



Science Communication

A Message from the Chair - K. Ramesh Reddy

The need to broaden science communication to the public is becoming increasingly important. This responsibility lies on researchers who develop innovative solutions to address critical problems, in our case soil, water, and environmental issues that affect people's daily lives. Scientists are thoroughly trained in research and analytics and they communicate their findings with their peers through presentations at professional meetings and conferences and publications in journals and books. However, they are often poorly equipped to communicate the value of their scientific findings to general audiences. Many universities have academic departments that offer courses in science communication. Often these programs are more focused on theory and basic concepts of communication and offer limited opportunity to provide practical usable training to scientists in other academic disciplines. Much needs to be done to improve the effectiveness of science communication in all disciplines.

Scientists working in land-grant universities are normally exposed to communicating science to clientele through Cooperative Extension Service programs. These programs are designed to educate people so that they can solve problems. The Soil and Water Sciences Department (SWSD) has a cadre of Extension faculty located at the UF main campus in Gainesville and at eight Research and Education Centers (RECs) across the State of Florida.

These faculty members work with county agents and conduct educational programs that help Florida's citizens solve a wide variety of agricultural, urban and natural resource problems across the state. These programs are designed to "train the trainers" to communicate the value of science to identify practical solutions to solve problems. Florida's water resource issues of concern center on water quality impairment by nutrients and competition for freshwater supply. Thus, a large portion of the department's Extension effort is directed towards nutrient and water management for crop production and water quality protection in agricultural, recreational, and urban land use.

The ultimate goal of this statewide Extension effort is to help Florida strike a balance between viable agricultural production, urban growth, and natural resource protection that maintains a high quality and plentiful water supply for all users. The SWSD Extension faculty translate current, relevant soil, water, and environmental science knowledge into user-friendly formats for Florida residents, visitors, industry, business, governmental agencies and county agents. Formats include publications, presentations, on-site and on-line training programs, videos and other digital outlets. In this newsletter, we present a few examples of communicating science to these groups.

Sustainable Nutrient Systems in Florida Agriculture - An Overview

The SWSD offers highly visible educational programs in sustainable nutrient systems to extensive audiences throughout Florida to include commercial agricultural producers, green industries, crop professionals and consultants, IFAS Extension faculty, Master Gardener volunteers, homeowners, state and local agencies and commodity organizations. All activities are in direct support of the IFAS Super Issue #1: *The awareness and appreciation of our food systems and our environment* and the High Priority Initiative #1: *Increasing the sustainability, profitability, and competitiveness of agricultural and horticultural enterprises.*

Our programs are aimed at development of predictive and diagnostic procedures for soil, plant, water and waste analyses, interpretations and IFAS standardized nutrient recommendations, field calibrations, nutrient use efficiencies, development and implementation of Agricultural Best Management Practices for specific sensitive ecosystems in the state, Phosphorus Index tool, water quantity and quality interdependencies, etc. Some of the commodity-specific programs include citrus production systems, forage-livestock systems, precision agriculture, soil-microbial systems and soil health. We

are looking forward to a couple of new faculty members joining us in the Fall, when soil ecology and urban landscapes will likely be added to our multi-dimensional programs. For additional information, contact Rao Mylavarapu at: raom@ufl.edu.



Enhancing and Protecting Water Quality and Quantity, and Conserving Natural Resources

The SWSD plays a diverse role in implementing the UF/IFAS Florida Extension Roadmap. The Florida Extension Roadmap is a ten-year plan of action consisting of seven statewide initiatives and 22 working groups: <http://pdec.ifas.ufl.edu/roadmap/>. Extension faculty

within the department focused on natural resources mainly align with two of these initiatives, Initiative #2: *Enhancing and protecting water quality, quantity and supply*, and Initiative #3: *Enhancing and conserving Florida's natural resources and environmental quality*. Most of the program focus under these initiatives recently has been in the area of urban and agricultural water quality and strategies to integrate Low Impact Design practices in urban settings and improve BMP implementation and investigate innovative "enhanced BMP" practices on agricultural lands.

Efforts have also focused on interpretation and communication of the often complex regulations associated with federal and state water policy, including Impaired Waters, Minimum Flows and Levels (MFL), Numeric Nutrient Criteria (NNC), Total Maximum Daily Loads (TMDL) and Basin Management Action Plans (BMAPS), to name a few. The recent infusion of faculty, including many with Extension appointments, will significantly increase the department's programmatic involvement in these initiatives. This will expand our activity in urban environments with A.J. Reisinger, watersheds with Matt Deitch and coastal ecosystems with Laura Reynolds. We look forward to hearing more about their individual programs in the future. For additional information, contact Mark Clark at: clarkmw@ufl.edu.



Stormwater Ecological Enhancement Project (SEEP) on the UF campus. The site has been used extensively to educate developers, government officials, citizens and students about wetland functions and stormwater infrastructure and how the two can be combined to improve water quality and enhance the function of these parts of the developed landscape.



Soil Test Validation and Nutrient Recommendations

An appropriate and reliable predictive soil test is the first step for ensuring both agronomic and environmental sustainability by ‘preventing’ excess nutrient applications. Continuous validation of test interpretations and nutrient recommendations based on the Mehlich-3 soil test procedure is critical. Such studies aim to optimize phosphorus (P) and potassium (K) recommendations, guiding BMP implementation and monitoring in the state of Florida and directly minimizing water quality impacts. Two separate grant proposals



Post-doctoral associates and student at the study site planted to peanuts in Suwannee County during a visit by the FDEP official.

were funded by the Florida Department of Agriculture and Consumer Services and the Florida Department of Environmental Protection to accomplish these goals. During 2015-16, studies were conducted in north Florida on fields planted to bush beans, carrots, cabbage, broccoli, collards, watermelons and peanuts to compare responses to combinations of IFAS recommended and higher rates of P and K. Data from the first year trials showed that additional nutrient applications beyond the current IFAS recommendations did not yield any response for any of the crops at any of the locations and soils. Similar studies were also conducted on lettuce and sugarcane in Belle Glade, and on tomatoes in Homestead and Immokalee. The second year (2016-17) of the studies is being continued at these locations and also expanded to include forage and row crops. A large team of Soil and Water Sciences faculty members, along with those in Agronomy and Horticultural Sciences, has been assembled to accomplish these tasks to help guide P and K applications by the producers on different crops, soils and ecosystems of the state, minimizing the potential risk of environmental losses. For additional information, contact Rao Mylavarapu at: raom@ufl.edu.

Soil Testing Laboratory

The IFAS Extension Soil Testing Program successfully helped process over 18,850 soil, water, tissue and waste samples during the year 2016, an increase of approximately 11% from the previous year. Along with a new ICP, a new CNS Analyzer and a robotic pH meter have been added to the instrumentation this year. The revised standard soil test will soon include all macro- and microelements on the same report. Along with the other nutrients, sulphur and boron will now also be included with the tests. For additional information, contact Rao Mylavarapu at: raom@ufl.edu.



IFAS Educational Program for Florida Certified Crop Advisers

There are about 180 Certified Crop Advisers (CCAs) in Florida, with whom the commercial agricultural and horticultural producers in the state consult about all



production practices to sustain profitability and market competition while minimizing any negative environmental impact. To keep up the certification, the CCAs need about 40 units of Continuing Education credits every two years in four different topical areas, in which we organize training sessions in a 10-hour day format, twice a year. All four technical themes of production agriculture are covered - nutrient, soil and water, crop, and pest management. The sessions are videocast live to five locations across the state, and pre- and post-tests are administered at each location to determine knowledge gain. The following groups typically attend this program: CCAs from Florida and neighboring states, IFAS County Extension Agents, IFAS Extension Specialists, research scholars and graduate students. For additional information, contact Rao Mylavarapu at: raom@ufl.edu.

Precision Agriculture: Variable Rate Agriculture Begins with a Good Soil Map

On-the-go mapping of soil electrical conductivity, pH and organic matter is being demonstrated on-farm, in order to identify potential benefits for use in precision agriculture. Florida Department of Agriculture and Consumer Services is considering soil mapping and grid sampling as candidates for additional cost-share support. Interviews with Florida fertilizer distributors and farmers using variable rate applicators based upon soil maps affirm typical monetary input savings of 20% or more. For additional information, contact Cheryl Mackowiak at: echo13@ufl.edu.



Extension professionals gather for a demonstration of the Veris MSP3 soil mapping implement at a field in North Florida.

Forage-based Livestock Production Systems: Soil and Nutrient Management



The Soil and Water Sciences Extension program at the Range Cattle Research and Education Center, Ona, Florida, addresses the agronomic and environmental challenges associated with soil nutrient management in forage-based livestock production in Florida. Because maintenance and management of soil fertility is central to the development of sustainable beef cattle production in the state, our major goal is to develop, deliver, teach, and facilitate implementation of soil nutrient management programs that result in economically sound forage production while protecting soil and water resources. For additional information, contact Maria Silveira at: mlas@ufl.edu.

Citrus Production Systems: Citrus Under Protective Screen (CUPS) – Lake Alfred

One of the citrus Huanglongbing (HLB) disease prevention options being pursued at the Citrus Research and Education Center (CREC) is to grow the trees under protective screen houses to exclude the psyllid insect (HLB disease vector). The photograph illustrates the one acre research and extension demonstration screen house at the CREC, which has proved a valuable resource for both scientists and growers. Three growers recently adopted the CUPS technology in 50 acres of new grove and more are following their example. We are assisting them with proper irrigation and fertigation techniques by installing monitoring stations in their CUPS (example links below).

KLM Farms: <http://166.130.8.210:4252/weewx/>

EiP Citrus: <http://172.109.133.69:4242/weewx/>



For additional information, contact Arnold Schumann at: schumaw@ufl.edu.

Citrus Production Systems: Citrus Under Protective Screen (CUPS) – Ft. Pierce



Citrus growers are interested in a screenhouse demonstration project and its effectiveness for excluding Asian citrus psyllid and HLB prevention. The Soil and Water Sciences Extension program at the Indian River Research and Education Center focuses on citrus production systems. Multiple field tours were conducted at the Containerized Undercover Production System (CUPS), where we demonstrated that CUPS excluded HLB and psyllids from the trees, resulting in disease-free trees. Because of the demonstrated effectiveness of CUPS, several growers are now building their own structures to grow HLB-free citrus. For additional information, contact Alan Wright at: alwr@ufl.edu.

Citrus Production Systems: Water & Nutrient Management

The Soil and Water Sciences Extension program at the Citrus Research and Education Center, Lake Alfred focuses on addressing the challenges in irrigation and nutrient management in citrus production systems in Florida. The Extension program includes best water and nutrient management practices, improved nutrition programs of citrus, improved water management for cold protection, and exploration of highly efficient micro-irrigation systems. For additional information, contact Davie Kadyampakeni at: dkadyampakeni@ufl.edu.



Citrus Production Systems: Soil Microbiology



Microbial mats at Southwest Florida citrus grove.

The Soil and Water Sciences Extension program at the Southwest Florida Research and Education Center, Immokalee focuses on the soil microbial communities in citrus production systems. Grower observations are extremely helpful. A local grove manager recently approached our Extension specialist about black mats he found around young citrus trees that looked healthier than other trees of similar ages. Preliminary observations showed that these “black mats” are consortia of soil bacteria and fungi that may be fixing nitrogen. Currently, work is in progress at the REC with other colleagues in the department to determine how these mats might help the growth of citrus. For additional information, contact Sarah Strauss at: strauss@ufl.edu.

SWSD Social Media and Blog

The Soil and Water Sciences Department is currently connected on Twitter, Facebook, YouTube, Flickr, and LinkedIn. Students, faculty and staff can also contribute to our blog (<http://blogs.ifas.ufl.edu/swsdept/>). If you are interested in staying up to date with the latest SWSD news and information, sign up for our email list at <http://soils.ifas.ufl.edu/connect-with-us/>.



Rice Production Systems in South Florida

One of the Extension programs the Everglades Research and Education Center focuses on is promoting sustainable agricultural practices in and around South Florida by delivering science-based information related to soil sustainability, water quality and nutrient management. In South Florida each summer, nearly 25,000 acres of land are planted with flooded rice, a trend that has increased by almost 80% since 2008. The net value of growing rice as a rotation crop far exceeds its monetary return. In addition to being a food crop in Florida, production of flooded rice provides several benefits to the agroecosystem. By flooding fields, growers greatly reduce the negative impacts from issues related to soil subsidence, nutrient depletion, and insect pests.

In February 2017, we organized the first Florida Rice Growers Training and Workshop at the Everglades REC to discuss common concerns in rice cultivation. Follow us on Twitter: [@UFSustainableAg](https://twitter.com/UFSustainableAg). For additional information, contact Jehangir Bhadha at: jango@ufl.edu.



Coastal Ecology Extension Program



Laura Reynolds is a coastal ecologist interested in improving management and restoration of near shore habitats (e.g., seagrasses). She works with scientists and practitioners to identify and test the effectiveness of specific restoration techniques—using seeds vs. adult plants or sourcing plants from single vs. multiple populations—in maximizing plant persistence and function. Her Extension work also engages and educates citizens, who benefit from the functions those projects provide—fisheries and erosion control. For additional information, contact Laura Reynolds at: lkreynolds@ufl.edu.

Joe Rains Beach Living Shoreline Demonstration Project

Coastal erosion often results in human “hardening” of the shoreline using concrete and steel to protect infrastructure, often at a loss of wetlands and ecosystem services. An alternative approach is to promote and create wetlands, a.k.a Living Shorelines. A nearly completed project in Cedar Key, FL will be used to demonstrate this stabilization technique, evaluate implementation practices and investigate the ecosystem services this alternative provides. For more information, contact Mark Clark at: clarkmw@ufl.edu.



Video-based Communication

The SWSD recognizes the growing need to incorporate effective video-based materials into education and training programs. In an effort to provide county Extension faculty with supplementary visual materials to complement EDIS fact sheets for communicating topics related to soils, water and environmental science, SWSD faculty will be creating videos on a range of topics related to environmental management in agriculture

and natural resources. Videos will be available on our YouTube channel (https://www.youtube.com/channel/UCqQt-Ka0ZapaKwussUv_wg) and linked to fact sheets and related resources in the Video Topics section of our website (<http://soils.ifas.ufl.edu/extension/videos/>). For more information, contact Barbra Larson at: bcl@ufl.edu.



Jonathan Judy Joins the SWSD Faculty



Jonathan received his PhD in soil science from the University of Kentucky in 2013. His research there examined the potential effects of the unintentional release of nanomaterials from consumer products into terrestrial ecosystems. Jonathan continued his research in this area, focusing specifically on potential disruption of important plant-microorganisms symbioses, during a 3-year post-doc at the Commonwealth Scientific and Industrial Research Organization (CSIRO) in Adelaide, Australia. Jonathan's current research interests include surface chemistry, colloid-facilitated transport of contaminants and nutrients, and the ecotoxicology and environmental mobility of emerging contaminants. For additional information, contact Jonathan Judy at: jonathan.judy@ufl.edu.

Julie Meyer Joins the SWSD Faculty

Julie grew up between the Chesapeake Bay and the Atlantic Ocean and ever since she has been interested in understanding the connections between land and water. She earned her PhD in Marine Biosciences at the University of Delaware and a competitive postdoctoral fellowship from the Center for Dark Energy Biosphere Investigations at the Marine Biological Laboratory in Woods Hole. Julie has extensive expertise in bioinformatics to analyze the role of microbes in the environment. Her current work, partially funded by her 2015 L'Oréal For Women in Science award, focuses on microbial interactions in the establishment of coral diseases. For additional information, contact Julie Meyer at: juliemeyer@ufl.edu.



Masanori Fujimoto Joins the SWSD Faculty



Masanori obtained his dual PhD degree in Microbiology / Ecology, Evolutionary Biology & Behavior at Michigan State University in 2012. His postdoctoral work at the University of Michigan involved nutrient cycles in Lake Michigan. Prior to joining the SWSD, he was a Research Assistant Professor at Marquette University, where he was involved in projects including anaerobic digestion and biological phosphorus removal from wastewater. His current research at the SWSD focuses on the microbial diversity in regulating phosphorus cycle in the Everglades Stormwater Treatment Areas. Fujimoto has a strong passion in understanding fundamental ecological processes and applying it to solving practical issues. For additional information, contact Masanori Fujimoto at: mfujimoto@ufl.edu.

Congratulations Spring 2017 Graduates!

PhD

Eunice Yarney (Clark)

MS

Noha Abdel-Mottaleb (Wilson)
Jennifer Bearden (Mackowiak)
Denise Breen (Wright)
Aaron Kinty (Wilson)
Andrew Land (Mylavarapu)
Michael Mertens (Toor)
Adam Orndorff (Daroub)
Eron Raines (Osborne)
Kara Verge (Jawitz)

BS - IS-EMANR

(Advisor - Curry)
Victoria Carpenter
Laura Duke
James Erich
Haley Glaab
Chelsea Hazlett
Angellica Karones
Ashia Sonnenberg

BS-SLS-SS

(Advisor - Bonczek)
Sara Baker
Jennifer Sarchapone

SLS Minors

(Advisor - Bonczek)
Nicholas Andreatchio
Chanja Cassini De Thury
Bridget Chalifour
Nicole Darrow
Haley Glaab
Melanie Grimmatt
Chelsea Hazlett
Daphne Lepretre
Bianca Moreno
Sophie Pacelko
Hannah Van Horn

Faculty, Staff and Students

Congratulations!

Sabine Grunwald was a recipient of the 2017 University of Florida Research Foundation Professor Award.

Sabine Grunwald, Jim Jawitz, Yuncong Li, Lena Ma and Maria Silveira were recipients of the 2017 IFAS Term Professorship Awards that recognize faculty excellence in recent contributions along with the potential for future accomplishments.

Angela Echeverry (IS - EMANR - Curry) was accepted to the CALS Leadership Institute:
<http://cals.ufl.edu/students/leadership-institute.php>

Welcome New Students Summer 2017

MS

Sara Baker (P. Inglett)

BS - IS-EMANR (Advisor - Curry)

Emily Gaskin
James Hayes
Pamela Jones

Mehdi Manseur
Mark Parrish
Elisa Williams

Mark Your Calendar... 18th Annual Soil and Water Sciences Research Forum

The 18th Annual Soil and Water Sciences Research Forum will be held on September 14, 2017, in Gainesville, Florida. The forum is designed to bring together representatives from state and federal agencies, private industry, faculty, graduate students, and prospective students interested in soil and water sciences. The forum will provide an opportunity for all those interested in soil and water sciences to interact with our students, faculty, and administrators on campus. We look forward to your participation in the forum. For additional information, contact James Jawitz at: Jawitz@ufl.edu.

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soils.ifas.ufl.edu/give

Myakka (pronounced '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, siliceous, hyperthermic Aeric Alaquod) on flatwood landscapes.