UF IFAS UNIVERSITY of FLORIDA

Soil & Water SCIENCES

SOIL AND WATER SCIENCES

17th Annual Research Forum

September 15, 2016

Making a difference in quality of life . . . for everyone.

INTRODUCTION

A Message from:

Dr. K. Ramesh Reddy

Chair, Soil and Water Sciences Department, UF/IFAS

Welcome to the 17th Annual Soil and Water Sciences Research Forum sponsored by the Soil and Water Sciences Department (SWSD), IFAS, and the University of Florida. The Forum is designed to bring together representatives from state and federal agencies as well as private industry, faculty, graduate students, and prospective students. The Forum provides an opportunity for all those interested in soil and water science to interact with our students, faculty, and administrators on campus.

The SWSD faculty are located both on the main campus in Gainesville and at several off-campus Research and Education Centers. The mission of the department is to conduct basic and applied research on soil, water, and environmental related problems associated with sustaining agriculture and protecting natural resources. Thus, our faculty and students conduct research and education in a wide range of ecosystems including: agricultural lands, urban lands, rangelands, forested lands, and wetlands and aquatic ecosystems, with emphasis on plant productivity, water quality, carbon sequestration, and greenhouse gas emissions. Research efforts are organized into the following thrust areas: Nutrient, Pesticide, and Waste Management, Soil, Water, and Aquifer Remediation, Carbon Dynamics and Ecosystem Services, Landscape Analysis and Modeling, and Wetlands and Aquatic Systems.

The keynote speaker for this year's Forum is **Dr. Pedro Sanchez,** Research Professor of Tropical Soils. His presentation is entitled **"Africa's Progress in Fighting Hunger: Science and Policy".** Dr. Sanchez's biographical information is posted in this brochure.

Research conducted by graduate students and post-doctoral fellows is the core of the SWSD research programs. At present 111 graduate students (including 54 Ph. D and 57 MS students, 88 undergraduates (10 SWS and 78 EMANR) and several post-doctoral associates support current research activities in the department. For this year's Forum we offer you select examples of the research conducted by three new faculty members who joined our department this year. Student presentations include 5 oral papers and 53 poster presentations. For those of you interested in our programs, please contact me or any one of our faculty members.

Thanks to the Faculty Research Forum Committee (Dr. James Jawitz, Committee Chair) for coordinating activities related to the Forum. Thanks to Kathryn McCurley, Joshua Papacek, Andres Rodriguez, Susan Curry, Barbra Larson, Angela Petringelo, Michael Sisk, Jessica Pardo and student volunteers for their excellent work in making arrangements for the Forum. Finally, I want to express my appreciation to all students, post-doctoral fellows, staff, and faculty for their active participation in the Forum. Assistance of judges in selecting best oral/poster presentations is greatly appreciated. We thank our collaborators from various state agencies and the industry for their support of our programs.

INTRODUCTION

Dr. Jack Payne

Senior Vice President for Agriculture and Natural Resources, UF/IFAS

Jack Payne is the head of the Institute of Food and Agricultural Sciences (IFAS). Prior to this he worked at Iowa State, Utah State, Penn State, and Texas A & M universities. He also spent 10 years leading conservation efforts for Ducks Unlimited. Now at his fifth land-grant university, he is passionate about the research, teaching and extension missions and insists that land-grants will have to play a central role in meeting many of the grand challenges of our times. Jack Payne has led IFAS since 2010. In the last six years, he's kept the organization strong despite lean state budgets and is now coming off a year in which IFAS brought in more than $140 million in research grants and $30 million in private donations and pledges. Payne received his MS in Aquatic Ecology and Ph. D. in Wildlife Ecology from Utah State University and is a graduate of the Institute for Educational Management at Harvard University.

Dr. James L. Anderson

Professor and Director, Institute for Sustainable Food Systems, UF/IFAS

James L. Anderson is Professor of Food and Resource Economics and Director of the Institute for Sustainable Food Systems at the University of Florida. Prior to joining the University of Florida, he was the Advisor for Oceans, Fisheries and Aquaculture and leader of the Global Program on Fisheries and Aquaculture at The World Bank. Before that he chaired the Department of Environmental & Natural Resource Economics, University of Rhode Island. His research focuses on the global food and natural resource systems, fisheries and aquaculture economics and policy, markets and international trade. Recent work has been directed toward the role of seafood in food security, constraints to aquaculture development, and evaluating how aquaculture and well-designed public-private partnerships are changing global natural resource use in both developed and developing nations.

INVITED SPEAKER

Dr. Pedro A. Sanchez

Research Professor, Institute for Sustainable Food Systems and Soil and Water Sciences Department, UF/IFAS

Prior to joining UF/IFAS, Dr. Sanchez served as Director of the Agriculture and Food Security Center and Senior Research Scholar at Columbia University's Earth Institute. He served as Director General of the World Agroforestry Center (ICRAF) headquartered in Nairobi, Kenya from 1991-2001, as co-chair of the United Nations Millennium Project Hunger Task Force from 2002 – 2005, and as director of the Millennium Villages Project from 2004 – 2010. Sanchez is Professor Emeritus of Soil Science and Forestry at North Carolina State University where he was in the faculty from 1968-1991 leading the Tropical Soils Research Program. He has lived in Cuba, the Philippines, Peru, Colombia and Kenya, and supervised research programs in over 25 countries of Latin America, Southeast Asia, and Africa.

Sanchez has written groundbreaking books on tropical soil science and hunger and he is author of 200 publications (including 9 in Science and Nature as first author). He is a fellow of the American Association for the Advancement of Science, American Society of Agronomy, Soil Science Society of America and honorary member of the Cuban, Peruvian and Colombian Societies of Soil Science. He is the 2002 World Food Prize laureate, a 2004 MacArthur Fellow, and was elected to the American Academy of Arts and Sciences in 2008 and to the National Academy of Sciences of the United States in 2012. At his induction, Ralph Cicerone, president of the National Academy, summarized why Pedro was elected a member: "Sanchez has led path-breaking research on soil management for improved food production in the tropical world. His work has influenced research in agronomy, ecology, and changed the way technology is used to increase food production."

PROGRAM

OPENING SESSION - Welcome & Keynote Speaker
Rion Ballroom - J. Wayne Reitz Union

8:15 am – 9:00 am	Registration
9:00 am – 9:05 am	***Opening Remarks*** **K. Ramesh Reddy** Soil and Water Sciences Department Chair
9:05 am – 9:15 am	**Jack Payne** IFAS – Senior Vice President for Agriculture and Natural Resources
9:15 am – 9:30 am	***Introducing the Institute for Sustainable Food Systems*** **James L. Anderson** Director, Institute for Sustainable Food Systems Professor, Food and Resource Economics Department University of Florida
9:30 am – 10:30 am	***Africa´s Progress in Fighting Hunger: Science and Policy*** **Pedro A. Sanchez** Research Professor, Soil and Water Sciences Department University of Florida
10:30 am – 10:50 am	BREAK

SESSION I - New Faculty Oral Presentations
Rion Ballroom - J. Wayne Reitz Union

10:50 am – 11:50 am	**Invited Faculty Session** **Session Chair: James Jawitz**
10:50 am – 11:10 am	***Pedogenic Processes in No Person's Land*** **Allan Bacon,** Assistant Professor Soil and Water Sciences Department, University of Florida
11:10 am – 11:30 am	***Managing Water Resources to Maintain Human and Ecological Needs: A Watershed-scale Perspective*** **Matthew Deitch**, Assistant Professor West Florida Research and Education Center, Milton Soil and Water Sciences Department, University of Florida
11:30 am – 11:50 am	***Taking Steps to Understand and Manage Soil Microbial Communities for Agriculture*** **Sarah Strauss**, Assistant Professor SW Florida Research and Education Center, Immokalee Soil and Water Sciences Department, University of Florida
11:50 am - 1:00 pm	**LUNCH ON OWN**

PROGRAM

SESSION II - PhD Graduate Student Oral Presentations
Rion Ballroom - J. Wayne Reitz Union

1:00 pm – 2:15 pm

Graduate Student Oral Presentations
Session Chairs: Katie McCurley, Joshua Papacek, and Andres Rodriguez

1:00 pm – 1:15 pm

The Opportunist: How the Human Pathogen* Salmonella *has adapted to The Tomato Host
Andree George and Max Teplitski

1:15 pm – 1:30 pm

Characterization of Microbial Communities within Tropical and Sub-Tropical Peatlands
Elise Morrison, P. Thomas, B. Turner, S. Newman, T. Kahveci and A. Ogram

1:30 pm – 1:45 pm

Drivers of Peatland Soil Carbon Composition and Potential Greenhouse Gas Production: A Global Perspective
Anna E. Normand, Benjamin L. Turner, Jamie Lamit, Adam N. Smith, Ben Baisier, Mark W. Clark, Erik Lilleskov, Sam P. P. Grover, Alex W. Cheesman and K. Ramesh Reddy

1:45 pm – 2:00 pm

Impact of Floating Aquatic Vegetation Suppression on Canal Sediment Properties in the Everglades Agricultural Area
Anne E. Sexton, Samira H. Daroub, Jehangir H. Bhadha and Timothy A. Lang

2:00 pm – 2:15 pm

Soil Salinity under Seepage Irrigation and Irrigation Drainage Tile in Northeast Florida
Eunice Yarney and Mark Clark

SESSION III - Student Poster Viewing and Reception
Rion Ballroom - J. Wayne Reitz Union

2:30 pm – 3:30 pm

Poster Session I
Judging of Even Numbered Posters Will Occur During This Time

3:30 pm – 4:30 pm

Poster Session II
Judging of Odd Numbered Posters Will Occur During This Time

JUDGED POSTER TITLES & AUTHORS

1. ***Potential Remediation of Contaminated Surface Waters using* Acorus gramenius *(Japanese Sweetflag) and* Canna hybrida *'Orange Punch'***
   Noha Abdel-Mottaleb and P. Chris Wilson

2. ***A Methane Emissions Model for Broad Application***
   Carla Alonso-Contes, Stefan Gerber, Isaac Duerr, and Nikolay Bliznyuk

3. ***Phosphorus Forms in Freshwater and Estuarine Waters of an Urban Watershed***
   Sinan Asal and Gurpal S. Toor

4. ***Looking Inside the Black Box: Effects of Flow and Vegetation Type on Enzyme Activities in Constructed Wetlands of the Florida Everglades***
   Sara Baker, **Kaylee A. Rice**, Kanika S. Inglett, X. Liao and Patrick W. Inglett

5. ***Impacts of the Abundance of* Candidatus Liberibacter *on the Citrus Phyto-Microbiome and Insights to Bacterial Interactions That Could Control the Pathogen***
   Ryan Blaustein, Kelly Morgan, Graciela Lorca, and Max Teplitski

6. ***Application of Submerged Aquatic Vegetation as Bio-filter for Phosphorous Reduction***
   Jay Capasso, Jehangir Bhadha, Timothy Lang, and Samira Daroub

7. ***The Effect of Short Term Inundation on Potential Nitrogen Flux in Coastal Ecosystems***
   R. Collins, R. Mylavarapu, T. Osborne, and M. Clark

8. ***Phytoremediation of As-contaminated soils by As-hyperaccumulator* Pteris vittata*: Long-term Efficiency and Biomass Disposal***
   Evandro B. da Silva, Jason T. Lessl, Ann C. Wilkie, and Lena Q. Ma

9. ***Temperature Sensitivity of Denitrification in Sandy Pasture Soils***
   D. Katelyn Foster, Xiaolin Liao, and Patrick W. Inglett

10. ***Solid State and Solution Chemistry to Evaluate Phosphorus Release from Biochars***
    Andressa Freitas, Vimala D. Nair, Willie G. Harris, and Cheryl Mackowiak

11. ***A Discussion of Methods of Stakeholders' Mental Models of Soil Management Relating to Food Security in India***
    Claire Friedrichsen, Samira H. Daroub, Martha C. Monroe, John. R. Stepp, and Suhas Wani

12. ***Background Concentrations of Polycyclic Aromatic Hydrocarbons and Heavy Metals in Florida Urban Soils***
    Peng Gao, Jing Su, Evandro Barbosa da Silva, Leo Jackson da Silva Moreira, Timothy G. Townsend and Lena Q. Ma

JUDGED POSTER TITLES & AUTHORS

13. ***Pedogenic and Spatial Characteristics of a Massive and Understudied Soil Carbon Pool***
Yaslin Gonzalez, Allan R. Bacon, and Willie G. Harris

14. ***Oak Hammock Restoration on a Disturbed Site Adjacent to Payne's Prairie (Gainesville, FL)***
Robbie Guggeneheim

15. ***Distributed Wastewater Treatment Plants – A Sustainable and Economical Phosphorus Source through Struvite Recovery***
John Hallas, Cheryl Mackowiak, and Ann C. Wilkie

16. ***Evolution of Legume-Rhizobia Mutualism after 18 Years of Elevated CO_2 and N Availability***
Chelsea M. Hazlett, Kimberly J. La Pierre, and Ellen L. Simms

17. ***Analysis of Microbial Communities and N Cycling Associated with Groundwater Discharge in the Yucatan Peninsula***
Laibin Huang, Caitlin Young, Andrea Pain, Jonathan B. Martin, and Andrew Ogram

18. ***Land Application of Lignocellulosic Residual Wastes: Effects on Soil Biogeochemical Properties***
S. Jamis, K.S. Inglett, J.E. Erickson, L. Vardanyan, G.A. O'Connor, and K.R. Reddy

19. ***Effects of Varying Rates of P and K Fertilizer on Sandy Soil and Peanut Production***
A. Land, R. Mylavarapu, G. Means, R. Gautam, and F. Bortolozo

20. ***Anatomical Responses of* V. Americana *&* S. kurziana *to Water Column Nitrate Concentrations and Sediment Type***
Leah LaPlaca and Todd Osborne

21. ***Dissolved Organic Nitrogen in Runoff/Surface Water from Agricultural Fields***
Liguang Li, Zhenli He, Patrick Inglett, Malak M. Tfaily and Peter J. Stoffella

22. ***Simulating Everglades Carbon Fluxes and GHG Emission Under Varying Hydrology Parameterization in the Community Land Model***
Yan Liao and Stefan Gerber

23. ***Hyphenated Hydrology: Multidisciplinary Evolution of Water Resource Science***
K.L. McCurley and J. W. Jawitz

24. ***Vegetation Response and Elevation Change in a Perturbed Hydrologic Regime: The Subsidy-Stress Gradient in a Peat-Based Floodplain Marsh***
Sara A. Miller, Angelique M. Keppler-Bochnak, and Kimberli J. Ponzio

JUDGED POSTER TITLES & AUTHORS

25. ***Prototype Development of a New Soil Index Using Econometrics Method: Data Envelopment Analysis***
Katsutoshi Mizuta, Sabine Grunwald, Wendell P. Cropper, Wonsuk Lee, Gustavo M. Vasques, and Michelle A. Phillips

26. ***Nitrogen Forms in Gradient from Freshwater to Estuarine Ecosystem: Longitudinal Distribution, Bioavailability, and Source Characterization Studies***
Jariani Jani and Gurpal S. Toor

27. ***Revisiting Traditional Sedimentation Techniques and Redefining Soil Texture with Laser Diffraction Technology***
J. C. Pachon and A.R. Bacon

28. ***A Survey of Nitrogen Fixation Potential in a Subtropical Estuary (Indian River Lagoon, FL)***
Joshua R. Papacek, Edward J. Phlips, Margaret A. Lasi and Patrick W. Inglett

29. ***Open-pond Cultivation of Microalgal Polycultures on Landfill Leachate***
Marie D. Peralta and Ann C. Wilkie

30. ***Karst Depression Analysis and Landscape Pattern in Big Cypress National Park***
Carlos Quintero and Matthew Cohen

31. ***Influence of Carbon Lability and Flooding Treatment in Potential Oxidation of Histosols in the Everglades Agricultural Area***
Andres F. Rodriguez, Samira Daroub, and Stefan Gerber

32. ***Data Mining Reveals Relationships between Soil Carbon and Environmental Factors at Tier 2 Sites***
C. Wade Ross, Sabine Grunwald, Jason Vogel, Allan Bacon, Eric J. Jokela, Rosvel Bracho-Garrilo, Madison Akers, Joshua Cucinella, Andy Laviner, Daniel Markewitz, Tom Fox, and Tim Martin

33. ***Bioenergy Production from Sheep and Goat Manure***
Claudia M. Sanchez and Ann C. Wilkie

34. ***Evaluation of Organic Carbon Accumulation on a Mangrove Spoil Island***
Tracey B. Schafer, Rex Ellis, Caitlin Hicks-Priès, and Todd Z. Osborne

35. ***Risks from Biosolids-borne Ciprofloxacin and Azithromycin***
Harmanpreet Sidhu and George O'Connor

36. ***Carbon Stocks in a Shifting Ecosystem: Climate Induced Migration of Mangroves into Salt Marsh***
L.T. Simpson, T.Z. Osborne L.J. Duckett, and I.C. Feller

37. ***Student Compost Cooperative – Promoting Soil Health***
Mary Vasilevsky and Ann C. Wilkie

NON-JUDGED POSTER TITLES & AUTHORS

38. ***Short-Term Impacts of Litter Quality on Soil Carbon Accumulation***
Amanda Baldo, Bernardo M. M. N. Borges, Victor S. Ribeirinho and Maria L. Silveira

39. ***Optimization of Phosphorus Requirement and Yield Prediction in Bush Beans using Artificial Neural Network***
F. Bortolozo, R.S. Mylavarapu, L.M. De Oliveira, and G.D. Means

40. ***Use of Biosolids in Reducing Phosphorus Loss from Florida Agricultural Soils***
Biswanath Dari, C.L. Mackowiak, Vimala Nair, and J.P. Shirley

41. ***Fluoride Enhanced Arsenate and Phosphate Uptake in Fern Plant* Pteris ensiformis**
Suchismita Das and L.Q. Ma

42. **Pteris vittata *Reduced Arsenic Uptake by Lettuce in an As-contaminated Soil***
Letuzia M. de Oliveira, Julia Gress, Bala Rathinasabapathi and Lena Q. Ma

43. ***Predicting Optimum N Requirement for Irrigated Field Corn in Sandy Soils of North-central Florida***
Rajendra Gautam, George Hochmuth, Rao Mylavarapu, Heather Enloe and Anthony Drew

44. ***Sustainable Agriculture Research in Everglades Agricultural Area***
Raju Khatiwada, Jay Capasso, Samantha Brody, and Jehangir Bhadha

45. ***Pesticides Sorption Kinetics, Equilibria, and Column Transport Using Fertilizer Mixtures in Soils from Florida and Nigeria***
Jorge A. Leiva, Nasiru M. Danmowa, Peter Nkedi-Kizza, Kelly T. Morgan, James Jawitz and Chris Wilson

46. ***Determination of Fomesafen in Soil using Hybrid Extraction Techniques and LC/MS-MS Analysis***
Zhuona Li, Francisca O Hinz and P. Christopher Wilson

47. ***Identifying Hot Spots and Moments of Denitrification and Nitrogen Transformation in the Silver Spring Springshed, USA***
Xiaolin Liao, Patrick W. Inglett, Andy Canion and Dean Dobberfuhl

48. ***Bioenergy Recovery Scheme for Industrial Starch Crop and Associated Co-products***
Wendy A. Mussoline and Ann C. Wilkie

49. ***Navigating Environmental Fellowships: What is Out There and Tips for Success***
Ana Normand

NON-JUDGED POSTER TITLES & AUTHORS

50. ***Assessment of Flow Paths and Confluences for Saltwater Intrusion in a Deltaic River Network***
Xiaojing Shao, Baoshan Cui and Zhiming Zhang

51. ***Screening of Potassium Solubilizing Bacteria: A Sustainable Approach for K-Deficient Soils in Pakistan***
Ali R. Siddiqui, Letuzia M. De Oliveira, Sher M. Shahzad, Muhammad Ashraf, Shabana Nazeer, Bala Rathinasabapathi and Lena Q. Ma

52. ***Organic Phosphorus Forms in Wetland Soils by Nuclear Magnetic Resonance (NMR) Spectroscopy***
Lilit Vardanyan, Sue Neman and K.R. Reddy

53. ***The Response of Sediments and Dissolved Organic Matter to Rapid Rainfall in the Santa Maria da Vitoria Watershed, Espírito Santo, BR***
Nick D. Ward, Luciano Firme de Almeida, Genswesley Dias, Rebekka Gould, Amanda Tan, Thomas S. Bianchi, Alex V. Krusche, Richard G. Keil, and Jeffrey E. Richey

SOIL AND WATER SCIENCES LOCATIONS

Soil & Water Sciences Department
2181 McCarty Hall A
P.O. Box 110290
Gainesville, FL 32611-0290
(352) 294.3151
http://soils.ifas.ufl.edu

Citrus Research & Education Center
Lake Alfred
http://www.crec.ifas.ufl.edu

Everglades Research & Education Center
Belle Glade
http://erec.ifas.ufl.edu

Gulf Coast Research & Education Center
Wimauma
http://gcrec.ifas.ufl.edu

Indian River Research & Education Center
Fort Pierce
http://irrec.ifas.ufl.edu

North Florida Research & Education Center
Quincy
http://nfrec.ifas.ufl.edu

Range Cattle Research & Education Center, Ona
http://rcrec-ona.ifas.ufl.edu

Southwest Florida Research & Education Center, Immokalee
http://www.imok.ufl.edu

Tropical Research & Education Center
Homestead
http://trec.ifas.ufl.edu

West Florida Research & Education Center
Milton
http://wfrec.ifas.ufl.edu

Whitney Laboratory for Marine Bioscience
St. Augustine
http://www.whitney.ufl.edu

Thanks to the following co-sponsors of the 17th Annual Soil and Water Sciences Research Forum:

Environmental Hydrology Laboratory

Wetland Biogeochemistry Laboratory

UF Water Institute

Special thanks to Michael Sisk for event organization.

PLAN TO ATTEND

18th Annual Soil & Water Sciences Research Forum

Thursday, September 14, 2017
J. Wayne Reitz Union
University of Florida - IFAS
Gainesville, Florida

Help Minimize Waste at This Event!

The Soil and Water Sciences Department is committed to improving the health of our soils by composting all biodegradable materials from this year's Research Forum, including coffee grounds, food waste, and shredded paper. All compost-friendly waste will be processed by the Student Compost Cooperative, creating an organic soil amendment to feed the future. Be sure to use the appropriate composting and recycling containers during the event.

Cover Photo: T. Samson/CIMMYT