# Thanks to the following co-sponsors of the 15<sup>th</sup> Annual Soil and Water Science Research Forum

Environmental Hydrology Laboratory [James Jawtiz]
Everglades Soils Research Laboratory [Alan Wright]
UF-Water Institute
Wetland Biogeochemistry Laboratory



## PLAN TO ATTEND

16<sup>th</sup> Annual Soil & Water Science Research Forum
Friday, September 18, 2015
J. W. Reitz Union
University of Florida - IFAS
Gainesville, Florida

### This is a Zero Waste Event!

The Soil and Water Science Department is working to reduce waste from this year's Forum and aid the University of Florida's goal of producing **Zero Waste by 2015**.

For more information on Zero Waste Events, you can visit the websites of the **UF**Office of Sustainability and **UF** Biogas – A Renewable Biofuel.



# **SOIL AND WATER SCIENCE**15<sup>th</sup> Annual Research Forum



September 18, 2014
J. Wayne Reitz Union - Grand Ballroom

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

#### INTRODUCTION

Welcome to the 15<sup>th</sup> Annual Soil and Water Science Research Forum sponsored by the Soil and Water Science 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 and water-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 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 Forum is **Dr. Peter Groffman** from the Carey Institute for Ecosystem Studies, Millbrook, New York. His presentation is entitled "The Bio-Geo-Socio-Chemistry of Nitrogen in Urban Watersheds". Dr. Groffman'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 135 graduate students (including 61 Ph. D and 74 MS students, 50 undergraduates (14 SWS and 36 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 faculty members. Student presentations include 5 oral papers and 37 poster presentations. In addition, 6 graduate students are selected for the "Graduate Student Lightning Talk Competition" to present their research findings in 3 minutes to broader group of audience. 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 Anna Normand, Debjani Sihi, Susan Curry, Greg Means, Angela Petringelo, Michael Sisk, 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.

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Sincerely,

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#### SOIL AND WATER SCIENCE LOCATIONS

Soil & Water Science 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 700 Experiment Station Road Lake Alfred, FL 33850-2299 (863) 956.1151 http://www.crec.ifas.ufl.edu/

Everglades Research & Education Center 3200 E. Palm Beach Road Belle Glade, FL 33430-8003 (561) 993.1500 http://erec.ifas.ufl.edu/

Gulf Coast Research & Education Center 14625 County Road 672 Wimauma, FL 33598 (813) 634.0000 http://gcrec.ifas.ufl.edu/

Indian River Research & Education Center 2199 South Rock Road Fort Pierce, FL 34945-3138 (772) 468.3922 http://irrec.ifas.ufl.edu/ North Florida Research & Education Center 155 Research Road Quincy, FL 32351-5677 (850) 875.7100 http://nfrec.ifas.ufl.edu/

Range Cattle Research & Education Center 3401 Experiment Station Road Ona, FL 33865-9706 (863) 735.1314 http://rcrec-ona.ifas.ufl.edu/

Southwest Florida Research & Education Center 2686 State Road 29 North Immokalee, FL 34142 (239) 658.3400 http://www.imok.ufl.edu/

Tropical Research & Education Center 18905 SW 280th Street Homestead, FL 33031-3314 (305) 246.7000 http://trec.ifas.ufl.edu/

West Florida Research & Education Center 5988 Hwy 90 Bldg. 4900 Milton, Florida 32583-1713 (850) 983-5216 http://wfrec.ifas.ufl.edu

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#### **NON-JUDGED POSTER TITLES & AUTHORS**

- 30. Biochar Application Effects on Soil Phosphorus Sorption and Release.
  - Biswanath Dari, Vimala Nair, Rao Mylavarapu, and Willie Harris
- 31. An Energetic Perspective on Sweet Potato: Food versus Fuel.
  Wendy Mussoline and Ann Wilkie
- 32. Drivers of Methanogenesis Pathways in Subtropical Wetlands:
  Florida Everglades as a Case Study.
  Lucy Ngatia, Francisca Hinz, Anna Normand, Kanika Sharma Inglett,
  Patrick Inglett, Jeffrey Chanton, and K. Ramesh Reddy
- 33. Chromate and Phosphate Inhibited Each Other's Uptake and Translocation in Arsenic Hyperaccumulator Pteris vittata L. Letuzia M. de Oliveira, Jason Lessl, Julia Gress, Rujira Tisarum, Luiz Guilherme, and Lena Ma
- 34. Comparison of Soil Organic Nitrogen Composition and Mineralization by Vegetation Type in Subtropical Wetlands. Christine VanZomeren, Rupesh Bhomia, Malak Tfaily, Kanika Sharma Inglett, William T. Copper, and K. Ramesh Reddy
- **35.** *Toxicity of an Imidazolium-Based Ionic Liquid on Wheat.* **Jun Wang,** Lena Ma, Lusheng Zhu, and Tong Liu
- 36. Fate of Trace Organic Compounds Drip-Dispersal Septic System Drainfield.

Yun-Ya Yang, Gurpal Toor, and Chris Wilson

- 37. Root Colonization of Exophiala pisciphila Enhances Tolerance of Maize (Zea mays L.) to Cadmium.
  - Fangdong Zhan, Youngmei He, and Gurpal Toor

#### **INVITED SPEAKER**

#### Dr. Peter M. Groffman

# Senior Scientist & Microbial Ecologist Cary Institute of Ecosystem Studies

**Peter M. Groffman** is a Senior Scientist at the Cary Institute of Ecosystem Studies in Millbrook, NY, with research interests in ecosystem, soil, landscape and microbial ecology, with a focus on carbon and nitrogen dynamics. He received his PhD in 1984 in Ecology from the University of Georgia. Groffman is deputy director of the National Science Foundation funded urban long-



term ecological research (LTER) project in Baltimore that includes watershed, soil, plant, historical, socio-demographic and education and outreach components. Other recent research efforts include studies of winter climate change effects on nitrogen dynamics in forests, effects of atmospheric nitrogen deposition on nitrogen gas fluxes, nitrate dynamics in riparian buffer zones, effects of a whole watershed calcium addition on soil nitrogen and carbon cycling, and the effects of exotic earthworm invasion on soil nitrogen and carbon cycling. Groffman was/is a member of the U.S. National Committee for Soil Science, the National Science Foundation Long-Term Ecological Research network Executive Board, the NOAA Gulf of Mexico Hypoxia Nutrient Reduction Workgroup, the working Group on Aquatic Terrestrial Biogeochemistry at the National Center for Ecological Analysis and Synthesis (NCEAS), the Working Group on Trace Gas Fluxes at NCEAS, and the Expert Group on N<sub>2</sub>O and CO<sub>2</sub> Emissions from Agricultural Soils, IPCC/Organization for Economic Cooperation and Development (OECD) Programme on National Greenhouse Gas Inventories. He was a lead author for the Second (Wetlands) and Third (North America) Assessment Reports of the Intergovernmental Program on Climate Change (IPCC) and a Convening Lead Author for the 2013 U.S. National Climate Assessment Chapter on Ecosystems, Biodiversity and Ecosystem Services. He currently serves on the editorial board of Ecosystems and was chair of the Biogeosciences Section of the Ecological Society of America (ESA) (2009 - 2011), of the Soil Ecology Section of the ESA (1997 – 1999), and of the Wetland Soils Section of the Soil Science Society of America (2002 - 2003).

In the Baltimore Ecosystem Study, one of two urban long-term ecological research (LTER) projects funded by the U.S. National Science Foundation, we are using "the watershed approach" to integrate ecological, physical and social sciences. Watersheds are a natural (and well-used) physical unit for bio-geo-chemical research and can also function as a focus for human-environment interactions, i.e. bio-geo-socio-chemistry. Suburban watershed input/output budgets for nitrogen (N) have shown surprisingly high retention which has led to detailed analysis of sources and sinks in these watersheds. Creating positive feedbacks between ecological restoration and human preferences can be key for achieving specific biogeosociochemical goals in urban and suburban watersheds.

#### **PROGRAM**

Grand Ballroom - J. Wayne Reitz Union

| 8:30 AM  | Registration   |
|--|--|
| 9:20 - 9:30  | Dr. K. Ramesh Reddy Opening Remarks Soil and Water Science Department Chairman   |
| 9:30 -10:30  | The Bio-Geo-Socio-Chemistry of Nitrogen in Urban Watersheds Dr. Peter Groffman Senior Scientist & Microbial Ecologist Cary Institute of Ecosystem Studies  |
| 10:30 -10:50   | BREAK  |
| SESSION I - Oral Presentations Grand Ballroom - J. Wayne Reitz Union |  |
| 10:50 – 11:50  | Invited Faculty Session  |
|  | Session Chair: Dr. James Jawitz  |
| 10:50 – 11:10  | Soil and Water Management of a Bacterial Disease Imperiling U.S. Citrus Production.  Dr. Jim Graham, Professor Citrus Research and Education Center – Lake Alfred, I Soil and Water Science Department University of Florida |
| 11:10 – 11:30  | Biogeochemistry of Florida Springs. Dr. Patrick Inglett, Associate Professor Soil and Water Science Department University of Florida   |

#### **JUDGED POSTER TITLES & AUTHORS**

- 21. Effects of Different Land Uses on Base-Flow Nitrogen
  Concentrations on the Main Campus of University of Florida.
  Jiexuan Luo, Mark Clark, and George Hochmuth
- 22. Shifts in Microbial Phosphorus Requirements within a Sub Tropical Peatland.

Elise Morrison, Andrew Ogram, Susan Newman, and K. Ramesh Reddy

23. Soil Organic Matter Response to Climate Warming in a Subarctic Peatland.

Anna Normand, J. Hans Cornelissen, Mark Clark, and K. Ramesh Reddy

24. Determining the Effect of Salinity on Nitrogen and Phosphorus Preference in Harmful Algal Bloom Species from the Northern Indian River Lagoon.

Joshua Papacek, Edward Phlips, Margaret Lasi, and Patrick Inglett

25. Field Study of the Use of Aluminum Water Treatment Residuals in a Permeable Reactive Barrier System to Reduce Soluble Phosphorus Movement in Groundwater.

William Schmahl and James Jawitz

26. Removal of Arsenic by Magnetic Biochar Prepared from Pine Wood and Natural Hematite.

**Shengsen Wang**, Bin Gao, Andrew Zimmermann, Yuncong Li, Lena Ma, Willie Harris, and Kati Migliaccio

27. Long-term (1890-present) Actual Evapotrasnpiration Estimates for Silver Springs and Rainbow Springs Basins using the Budyko Framework.

Antonio Yaquian and James Jawitz

28. Irrigation Water Salinity Impacts in the Tri-County Agricultural Area, Northeast Florida.

**Eunice Yarney** and Mark Clark

FL.

29. Nitrogen Starvation of Algae – A Stress for Lipids.

Brett Nelson and Ann Wilkie

11:30 – 11:50 Biogeochemistry of Contaminants: From Molecular

Soil and Water Science Department

Dr. Lena Ma. Professor

University of Florida

Biology to Bioavailability to Plants and Humans.

#### **JUDGED POSTER TITLES & AUTHORS**

11. Greenhouse Gas Fluxes from Peatlands Influenced by Flooding and Draining Cycles.

**Jing Hu,** Christine VanZomeren, Kanika Sharma Inglett, Alan Wright, Mark Clark, and K. Ramesh Reddy

12. Nitrogen Speciation and Concentration Dynamics from Agricultural Fields to Indian River Lagoon.

**Liguang Li**, Zhigang Li, Suli Li, Zhenli He, Yongshan Wan, Xiaoe Yang, and Peter Stoffella

13. Rhizobacterial Community Structure in Two Chilean Volcanic Soils Revealed by Pyrosequencing.

**Lorena Lagos Pailla,** Oscar Navarrete, Fumito Maruyama, David Crowley, Maria de la Luz Mora, and Milko Jorquera

- **14.** Mass Balance of Phosphorus in the Drip-Dispersal Septic Drainfield. Sara Mechtensimer and Gurpal Toor
- 15. Florida Wildfires during the Holocene Climatic Optimum (9,000-5,000 BP).

Kalindhi Larios, Stefan Gerber, and Mark Brenner

16. Soil Water and Nutrient Use in Low-input Rhizoma Peanut-Bahiagrass Mixes.

**Jennifer Shirley,** Cheryl Mackowiak, Ann Blount, Diane Rowland, and Craig Stanley

17. Using Chitosan and Graphene Oxide to Produce Controlled Release Fertilizers.

Tiantian Li, Bin Gao, and Yuncong Li

18. Effects of Flood Level and Midseason Drawdown On Water Quality and Rice Yield.

**Mohsen Tootoonchi,** Timothy Lang, Jehangir Bhadha, Ronald Cherry, Dennis Odero, and Samira Daroub

19. Single Point Simulation Setup for Everglades using Community Land Model.

Yan Liao and Stefan Gerber

20. The Interaction between Phytophthora spp. and Candidatus Liberibacter spp. Damage to Citrus Fibrous Roots.

Jian Wu, Evan Johnson, Diane Bright, Kayla Gerberich, and Jim Graham

#### **PROGRAM**

11:50 - 1:00 LUNCH

#### SESSION II - Graduate Student Oral Presentations

Grand Ballroom - J. Wayne Reitz Union

1:00 – 2:15 Graduate Student Oral Presentations

Session Chairs: Anna Normand and Debjani Sihi

1:00 – 1:15 Biochar Application Effects on Soil Phosphorus Sorption

and Release.

Biswanath Dari, Vimala Nair, Rao Mylavarapu, and Willie Harris

1:15 – 1:30 Residential Exposure to Arsenic & Hexavalent Chromium

from CCA Wood.

Ky Gress and Lena Ma

1:30 – 1:45 Molecular-level Characterization of Dissolved Organic

Nitrogen in Urban Waters.

Mary Lusk, Gurpal Toor, and Patrick Inglett

1:45 – 2:00 Temperature Sensitivity of Anaerobic Carbon Processing

under Two Contrasting Rates of Warming.

Debjani Sihi, Patrick Inglett, Stefan Gerber, and Kanika Sharma Inglett

2:00 – 2:15 Back-diffusion from Thin Low-Permeability Layers.

Minjune Yang, Michael D. Annable, and James W. Jawitz

#### **PROGRAM**

## **SESSION III - Graduate Student Oral Presentations**

Grand Ballroom – J. Wayne Reitz Union

#### 2:15 – 2:45 Graduate Student Lighting Talk Competition

The Influence of Eutrophication Status on the Kinetics of Methane Oxidation in Soils from a Subtropical Freshwater Wetland.

Francisca Hinz

Greenhouse Gas Fluxes from Peatlands Influenced by Flooding and Draining Cycles.

Jing Hu

Molecular Ecology of Microbial Phosphorus (P) Cycling in Oligotrophic Peatlands.

Elise Morrison

Carbon Chemistry of Peatland SOM across Climate Zones.
Anna Normand

Field Study of the Use of Aluminum Water Treatment Residuals in a Permeable Reactive Barrier System to Reduce Soluble Phosphorus Movement in Groundwater.

Bill Schmahl

Understanding Spatial and Temporal Changes in Central Florida Waterbodies and Their Causes.

Antonio Yaquian

## **SESSION IV - Poster Viewing and Reception**

Grand Ballroom, J. Wayne Reitz Union

3:00 - 4:00 Poster Session I

Judging of Even Numbered Posters at This Time

4:00 - 5:00 Poster Session II

Judging of Odd Numbered Posters at This Time

#### **JUDGED POSTER TITLES & AUTHORS**

- Characterization of Coal Combustion Residuals in Florida.
   Evandro Barbosa da Silva, Xiaoling Dong, Julia Gress, and Lena Ma
- Use of Biochars Produced from Local Residue Feedstocks to Grow Sugarcane on Sandy Soils in South Florida.
   Odiney Alvarez, Samira Daroub, Jehangir Bhadha, Bin Gao, Barry Glaz, and Timothy Lang
- 3. Fitness of Tetracycline-Resistant Escherichia coli O:157 H7 Exposed to Sub-Lethal Doses of Tetracycline in Soil.

  Alexandra DeBose-Scarlett, Massimiliano Marvasi, and Max Teplitski
- Cadmium (Cd) Contamination of Cacao (Theobroma cacao, L.)
   Beans in Southern Ecuador: Its Nexus with Soil-Cd.
   Eduardo Chavez, Zhenli He, Virupax Baligar, B. Moyano, and Peter Stoffella
- Genes Involved with Nitric Oxide Biofilm Dispersal.
   Ian Durie, Massimiliano Marvasi, Keith Jenkins, and Max Teplitski
- Nitrogen Transport from Drip-Dispersal Septic System Drainfield to Shallow Groundwater.
   Mriganka De and Gurpal Toor
- Are We Getting Closer to or Further from Water? An Analysis of Human Distance to Water in the USA, 1790-2010.
   Yu Fang and James Jawitz
- 8. Nutrient Recovery from Small Wastewater Treatment Plants.
  John Hallas, Cheryl Mackowiak, and Ann Wilkie
- The Influence of Eutrophication Status on the Kinetics of Methane Oxidation in Soils from a Subtropical Freshwater Wetland. Francisca Hinz, Lucy Ngatia, Patrick Inglett, K. Ramesh Reddy, and Kanika Sharma Inglett
- Developing Sustainable Soil Management Practices for Shallow Organic Soils of the Everglades Agricultural Area.
   Stephen Jennewein, Samira Daroub, Jehangir Bhadha, Maninder Singh, Mabry McCray, and Timothy Lang

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