UCF | NanoScience Technology Center

UNIVERSITY OF CENTRAL FLORIDA

MATERIALS INNOVATION FOR SUSTAINABLE AGRICULTURE

MISA 2025 Conference

October 23 - 24, 2025

UCF | NanoScience Technology Center
UNIVERSITY OF CENTRAL FLORIDA

MISA

Welcome Remarks from the Chair

Dear Friends,

It is my great pleasure to welcome you to MISA 2025 – the Tenth Annual Symposium for Materials Innovation for Sustainable Agriculture!

The UCF MISA center was founded in 2016 through an effort to foster collaborations towards Materials Innovations for Sustainable Agriculture. The primary interest of our center was to tackle citrus greening and canker in Florida. Since then, our team has designed and developed several industrially viable pesticide and fertilizer formulations that have shown good efficacy in the field. Our aim is to impact overall crop productivity and nutrition, while decreasing the environmental risk factors. These new products would alleviate the excessive use of conventional crop protection chemicals and subsequent risks of pathogen resistance development. Moreover, versatile designs suggest new avenues for multifunctional crop-protectant formulations, which are also expected to gain popularity in the coming years.

Our center is committed to:

- Promoting interdisciplinary research culture for stimulating innovations in materials research
- Developing new technologies for protecting sustainability of the agriculture industry challenged by emerging threats of plant diseases and unpredictable weather patterns
- Establishing industry-academia collaborations with a strong emphasis on educational and technological knowledge sharing
- Establishing interdisciplinary education and extension programs to support growers in making informed decisions
- Promoting sustainable outcomes by adopting innovative and synergistic approaches through engagement of stakeholders, scientists, engineers, industry partners, and regulatory agencies

The goal of this symposium is to provide a platform that will facilitate interactions between academics, industry partners, growers, and government agencies by engaging participants from diverse expertise. We continue to partner with industry, government, and non-profit organizations to explore new initiatives to solve pressing agricultural problems by taking advantage of new technologies.

MISA 2025 theme: Emerging crop protection technologies and sustainability challenges

We truly appreciate your support for the MISA center and hope to continue this collaboration for years to come! We wish you a successful symposium!

Swadeshmukul Santra

Dr. Swadeshmukul Santra MISA
Director and Program Chair

Organizing Committee

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Acknowledgments

We appreciate the Nanoscience Technology Center and Office of Research and Commercialization from the University of Central Florida for providing financial support for our MISA symposium.

Special thanks to our industry partners

MISA Sponsors/Donors

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And

Estes Citrus Inc.

Keynote Speaker

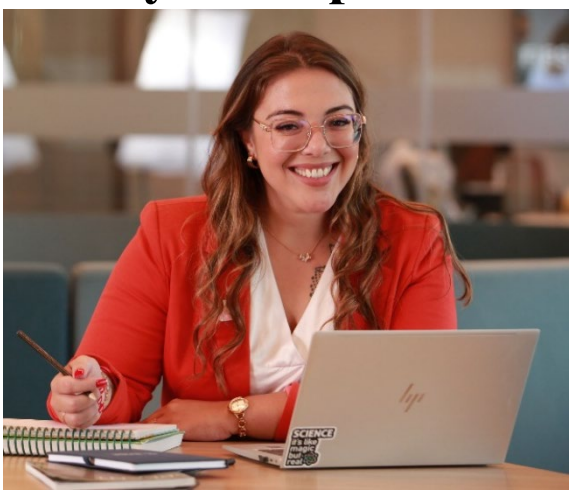
Ariel Singerman, Ph.D.

Associate Professor and Extension Economist
Citrus Research and Education Center, University of Florida

The economics of management strategies to deal with Citrus Greening disease in Florida

Citrus greening, or Huanglongbing (HLB), is a devastating bacterial disease affecting citrus production worldwide. Since the disease was first found in Florida in 2005, orange production statewide has decreased by more than 90%. Over the past two decades, many growers, packinghouses, and processors have struggled to remain profitable and have subsequently existed in the industry, leading to a significant downsizing. Invasive species such as HLB can be more challenging and costly to manage in perennial crops than in annual crops because the damage persists in subsequent seasons. Although public and private funding for HLB research is estimated to have totaled $750 million to date, no cure has yet been found. Scientists have proposed various strategies to try to manage the disease. The economic feasibility of those management strategies is critical for grower profitability. We examine some of the major approaches proposed in recent years — the latest being antibiotic trunk injections — and present the findings.

Keynote Speaker



Leticia Scopel, PhD
Environmental Risk Assessment and Ecotoxicology Specialist
BASF S.A.

Environmental Risk Assessment of Pesticides in Latin America: Current Approaches and Regulatory Perspectives

The presentation will provide an overview of how environmental risk assessment of pesticides is currently conducted in Latin America, with a special focus on Brazil. It will examine the main approaches applied across the region, outline the key environmental studies required for regulatory processes, and discuss the scientific and regulatory frameworks shaping decision-making. The session will also highlight ongoing challenges and opportunities for new developments, illustrating the current scenario in risk evaluation methodologies.

The Tenth Annual Materials Innovation for Sustainable Agriculture Symposium
University of Central Florida, Live Oak Event Center, 4115 Pyxis Lane, Orlando, FL

Thursday, October 23rd

4:00 pm – 8:00 pm: **Registration (Lobby area)**

Session I: Student Mixer (Live Oak Ballroom)

Moderator: Allison Lloyd and Melissa Deinys, University of Central Florida, USA

4:30 pm – 4:40 pm: Session Introduction
4:40 pm – 5:20 pm: Mr. Charles A. Richardson-Gongora, NASA, USA
"*Analytical Chemistry in an Engineering World*"
5:20 pm – 5:50 pm: Dr. Jorge Pereira, University of Central Florida, USA
"*Student success – key considerations*"
5:50 pm – 6:30 pm: Dr. Swaminathan Rajaraman, University of Central Florida, USA
"*My Journey in Commercialization with Axion BioSystems – From the Lab to Marketplace*"
6:30 pm – 8:00 pm: **Networking dinner**
8:00 pm: **Day 1 program Adjourns**

Friday, October 24th

7:30 am – 8:00 am: **Registration (Lobby area)**
Breakfast (Live Oak Ballroom)

Opening Remarks

8:00 am – 8:05 am: Dr. Swadeshmukul Santra, Professor of Chemistry and Director of Materials Innovation for the Sustainable Agriculture (MISA) Center, University of Central Florida, USA
8:05 am – 8:15 am: Dr. Lei Zhai, Professor of Chemistry and Director of NanoScience Technology Center, University of Central Florida, USA

Session II: Agrochemical Formulation for Crop Protection (Live Oak Ballroom)

Moderator: Dr. Swadeshmukul Santra (University of Central Florida, USA)

8:15 am – 8:20 am: Session Introduction
8:20 am – 9:20 am: Dr. Ariel Singerman, University of Florida, USA
"Keynote: The economics of management strategies to deal with Citrus Greening disease in Florida"
9:20 am – 10:05 am: Dr. Tripti Vashisth, University of Florida, USA
Citrus tree health management with plant growth regulators"

10:05 am – 10:50 am: Dr. Lukas Hallman, University of Florida, USA
"Grove-First: Discovering new therapies for managing Citrus Greening disease"

10:50 am – 11:35 pm: Dr. Madhura Kunta, Texas A&M University, USA
"An overview of current and emerging disease threats to citrus production in Texas"

11:35 pm – 12:10 pm: Dr. Jorge Pereira, University of Central Florida, USA
"Development of multi-nutrient formulations for sustainable agriculture"

12:10 pm – 1:15 pm: **Lunch Break and Networking (Live Oak Ballroom)**

1:15 pm – 2:15 pm: **Student Poster Presentation (Live Oak Ballroom)**

Session III: Plant Disease Management (Live Oak Ballroom)

Moderators: Dr. Jorge Pereira (University of Central Florida, USA); Dr. Edwin Davidson (Gatorade/Pepsi-Cola)

2:15 pm – 2:20 pm: Session Introduction

2:20 pm – 3:05 pm: Dr. Fulya Baysal-Gurel, Tennessee State University, USA
"Vascular Streak Dieback in Redbud: A Model for Understanding Emerging Fungal Diseases in Woody Ornamental Nursery Production"

3:05 pm – 3:50 pm: Dr. Gustavo de Almeida Teixeira, University of Idaho, USA
"Current management strategies of potato sprouting"

3:50 pm – 4:05 pm: **Coffee Break**

4:05 pm – 4:50 pm: Dr. Bhabesh Dutta, University of Georgia, USA
Fungicide resistance, mitigation, detection and monitoring in vegetable crops"

4:50 pm – 5:35 pm: Mr. Sam Baker, WriggleBrew
"From an idea to the market: High value organic fertilizer"

5:35 am – 6:35 am: Dr. Leticia Scopel, BASF, Sao Paulo, Brazil
"Keynote: Pesticide environmental risk assessment for Latin America"

6:35 pm – 8:00 pm: **Dinner and Networking (Live Oak Ballroom)**

8:00 pm: **Symposium Adjourns**

Presentation Abstracts

Charles A. Richardson-Gongora

Analytical Chemistry in an Engineering World

A look into analytical chemistry and quality certification for fluids and propellants at the KSC. I will go into what roles non-research chemists play and how we provide support to the various missions and research in aerospace. I will also give a brief overview of our laboratory instruments and analytical capabilities. The LASSOII Chemical Sampling and Analysis Lab provides routine and mission critical sampling and analytical support for NASA and NASA subcontractors at the Kennedy Space Center and USAF and USAF subcontractors at the Cape Canaveral Air Force Station. A variety of sample matrices, including high pressure gases, hypergolic fuels and oxidizers, cryogens, and assorted fluid samples are collected and analyzed to various NASA and military procurement and usage specifications and requirements. Housed in a state-of-the-art facility at Bldg. K6-1696, the Laboratory occupies approximately 25,000 sq. ft. comprised of several separate analytical areas; including Gas, Gas Chromatography/Mass Spectrometry, Elemental, Hypergols, NVR, Particulate, and Wet Laboratories. A wide range of services are performed though the Toxic Vapor Detection Laboratory involving instrument calibrations and repairs, and Material Compatibility and Permeation testing. CSA personnel are highly skilled Chemists, Analysts, and Samplers with varying degrees, certifications, and backgrounds. The group employs over 100 years combined of aerospace chemical and technical experience. The Laboratory is ISO 9001/2008, AS9100:2009, and NADCAP compliant.

Dr. Jorge Pereira
Postdoctoral researcher, MISA, NanoScience Technology Center
University of Central Florida, FL

Student success – key considerations

Student life is a hard endeavor necessary for professional development. There are many ways to undertake student life; therefore, it is essential to define success for yourself. In this presentation, I will recount my experience as a student and what I consider key to my success. Moreover, we will identify important skills and steps toward student success. Concrete goals that will enable you as a student to advance and gain control over your own success. In the same way that goals are important, it is necessary to identify pitfalls that can prevent you from succeeding. Throughout the presentation, several of UCF's resources will be highlighted as tools to be used for reaching goals and work-life balance. All in all, this talk will provide a bird's eye view and key considerations for student success, with a focus on transitioning from PhD into a Postdoctoral researcher.

Development of multi-nutrient formulations for sustainable agriculture

It is estimated that by 2050, there will be a surge in food demand ranging from 30 to 62 percent, due to the increase in global population. It is necessary to accomplish the United Nations' "Zero Hunger" sustainability goal by increasing crop yield and optimizing current agricultural practices. Given that one-fourth of food is lost due to pests and pathogens, it is necessary to improve our methods of crop protection. Nanotechnology has made strides improving active ingredient efficiency and reducing their environmental impact. The field is still in its early days, and most work focuses on early transition metal oxides, leaving most other nutrients and their combinations unexplored. In this presentation, I will introduce two different multinutrient nanosystems for crop protection. The first is Boron-Zinc formulation designed to target the stomata and epidermal cell junctions, areas normally populated by pathogens. Additionally, the material was utilized to target the delivery of oxytetracycline to these areas. The second formulation is composed of secondary macronutrients. It was developed by combining a Magnesium Hydroxide and Sodium Polysulfide

as a tank mix. This project shows how nanotechnology can be used together with registered products to obtain better outcomes. The nanoparticles were thoroughly studied through several characterization techniques, such as DLS, SEM, FTIR, and XRD. Furthermore, they were evaluated for synergic/antagonistic antibiotic activity against model plant pathogens. Afterwards, the physicochemical properties of these formulations were correlated with their biological effects on bacteria and plants to provide a comprehensive picture of their behavior. These results show that multi-nutrient nanoparticle systems exhibit unique properties that can be harnessed for improving crop health management. The formulations developed in this presentation lay the groundwork for a new generation of agrochemicals that possess both nutritional and crop protection capabilities.

Dr. Swaminathan Rajaraman

Assistant Professor, Departments of Materials Science & Engineering, Electrical & Computer Engineering, Biomedical Engineering, Burnett School of Biomedical Sciences, and the Nanoscience Technology Center, University of Central Florida, FL, USA

My Journey in Commercialization with Axion BioSystems – From the Lab to Marketplace

Moving technologies from the lab to the marketplace is the dream of most academics in science and engineering. I was fortunate to experience this journey after my Ph.D. prior to becoming a professor. In this talk I will introduce the story of this Company (Axion BioSystems Inc.) I helped co-found and will talk about my experience with moving technologies from the lab into a commercial success. Axion is a bio instrumentation Company and a world leader in the area of high-throughput electrophysiology. Axion's products have been sold to over 1000 customers worldwide, have recorded more than 6.5 million experiments, 950 peer-reviewed publications (as of 2024) and all are currently in volume production. The Company was further acquired in 2021 by a Swedish Private Equity and also spun out BioCircuit Technologies.

Dr. Tripti Vashisth

Associate Professor of Horticultural Sciences, Citrus Research Education Center, University of Florida/IFAS, USA

Citrus tree health management with plant growth regulators

Huanglongbing (HLB), also known as citrus greening, is a bacterial disease that poses a significant threat to global citrus production. In Florida, citrus growers are grappling with the devastating impact of HLB, which has led to a more than 75% decline in citrus output over the past 15 years. The disease is caused by *Candidatus Liberibacter asiaticus* (CLas), which disrupts phloem function by plugging sieve pores, resulting in impaired vascular transport, root loss, and altered mineral nutrition. These physiological disruptions arrest tree and fruit growth, increase fruit drop, and reduce yield. HLB symptoms include leaf yellowing, blotchy mottling, chlorosis resembling zinc and iron deficiencies, shoot dieback, and stunted tree growth. With no known cure or resistant germplasm, growers face significant challenges in managing infected orchards. Consequently, current management strategies focus on maintaining tree vigor through intensive nutritional programs and the use of plant growth regulators (PGRs). Recent findings indicate that the decline in HLB-affected trees is primarily due to a hormonal imbalance—specifically, a deficiency in growth-promoting hormones such as auxins, gibberellins (GA), and cytokinins, coupled with an overaccumulation of defense-related hormones like salicylic acid (SA) and abscisic acid (ABA). This imbalance leads to delayed bud emergence, compromised leaf and shoot development, increased bud dieback, and reduced canopy density. During leaf development, the elevated ratio of defense to growth hormones suggests a resource trade-off favoring defense overgrowth. To counteract this imbalance, exogenous application of growth-promoting hormones—particularly GA and 2,4-D (a synthetic auxin)—has shown promise in improving canopy density, fruit retention, and overall yield in HLB-affected sweet orange trees. Multi-year field trials have demonstrated that repeated GA applications (September–January) suppress return bloom, enhance vegetative growth, improve source-to-sink dynamics, and boost photosynthetic activity and carbohydrate synthesis. These physiological improvements contribute to better fruit retention and higher yields. As a result of these findings, Florida citrus growers have increasingly adopted PGRs as part of their management strategy. In the absence of a cure for HLB, integrating robust nutritional practices with targeted hormone treatments offers a viable approach to sustaining citrus production by promoting vegetative growth and optimizing source-to-sink relationships in affected trees.

Dr. Lukas Hallman
University of Florida, USA

Grove-First: Discovering New Therapies for Managing Citrus Greening Disease

Citrus greening disease, or huanglongbing (HLB), is the greatest threat to Florida's citrus industry. There is an immediate need to provide relief from HLB and return the industry to profitability. Traditional methods for screening HLB therapeutic molecules rely on laboratory-based assays to identify antimicrobial compounds, followed by greenhouse and multi-year field trials. To accelerate this process, we developed a design-of-experiments (DOE) framework to rapidly screen candidate molecules in fruit-bearing citrus trees using direct trunk injection. Using a drug repurposing strategy, we selected and screened chemistries with regulatory-friendly profiles to support rapid industry adoption. Several compounds demonstrated effects on tree health and yield indices that were comparable to or better than oxytetracycline (OTC) in 9-year-old Valencia trees infected with HLB. These promising chemistries were then advanced into larger-scale field trials with grower collaborators for commercial validation. This new framework, called "Grove-First," reflects the initial evaluation of therapies directly on diseased trees in commercial groves and has significantly accelerated the discovery and testing of new HLB therapies. A USDA-funded citrus grove, managed commercially, is available to research teams worldwide to evaluate new therapies within the Grove-First framework, which protects the intellectual property of participating teams.

Dr. Madhura Kunta
Texas A&M University Kingsville Citrus Center, USA

An overview of current and emerging disease threats to citrus production in Texas

Texas is the third largest citrus producer in the US and the commercial citrus industry in the state is located in the Rio Grande Valley (RGV) in the south. Diseases caused by nematodes, fungi, oomycetes, bacteria, viruses, and viroids affect citrus production in the RGV. Among them, greasy spot, anthracnose, sour orange scab, brown rot, melanose, Phytophthora-induced diseases, gummosis, stem-end rot, cotton root rot, wood rot, and psorosis have been in Texas for several decades while Huanglongbing and sweet orange scab diseases are recent introductions. Additionally, fungal diseases such as dry root rot and lime anthracnose have been recently reported. Rigorous eradication efforts excluded citrus canker from Texas for many decades, but in 2015, the Aw strain of Xanthomonas citri subsp. citri, which has a limited host range, was detected in dooryard Mexican lime trees. In 2016, canker caused by Asiatic strain, which has a wide host range, was detected in dooryard citrus trees in Houston and neighborhood areas, hundreds of miles away from the commercial citrus belt. Both HLB and canker pose significant risks to the Texas fresh citrus fruit market. Citrus tristeza virus (CTV) is very rarely found in RGV but it is widespread in the Upper Gulf Coast region of Texas where strains that can potentially cause decline on sour orange, stem pitting in grapefruit and overcome resistance in trifoliate orange rootstock have been reported. Although the brown citrus aphid, a highly efficient vector of CTV, has not been recorded in the RGV, the predominant use of sour orange rootstock makes citrus production vulnerable to potential outbreaks. Citrus nematodes were reported in 1970s and 1980s to cause slow decline and significant economic losses. However, there is a lack of recent studies evaluating their current status and impact on citrus production in the region. The state-mandated citrus budwood program, managed by TAMUK-Citrus Center, has played a vital role in reducing the incidences of viruses, viroids, and other graft-transmissible pathogens in Texas. Since its inception in 2010, the ongoing areawide psyllid management has played a significant role in limiting the spread and incidence of HLB in commercial groves in the state. On-going surveys and research are also vital and have resulted in the recent discovery of citrus virus A and Nectarine virus M in Texas citrus, and that apple stem grooving (citrus tatterleaf) and citrus concave gum-associated viruses are seed transmitted.

Dr. Fulya Baysal-Gurel
Department of Agricultural Sciences and Engineering, Tennessee State University, USA
Otis L. Ornamental Nursery Research Center, TN, USA

Vascular Streak Dieback in Redbud: A Model for Understanding Emerging Fungal Diseases in Woody Ornamental Nursery Production

Vascular streak dieback (VSD) is an emerging disease of redbud (Cercis spp.) in the Southeastern United States, characterized by leaf scorching, tip dieback, vascular streaking, defoliation, and chlorosis. Although the causal agent has not been conclusively confirmed, *Ceratobasidium* sp. has consistently been detected in symptomatic plants. To better understand cultivar responses and management options, field studies were conducted in Tennessee between 2022-2024. A cultivar screening trial evaluated Eastern redbud, eleven C. canadensis cultivars, and one C. chinensis cultivar under natural VSD pressure. Cultivars with yellow foliage and papery leaf texture were more susceptible, showing symptoms by late May, while cultivars with dark green or purple foliage and thick leaves exhibited delayed symptom expression until late August. No cultivar displayed complete resistance. Foliar nutrient analysis indicated that highly susceptible cultivars had elevated nitrogen, sulfur, and phosphorus but lower boron, iron, and aluminum. In fungicide efficacy trials, symptomatic redbuds were treated with fungicides as drench or foliar application. Foliar application of Astun at 17 fl oz/100 gal, Postiva at 20 fl oz/100 gal and Mural at 7 oz/100 gal in 14-day application intervals were the most effective treatments in reducing leaf scorching severity. These results highlight the threat posed by VSD to redbud production and demonstrate that fungicide applications, combined with informed cultivar selection, can reduce disease impact.

Dr. Gustavo Henrique de Almeida Teixeira
Kimberly Research and Extension Center, University of Idaho, USA

Current management strategies for potato sprouting

Sprouting is a major cause of economic losses in potato storage, leading to quality deterioration through increased water loss, mobilization of starch and proteins, and tissue wilting associated with shoot emergence. Traditionally, sprouting has been managed using cold storage in combination with carbamates, particularly isopropyl-N-(3-chlorophenyl) carbamate (chlorpropham, CIPC). CIPC is widely used because it is highly effective, easy to apply, and can be evenly distributed via thermal fogging. However, regulatory restrictions have progressively limited its use. Since 1996, the U.S. Environmental Protection Agency (EPA) has enforced maximum residue limits (MRLs), and subsequent reductions were introduced by the European Commission (2008), the Health and Safety Executive (2009), Canada, and the United States, setting limits at 10, 15, and 30 mg kg^{-1}, respectively. These restrictions have prompted the search for alternatives. Current options include pre-harvest applications of maleic hydrazide (MH) or post-harvest treatments with compounds such as 1,4-dimethylnaphthalene (1,4-DMN), 3-decen-2-one (SmartBlock®), ethylene (C_2H_4), or essential oils. Physical methods, including irradiation (X-rays, electron beams, or gamma rays), have also been explored, but with limited practical application. Despite these advances, no alternative has matched the broad effectiveness and practicality of CIPC, underscoring the ongoing need for improved sprout suppression strategies in potato storage.

Dr. Bhabesh Dutta
University of Georgia, USA

Fungicide resistance, mitigation, detection and monitoring in vegetable crops

Fungicide resistance is a major limiting factor in the management of fungal diseases in vegetable crops. In this presentation, distribution and prevalence of fungicide resistance will be discussed using *Alternaria brassicicola* (a causal agent of leaf blight and head rot in broccoli)-brassica as a pathosystem. This pathogen can cause significant economic losses to yield and quality. The management has particularly been difficult due to the development of resistance against commonly used fungicides in the Fungicide Resistance Action Committee (FRAC) group 11 (Quinone-outside inhibitor; azoxystrobin) and 7 [succinate dehydrogenase inhibitor (SDHI)] fungicides, which are the mainstay of our fungicide program in broccoli. We observed that commercially infested broccoli seeds can be infested with this pathogen and to make things worse these pathogens are inherently resistant to some of the fungicides in FRAC 11 and 7. We observed that 93% of the *A. brassicicola* isolates from naturally infested commercial broccoli seeds contained a point mutation that confers resistance to two SDHI fungicides (boscalid and penthiopyrad). Furthermore, we developed a PCR-based allele-specific assay for rapid detection and monitoring of fungicide resistance. Our study highlights the importance of seed health testing and potential dissemination of fungicide-resistant isolates locally and globally thus impacting the disease management strategies.

Mr. Sam Baker
WriggleBrew, USA

From an idea to the market: High value organic fertilizer

Translating an idea from the lab (or the dorm) into the competitive agricultural inputs market is a daunting task. This talk will highlight one UCF business - WriggleBrew - which recently navigated this exact task. Founded by undergraduate seniors in 2022, WriggleBrew's journey from campus lab and dorm to industrial production and sales presents a unique blend of information and lessons regarding the trials and tribulations required to break into the fertilizer industry. WriggleBrew uniquely managed to scale from idea to major revenue withohut taking in outside investment, loans or VC - relying entirely on sales, grants and bootstrapping. This talk will also cover aspects of the technical development in creating a new, high performance organic fertilizer, and aims to provide a candid look at WriggleBrew's history as a product, startup, and journey.

Poster Session

Antimicrobial efficiency and characterization of Isoborneal nanoparticles

Sharon Rodriguez, Melissa M. Deinys, Jorge Pereira, and Swadeshmukul Santra

Characterization and assessment of zinc-based fertilizer with nano characteristics on HLB-afflicted citrus

Allison Lloyd, Jorge Pereira, Mike Barry, and Swadeshmukul Santra

Leveraging multi-modality data and GeoAI for environmental hazard sensing and modeling

Weiwei Zhan

Foliar application of nanosilicon: A sustainable innovation for boosting orange tree growth via photosynthetic enhancement

Jonas Pereira de Souza Jr. and Davie Kadyampakeni

Controlled release of plant micronutrient via stimuli-responsive self-assembled polyphenolic nanodelivery system

Ganga Prasad Phuyal, Jorge Pereira, and Swadeshmukul Santra

Environmentally friendly CNCs as nanocarriers for copper-based antimicrobial treatments

Ronit Apsingekar, Bhanu Sharma, Jorge Pereira, and Swadeshmukul Santra

Zein-nanocarriers for the delivery of genetic materials to plants
Preeti Maiti, Jorge Pereira, Edwin Davidson, and Swadeshmukul Santra

Novel application of nickel oxide anodes for electrochemical degradation of microcystin-LR in real world systems
Samuel Adjei-Nimoh, Manuel Alejandro Ramirez-Ubillus, Lei Zhai, and Woo Hyoung Lee

AI-assisted detection and quantification of pesticide residues and disease symptoms in citrus leaves
Giulio Diracca, Melissa M. Deinys, William Bu, Jorge Pereira, Everton Luiz Vieira Aguiliar De Souza, and Swadeshmukul Santra

Near-neutral adjuvant solvents as a sustainable strategy to enhance oxytetracycline stability and efficacy for huanglobing management
Saoussen Ben Abdallah, Melissa M. Deinys, Umar Mohammad, Jorge Pereira, and Swadeshmukul Santra

Microbial fuel cell (MFC)-based *in-situ* water toxicity biosensor for monitoring heavy metals and BTEX
Jong-Hyun Baik, Jae-Hoon Hwang, Keugtae Kim, and Woo Hyoung Lee

Microelectrode analysis of copper release at metal surfaces in chlorinated water using a Cu (II) ion-selective microelectrode
Lance-Nicolas Rances, Keval Patel, Carlos Salazar-Gallupe, Karin Chumbimuni-Torres, and Woo Hyoung Lee

Platinum-Cobalt Nanoparticle as Magnetically Active Peroxidase Mimics for Biosensing Application
Shikuan Shao and Xiaohu Xia