extension Professionals (ANREP) and the Florida chapter of the association (FANREP) award winners:

AJ Reisinger, assistant professor of urban soil and water quality, and Mark Clark, associate professor of wetland ecology, are part of the team that received an ANREP Innovative Program Achievement Award for Sustainable Floridians Benchmarking and Monitoring Program.

Ashley Smyth, assistant professor of biogeochemistry, received the Outstanding Extension Specialist award from FANREP. She also received 2<sup>nd</sup> Place in the Long Publication category as part of the team that submitted Florida's Handbook for Municipal Action on Climate Change.

Davie Kadyampakeni, assistant professor of citrus water and nutrient management, received an Early Career Seed Grant for \$50,000 from the UF/IFAS Office of the Dean for Research. He will be studying reclaimed water use for the irrigation of blueberries.

Sam Smidt, assistant professor of watershed science, Jango Bhadha, assistant professor of soil, water, and nutrient management, and other IFAS colleagues were selected for an \$8,000 Let's Talk About Water event through the Consortium of Universities for the Advancement of Hydrologic Science, Inc. (CUAHSI). They will be making a movie on the Social Responsibility in Water Science for the Greater Global Good.

Kelly Morgan, professor of soil fertility and water management, was one of 14 UF/IFAS faculty members recognized for receiving a \$1 million+ external grant in 2021.

Davie Kadyampakeni, assistant professor of citrus water and nutrient management, was elected to serve as the vice leader for the American Society of Agronomy's crop irrigation strategies and management community.

## Wilkie part of team honored for high-impact research

When it comes to conducting research that has high impact, Dr. Ann Wilkie has a distinctive skill set that leads to her participation in many interdisciplinary studies. For the second time in three years, Wilkie is a co-author on research the UF/IFAS Dean for Research Office considers “high impact.” The most recent honor for the research professor of bioenergy and sustainable technology in the Department of Soil, Water, and Ecosystem Sciences (SWES) involves South American birds and fungi in a study that reveals the importance of native bird species in spore dispersal.

For “Discovering the role of Patagonian birds in the dispersal of truffles and other mycorrhizal fungi,” published in *Current Biology*, Wilkie worked with Dr. Matthew Smith in the Department of Plant Pathology. The study was part of lead author Marcos Caiafa’s dissertation research. For her part, Wilkie drew on her experience as a microbiologist to design the epifluorescence microscopy protocols and developed the staining technique used in the study to examine representative fecal samples and estimate the fungal spore load and spore viability.

“This was such an interesting research project to work on,” Wilkie said. “I was pleased to contribute my knowledge toward a protocol for analyzing the samples and interpreting the results.”

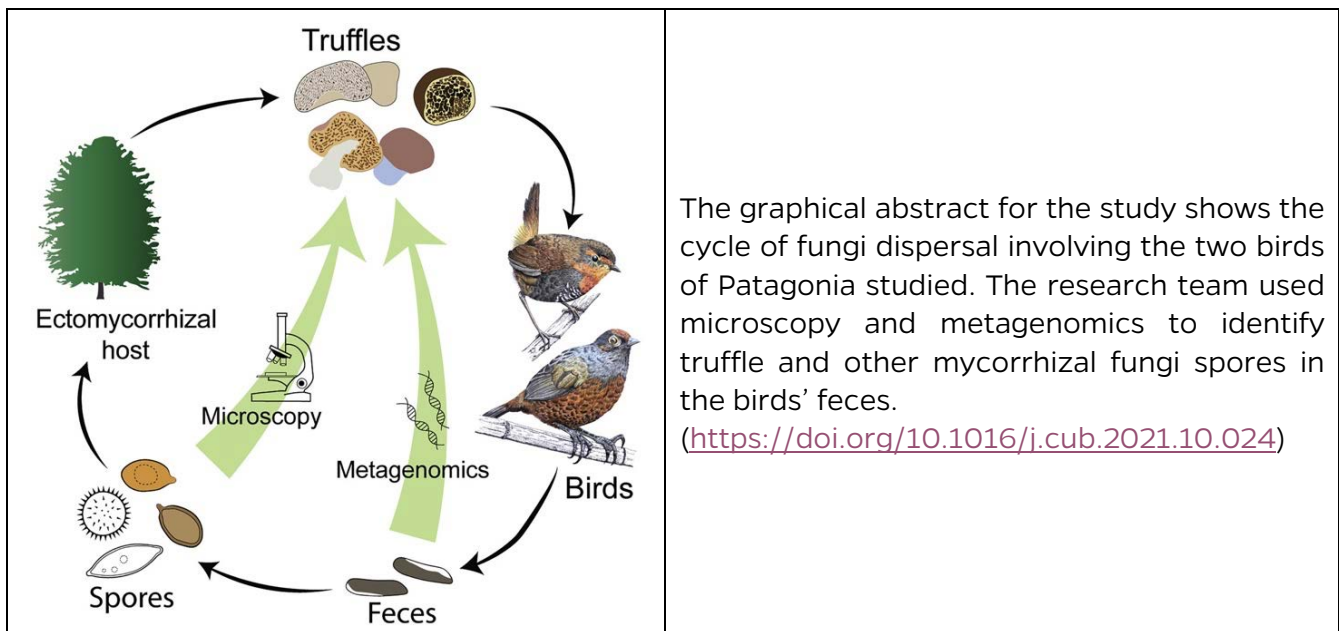
This research explored the role of two native Patagonian birds, chucao tapaculos (*Scelorchilus rubecula*) and black-throated huet-huets (*Pteroptochos tarnii*), in the dispersal of plant-symbiotic mycorrhizal fungi. These birds concentrate their activity on the forest floor, scratching the ground like pheasants. The study used metagenomic analyses of fecal samples to show that the two endemic bird species consume a wide diversity of truffles and other mycorrhizal fungi that are symbiotically associated with *Nothofagaceae* (southern beech) trees that dominate Patagonian forests.

Epifluorescence microscopy of fecal samples indicates that a high proportion of fungal spores remain viable after passage through the birds’ digestive systems. The role of mammals in fungal spore dispersal is well documented, but the relevance of birds as dispersal agents of fungi has been understudied, despite the prominence of birds as seed dispersal vectors across the globe.



Dr. Ann Wilkie

The results show that fungi are a common food for both chucao tapaculos and black-throated huet-huets. Also, this animal-fungi symbiosis is widespread and ecologically important in Patagonia (with samples spanning more than 700 km across southern Chile). Evidence suggests that the birds are particularly important for the more than 45 species of truffles (enclosed fungi that fruit mostly belowground) that were detected in bird fecal samples, since those fungi are not capable of dispersing their spores via wind and therefore rely on animals to spread their spores. This research is important because it shows that birds may replace mammals as the principal vectors for the dissemination of fungal spores in certain habitats – a new and surprising finding that amounts to a paradigm shift in our understanding of bird-fungi interactions.



“This study is the first conclusive evidence for truffle dispersal by birds,” Wilkie said. “This has wide implications for the study of animal-fungal symbioses.”

“This is another well-earned honor for Ann,” said Dr. Matt Whiles, professor and chair of SWES. “She has an exceptional ability to investigate diverse topics and is a much sought-after collaborator because of her unique talents. I am particularly excited about this paper because it showcases the variety of research we do as a department that spans so many ecosystems.”

The research is one of ten receiving special recognition out of more than 2,000 published articles from UF/IFAS academic departments. Awardees were honored at a ceremony in early May. You can read the research article here:

<https://www.sciencedirect.com/science/article/pii/S0960982221014135>

## Undergraduate student helping farmers in Africa

Caitlyn Claverie is a UF Online student, majoring in Interdisciplinary Studies: Environmental Management in Agriculture and Natural Resources (EMANR). For the past two-years, she has been in the south-central African nation of Zambia. As part of a program called Farming God's Way, she and others are teaching sustainable farming practices in small villages.

"We've seen so many people transformed by this practice, both spiritually and physically," Claverie said.

During a recent presentation to faculty, staff, and fellow students, she highlighted the work she has done in Zambia. This includes teaching farmers how to grow crops using mulch to better retain soil moisture. She also shows them what tools and resources are available in their community.

"We don't want them to feel like they can't afford GMO seeds, commercial fertilizer, or fancy tools. Instead, we teach them to use what God has given them. They can use better farm management techniques and readily available livestock manure to increase their yields," Claverie explained.

The results are impressive. Claverie said during a successful rainy season, a typical one-hectare field in Zambia yields about 20-30 bags of maize. Under the Farming God's Way method, farmers are producing anywhere from 100 to 150 bags per hectare. She explained that one bag is about 50 kg of maize.



Mr. Fred (center) in the middle of his maize field. This was his first year doing Farming God's Way, and he has already seen success. Caitlyn Claverie (right) says people from surrounding villages will come to look at how well his maize is growing. (Photo provided)



Farming God's Way is based on continuously building relationships Claverie explained. "The team will go back to the place where they've taught and check on people's fields. They spend time with families to pray and encourage them." (Photo provided)



Claverie stands next to her anaerobic digester. All the materials were locally sourced, and she built the digester with her team. (Photo provided)



To build the microbiome in the anaerobic digester, Claverie added a mix of manure from the local village and water. (Photo provided)

Claverie's work is not exclusive to the field. She is trying to bring biogas to the villages as well.

"I'm using local materials accessible to the average Zambian to create 'free energy' with an anaerobic digester," she said. "Our inputs include manure and food scraps."

Many people in sub-Saharan Africa still cook over a campfire. Claverie points to deforestation and a shorter life expectancy due to smoke inhalation as problems associated with that practice.

"Biogas produces methane gas, which can be harvested to cook with," she explained. "A secondary byproduct is an organic fertilizer."

While she is teaching farmers, they also show her what is important in their culture.

"They are very hospitable people and will stop everything they are doing when a visitor comes to their home," she said. "They will also sit with that guest for hours. It was interesting to see how our often-rushed culture compared to theirs."

Claverie will return to Zambia this summer. She plans on spending another three years serving in the program. You can find more information about Farming God's Way here: <https://www.farming-gods-way.org>



Claverie believes in the importance of knowledge and the potential of biogas. She is teaching a group of Zambian students in the Overland Missions training program, how to build an anaerobic digester. She utilized items considered "trash" to build a small model. (Photo provided)

## From Soil Scientist to Soil Artist

Ken Van Rees (Ph.D. `89) retired from the University of Saskatchewan as a professor of forest soils last year. After spending more than three decades teaching and conducting research, the now-professor emeritus did not have to wonder about filling his time outside of the classroom. Since 2004, Van Rees has been using the tools of an artist as well as a pedologist.

You can read the story of the “epiphany” he had while standing in an Ontario-area art gallery on his website, [here](#), and how he cautiously incorporated art into a soil field course. Nearly 20 years later, Van Rees is an accomplished plein air painter who has exhibited his work in different parts of Canada. He also is one of the [Men Who Paint](#), a group of artists who get together to paint their landscapes outside.

“I enjoy looking at the various landscapes and trying to understand the processes that made them what they are today,” Van Rees explained, “but the greatest excitement is trying to capture them on canvas whether it is during the morning sunrise or standing in the silence as the snowflakes flutter around you.”



Drip Drop Spruce River 18 x 24" acrylic on canvas



Water as our Lifeblood 24 x 30" Mixed media (soil and acrylic) on canvas. This work from northern Saskatchewan tells the story of water percolating through the soil with river channels painted red to draw the parallel with blood flowing through our veins.

With his deep knowledge of soil, he also wanted to incorporate that into his art. With an interesting soil profile in front of him, Van Rees would press a small canvas thick with paint into the soil for a mixed-media effect. He and his students also created finely-ground pigments with different colored soils that were ready for the canvas.

“In 2012, I taught a course at the University of Saskatchewan's Emma Lake Kenderdine Campus with Allyson Glenn and Symeon van Donkelaar on using soil, bones,

and plant material to create pigments for painting,” Van Rees said. “There were five

graduate soil science students and five MFA students thrown together and it was exciting to see the interactions between art and science!”

## Charcoal Art

More recently, Van Rees has focused on charcoal art. It started when fire burnt a research plot where he was studying an aspect of carbon dynamics. As he was checking the damage done to his equipment, he noticed the interesting patterns that the charred remains left on his clothes.

“What started as a research program investigating the dynamics of root growth and carbon biomass of boreal species, has turned into a treatise with the burnt landscape to understand this new configuration of black carbon,” he explained. “Trees don’t all burn with the same intensity or severity, or even remain standing which results in different textures, patterns and sounds.”

Van Rees was left with more questions than answers: Where does all this black carbon go; does it disappear, get repurposed or remain permanently in the landscape? How do you capture this black carbon to represent fire impacted landscapes?

“My artistic interaction with these burnt charcoal remnants is based on scientific research methodology; where I observe, create hypotheses and test them with various experiments using a range of mediums at different spatial and temporal scales.”

His experimentation involved meandering through the forest with paper and canvas taking charcoal marks from burnt trees. Another method is leaving canvas on the burnt forest floor covered in charcoal logs to determine the effect of time and environment on charcoal breakdown and movement.

“In the end, this collaborative interface results in burnt trees contributing the charcoal on my canvas to create a deeper exchange about these transformed forests.” Van Rees said.



Ken Van Rees holding his newest charcoal work which involves leaving burnt logs on top of canvas in the forest for several months, resulting in these carbon transfers left on the canvas. Van Rees standing next to the charcoal artwork from his recent exhibition at the Mann Art Gallery in Prince Albert, Saskatchewan.

You can view more paintings by Ken Van Rees on his website: [www.kenvanrees.com](http://www.kenvanrees.com)